

Imagining the future of library services at University of Cambridge.



Student Learning Journey project

Investigating the experiences of taught students at the
University of Cambridge

Futurelib – September 2018

THE FUTURELIB PROGRAMME

Futurelib is an innovation programme exploring the future role of academic libraries within the University of Cambridge. It employs qualitative research methods and user-centred design techniques to examine the current user experience of libraries and draws on the skills of librarians from around the institution to test new service concepts. Futurelib is funded by Cambridge University Library.

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1. Introduction

Between October 2017 and May 2018, the Futurelib programme conducted an in-depth qualitative research project, investigating the experiences of undergraduate and taught postgraduate students at the University of Cambridge. Besides a focus on these student groups and an emphasis on working with students in the STEM (Science, Technology, Engineering and Medicine) subjects, the brief for the Student Learning Journey project was very broad, which provided an exciting opportunity to conduct a proactive, exploratory study with Cambridge students, with no specific agenda or problem to solve. Since 2014, Futurelib projects have, for the most part, examined specific areas of library service. This project provided us with an opportunity to refresh, and to explore the current experiences, needs, behaviours, approaches, goals and motivations of the students that Cambridge libraries and their services support. During the latter stages of the project there was a focus on student experiences, perceptions and approaches related to academic skills and information literacy, to support work conducted by the CILN (Cambridge Information Literacy Network) initiative, which is working on developing an Information Literacy Framework for Cambridge libraries.

The timing of the Student Learning Journey project meant that we were able to capture data and insights from working with students at key points in their journeys into, and through, their studies in higher education. We worked with students immediately after their transition to Cambridge, who had followed various routes to both undergraduate and taught postgraduate study. We explored students' experiences as they settled in and moved to a more structured and familiar learning experience in Lent Term (January to March 2018). The final phase of our research for the project ended in May 2018, which meant that students were preparing for exams and completing other forms of assessment, such as final year projects and dissertations. We were keen to develop our understanding of the experiences of students who, for Cambridge, would sometimes be considered 'non-traditional' - for example - distance learners, part-time students and students who had returned to higher education after time spent in the workplace pursuing careers.

Our research aimed to uncover insights which can be used to inform the continued activity of Cambridge libraries, specifically the ways in which those libraries and their services support and contribute to the experience of students learning at the University. Keeping an open mind, we worked with students to explore their needs and behaviours, with the intention of learning more in order to continue to provide library services more tailored to the needs of their users.

2. Project planning and set-up

Open invitation session for Cambridge library staff

As well as introducing the project, we knew it would be a valuable exercise to draw on the combined knowledge and expertise of staff from across Cambridge libraries, particularly in terms of their experiences working with and providing support to students. We held an open invitation presentation and workshop session, during which those attending were asked to work collaboratively to produce answers to the following questions:

- “What has been the most interesting thing a student has said to you in the past year, in terms of how our [Cambridge libraries] services are perceived?”
- “What do students know about, and what don’t they know about, in terms of the services we [Cambridge libraries] offer?”
- “How might we better communicate to students the services we do offer (*if you think a change would be desirable*)?”

The input from this session can be found at [Appendix 2](#) of this document, and was invaluable in informing the project and was referred to throughout, particularly during the analysis process.

Recruiting project team

Due to the nature of the project it was vital for us to work with a team made up of library staff from across the University of Cambridge. Specifically, we invited staff whose roles included an emphasis on student services and support, as well as teaching, training and information literacy. We were keen that the project team had strong representation from libraries supporting students in the STEM subjects, but also in the Arts, Humanities and Social Sciences, as well as representation from Cambridge college libraries. Our project team consisted of:

- 5 members of staff from STEM (Science, Technology, Engineering and Medicine) libraries
- 1 member of staff from AHSS (Arts, Humanities and Social Sciences) libraries
- 2 members of staff from Cambridge college libraries
- 1 member of staff from the Reader Services Desk team at the main University Library

Meeting with student representatives

Before commencing our research, we were keen to seek input from individuals who could inform our work, as well as benefit from the resulting outputs and suggested opportunities for library

service design and delivery. These included representatives from Cambridge University Students' Union (CUSU). Our meetings with the CUSU President and Education Sabbatical Officer were both informative and insightful. One outcome of these conversations was an increased focus on working with students who could otherwise potentially be under-represented, specifically BME (Black and Minority Ethnic) students and students who had identified as having a disability.

Research design

The next step was to work together as a project team to develop the research design for the project, both in terms of areas we felt would be valuable to explore with students and potential methods to achieve this. The project team met to brainstorm and to share ideas and experiences; the outputs of this discussion formed the basis for the initial research design for the first stages of the project. Potential methods and areas for exploration, at this stage, included:

Areas for research	Methods
Perceptions and preconceptions	Feedback walls
Transition between stages of study	Comment cards
Experiences of teaching and training	Online questionnaires
Perceived 'skills gaps'	Printed questionnaires
Routes to guidance and advice	Ad-hoc interviews
The student journey	In-depth interviews
Emotions, goals and motivations	Digital diary study

Although we had put considerable shape around the first stages of the project, it was agreed that a suitable approach would be to revisit intended methodologies and related aspects of research design in December 2017, i.e. before the next distinct phase of the project.

Observation of library teaching sessions

As the project would focus to an extent on information literacy and academic skills, it seemed sensible to attend and observe teaching and training sessions conducted by various libraries in different Cambridge departments and faculties. This provided us with an opportunity to begin to immerse ourselves in some aspects of the Cambridge student experience which we would be researching.

3. Methodology (Research Phase I)

The time allocated to complete this project meant that we were able to conduct two distinct phases of research, with analysis of data gathered during the first phase informing further research during the second phase. It was decided that during the first phase of the project we would take a very broad, open approach to the conversations we had with students and to the design and construction of the research mechanisms we used. The project team started to refer to this as the ‘canvassing’ stage. The methods we used during this phase reflected this approach; they were easily deployed and allowed us to capture the experiences and opinions of a relatively large number of students in a short amount of time. Methods included: contextual interviews with students in and outside of library spaces; short questionnaires (printed and online); feedback walls; and comment cards. Mechanisms such as feedback walls and comment cards provided us with valuable background data (i.e. short but numerous responses), which could be compared with the deeper, qualitative data gained through, for example, in-person interviews.

The questions we asked students during this phase of the project, in the various ways outlined above, included:

- “What do you enjoy most about studying at Cambridge?”
- “What do you find most frustrating about studying at Cambridge?”
- “What did you think studying at Cambridge would be like before you started your course, and how has this changed?”
- “What has been the main difference between your teaching and learning at Cambridge and your previous education?”
- “What has been the most surprising thing about studying at Cambridge so far?”
- “What has been the most challenging thing about studying at Cambridge so far?”
- “What digital tools do you use to support your studies?”

Project team members who worked in STEM libraries and libraries in colleges with a large number of STEM students were instrumental in ensuring that we were able to work with these students at this stage of our research. Due to the teaching- and lab-intensive nature of many of the STEM programmes, it is often difficult to work with these students in person; having access to relevant college and department buildings meant that we were able to conduct a number of face-to-face interviews with STEM students, which was invaluable in informing the project as a whole.



[The Department of Materials Science and Metallurgy, where we conducted research with students]

Workshop with BME students

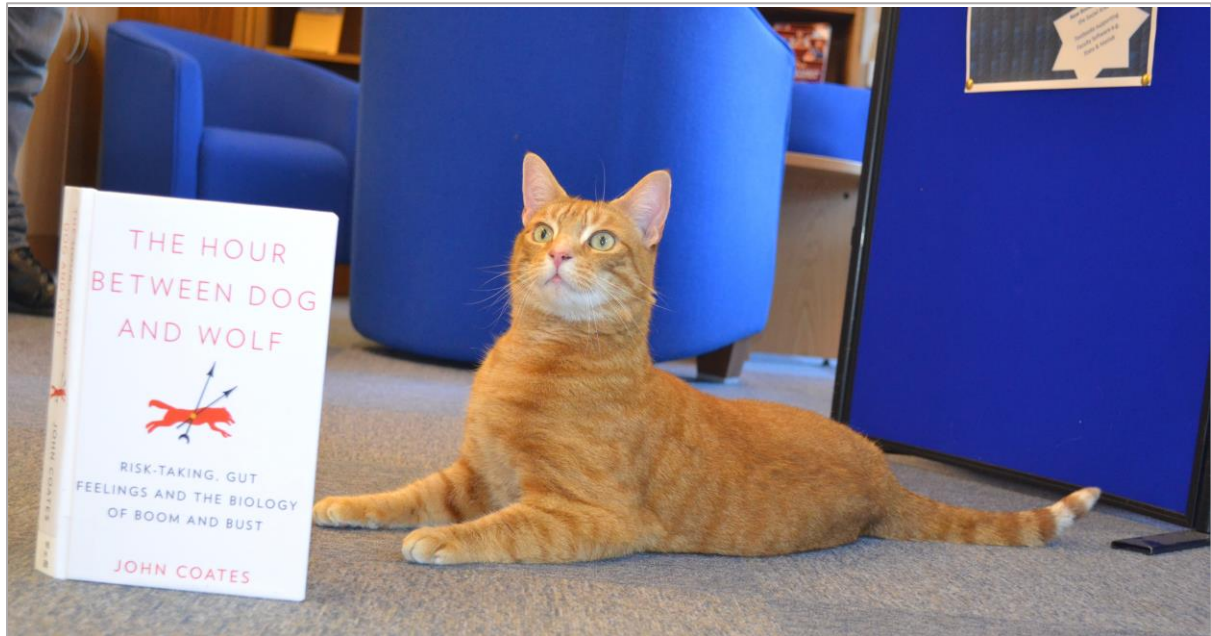
In addition to the research described above, in the first phase of the project we conducted a workshop organised with Cambridge University Students' Union. We specifically invited BME students to attend, as we wanted to capture the voices and experiences of student communities who may otherwise have been under-represented in our work. The workshop was conducted with seven participants and was activity-based, with one of the exercises involving students brainstorming their thoughts and reflections in response to the following two questions:

- "What do you enjoy most about studying at Cambridge?"
- "What do you find most frustrating about studying at Cambridge?"

Jasper, the Marshall Library cat

An opportunity to work with a large number of students from a variety of disciplines presented itself in a slightly unusual way during the early stages of our project. The Marshall Library of the University of Cambridge Economics Faculty is a sometime home to a three-legged cat, Jasper, who has become of both local and national interest. The Marshall Library team had previously introduced Jasper to students during significant points in the academic year, such as exam time, and did so again during

the first stages of our project. As Jasper attracts students from across disciplines and stages of study, we took this opportunity to ask students to help with our research by filling out short comment cards and printed questionnaires while they waited to see the famous cat.



[Above: Jasper posing during a previous event. Photo credit: Marshall Library, University of Cambridge]

4. Interim Analysis

After we had completed the first phase of our research we worked together as a project team to analyse and group into themes the data gathered so far, which fed into the development of the research design for the second phase of the project. At this stage, we had uncovered some insights into Cambridge student activity, along with some tentative ideas around how we might, as Cambridge libraries, be able to better tailor our services to the needs of those students. We were, however, keen to further explore certain areas and gather more data which could be used to corroborate and question what we had learnt at this stage. Some of the insights and areas of interest at this point included:

- The importance students placed on the relationships they had with peers, academic staff and other individuals.
- The experiences students had when transitioning to higher education, or to taught postgraduate level study, and how they reflected on this.
- The fact that students had often received little information prior to arriving at the University and that, particularly in the case of taught postgraduate students, many would have

appreciated having received more information about aspects of their programmes such as their course structure, to help them ‘hit the ground running’.

- A strong focus from students, particularly undergraduates, on the importance of wellbeing and on a positive, reflective approach to study, as well as on related aspects of their studies such as time management and planning ahead.
- Many students expressed frustration at the different digital tools and products provided by the University, which they often saw as unintuitive and decentralised and therefore damaging to their productivity.
- A lack of awareness on the part of students in terms of opportunities for training, guidance and support with their study and research skills.
- Many students talked about the importance of working in a way that has previously been described by Futurelib as ‘alone-together’, i.e. working with other students, not on the same assignment but with the opportunity to talk to each other about their work.

From these initial insights, we arrived at a number of areas that we wished to focus on and explore further during the second phase of our research. These included:

- Experiences and practices on the part of students, related to their use of digital, including the tools, platforms and environments they used for different purposes, during their studies and at the University.
- The relationships Cambridge students have with peers, academic staff and others, and how these inform student working approaches and practices.
- The ways in which student perceptions and approaches change over the course of their studies at the University, including the perceptions they have of Cambridge libraries and their services.
- Student experiences of communication with and from the University.
- Student approaches to seeking advice, guidance and training, particularly in terms of the underlying academics skills and practices that support their learning.

5. Methodology (Research Phase II)

Digital diary study

During the second phase of our research (January to May 2018), we concentrated on trying to uncover deeper insights which would supplement the data gathered during the first phase of the project. Research methods during this second phase included a three-week digital diary study, conducted with 36 undergraduate and taught postgraduate students from a range of disciplines. 11

of these students were interviewed in depth after they had completed the study, allowing us to further explore their needs, behaviours, goals, motivations and experiences of studying and learning at Cambridge. Our diary study participants included students at different stages of undergraduate and taught postgraduate study and from a variety of course programmes, in the following subjects:

Chemical Engineering	Clinical Medicine	Computer Science
Conservation Leadership	Education	Engineering
Geography	Health, Medicine and Society	History
Land Economy	Law	Management Studies
Mathematics	Medicine	Modern and Medieval Languages
Natural Sciences	Primary Care	Psychology
Public Health	Theology	

Representative of the focus of the project, the sample of participants in our diary study was weighted towards the STEM disciplines as well as towards taught postgraduate students. We made efforts to recruit participants who were taking applied taught postgraduate courses and studying part-time; examples above include MPhil Engineers, PGCE students and MPhil students in the Department of Public Health and Primary Care. Recruiting participants for these in-depth exercises is always challenging, but thanks to efforts from staff across Cambridge libraries and also from the Cambridge University Students' Union, we were able to find a useful and varied sample of 36 student participants for our study. Each student who completed the study, having made a minimum of 21 diary entries over a period of 21 days, received a £25 shopping voucher as a reward.

Each student who participated in our diary study attended an in-person briefing session, during which they registered for the study using the mobile app 'dScout' (<http://dscout.com>) and were briefed in terms of when we wanted them to make diary entries. Participants were encouraged to make as many entries as they could over the course of three weeks, as close to study 'events' as possible, for example directly after a supervision, lab or lecture, or during lone, self-directed study or group work activities. The students who took part were encouraged to be as reflective as possible throughout the diary study and it was emphasised that the more data they provided, the more we would be able to do to develop and tailor Cambridge library services to meet their needs and the needs of other Cambridge students.

Each diary entry took students only a few minutes to complete and followed the structure below.

[1. Checkpoint - students received the following message on screen:]

“Hi there! Get ready to tell us a bit about what you’re up to now. Next, you’ll be asked to upload a photo or video which shows us the task you’re currently completing.”

[2. Media content – students received the following message on screen, then uploaded photo or video content:]

“Upload a photo or video here that would really help someone who doesn’t know you understand what this moment is about.”

[3. Open ended question – students received the following message on screen, which they responded to in a free text field:]

“In detail... Tell us a bit more about your current study activity or task.

Describe this study activity. Why did you choose now to approach or complete it?

What are you hoping to achieve?”

[4. Open ended question – students received the following message on screen, which they responded to in a free text field:]

“How is this study activity or task going / did it go? How has approaching or completing this study task made you feel?”

[5. Open ended question – students received the following message on screen, which they responded to in a free text field:]

“In detail... Are there any areas in which you feel/felt under-skilled, or under-prepared while completing this study task?

(We’re particularly interested here in your ‘study skills’, i.e. not academic knowledge but things like planning, time management, essay/report writing, finding the right resources, etc.)”

[6. Quantitative scale question – students received the following message on screen, which prompted them to move a sliding scale to the relevant number:]

“How prepared did/do you feel for this task? (1 = not prepared at all, 10 = extremely prepared)”

[7. Open ended question – students received the following message on screen, which they responded to in a free text field:]

“Is there anything else you want to tell us at the moment?”

We tested preliminary iterations of the diary study structure with students and with library staff; the feedback we received informed its final construction. It was decided that we would retain the quantitative sliding scale measure to give each entry context and to keep participants engaged. The most difficult question to construct was question 5, with which we wanted to encourage students to reflect on their academic skills and practices. It was impossible to elicit appropriate responses without providing examples, and this will, to an extent, have informed student answers to the question. Analysis of the responses to this question showed that, although some responses seemed to be informed by the examples given in the question, student participants regularly used this opportunity to focus on aspects of their studies that were not mentioned by us in the question.

Our diary study participants together made over 600 individual entries, each containing media content, along with three or four qualitative responses and one quantitative response. The data this yielded proved invaluable in informing the project as a whole and particularly our findings and insights to do with Cambridge student experiences, perceptions and practices related to information literacy.

We selected 11 of our participants to interview in depth after they had completed the three-week diary study. We used this opportunity to ask students follow-up questions about aspects of their diaries which were of interest. This was done at the end of a semi-structured interview which lasted around an hour. Interview questions were focused around a number of themes, including:

- Study routine and activity
- The student journey (how student experiences and approaches change over time)
- Goals and motivations
- Use of data and information
- Academic skills
- Perceptions of Cambridge libraries
- Students' relationships with peers, academics and others

Alongside the diary study and follow-up interviews we utilised a number of other methods during the second phase of our research for the project. We continued to conduct ad hoc, contextual interviews with students in various University locations. We also used shorter, activity-based methods to explore specific areas which had become of particular interest after analysing the data from the first phase of the project.

Card sorting

We were interested in finding out more about the routes and approaches students took when they felt in need of further advice, guidance or instruction in various areas. We decided to repurpose a User eXperience (UX) technique, card sorting, which is often used to inform aspects of website design, particularly how web content is structured. The technique involves participants working with two sets of printed cards, moving cards from one set into categories listed on another set of cards. For our purposes, we asked students to place cards showing different 'study skills' close to cards which showed potential avenues for advice and guidance in these areas. Our student participants were asked which of the routes listed on the second set of cards they thought they would be most likely to take if they needed further guidance with the aspects of their studies listed on the first set of cards, or indeed, which routes they had taken in the past. The cards we used were as follows, partly informed by data gathered from students in the first phase of the project and partly by our pre-existing knowledge. We included blank cards to give students the option to add their own cards to the second set:

<u>Study Skills</u>		<u>Guidance and Advice</u>
Essay writing	Data visualisation	Peers
Working with and managing research data	Report writing	Course Administrator
Presentation skills	Searching for printed resources	Library
Managing references	Time management	Supervisor
Using online databases	CV writing	Careers Service
Evaluating academic sources	Academic writing	Director of Studies
Job application and interview skills	Reading for academic purposes	Course Director
Formatting assignments	Searching for online resources	Tutor
Using and referencing audio visual materials	Note taking	Academic Skills Tutor
Interview skills (e.g. for social science research)	Dissertation skills	Moodle/online learning environment
Using statistical packages	Using specific software for academic purposes	Google
Poster design	Data analysis	[Left blank for you to fill in]
Essay/report planning	Producing lab reports	[Left blank for you to fill in]

We found the card sorting exercise to be an extremely useful way of exploring the routes students took when seeking guidance and advice with various aspects of their studies. The fact that the exercise involved participants concentrating on and interacting with physical objects seemed to put them at ease and make them more comfortable in talking about their experiences and approaches. The exercise was largely qualitative; we asked students to talk as they worked, explaining in as much detail as possible why they would choose an individual figure, University department or other route if they felt they needed further advice or guidance in a certain area. This led to valuable insights in terms of student approaches to seeking support in these aspects of their studies, which fed in to the final analysis and findings for the project.

It was decided not to include a quantitative breakdown of how many times students moved cards from one set to the other. This was mainly due to the following factors:

- We worked with students from a wide range of disciplines; many felt that specific cards in the first set did not apply to their studies at the University, so did not use these during the exercise.
- Discrepancies in terms of individual student circumstances and experiences detracted from the potential to usefully compare the data. For example, some students were at Cambridge colleges with a designated 'Study Skills Tutor', which had a large impact on their responses.



[Above: Conducting the card sorting exercise with a student at the Law Faculty]

Student evaluation of library teaching session descriptions

An area which we were keen to explore with students was the ways in which they responded to promotion and communication from libraries, as well as from other areas of the University. We were interested in how students interpreted and responded to information used to promote teaching sessions offered by libraries. In order to achieve this, we decided to use a method which had previously been developed by staff at the Cambridge Department of Engineering Library. We took various instances of titles and short descriptions of library teaching sessions, all of which could be found by students on University of Cambridge web pages. We gave our student participants time to read these descriptions and then asked them the following questions:

- Which parts of the text did you understand intuitively?
- Which parts of the text did you not understand, or find confusing?
- How would you reword the text, so that it would make sense to students reading it?

The findings from this research fed into the analysis, findings and suggestions for service design for the project. Key insights from the exercise included:

- The importance of brevity: students often mentioned that they would be unlikely to read lengthy and dense descriptions. This also applied to subjects of emails, and so on.
- An emphasis on careful consideration of words used to describe teaching sessions. A specific issue here was that for students who did not have English as a first language, colloquialisms and instances of culturally-specific terminology were not understood.
- A preference for plain language: students suggested that libraries should resist the temptation to make descriptions too exciting.
- The importance of not assuming a level of pre-existing knowledge; this applied to instances where, for example, locations at the University were given without enough explanation for students who had not been there before, and where acronyms and complicated terminology were used without sufficient explanation or context.

Workshop with disabled students

We worked with the Cambridge University Students' Union again in Easter Term 2018, this time working with the Disabled Students' Officer to host an activity-based workshop to which we invited students who had identified as having a disability. The format was very similar to the workshop we

conducted with BME students during the first phase of the project, with a number of activities, included a brainstorming session based on the following questions:

- “What do you enjoy most about studying at Cambridge?”
- “What do you find most frustrating about studying at Cambridge?”

As this workshop took place during Easter Term we were aware that the conversations we had and the outputs the workshop produced would be influenced to an extent by the fact that the participants were, or would soon be, sitting exams. There was indeed a focus on the ways in which aspects of this had an effect on their lives studying at the University, but we were also able to explore other areas of the Cambridge student experience with those who participated.

The timing of our workshop also meant that few students were able to attend, but the conversations amongst the five student participants present added valuable data and insights to the project as a whole.

6. Analysis of Project Data

Traditionally, the Futurelib programme has taken a primarily analogue approach to data analysis. This is partly due to the fact that during our shorter, targeted design research projects we looked for quick insights to inform specific aspects of library service design and delivery. The scope and breadth of this project meant that we were working with large, qualitative data sets, including the data gathered during our diary study and from the in-depth interviews we conducted with students.

The decision was taken to approach aspects of our analysis work for the project digitally, using the qualitative analysis software NVivo ([qrsinternational.com/nvivo](https://www.qrsinternational.com/nvivo)). This allowed us to code, categorise and theme data from the various sources we had gathered and to manage, interrogate and query these sources and data sets at the same time. The initial coding of the data took time, as the project team worked together to create, question, revise and reiterate our coding schema for the project. When this work had been completed, we were able to work with our qualitative data in a sophisticated way, asking specific questions of it and producing reports quickly. Another advantage was that we were able to search these documents and data sets together for specific instances of words or phrases, rather than having to run the same search multiple times.

Our approach to analysis will always reflect the task at hand, but the decision to use digital tools for the purposes of this project validated itself through the ease with which we were able to query the data in the latter stages of our analysis and reporting.

7. The Student Journey

7.1. Pre-arrival and transition

For those starting undergraduate or taught postgraduate study at Cambridge, the journey begins well before the point of arriving at the University. Students come to Cambridge with expectations about how various aspects of their studies and learning will take place. These expectations can be based on a number of factors, including previous experiences students have had in education, perceptions of the University based on information from a variety of sources (including peers, staff at schools and colleges, and the media) as well as other assumptions based in little but the name 'Cambridge'. How these expectations compare with the experiences students have on arrival at the University can be an important factor in terms of how students approach and manage the early stages of life at Cambridge. We found that when the reality differed from the experience students expected, it could be confusing and sometimes frustrating for them. We had the opportunity during Michaelmas Term 2017 to talk to students who had just arrived at Cambridge about this experience:

- "The transition was difficult – for the first five weeks or so it's a difficult style of study. At A Level you just had to memorise the answers, here you have to study more." (1st year undergraduate Natural Sciences student)
- "I feel quite prepared for the essay writing. I think what has been the most difficult is the speed of the language learning. I don't know if there could be more support for that type of thing. You know, it just goes so quickly and then you feel like you haven't fully caught up with it." (1st year undergraduate Theology student)

For students who had had the opportunity to talk to people who had previously studied at Cambridge before arriving, or who had been able to do a certain amount of preliminary research, expectations were more aligned to the reality of the first weeks at Cambridge and the experience of transitioning to University study was less of a shock:

- "I knew what it would be like – everybody says 'First year Nat Scis, you spend all your time doing things.'" (1st year undergraduate Natural Sciences student)
- "[I expected that studying at Cambridge would be] hard work, intellectually stimulating, lots of reading. All of this turned out to be true but so far much more manageable than I expected. As a result of the large workload no one can expect perfection in essays." (1st year undergraduate English student)

Our taught postgraduate student participants had arrived at Cambridge following a number of different routes. Many were from overseas, with a variety of cultural and academic experiences. Some had returned to study from the workplace, while others were enrolled in applied taught postgraduate courses after completing PhDs or working as researchers, in order to be able to pursue different career paths and apply their knowledge and experience in specific contexts. For these students, the differences between aspects of taught study at Cambridge and their previous experiences could be surprising and occasionally unsettling:

- “Coming from a field where a lot of it is self-directed (the programme I’m based in in [home country] is almost entirely problem-based, self-directed learning), it has been a bit hard for me to sit down in a lecture, two lectures a day, and focus.” (MPhil Primary Care student)
- “I was surprised by the grading system – in the States I was aiming for 100%! I had heard it was different here, but I was still shocked when I first experienced it!” (MPhil Finance student)

Some students we worked with almost immediately saw the value of the style of teaching and learning they experienced at Cambridge. This was mainly in terms of the close nature of teaching, i.e. the opportunity to work one-to-one and in small groups with supervisors, with PhD students in labs, and with other academic staff:

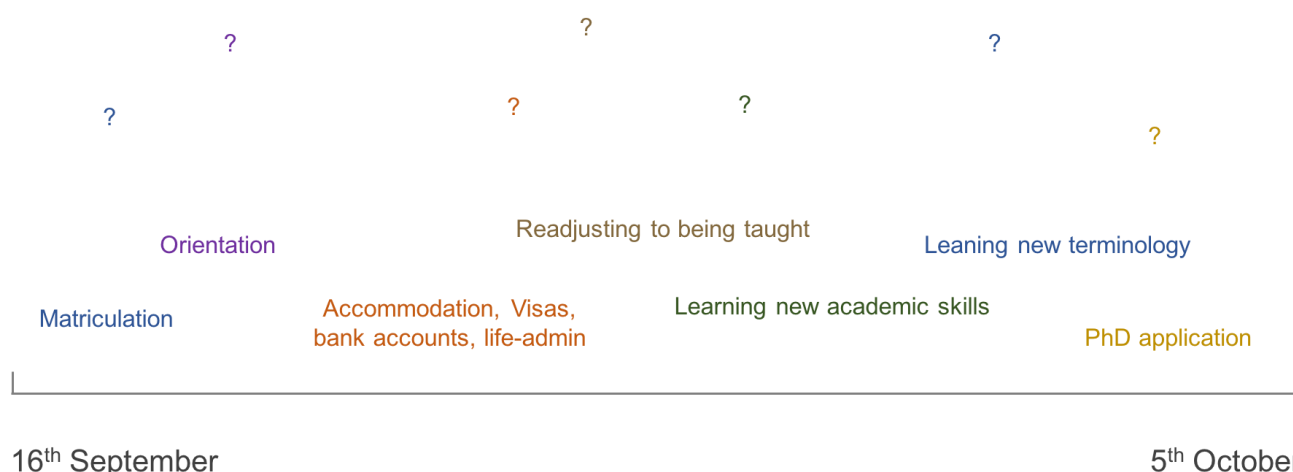
- “I’ve learnt more from practicals than I previously thought I would. You don’t learn anything from them in school – they’re just hoops you have to jump through. It’s great here – you’ll have about 50 people working on six tables. There are about six people supervising, with one leading the session. It’s a good opportunity to work with PhD students, with a practical focus.” (1st year undergraduate Natural Sciences student)
- “I thought there would be more lectures – I’m learning more from supervision work.” (1st year undergraduate Economics student)
- “The lectures are OK and very interesting but they’re very big groups. I’ve learnt more from supervisions because they go beyond your own subject. I also enjoy the immersion in the subjects being taught.” (1st year undergraduate Natural Sciences student)

Some of our student participants, particularly those arriving at Cambridge to study one-year taught postgraduate course programmes, specifically mentioned that they would have appreciated receiving more information from the University prior to arriving at Cambridge. These students were aware of the relatively short time they would have to maximise the opportunities studying at Cambridge would provide, and were keen to learn as much as possible before arriving, in order to be able to hit the ground running.

- “During the summer [...] it would have been nice if I had, at least the syllabus, and had an idea of what I was supposed to do, so I could have mentally prepared myself for the next year, which I didn’t really have until two or three weeks before the course started. ‘This is the stuff the lecturer will produce’, ‘This is the grade that will get you a distinction’, things like that.” (MPhil Public Health student)

Being informed from an early stage about what their teaching and learning will look like and what might be expected of them can be extremely beneficial to students, potentially having a positive effect on their confidence and wellbeing in the initial stages of their studies at Cambridge. Students we worked with appreciated opportunities to plan and prepare themselves mentally for upcoming work, which was only possible when this information was available to them at the appropriate time. Cambridge libraries are currently focusing efforts and resource in this area with the development of CamGuides, an open educational resource which will be promoted to taught postgraduate students prior to their arrival at Cambridge, detailing some of the key ‘Graduate Information and Digital Essentials’ they will need whilst studying at the University.

The timeline above gives an impression of the activity which taught postgraduate students are tasked with completing during the first few weeks of studying at Cambridge. Often, alongside University commitments, students have to organise and complete tasks in various other areas of their lives. This can particularly be the case for students arriving at Cambridge from overseas. During this project and in previous research, we worked with taught postgraduate students who, due to



funding considerations, were having to complete applications for PhDs at this very early stage in their studies, which provided an added source of work and stress. The question marks in the diagram represent the activities which will be taking place for each student in addition to those listed, but which we as Cambridge libraries may know little or nothing about. This knowledge of the intensity of

the initial stages of study for these students at Cambridge should inform the ways in which we develop our services, as well as how we communicate and work with students.

7.2. Student perceptions of Cambridge libraries

Along with other aspects of the ways in which they will study and learn at the University, student perceptions and expectations of Cambridge libraries, the services they offer and the nature of the collegiate University library system, can differ greatly for individuals, prior to and on arriving at the University. This is particularly the case for those who are attending Cambridge for one-year taught postgraduate programmes of study, students who often come to the University from different academic, social and cultural backgrounds. The unique nature of the Cambridge academic system, including the ways in which its libraries work together, can be confusing to students who may have had very different experiences in other higher education institutions.

Students attending Cambridge for relatively short taught postgraduate programmes of study do not have the same time to adapt and to learn the system as students who study at Cambridge for three or more years. The taught postgraduate students we worked with were often surprised and perplexed by aspects of the Cambridge library system when they arrived at the University, often having had little introduction to or information about Cambridge library services before this point. These perceptions and reactions on the part of these students were partly due to experiences of library services at other higher education institutions, both in and outside of the UK.

- “Why the libraries don’t help each other out and cross-loan books [...] is bizarre to me.”
(MPhil Public Health student)
- “I remember, we had some small group work, with people [at named Cambridge college], so [the students at named College] said ‘Oh, why don’t you join us’ [...] and we were in a room in the library, and then someone came and checked, so they kicked me out and I felt so embarrassed [...] I mean if it’s really busy of course, I understand [...] but it wasn’t the case.”
(MPhil student, name of course programme removed)

Although aspects of how Cambridge libraries operate were confusing to some of our participants, what was clear was that they were almost instantly aware of the abundance and depth of library resources available to them, in terms of spaces, collections and expertise.

Students who had come to understand the complexities of the Cambridge library system and the extent of the resources, services and expertise available to them, often viewed these in a very positive light, particularly when they saw the benefits the libraries available to them could provide,

at college-, department-, faculty- and University-level. It is of utmost importance that Cambridge libraries make students aware at every possibly stage of these benefits, and introduce students to the value of these aspects and nuances of Cambridge library services as early as possible.

7.3. Changes over time at Cambridge

We worked with students from a wide variety of disciplines, across the STEM (Science, Technology, Engineering and Medicine) and AHSS (Arts, Humanities and Social Sciences) subjects. Aspects of how these students were taught and studied at the University were very different across course programmes. For some, there was little change in terms of the levels of contact time and self-directed study they experienced over the time they spent at Cambridge, particularly for our taught postgraduate students and for undergraduate students in disciplines such as the Natural Sciences. For others, including many of our undergraduate AHSS student participants, the ways in which they were expected to study and produce in the latter stages of their degree were markedly different to their experiences in the initial stages.

Our student participants valued the opportunities they had to specialise and pursue their own interests as they progressed through their course. This opportunity to engage with areas of their discipline which they were most interested in was seen as exciting, and as a reward, after the time they had spent studying many different areas in a relatively low level of depth and at a rapid pace.

- “The whole experience in the third year was much better. The third year was more specific and to do with the day-to-day. It was relevant so I attended more. Dissertation supervisions were much better [than my previous supervisions] – more intellectually challenging.”
(recently graduated undergraduate History student)
- “Part III is particularly fast-paced, lectures go very fast. You’re expected to do all of your own work, lots of self-teaching.” (4th year undergraduate Mathematics student)
- “The lab time is much more self-directed in the fourth year, you’re doing your own work rather than it being a ‘teaching lab’, with everyone being set the same experiments to complete.” (4th year undergraduate Natural Sciences student)
- “It’s a lot more specialised this year, some of it is very niche. I’m really enjoying it – I get a lot more out of it – critical thought, more high-level discussions. There’s a real chance to focus in.” (3rd year undergraduate Human, Social and Political Science student)

Some students we worked with mentioned that they had only come to realise the value of the way their teaching had been approached as they neared the end of their degree programmes. For these students there seemed to have been a moment when things ‘gelled’ and they realised that their

course programme and structure had given them both the ability to cover a breadth of areas within their discipline and the opportunity to spend time specialising in areas they were particularly interested in.

- “When I started I didn’t want to take all the modules as it seemed too broad and I knew I wasn’t going to end up taking a lot of it further. Now though, I’m amazed that we’ve basically covered the history of English literature in three years and I’m really glad to have the knowledge.” (3rd year undergraduate English student)

Students we spoke to in the latter stages of their undergraduate degrees mentioned that they felt more a part of the academic discourse and discussion in their chosen area of study. They were aware of the unique opportunity they had to work and engage with academics who were leaders in their fields, and that their ideas and outputs were receiving attention from these individuals in a different way to during their previous undergraduate studies.

- “At this stage you get enthusiasm from interested supervisors. If you work hard at it supervisors do take stuff seriously – they might write a book on it the following year!” (3rd year undergraduate Human, Social and Political Science student)

A key issue mentioned by students we worked with was the necessity for Cambridge students to learn how to accept that they would not be able to study and produce work in the same way they had been able to during their previous education. Students often made comments along the following lines:

- “It has taken a lot of effort to feel OK with being behind.” (4th year undergraduate Natural Sciences student)

Across the course of the project we asked our student participants to tell us what one piece of advice they would give a student just about to start their course. Many of the responses to this question were related to being realistic around workload and learning to accept the fact that it would be impossible to read everything set by supervisors and academics and to produce each assignment to a polished extent:

- “Don’t worry about the whole reading list. No one can understand Middle English until they’ve been taught to read it. Critical theory is meant to be confusing.” (1st year undergraduate English student)

- “Don’t worry if you can’t do all the questions, 60% is fine. [The feeling that you have to complete everything] lasts for a term, maybe two.” (2nd year undergraduate Natural Sciences student)
- “Don’t be intimidated by work, it’s often easier than you think. Don’t be afraid to leave parts unfinished, work should benefit you, not prove how clever/diligent you are.” (3rd year undergraduate Computer Science student)
- “Be ruthless in cutting out what you don’t need to learn – you need to organise and use your time more effectively. Look at past exam papers and study based on the questions that actually come up. Don’t carry the A Level mind-set that you need to learn everything.” (5th year undergraduate Medicine student)

It had often not taken long for students to be aware of and reflect on this aspect of their studies at Cambridge. It is, however, the case that very few students arrive at Cambridge with this mentality; almost all students we spoke to mentioned that at the start of the course they had felt pressure to produce and achieve in a way which they later realised could not be expected of them.

7.4. Added work

Many of the students we worked with across the course of the project mentioned that they had ‘extra’ compulsory modules and activities which, for various reasons, they had to complete alongside the other aspects of their curriculum. This could be due to having arrived at Cambridge having completed undergraduate study at another institution, having not completed study in certain subjects prior to arriving at Cambridge or because they wanted to follow a particular route through their course programme. These extra subjects were, in some cases, taught and assessed in a similar way to the other papers students were taking, on a similar cycle. This had a pronounced effect on aspects of students’ lives at Cambridge, including the ways in which they approached managing their time and mental efforts.

- “Students who come to the MPhil from outside of Cambridge have to do some of the Cambridge undergraduate modules first.” (MPhil Modern and Medieval Languages student)
- “I’m also learning Greek, so I have to kind of fit that in – we have a test every Monday, sometimes there’s a list of 30 odd words, sometimes it’s grammar that we’re memorising. So I kind of have to fit that in between my reading.” (1st year undergraduate Theology student)

These activities can sometimes clash with other scheduled study events in student timetables. This can lead to students feeling anxious and overwhelmed, as they are unsure how to prioritise these different learning opportunities.

8. Goals and Motivations

A strong focus over the course of the Student Learning Journey project was on talking to students about what they hoped to achieve during, and after, their time at Cambridge. Responses were many and varied, informed by aspects such as length and nature of course programme, stage of study, and student goals and ambitions beyond their current degree course. Although these goals and motivations were different for each individual, there were themes related to what students hoped to achieve through, and gain from, the experiences and opportunities they had whilst studying at the University.

8.1. Transferrable skills

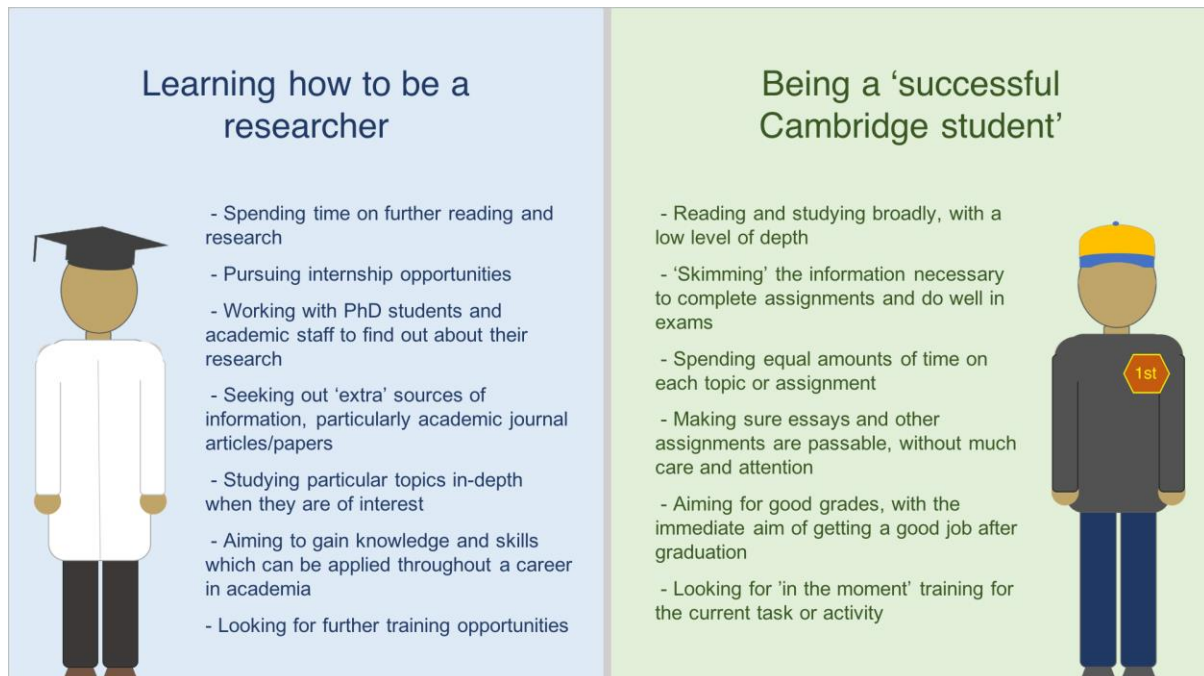
Our student participants talked about developing skills and practices whilst at Cambridge, which they could apply beyond their degree, in the 'real world'. This was often the case for students in the latter stages of undergraduate study or undertaking taught postgraduate study, particularly in more applied subjects and degree programmes. Students who knew that they would, for the time being, not be pursuing further study or careers within higher education were often looking for knowledge and experience which could be applied outside of academia.

- "The course means that we're always doing something different [...] We're working with people in different areas of industry. [...] What we're doing in the course is very like what we'd be doing working in companies." (MPhil Engineering student)
- "I see this programme in general as being entirely pragmatic. That's really why I'm here – to take as many skills as I possibly can out of it." (MPhil Public Health student)
- "The breadth of the degree teaches you so many valuable skills. English is applicable to anything." (3rd year undergraduate English student)

8.2. The student-researcher conflict

We noticed an interesting phenomenon which was present for many of the students we worked with, particularly those who were keen on pursuing further study and careers in academia, most notably amongst STEM undergraduate students. These students mentioned that there was a tension for them in terms of understanding that they needed to absorb and learn the information necessary

to pass their exams, often studying a wide range of subjects at a relatively low level of depth, but also wanting to research areas which were of interest to them in more detail, and learn practices and skills which would be necessary to pursue further study and potentially careers within academia.



- “My current, sort of, main goal, is to become a good researcher and to go into academia, at least to try it out. [...] Becoming a good researcher, a good scientist, is fairly far from getting good results in exams. There is a little bit of overlap between the two worlds, but it’s not really that much. But, at the same time, to keep continuing, and going to [...] higher education, you do need those results.” (2nd year undergraduate Natural Sciences student)
- For PhD-relevant research skills, the main component developing those is the project next year [...] where you're working with a PhD student on a subset of their own project, and [...] you take a bit of their workload, develop both the practical and research skills, and ultimately provide them hopefully with something useful which will give them a bit of a boost. And that's a good taste for working in a lab environment, because it's hopefully - you can choose the project you work on, directly relevant to what you might go and do a PhD in.” (3rd year undergraduate Natural Sciences student)

The ways in which students approach their learning at Cambridge can be informed to a great extent by what they are hoping to achieve and take with them after completing their studies at the University. These different goals have direct implications for students needs and activities related to

their use of information, as well as their attitudes towards developing information-related skills and practices that can be applied in research, or outside of academia.

9. Welfare and Wellbeing

During almost all of the work we conduct with students, regardless of the primary area of research, analysis of the data gathered raises themes around welfare, wellbeing and associated issues such as healthy approaches to studying at Cambridge. This was the case more than ever before during the Student Learning Journey project, partly due to the themes we were exploring through our research and the resulting questions we asked students.

9.1. Library spaces

Students we worked with talked about the fact that they saw Cambridge libraries as ideally being safe, welcoming and inclusive spaces. While this was judged to be the case the majority of the time, some of our participants did mention that libraries could improve efforts to make people feel comfortable, safe and welcome and to foster student welfare, particularly during potentially stressful times of the academic year such as Easter Term. Students mentioned that they felt under a lot of pressure at this time of year and that they were very aware of the activities and approaches of other students. Even passing other students working in libraries at various times of day could cause people to feel worried that they should also be working.

Advice we received from students in this regard was that if Cambridge libraries do open with extended hours, or are accessible to students 24/7, they should do this with a high level of awareness of the potential implications this might have in terms of student welfare. These spaces should be designed to feel welcoming and not austere and provide opportunities for students to take breaks, whether that be through furniture and layout or through providing activities, as well as providing appropriate visual cues and information in the environment. We discussed this with Students' Union Sabbatical Officers, who suggested that libraries that are open 24/7, particularly during Easter Term, could display posters with messages in a friendly tone, reminding students to take breaks, be reflective about their approaches to work and use of time, and so on.

- "It is important that libraries are accommodating for students with all learning styles and patterns, however, libraries must also recognise that they have welfare responsibilities to students who work late into the evenings. Creating a caring library environment can be as simple as putting up posters reminding students to eat regularly, take active breaks, go outside for a walk. This is not only practical advice which will aid students' concentration

levels but also makes students feel that the institution does care about their welfare, giving them permission to feel like they can and should prioritise their wellbeing.” (Martha Krish, Cambridge University Students Union Education Officer)

9.2. ‘Stress culture’

Another emergent theme from our work with students, particularly amongst undergraduate students and most strongly during the exam period, had to do with what students often referred to as the ‘stress culture’ present at Cambridge. Our participants mentioned that students often, consciously or not, promoted and perpetuated this by making other students feel that they *should* be stressed during periods like Easter Term, and that this could be damaging to student mental health and wellbeing.

- “There is just an unhealthy atmosphere generally, a lot of stress. A lot of people putting too much stress on themselves.” (4th year undergraduate Natural Sciences student)
- “There’s a constant, underlying pressure, all the time.” (3rd year undergraduate English student)

Students who participated in our research mentioned that some of the ways in which the University and its colleges handled aspects of student life only served to further exacerbate this issue. Students mentioned feeling uncomfortable when college bedrooms were dubbed ‘Study Rooms’, as this suggested to them that they should be working constantly and did not recognise that breaks from work are necessary in order for individuals to be healthy. Similarly, students mentioned frustration at ‘quiet periods’ in college, i.e. designated times when they had to be silent in their rooms.

Although students understood why these procedures were in place, they felt that this approach forced them into specific working patterns which may not have been the most suitable or productive for them as individuals.

9.3. Approach to studying at Cambridge

Some of the students we worked with were very conscious and reflective in terms of their approach to maintaining their wellbeing and mental health. This was strongly linked to a level of reflection and awareness in terms of how students approached their work and structured their time and efforts over the course of their degrees. When we asked students what advice they would give another student about to start their course, many emphasised the importance of approaching the inevitably high workload at Cambridge in a positive, conscious way, from an early stage.

- “Stay on top from the very beginning on. If you do that it’s all going to be fine, if you don’t it will be a lot of trouble catching up.” (3rd year undergraduate Mathematics student)
- “Work at a steady pace, no short bursts. It’s really not the end of the world if you get a 2:1 in undergrad, no one will ever care when you start working, just do your best and learn how to deal with stress. [...] More often, my peers pulled out of medical school, not because of their inability to learn the massive amount of knowledge we need to learn, but because they were unable or unwilling to deal with stress any more. So the earlier you learn about your stress habits and how you can cope with it, the better your time will be in Cambridge.” (6th year undergraduate Medicine student)
- “Basically, I try to take time for myself as well, because before coming here I had eight years of agoraphobia and anxiety, so in trying to do my work I’m also conscious that I need to take time to rest and not push myself, so I work in the middle of the day, mainly, and take time around that.” (1st year Theology student)

It is important to mention that many of our student participants reflected very positively on the experiences they had had studying at Cambridge and what this had meant for them as individuals. Students were keen to emphasise the importance of an objective perspective and appreciating Cambridge: its unique history, the cutting-edge research taking place and the resources and expertise it provides.

- “Just being here and being able to go to, you know, talks by Nobel Laureates and having, really, just the best of everything at your fingertips, I think that’s what the best thing is.” (MPhil Primary Care student)
- “Have fun and relax! By the end of it, you will see how much you’ve achieved, even if the process was tough!” (3rd year undergraduate Human, Social and Political Science student)
- “It feels like wherever I go there are opportunities and things I want to do. Like even the most trivial things – I want to learn tango and I’ve never done tango before – the resources are there and my college is extremely supportive as well. They care about you as a human being, rather than just as a person who can write essays or produce papers. That, I really appreciate. [...] In terms of support systems and being able to excel, Cambridge is probably a mini utopia for learning.” (MPhil Public Health student)

It is worth mentioning at this stage some of the themes that emerged from our workshops with BME and disabled students. These individuals mentioned many similar experiences and approaches to the students we worked with over the course of our project, also highlighting aspects of Cambridge that were particularly important to them.

The BME students who took part in our first workshop mentioned that they had, at points, felt frustrated with aspects of the Cambridge curriculum that were seen as inflexible and limiting, although there was a positive response in terms of increased efforts from the institution to allow students to follow their own paths in this regard. One key theme that emerged from the workshop was also reflected in other areas of our research, in terms of a positive reflection on the close nature of Cambridge teaching, as well as the extracurricular events and opportunities that are available to students at the University.

Participants at the workshop mentioned that they were used to reflecting and talking about their experiences studying at Cambridge, which was not the case for many of our other participants, who often expressed that taking part in our research had caused them to be reflective about their approaches and experiences in a way that was unfamiliar to them. While the BME students we worked with felt that the University was increasingly engaging with their specific needs and experiences, there was a concern that BME students were sometimes seen and represented either as statistics or as activist voices. They commented positively on the fact that the workshop we conducted sought to listen to their voices as Cambridge students, focusing on the same areas and asking the same questions that we asked other students across the course of the project.

The disabled students we worked with talked about the key aspects of studying at Cambridge that they felt particularly affected by, as well as reflecting on their wider experience at the University. One key frustration for these students was the lack of physical accessibility in parts of the University, particularly in older University and college buildings, although there was an awareness that efforts were being made to reduce this wherever possible, and that most instances were due to the age of many of the buildings in the estate.

A strong focus during the workshop was on the importance of SSDs (Student Support Documents). The students we worked with had sometimes had very positive experiences in this area, with academics and other staff endeavouring to tailor their teaching and support to the needs of individual students. There were also, however, times when our participants felt that their SSDs had not been given the attention they deserved and that individuals did not always try to understand disability, or were too anxious about engaging with these issues to work with students in the ways they would have expected and hoped. When our student participants talked about the positive experiences they had had interacting and working with staff and other members of the University, it was clear that they truly valued this. Participants mentioned by name academics who had been particularly supportive of their individual circumstances and college porters were referred to on

many occasions during the session as being particularly helpful and aware of the needs of disabled students.

9.4. Pinch points in the student journey

There are distinct pinch points in each student's learning journey. These include: transitioning to degree-level or taught postgraduate level study; moving into the final year of undergraduate study; preparing to produce and submit dissertations and final project work; and revising for and sitting exams. Although the role of libraries in some of these events for students is not always seen as direct, it is important that our services and the ways in which we engage with students during these times reflect an awareness of their importance and the potential implications of this for students. There are opportunities for Cambridge libraries to foster wellbeing amongst students at times that can be particularly difficult and stressful for them.

10. Inter-personal Relationships

Relationships form the basis of the Cambridge student experience. Contact, communication and relationships with peers, senior students, supervisors, teaching academics, library staff and others are seen and referred to by students as being the core components of their studies and learning. Cambridge is not primarily interpreted by students as a University of buildings, services and facilities, but as a network of people; their knowledge, expertise, advice and guidance. We concentrated our efforts on exploring what these relationships meant to students and how they interacted with different figures in their lives at Cambridge, including:

Peers at Cambridge, in and outside of their subject	'Senior' students in their subject	Lab supervisors (PhD students and postdocs)
Supervisors	Lecturers	Directors of Studies
Tutors	Academic skills tutors	College 'family'
Course conveners and administrators	Friends studying at other institutions	Partners in industry and other organisations
Family	Supervision 'partners'	

Students over the course of our research talked about the value of working with peers in order to be able to chat informally with them and share approaches to work, as well as learning from PhD students and postdocs in supervisions and labs. They reflected on the almost unique situation they were in in terms of being taught by academics who were leaders in their field and also about opportunities to hear from experts in other disciplines. Students often felt very strongly about the groups they were part of, whether those were with peers in their discipline, friends from college, societies, sports clubs, activist groups and others.

10.1. Student cohorts

The ways in which students approach their learning can be directly informed by the relationships they have with peers, 'senior' students and academic staff. One important factor is the size of a student cohort, which can affect student approaches to sourcing information and seeking guidance and assistance with their studies. We worked with a student who was studying towards an MPhil in Conservation Leadership, a mid-career, applied course, which accepts around 20 applicants each year. These students work incredibly closely together; during the first days of their course they present to each other on the work they have been doing, usually for NGOs (non-governmental organisations) or other conservation initiatives. The next activity, still during the first few days of study, involves the students participating in a field trip exercise, where they work closely and camp together. When asked about the relationship they had with the other students on their course, this student described how this felt:

- "We travel as a pack. [...] We all know what everyone does by this point. [...] We all know how the conversation is going to go. [...] If you want to ask people about something, or if you know it's related to [their areas of expertise], you can go and ask them."

This may be an extreme example, but it is included here to emphasise the extent to which the size of a cohort can influence student approaches, behaviours and needs. We found that students valued being part of smaller, more intimate course programmes and departments and that this increased their confidence, as they were more familiar with the people they interacted with and with other aspects of how those programmes and departments functioned. This familiarity and resulting confidence was also present in some of the latter-stage undergraduate students we worked with, who had become familiar with their department, their peers and the academics they worked with over a number of years.

- "I love the Materials [Science and Metallurgy] Department; it's friendly, and it feels like people want you to do well." (4th year Natural Sciences student)

- “In a Master’s programme like this, putting people together from, you know, public health institutions, to epidemiologists, to anthropologists, it brings diverse approaches together [...] probably the best learning experience so far has just been talking with my colleagues from different fields.” (MPhil Public Health student)
- “I have an existing rapport with the [teaching] staff, which helps. I know them and this means I feel confident in asking questions.” (MPhil Modern and Medieval Languages student who completed undergraduate study in Modern and Medieval Languages at Cambridge)

10.2. Colleges and departments

The Cambridge college system is designed to ensure that Cambridge students make contact with other students, both in and outside of their discipline and stage of study. Most undergraduate and taught postgraduate students are resident in college accommodation throughout their time at Cambridge. Colleges put early, formal structure around student relationships through the use of ‘college families’. This approach means that many students arriving at the University have already been introduced to other students in some form, with college ‘mothers and fathers’ who are already studying at Cambridge reaching out to ‘sons and daughters’ who have yet to arrive. The situation is more complicated than this, however, as some students, particularly taught postgraduates, do not have the same opportunities.

The taught postgraduate students we worked with, particularly those that were not resident in college, did not have this initial provided social network and had to create their own. This was primarily achieved through MPhil class groups and similar formal teaching groups, but due to the different ways in which course programmes are taught, this experience was inconsistent across students. Generally, however, the taught postgraduate students and undergraduate students in the later stages of study we worked with felt more of an affinity to their departments; undergraduate students earlier on in their journey to their college.

- “The college system is designed for you to work with others, so we do arrange group study sessions, but mainly through the College.” (1st year undergraduate Natural Sciences student)
- “There are nine students at my College, doing my course, in my year. We have certain classes together as a nine and this is really useful. You get a good sense of what other people are doing and it’s really instructive listening to other people.” (3rd year undergraduate English student)

- “I’m doing more Education papers this year so I’m at the Faculty more. I have two close friends [at the Education Faculty] so we’ve been able to work together much more this year.” (3rd year undergraduate Modern and Medieval Languages and Education student)
- “Any time a questions pops up I approach a peer and we figure it out. First ports of call are my study group and Maths students at my college. [...] The students in my study group are all doing algebra; this is necessary as there is no overlap of concepts [with other specialist areas of Mathematics] at all.” (MPhil Mathematics student)

This situation can lead to inconsistencies in the Cambridge student experience. We spoke to students who were resident at smaller colleges where there were fewer students doing the same course, so had less of an opportunity to enter into what could be important social and academic relationships with peers. For taught postgraduate students, the size of classes and working groups can often be a key factor.

10.3. Inter-disciplinary contact

Students who participated in our research often reflected on the opportunities Cambridge provided for them to talk to, work with and learn from other students and academic staff in disciplines which were not their own. These opportunities are facilitated to a large extent by the Cambridge colleges, where students from a wide range of subjects live, eat and socialise together.

- “I think I’m the only person studying Public Health at my College. There are lots of mathematicians, but also there are people working in, you know, Classics, and it’s so terrific being able to chat over dinner or breakfast, and getting to know people as three-dimensional beings, but also knowing their research interests.” (MPhil Public Health student)
- “[At Cambridge] everyone is really bright, and everyone has something to contribute to your life.” (MPhil Modern and Medieval Languages student)

This aspect of the ways in which students learn together at Cambridge is seen by students as one of the most valuable assets of the collegiate University system. Libraries can play a key part in ensuring that students continue to be able to encounter their peers in different departments, faculties and schools, by working collaboratively and facilitating this contact through events, work-sharing opportunities, and other aspects of service.

10.4. Studying alone-together

Our research during this project highlighted an issue which has previously been noted and discussed as a result of previous Futurelib studies. Although in many subjects at Cambridge students are set

few formal group work assignments to complete, these students still place a very high level of importance on the opportunities they have to work together with peers from their discipline, often at the same stage of study and in the same college. Students who study in this way almost always reflect on the experience positively, focusing on the fact that they value the opportunities to ask other students questions about their work and to share ideas about specific tasks when they have mental blocks or are struggling with a particular activity.

- “We often work together and ask each other about the questions we’re working on. We meet up in the Faculty building between lectures.” (1st year undergraduate Economics student)
- “It’s hard to self-motivate [with little contact time in my course], so working where others are is helpful.” (MPhil Modern and Medieval Languages student)
- “[...] people come up with a couple of ideas and they see things differently. So what I quite like is with my group of friends [...] you’re exposed to a lot more, quite a few different approaches to certain questions, that you think, ‘oh, that’s a bit odd’, but then actually, you look at it, and you think, ‘that was a very smart way of doing that’. So that tends to help.” (1st year Natural Sciences student)

This way of working is important for students, particularly those with low levels of contact time. By studying in this way students are essentially creating their own contact time, which can be of benefit to them both in terms of the work they produce and in terms of their resilience and wellbeing.

Cambridge libraries play a vital role in supporting this activity and should continue to prioritise this in the design of study environments and other services and opportunities for students.

10.5. Working with senior students and researchers

Many of the students we worked with during our research talked about the positive experiences they had had working with students in the years above them, as well as with PhD students and postdoctoral researchers. For students in AHSS, contact with these research students and researchers mainly happened through supervisions. Students in STEM had research students as supervisors in the same way, but were also working closely with them in practical lab environments. Our student participants saw these relationships and conversations as extremely useful, as the PhD students and early-career researchers had often recently had the experience of undergraduate study, in some cases at Cambridge.

- “When I arrived, I thought all my teaching would come from professors, but actually, I get supervisions from PhD students and they can be better than from professors [...] They know the subject and are good at teaching.” (3rd year undergraduate Economics student)
- “I find having PhD students as supervisors very useful. It’s nice to have a fresh perspective on things.” (3rd year undergraduate English student)

For those students who worked with PhD students as supervisors in more practical, lab-based settings, there was a shared feeling amongst most that this experience was particularly valuable, as it gave them an opportunity to learn practical, applied skills from people who had more experience than them, and who were willing to take the time to guide and advise them on their practices and approach.

- “[PhD lab supervisors are] very helpful in terms of, the instructions will say one thing, and then they’ll go, ‘yeah, but nobody really does that because it doesn’t work, so do it this way, which I know from experience, and I was taught when I was this grade’. And yeah, just the skills of, getting the knowledge of someone who’s done this for 5 or 6 years is really helpful because they help you get through your report a lot quicker, and they do help me understand the theory behind it as well, because they’ve done the practicals and they clearly know what they’re doing.” (1st year undergraduate Natural Sciences student)
- “[...] In the ecology field trip, there’s a PhD student that teaches us how to use R and she’s there throughout the field trip so she can help our analysis if we have questions.” (2nd year undergraduate Natural Sciences student)
- “So some of our PhD students have been really interesting, so when we’ve gone for our lunch break we’ve just chatted with them about what they’re doing, finding out about their research.” (1st year undergraduate Natural Sciences student)

11. Place and Space

The Futurelib programme has conducted a number of in-depth research projects looking at aspects of the use of physical library spaces, so it was not our intention during this project to focus too closely on this aspect of library service provision. It was, however, of particular interest to us what activities students conducted in different physical and digital environments, the reasons for these behaviours, and how this related to the ways in which students study and learn at the University. We were keen not to immediately draw a distinction between digital and physical, instead concentrating on talking to students about the different activities they were involved in as part of their studies and the approach they took to completing these.

11.1. On-the-go learning

A strong emergent theme during our research was the extent to which Cambridge students are mobile, studying on the go using a variety of devices, tools and media, as well as completing more traditional study activities such as reading and producing assignments when travelling and away from the University estate. Many of the students we interviewed and who took part in our digital diary study reported using podcasts, educational videos and other media to support their learning. This was seen as a way to relax and learn at the same time; when students could no longer concentrate or had lost a level of productivity completing tasks such as reading and writing, they often turned to these other ways of learning in order to continue to be productive whilst conserving mental energy.

- “I am walking back from a friend’s, listening to a podcast which will add to my knowledge of [my] Plant Sciences course. It’s an interesting podcast and extra information is always welcome.” (2nd year undergraduate Natural Sciences student)
- “I’m listening to a podcast to prepare for the class discussion, after reading so many articles was an enjoyable experience yet not a wasted time. It went well and it felt good to take a break in something useful.” (MPhil Engineering student)

For some of our students, due to the nature of their studies and personal lives, working on the go was less of a choice and more of a necessity. We worked with a Graduate Medicine student who recorded a diary study entry describing using a medical database app whilst on placement working in an ambulance, and a PGCE student who used the time driving between school placements and other engagements to learn by listening to educational podcasts:

- “[I’m] doing an ambulance shift. Best time to learn (/remind myself of something) is when I see a patient with a problem! That’s why I like having apps to get information quickly.” (4th year Graduate Medicine student)
- “[I’m] listening to a podcast on situation ethics, looking for analytic and evaluative questions. Mostly completed. Couldn’t make notes while driving. Had to take quick notes while picking someone up from the station. Perhaps if I had telephoned myself I could have left a message (hands free) and then taken notes.” (PGCE student)

Students take a number of different approaches to study and it is important that we are able to support these different practices and ways of working. Knowledge of this aspect of the ways in which Cambridge students are approaching their studies and learning should inform the ways in which we provide services, including teaching, training and guidance for students.

11.2. Factors influencing study space choices

Although the use of physical study environments was not a primary focus of our research, we did uncover some insights into how the ways in which students study and learn inform their study space needs and preferences.

We worked closely with students in the Natural Sciences, who often made reference to the amount of material they needed to carry around with them in order to study effectively. This included lecture notes and handouts, text books and other sources of information, along with scientific calculators, note pads and other items. This had direct implications in terms of where they chose to complete different study activities.

- “Nat Scis would never use the UL [University Library], we’ve got too much stuff, so the whole thing of having to put your bag in the lockers and carry piles of work through just wouldn’t work for us.” (2nd year undergraduate Natural Sciences student)
- “[...] whereas the [named library] you get a lot of desk space, we can sort of spread out, but we do feel odd, and have to hide our calculators a bit, because we feel like we’re slightly traitorous for using the arts library!” (1st year undergraduate Natural Sciences student)

For some of our student participants, factors such as social anxiety and aspects of physical health had a strong influence on whether they chose to study in a particular location, for example, a library, café or their college room.

- “I like checking things, and kind of standing up and walking around in the middle of it, so my own space is really valuable for that. [...] I don't think I'm any more distracted in my room, particularly, it just means that I can have the distractions I want, if you see what I mean, because I'd want to be able to get up and spend two minutes doing something, walking about, moving, like flicking through a book or whatever, and so my room lets me do that.” (undergraduate student with Attention Deficit Hyperactivity Disorder (ADHD), subject and stage of study removed)

One student emailed after an in-depth interview they participated in to add this to the transcript:

- “I would like to add on to my interview that libraries/departments should consider computer screen monitors with decent dimensions and IPS screens instead of the typical TN/VA Monitors. This will help cater to visually-impaired students.” (2nd year undergraduate Geography student)

Cambridge libraries should continue to endeavour to support the requirements of students with different study space needs and preferences. It is important to be aware of the needs of students who, for various reasons, may be unlikely to use a physical library environment to study, so that we can better support them whilst working away from these spaces. There is a clear link between the physical and digital library experience for students; factors such as resource access, technologies needed by individual students to study effectively, and environments which support the productivity and wellbeing of students with different needs are interlinked and play an important role in how students undertake and approach their studies at Cambridge.

11.3. Collaboration in digital environments

The research we conducted over the course of the Student Learning Journey project highlighted that increasingly, collaboration between students takes place in and relies on digital environments and platforms. Students often mentioned that they were part of groups, usually made up of students in a specific course programme and, in the case of undergraduate students, in the same year of study at the same Cambridge college. These groups were usually set up using social media platforms such as WhatsApp and Facebook; students used these for various aspects of their studies including: sharing resources; arranging to meet and study together; relaying the content of lectures and other study events that might have been missed by members of the group; and sharing documents, information and data that members of the group were working with together.

- “We have various group chats in College and there have been a couple of Maths things – I missed the first one but I might go to the second one.” (1st year undergraduate Mathematics student)
- “We have a WhatsApp group which I think contains almost every student in our year.” (MPhil Primary Care student)

We spoke to students who had used social media platforms such as Facebook and LinkedIn to make contact with students on their course, or at their college, prior to arriving at the University. This meant that they had already established relationships which were of benefit to them both socially and academically at an early stage of their studies at the University. The majority of students are already using social media platforms when they arrive at Cambridge, so these are seen as a natural place to converse, collaborate and share.

11.4. Decentralised student digital services

A shared frustration for many of the students who took part in our research was the lack of centralisation and unification in terms of the information and support that was available to them

digitally. Students understood the breadth and variety of options available to them at Cambridge, in terms of study support information, training options and guidance. The discoverability of these opportunities, however, was often found to be lacking and students were, in many cases, unaware of, or unable to easily find, resources which could have been of use to them during their studies. Students often ended up using routes which were familiar to them to find the information they needed, which meant they did not arrive at resources that had been specifically created and curated for them by the University.

Another frustration for the students we worked with was that they had to use various different tools for the underlying 'study admin' activities and tasks which allowed them to approach their learning at Cambridge. These included: calendars to keep track of lectures, supervisions, labs and other scheduled study events; email platforms; and virtual learning environments (VLEs) through which they accessed their course materials. Many of the students we worked with, particularly those enrolled in teaching-intensive programmes of study, saw these tools as being cumbersome and unintuitive, and as having a negative impact on their confidence and productivity.

- "Why is our email on a 1990s platform? Before I migrated my email to Outlook I was wasting my time trying to find people's email addresses and reply and not being able to use it on my phone, not being able to keep up with my schedule. These small, minor frustrations every day, kind of build up." (MPhil Primary Care student)
- "[If I needed advice] I'd ask students in the year above and use the VLE, but the VLE is not user-friendly." (undergraduate student, stage of study and name of department removed)
- "Last year we couldn't see an online breakdown of the year. We all sent feedback to the Department and this has now changed. I learnt the schedule this year from the start – it's useful to know how much things are worth so you can spend the right amount of time." (undergraduate student, stage of study and name of department removed)
- "The timetables are not integrated and some teaching times are only sent by email and not timetabled. I've missed lectures, not because I don't want to go, but because I don't know they're happening!" (undergraduate student, stage of study and name of department removed)

Student activity takes place in a number of different digital spaces, both University and otherwise. At present, information for students about opportunities to support their studies and learning is often difficult to find, decentralised and not easily discoverable. When students are presented with meaningful information about these opportunities, it can be in a sometimes confusing and inaccessible format.

Providing a cohesive and intuitive digital experience is essential to support student learning at the University. Cambridge libraries should continue to endeavour to provide as seamless a digital experience as possible for their students, in order to support and enable student confidence and productivity.

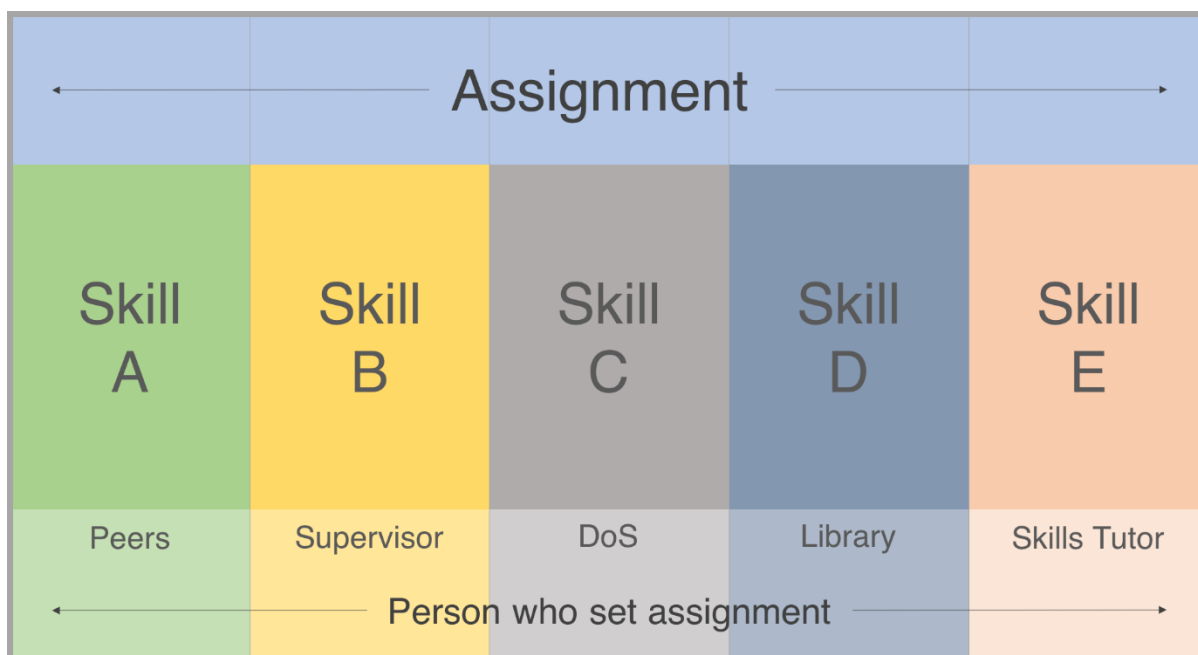
12. Approaches to Learning

We worked with a large number of students using various research methods across the course of our project. Each had arrived at Cambridge with different experiences and with a different approach to their studies. There were, however, identifiable themes in terms of the ways students approached aspects of their studies at the University.

12.1. Seeking guidance and advice

The University of Cambridge is incredibly well-resourced in terms of the variety of support that is available to students. The supervision system means that undergraduate students and some taught postgraduate students have an immediate port of call and are able to work closely with academics and research students who are at the forefront of their fields. Other study support is available to students through individuals and departments at the University including, but not limited to: teaching academic staff, study skills tutors, librarians, the Careers Service, the Language Centre, and the Disability Resource Centre.

During our card sorting exercise and with the in-person interviews we conducted, we focused on where, and to whom, students would go to for advice and guidance with various aspects of their studies. We found that, due to the nature of Cambridge teaching, many students return to one individual for guidance in almost all aspects of their studies. Students often saw the person who had set or was responsible for the assignment they had been set as an authority and point of contact for all areas of that work. This meant that they would, in many cases, approach these individuals for everything related to that work, including the underlying academic skills needed to complete it. Examples included undergraduate students asking supervisors about aspects of their work, for example searching for and finding appropriate sources of information, producing work in various formats and referencing styles. For our taught postgraduate students this behaviour was less relevant but many of these individuals followed a similar pattern, approaching course conveners and equivalent figures for advice with almost all aspects of their work.



[Above: A figure showing that students are likely to approach the person who set their assignment for guidance and advice with all aspects of that assignment, although expertise may exist elsewhere]

- “I have a good relationship with my supervisor and they’re the closest person to what I’m doing. Other services aren’t tailored to me in the same way.” (Education MPhil student)
- “They [supervisor] would know the content so would also be able to advise on a suitable structure for that content.” (LLM (Masters of Law) student, asked who they would go to for advice or guidance on report writing)

Another commonality amongst many of the students we worked with was that they relied heavily on the time and number of opportunities they were allocated by supervisors and teaching staff to ask questions and seek feedback on their work. Students often saw supervisions, lab time and the few opportunities they had to interact with teaching staff as the only opportunities they had to ask for guidance and advice on various aspects of their work.

- “After you have chosen your topic, you are allowed up to three meetings to ask any questions you have.” (4th year undergraduate Mathematics student)

There is an opportunity for Cambridge libraries to support students by capitalising on their anonymous, supportive role in teaching and learning at the University. If students feel that they cannot approach academic staff for guidance and advice outside of designated, scheduled opportunities (or if this is in fact the case) libraries should continue to promote the fact that they can provide additional support in various areas of study on a less official, more ad-hoc basis.

12.2. Use of media

The students we worked with were using a variety of media during their studies. Some of this was as part of compulsory work, but often students supplemented their use of more traditional sources of information with audio-visual content. Students during our research were actively seeking out information in these forms, as it provided a change to their primary learning activity and an opportunity to learn in a varied and engaging way.

- “[I have just] listened to a recorded talk on how to get a First (= do well this year, First is just a version of that doing well...). Tried to make a short summary of the points raised and accordingly create a plan for the near future.” (2nd year undergraduate Natural Sciences student)
- “[I’m] currently studying gynaecology – just watching a video plus using a reference text. It’s going well – it helps to have two sources of information.” (2nd year undergraduate Medicine student)
- “For [my] Palaeontology course a part of reading is TV series on evolution. The task is both to learn a bit from it, but mostly to track carefully and critique, raise and oppose or support ideas discussed and provide robust scientific reasoning rather than a bit vague popular tone. It’s fun and it’s different and watching is generally easy and rather passive.” (2nd year undergraduate Natural Sciences student)

12.3. Extracurricular events and opportunities

Some of our student participants mentioned the value they saw in the extracurricular, but academic-related, opportunities that were available to them at Cambridge. These included exhibitions, workshops and lectures that were not directly related to their area of study. These events and opportunities were seen by students as being directly part of the learning experience they had at the University.

- “I’m at a CUSU Women’s Campaign forum discussion with Stella Dadzie, a Black socialist organiser. I’m hoping to learn some things about anti-racist activism that I can use to pad out my studies re: liberation and Otherness. [...] I feel privileged to have resources like this available from the liberation campaigns in the University. [...] I think it’s worth thinking about how extracurricular events like this shape study. My academic interests have completely changed since I started my degree thanks to identity based activism.” (3rd year undergraduate Modern and Medieval Languages student)

- “Museum tours can be a good educational tool to help consolidate materials taught in lectures. The Landscapes Below tour was somewhat relevant to geography and I thought it would be ideal to explore what I had learnt better on a free day.” (2nd year undergraduate Geography student)
- “I went to the Cambridge Union to hear the debate ‘The house fears Kim’s North Korea more than Putin’s Russia.’ I was hoping to learn more about the geopolitical dynamics of both regions and hear experts speak on the issue. [...] Learning doesn’t have to happen in the classroom! Cambridge is great for talks and discussion beyond your field.” (MPhil Primary Care student)

Libraries can play a key part in contributing to this experience for Cambridge students. Hosting talks, displaying exhibitions related to areas of the curriculum and otherwise facilitating and providing opportunities for students to ‘look beyond’ their degree programmes can add value to the Cambridge experience for students and encourage a more holistic approach to learning.

13. Back to Basics

A key issue for many of the students we worked with, particularly those enrolled in taught postgraduate programmes of study, had to do with what they saw as ‘basic’ knowledge and practices which, used effectively, could have a considerable and positive effect on their learning. These students often expressed that more support, guidance and teaching in these areas would have been valuable, on occasion mentioning that there seemed to be an assumption on the part of the University that students would come to Cambridge already being familiar with these practices and ways of working.

13.1. Studying towards exams

Students come to Cambridge with a variety of experiences and following a number of routes. We worked with undergraduate students who were entering study in higher education following years spent pursuing careers. Many of our taught postgraduate student participants had returned to higher education following research degrees, careers in the public and private sectors, as well as directly after completing undergraduate degrees at institutions around the world. Along with other aspects of the ways in which teaching and learning is approached at Cambridge, these students were often unfamiliar or out of practice in terms of focusing on their studies in a way which would allow them to sit and succeed in end of year exams. This was particularly the case for taught postgraduate students in the STEM disciplines and for those taking teaching-intensive, applied courses. For these

students, feeling less than confident in their ability to successfully absorb, synthesise and reproduce information on a broad range of topics over the course of an academic year led to feelings of anxiousness and unease.

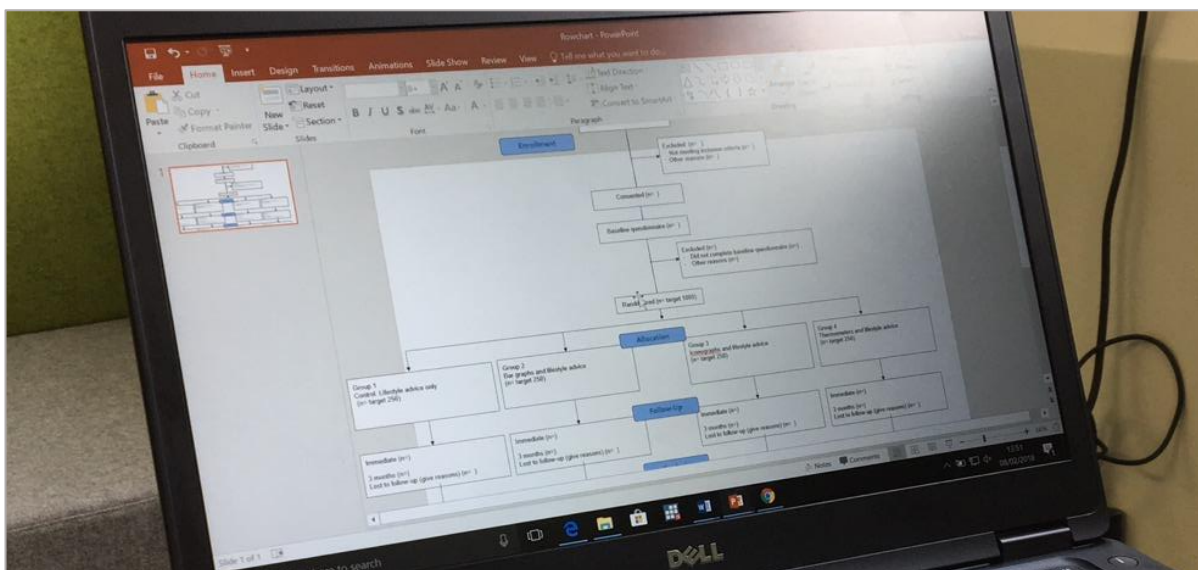
- “Maybe we are lacking some training in managing stress, avoiding procrastination and in test taking. Exam techniques are so important but we never touch on this.” (2nd year Graduate Medicine student)
- “[I’m doing] stats revision. [It’s] hard going. Revision for mock exam in March having done no stats lectures/teaching since early December! Some formal revision sessions would have been appreciated.” (MPhil Primary Care student)

Many aspects of the ways in which students learn, study and prepare for exams are related to how they interact with information. It is important that Cambridge libraries continue to support students with these aspects of their studies, particularly as guidance in this area is often seen by students as lacking on the part of the University.

13.2. Using software for academic purposes

A large number of the students we worked with across the course of our project mentioned that they used software in a number of ways, both as part of the assignments they were completing and also to tackle the more administrative aspects of their studies, such as communication and collaboration with other students and managing their time and information. These students had rarely had any formal advice or instruction on how to make the most effective use of these tools and were aware that a higher level of proficiency could enable them to use these ‘basic’ software packages in a more productive way.

- “[I’m] preparing a presentation for an assignment on Wednesday. [...] [I] have all the information, just putting it into slides. Some skills in using PowerPoint, and Office in general, may have been useful.” (MPhil Engineering student)
- “I am logging source materials on a train. [...] I would like to know more about Excel – I’ve never had Excel training and I think I could use it more efficiently.” (MPhil History student)
- “I am currently sorting out my work schedule for the rest of term, as it has gotten so much that I need a better overview of what to do when. [...] I wish I was a bit quicker and able to use Excel with more ease.” (2nd year undergraduate Geography student)



[Above: an image uploaded by one of our digital diary study participants]

There is an opportunity for Cambridge libraries to support students in their learning by focusing attention on teaching and advising them on the effective use of these and similar software packages, as students are actively seeking this guidance and often find options for support in this to be lacking.

13.3. Managing information

Managing the various sources of information and data they use across the course of their studies is an important aspect of the ways in which students learn at Cambridge. Resources students use at an early stage in their studies can become important again during exams, dissertations and other forms of assessment. Very few of the students we worked with were using bespoke software to manage their information; most relied on more general-purpose office products. Student approaches to information management were often haphazard; those who had chosen to take a more systematic approach realised the value of this, but many students we worked with at all stages of undergraduate and taught postgraduate study had not received any formal advice or guidance in this area. During our in-depth interviews many participants, particularly undergraduate students, were confused when we asked them questions about their practices in this regard.

- “Basically, everything will be kept until at least third year. I probably won’t have it in Cambridge, like my organic notes will probably come back with me next year, because I’m doing Organic Chem [sic] next year, and the bits of the Physiology that I’m interested in [...], but then again they’re on Moodle, so you might not bring them.” (1st year undergraduate Natural Sciences student)

- “I have three bookmark folders, papers for Plants, papers for Animals, papers for CDB [Cell and Developmental Biology]. And that means that I have this massive archive file. And if the lecturer sends me anything, I’ve got files on my desktop – Plants, Animals, whatever. I save a bunch of stuff there.” (2nd year undergraduate Natural Sciences student)
- “I am not very disciplined about saving my citations right away and I end up having to search for the Harvard style citation in Google Scholar again when I finish writing essays and coursework – this is annoying and I do not yet have a good workflow set out for this.” (2nd year undergraduate Geography student)

Cambridge libraries can make an important contribution to the lives of students at the University by teaching and advising on all aspects of information management, which could lead to enhanced student confidence and productivity.

13.4. Planning and time management

For several reasons, a conscious and reflective approach to the allocation of time is essential for Cambridge students to succeed during their time at the University and to avoid stress and anxiety. The short undergraduate terms, the teaching-intensive nature of many of the course programmes and the sheer amount of work Cambridge students are asked to produce means that taking an active approach to managing time and carrying this out in a rigorous way is a key aspect of how students engage with their learning at the University. Our student participants often reflected on this aspect of their studies, describing their approaches to managing their time and the measures they had put in place:

- “I had to manage my time much better in my third year as you’re doing three papers at once. [I achieved this by] planning every week ahead and dedicating days to reading.” (recently graduated undergraduate History student)
- “I usually have just a couple of days where I don’t really do much, apart from think [about my current assignment], and that’s usually after my supervision, so after my previous essay. [...] Then I start on my next essay, with the reading for about four days, and then I do the essay on the last day.” (1st year undergraduate Theology student)

The undergraduate terms at Cambridge are short, each lasting around 8 or 9 weeks. This means that for approximately half the calendar year Cambridge students are on vacation. Some of the students we worked with were very conscious of this and planned accordingly, setting aside work which they knew they could return to during vacation periods, concentrating efforts on their supervision assignments and similar tasks during term time.

- “I’m saving reading which isn’t compulsory for supervisions until outside of term.” (1st year undergraduate Economics student)
- “This year I’m deliberately doing less work in term and leaving more for the holidays.” (4th year undergraduate Natural Sciences student)
- “During term, I concentrate on the supervision essays – I’m leaving further reading and studying the syllabus until the vacation.” (1st year undergraduate Natural Sciences student)

For students who do not consciously plan how they will spend their time and mental energies in this way, term times at Cambridge can be incredibly stressful, as these students see the amount of reading and other work they have been set as impossible to complete.

Our taught postgraduate students, although having longer terms than the undergraduates, were often taking teaching-intensive courses and balancing their studies alongside work, placements and other commitments. For these students, managing their time on a day-to-day basis is vital in order for them to succeed in their studies at Cambridge.

- “Even though I’m only a couple of weeks in, what I’m finding really difficult about the course structure now is that we have class every single day, apart from Wednesday some weeks.” (MPhil Primary Care student)
- “You need to have the time, which is in short supply in this course, especially because I am working one day a week in general practice, so even that self-study time which other people get for me is a day, a full day, seeing patients, which generates its own admin and is typically a long day.” (MPhil Public Health student)

For the students we worked with that were enrolled in courses or at a stage in their studies which involved little contact time, setting aside time and planning was an essential aspect of how they approached their work.

- “I’m working on my dissertation, which is one big deadline. I have to work gradually. I have to set myself deadlines because I have no deadlines. I have to be self-organising.” (3rd year undergraduate Economics student)
- “You have to be good at managing time because most of the study is independent and self-guided.” (LLM (Master of Law) student)
- “[I would advise new History students that] your work is very independent, so make sure you can motivate yourself and trust yourself to get on with the work set. Plan your work around events in the week and make sure you account for some leisure and down time.” (2nd year History undergraduate student)

Planning, managing time and prioritising different study activities is a key part of the way students study and learn at Cambridge and has direct implications for the ways in which they interact with information, at different stages of the academic year and over the course of their degree programmes. An awareness of this should inform the ways in which Cambridge libraries work with and support these students during their time at the University.

14. Communication and Terminology

Due to the complex structure of the University of Cambridge, students receive a large amount of communication from the University and its colleges in a number of forms. These include: college bulletins and email lists; emails from supervisors, lecturers and other academics; social media used by colleges, departments, libraries and other organisations within the institution; messages and learning content hosted in virtual learning environments (VLEs); University-wide communication through email lists and other routes.

14.1. Communication and promotion

The students we worked with often referred to the sheer quantity of emails and other communication they received. They prioritised which information they would read and pay attention to based on a few key factors, including the source of the communication, the key messages displayed in the subjects of emails and the extent to which the information felt relevant to their studies. Often, emails and other forms of communication which were not seen as immediately important and relevant were not read. It is important for Cambridge libraries to be aware of this situation and to ensure that communication is, as far as possible, tailored to the needs and current activities of students. It is important that key aspects of communication such as the subjects of emails and messages given through social media are carefully considered and designed to engage students' attention at the earliest possible stage.

Several of our student participants mentioned that they often paid attention to and made note of information which was provided to them at the start of lectures. This was seen by students as the most successful way of promoting of upcoming events and opportunities, such as teaching and training sessions, lectures, talks, conferences and seminars.

- "At the start of lectures we often have people coming in to tell us about things that are happening – lectures, conferences, that sort of thing. If you really want students to listen that's the best time." (2nd year Graduate Medicine student)

14.2. Terminology, language and tone

A focus of our research was to investigate the extent to which students understood and engaged with various aspects of terminology and language, particularly that used to outline and promote the opportunities available to them.

The key finding in this area was that students preferred and positively responded to short, clear, defined messages; complicated and lengthy descriptive text was seen as arduous and often ignored. The use of culturally specific terminology and colloquial language alienated some of our student participants, particularly those who did not have English as a first language and who had only been in the UK for a short period of time. Linked to this was the importance of the University not assuming prior knowledge on the part of its students; situations where students felt that they were expected to have heard certain terms or be familiar with specific concepts and terminology led to them feeling anxious and uncomfortable, often in the presence of their peers.

Cambridge libraries should respond to this knowledge of how students interact with information. Terminology can be either a barrier, or gateway, to information and knowledge. There is an opportunity to work with and educate our students in the use of terminology which they are likely to encounter over the course of their studies at the University, as well as to ensure that Cambridge libraries communicate with their student populations in the most productive way possible.

15. The Cambridge Information Literacy Network

A key focus of our work, particularly during the latter stages of the project, was to support the activity of CILN (Cambridge Information Literacy Network). The manner in which our digital diary study and the following exit in-depth interviews were constructed meant that there was strong focus on student experiences, perceptions and activities related to information literacy. The CILN definition of and approach to information literacy is divided into four strands: Resource Discovery; Managing Information; Critical Assessment; and Creating and Communicating. A report was produced specifically for this aspect of our work, which details some of the insights arrived at during the Student Learning Journey project into these four strands, also introducing other key insights from the project which we feel are most valuable in relation to the work CILN is undertaking. The report can be found at [Appendix 1](#) in this document.



16. Opportunities

Our research provided us with valuable insights which can be used to inform various aspects of how Cambridge libraries work together to support the needs and activities of students undertaking taught study at the University. The Student Learning Journey project team have worked together to arrive at ideas and concepts in terms of how the project findings could be translated into service design and delivery.

The following pages of this document outline key opportunities for student-centred service design and delivery.

In terms of the digital tools and environments included below, it is important to mention that these would need to be carefully considered. This report has mentioned that the digital support provided to students at Cambridge is de-centralised and often not easily discovered. If any of these opportunities were to be taken further, care would need to be taken to ensure that they enhanced the student experience, rather than added to the existing confusion for students. Any of the opportunities below would need to be discussed, designed and developed with students from the earliest stage possible in order to be successful.

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16.1. Workload Manager

Due to the short nature of Cambridge undergraduate terms, students often struggle to keep on top of their workload and are frustrated when they are unable to pursue topics which are of interest to them in depth. During our research we found that students who were able to plan effectively for both the term and vacation periods were more satisfied with their student experience and had a higher level of confidence in approaching their studies.

Workload Manager would be an app that would allow students to plan how to make the best use of the Cambridge term and vacation periods. It would allow students to import references from iDiscover and from reference management software, as well as from other databases and resource discovery platforms. The app would allow students to list study goals and activities by date, also containing note-taking functionality. When students had completed a task, or had finished reading one of the sources they had imported a reference for, they would be able to mark this as complete within the app.

In the first instance, Workload Manager would be promoted to undergraduate students in both AHSS and STEM subjects, as a tool to plan for vacations. If, after the initial stages of prototyping and development, the service proved to be a success, it could be developed as a tool that would allow students to prioritise their study activities and goals, reading and research, throughout the academic year.

The name, branding and approach to promoting Workload Manager would need to be carefully considered. The tool is designed to enable students to shape their own learning experience at Cambridge and to make them feel less under pressure during Cambridge term time. If promotion and branding were not handled correctly, there is a danger that the app could be seen by students as encouraging them to add to their workload and study throughout the vacation.

Students could be given advice within the app on sensible reading techniques, approaches to interrogating and using reading lists, prioritising study tasks and taking a healthy and reflective approach to their studies. This information could be given through initial start-up messages, and held in a specific section of the app.

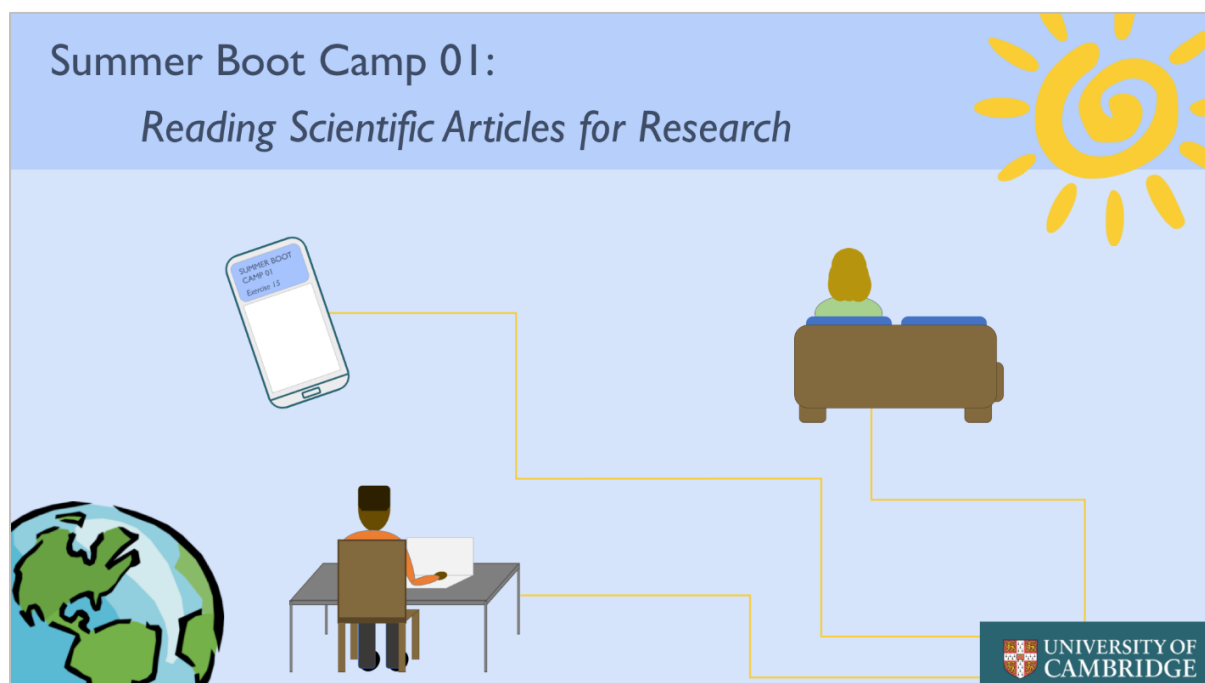


16.2. Student Summer Boot Camps

Students who are considering pursuing further study within higher education and careers in academia are aiming to develop skills and practices which they will be able to apply in research. Due to the short, intensive nature of Cambridge terms these students often look to the vacations for opportunities to learn and develop in this area.

Student Summer Boot Camps would consist of digital teaching packages which would allow students to develop research skills during the vacation. Individual courses within Student Summer Boot Camps would be short and defined and students would be able to monitor their progress as they progressed through the courses. The content would be mobile-responsive, allowing students to take part using mobile devices from anywhere in the world.

In the initial stages of its development, Student Summer Boot Camps would make use of and repurpose existing teaching and training materials from across the Cambridge library network. Making use of teaching materials and content already available to PhD students and early-career researchers would mean that undergraduate and taught postgraduate students would be able to begin exploring and developing practices which they could go on to apply throughout their careers in academia.



If possible, these teaching and training packages would be created as MOOCs (Massive Open Online Courses), which would allow Cambridge students and others to access them without any firewalls or institutional barriers and blocks.

16.3. Cambridge Libraries Student Welfare Group

A key theme from our research was the importance of supporting and being aware of the welfare and wellbeing of students during their time at Cambridge. Libraries are seen as safe, anonymous spaces by students and there is an opportunity to leverage this in order to provide support to students, particularly at key points during the academic year. At present, Cambridge libraries provide a range of services and opportunities to students which are designed to support student wellbeing. There is an opportunity to put more formal shape around this activity and to collaborate across Cambridge libraries to ensure that we provide the best possible experience for students in this area.

The Cambridge Libraries Student Welfare Group would work together to share knowledge, experiences and practical tools that could be used by libraries across the University. Activity for the Group could include:

- Developing a repository of wellbeing-related materials which could be used and re-purposed in individual Cambridge libraries.
- Reaching a consensus on key messages which should be promoted to students, along with how these are delivered.
- Researching and learning from other institutions in terms of how Cambridge libraries might better support and enable student wellbeing.
- Designing and developing wellbeing-related content such as events, activities and materials including posters and flyers.
- Collaborating with areas of the University such as the Disability Resource Centre, the Counselling Service, college tutors and student welfare officers to ensure that Cambridge library services and practices aid and assist students throughout their learning journeys in the best way possible.



[Above: Wellbeing and mindfulness advice at the main University Library during Easter Term 2018]

16.4. Cambridge Libraries Communication Framework

For many reasons, the experiences individuals have studying at Cambridge can differ greatly.

Cambridge colleges approach teaching and supporting student learning in different ways, the curriculum is taught and assessed in varied and nuanced ways across departments, Faculties and Schools and library services also differ from department to department and from college to college. This variation can have some very positive implications for students, particularly in relation to the subject-specific expertise and knowledge of Cambridge librarians working in departmental and Faculty libraries.

There can, however, be negative implications for students as a result of discrepancies and inconsistencies in the experiences they have studying and learning at the University. Cambridge libraries can play a part in avoiding this potentially negative experience for students by working together on specific aspects of service, that are not directly a result of departmental or subject-specific needs. One of these aspects is the way Cambridge libraries communicate with their student users.

The Cambridge Libraries Communication Framework would be arrived at drawing on the combined experience and knowledge of library staff working in various roles across the institution. The goal would be to ensure that Cambridge students received consistent messages and enjoyed a similar experience when in, or interacting with, any of the libraries at the University. The Framework would work towards a consistent tone and branding on the part of Cambridge libraries.

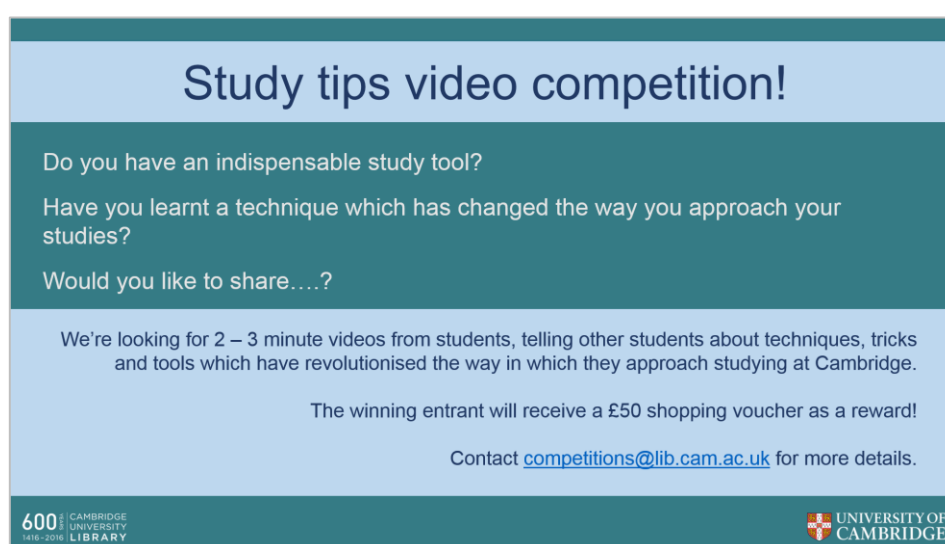
Areas to explore under the Framework could include:

- Discussions around the tone and voice Cambridge libraries might use to communicate their services and expertise in the most productive way possible to students at the University.
- The development of templates and content that could be drawn on by Cambridge libraries when composing web content, emails and other media.
- The use of social media to communicate with library users and to promote services, exhibitions, talks, events and library teaching sessions.

The Cambridge Libraries Communication Framework would not attempt to in any way detract from the value for students of the tailored, subject- and college-specific library services and opportunities available to them. Instead, it would aim to provide a repository of knowledge which could be drawn on by librarians across the institution and enable Cambridge libraries to more efficiently and positively communicate key messages and information to the student groups they support.

16.5. “Back to Basics”

A key finding of our work was that often students felt lacking in confidence and ability in activities and practices which could be seen as basic, and that guidance and support in these areas was sometimes seen as under-provided by the University. These included: studying for exams; using software for academic purposes; managing information; and time management and planning. When students looked for instruction and guidance in these areas they tended to look online for quick, easy to access information at the point of need. Back to Basics would be a selection of guides containing useful information, created by students and covering the areas listed above, as well as imparting other useful approaches, techniques, knowledge and tools that students had come across during their time studying at Cambridge.



Study tips video competition!

Do you have an indispensable study tool?

Have you learnt a technique which has changed the way you approach your studies?

Would you like to share....?

We're looking for 2 – 3 minute videos from students, telling other students about techniques, tricks and tools which have revolutionised the way in which they approach studying at Cambridge.

The winning entrant will receive a £50 shopping voucher as a reward!

Contact competitions@lib.cam.ac.uk for more details.

600 CAMBRIDGE UNIVERSITY LIBRARY

UNIVERSITY OF CAMBRIDGE

[Above: Content could be gathered from students using a video-creation competition]

By curating lists of videos, online tutorials and other content, Cambridge libraries would be able to guide students to resources that could be beneficial to them throughout their studies. Many of the areas in which students are often looking to develop their skills are related to the ways in which they interact with information, whether that be keeping track of the various sources of information and data they encounter, or using software to analyse, visualise, create and communicate information.

Back to Basics would need to be easily discoverable by students, as the usual student approach to searching for this type of resource is to search using Google. Some students specifically mentioned that they searched for the name of an area they wished to develop, also including the word Cambridge in their search string. Promoting these student-created videos via social media and other channels would begin to make them more discoverable in the digital spaces that Cambridge students inhabit.

16.6. LIBraries GLOSSary

Many of the students who took part in our research mentioned coming across terminology during their time at the University that was unfamiliar to them. This was often subject-specific, but also included instances of more general academic language. Knowledge of this terminology was sometimes an important factor in the ways in which students were able to search for, locate and understand information. A lack of knowledge of specific words, acronyms and phrases led to students feeling unprepared and anxious. Examples in our research included:

- “*Apollo*” (the University of Cambridge institutional repository)
- “*REF*” (the Research Excellence Framework)
- “*Research Fish*” (a Research Impact Assessment Platform)
- “*SIC codes*” (codes used in the Standard Industrial Classification of Economic Activities)

[Below: A mock-up of a poster which could be displayed in physical and digital University spaces, explaining key research terminology. Some content taken from ‘Research Support Glossary’, Claire Sewell, Cambridge University Library

LIBraries GLOSSary

Common words and phrases you might come across during your work

<i>Altmetrics</i>	Alternative metrics used to record information about the performance of scholarly outputs, e.g. the number of times an academic paper has been cited on Twitter.
<i>Apollo</i>	The University of Cambridge online repository, holding the research outputs of members of the University.
<i>Copyright</i>	An intellectual property right which gives people the right to protect their creations and receive recognition for their use.
<i>Creative Commons Licenses</i>	A group of license which provide an easy to use, standardised way for researchers to share their work with others. There are various licenses which can be applied depending on what a creator wants to do with their work.
<i>HEFCE</i>	The Higher Education Funding Council for England. A government body which is responsible for giving funds to higher education establishments in England.
<i>Open Access</i>	A mode of publication which sees research outputs made freely available online rather than published behind a paywall. Green Open Access refers to the practice of making a pre-publication version of a text available in a repository. Gold Open Access refers to content that is created freely available.
<i>RDM</i>	Research Data Management. The process of managing different types of data produced as a result of research.
<i>REF</i>	Research Excellence Framework. A method of assessing the quality of the research output at British higher education establishments. University departments are required to submit examples of their best research for grading.

 Follow us @libgloss – we’re tweeting and explaining a new acronym each day – #tweettheacronym

The Cambridge LIBraries GLOSSary (LIBGLOSS) would introduce students to instances of terminology that they might come across during their studies at Cambridge. Outputs could include:

- Templates for posters which could be edited by libraries and placed in prominent digital and physical spaces
- A shared Cambridge libraries online glossary, containing research-related terminology, acronyms and terms specific to Cambridge and to Cambridge libraries.
- Campaigns on social media, for example a #tweettheacronym Twitter campaign, which could be promoted by library services across Cambridge.

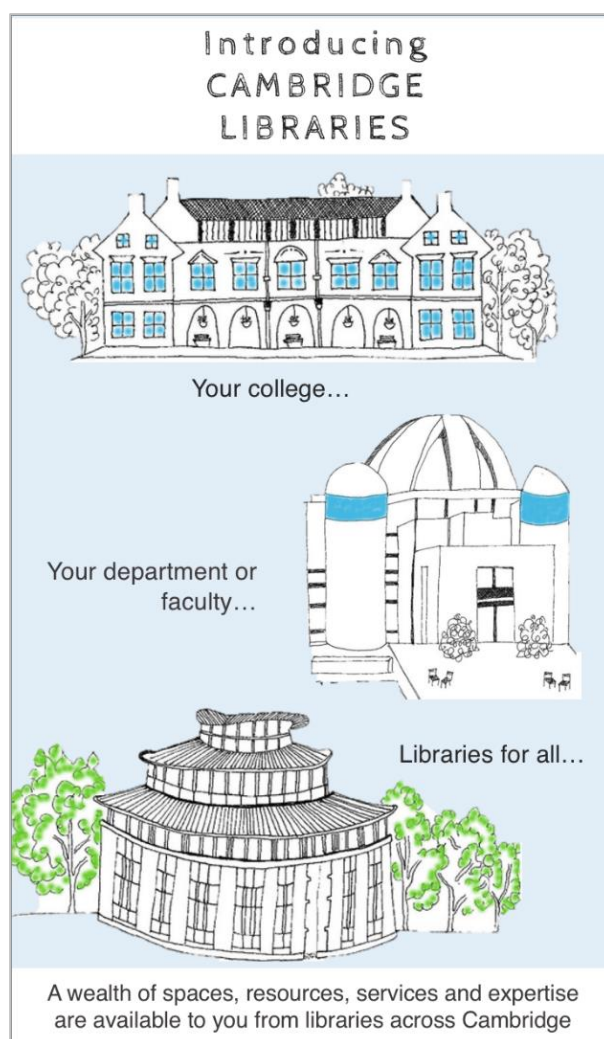
16.7. Introducing Cambridge Libraries

Cambridge libraries are currently dedicating resources to develop services which students can access prior to arriving at the University. This work has become manifest in the form of CamGuides (Cambridge Graduate Information and Digital Essentials), an open educational resource developed for pre-arrival taught postgraduate students. The CILN (Cambridge Information Literacy Network) initiative is working on enhancing the ways in which Cambridge libraries teach, guide and advise students on all aspects of information literacy, both prior to and on arrival at the University, which includes library induction and orientation programmes for students.

A key issue for students arriving at the University is understanding the complexities and nuances of the network of colleges, department, Faculties, Schools, libraries and other organisations present at Cambridge and how these work together to provide a unique teaching and learning experience. This can sometimes be confusing and frustrating for students, who do not understand why they are not able to access some of the University's libraries, their services, spaces and collections. Informing students in the most positive way possible of the breadth of library services, resources and expertise available to them at an early stage in their studies is vital in ensuring that they are able to enjoy and make the most of the experience they have studying at Cambridge.

Cambridge libraries would work together to design materials and deliver consistent information to students, introducing Cambridge libraries in a simple but effective

way. This could include creating visual explanations of how the Cambridge library system works, which could be printed and given to students on arrival at the University, or embedded in webpages and other key student-inhabited digital spaces.



[Above: A flyer developed by CILN, introducing some of the options available to students through Cambridge libraries, developed alongside the Student Learning Journey project]

16.8. Cambridge Mobile

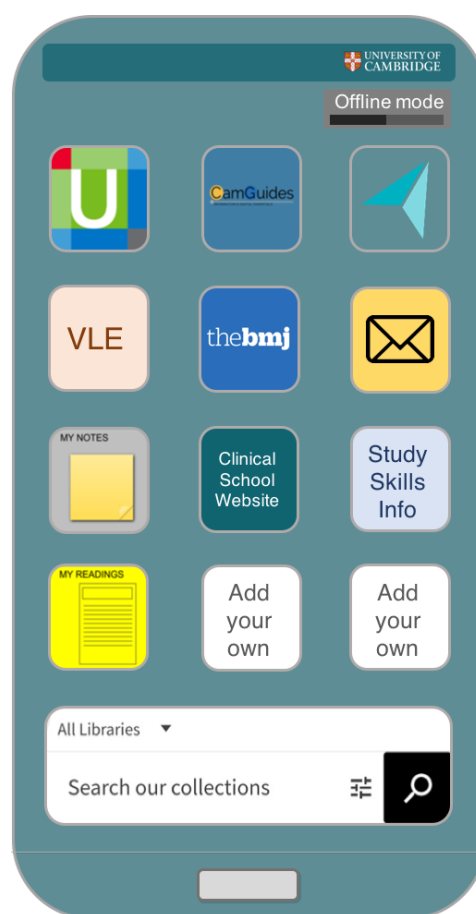
Students during our research often talked about the various digital tools they used, both as part of their studies and to perform administrative tasks which supported their learning at Cambridge. At present, Cambridge provides a wealth of information and tools to students, but in many cases these are decentralised and not easily discoverable. Students can be unaware of what is available to them in this regard and this can be detrimental to their learning experience. There is an expectation amongst students that the digital tools provided to them by the University will be discoverable, intuitive and responsive.

Cambridge Mobile would provide an app-based gateway for students, which would act as a route to the websites, apps and tools they use during their studies. It would include, or link to: email; calendars; iDiscover, the primary resource discovery system at Cambridge; subject-specific websites, databases and apps; study and research skills information and support; and other student support tools provided by the University.

Cambridge Mobile would be customisable for each student, allowing them to add links to the apps, tools and websites they used to support their studies and learning at Cambridge. It would feature an offline mode, allowing students to access key information, without relying on internet access.

The development of Cambridge Mobile would provide Cambridge libraries with an opportunity to play a key part in the learning experience of students at the University. In the initial stages of its development, Cambridge Mobile would include key library information and functionality such as an iDiscover widget, links to subject-specific databases and information, and routes to LibGuides, CamGuides and other teaching and training opportunities for students. Ideally, this tool would be developed in collaboration with the University Information Services (UIS).

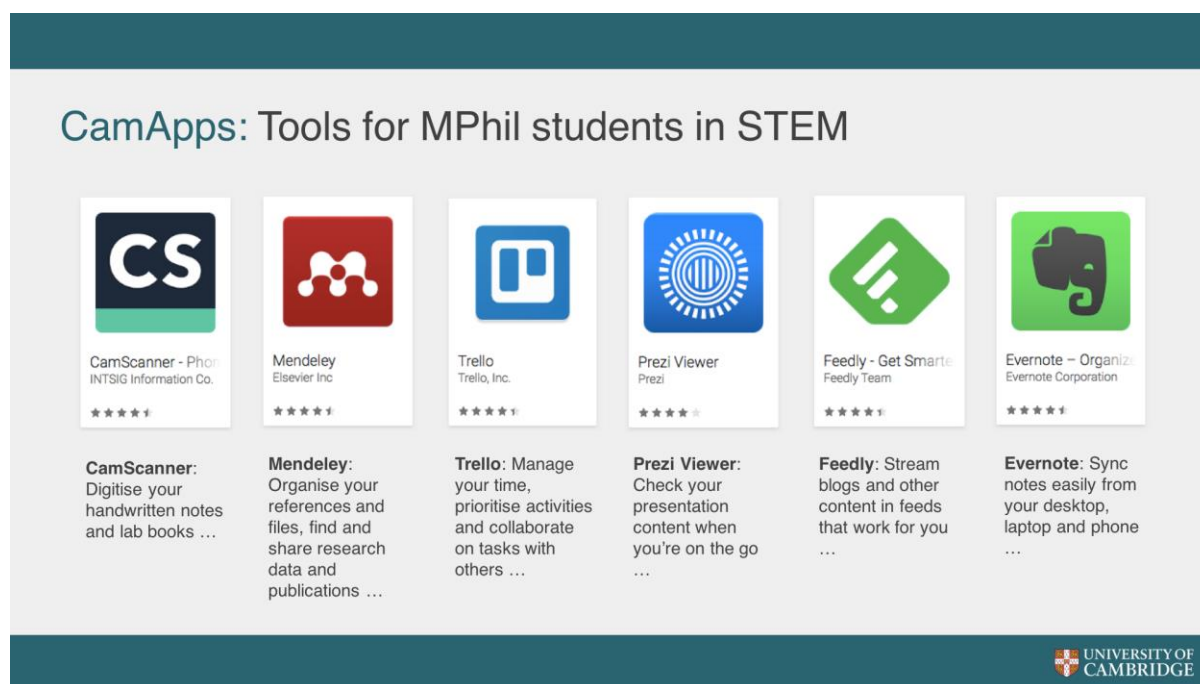
The image on this page represents some of the functionality and options which might be made available to students through Cambridge Mobile, and has been configured for a student studying Clinical Medicine.



16.9. CamApps

Cambridge students are increasingly making use of apps and other mobile-friendly tools to support their studies. There is an opportunity for Cambridge libraries to support students in their studies by responding to this existing activity. CamApps would involve Cambridge libraries working collaboratively with students to curate lists of mobile apps that could be used to support their studies throughout their time at the University.

The initial steps in the development of CamApps could involve Cambridge libraries creating basic lists of study-related apps. CamApps could include: tools for productivity; note-taking software; reference managers; dictionaries; thesauri; file-sharing and collaborative tools; subject-specific databases and information. The aim would be to encourage students to use CamApps to list and share apps which they had found valuable and the service would also allow for reviews and tips. Lists of apps created in CamApps could be aimed at students in different disciplines and at different stages of study. Examples might be a list of apps curated for undergraduate students arriving at the University and a list for MPhil History students.



These curated lists of apps would be housed in a visible, accessible digital space. As the CamApps service developed there would be little involvement from library staff and students would be encouraged to continue to use CamApps to share, comment on and review apps which they had found useful in their studies. If appropriate, Cambridge library staff could also continue to recommend certain apps, particularly those related to the use of information.

16.10. Collab Cam

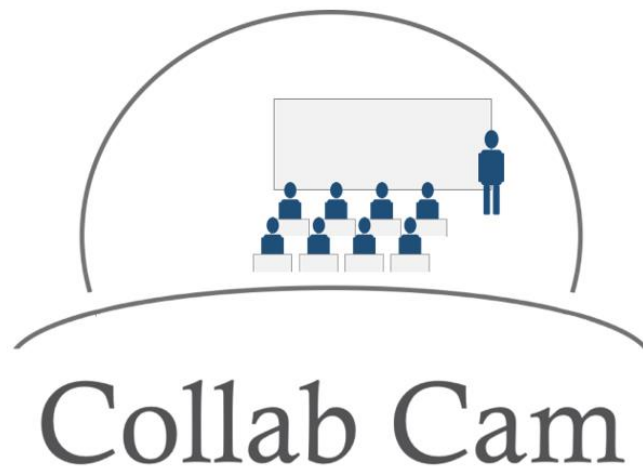
Students at the University of Cambridge, particularly those who are resident in Cambridge colleges, have the chance to mix with students studying a wide range of subjects. There are, however, few formal, structured opportunities for students to share their work with students outside of their discipline. Students who are not resident in college do not always have the same chance as those who are. Participants during our research mentioned that being able to learn about the work their peers were conducting in different academic areas was one of the most valuable things about studying at Cambridge.

Collab Cam would be a series of events and opportunities for taught Cambridge students, including student led exhibitions and interdisciplinary work-sharing seminars. This would provide Cambridge students with opportunities to learn about work happening in academic areas outside of the primary focus of their studies. Collab Cam would prompt students to communicate their work in

different ways and to different audiences, practices which can be applied throughout and beyond their studies at Cambridge.

Libraries could play a key part in facilitating Collab Cam by providing physical space for student-led events, digital space to allow students to share blog posts and slide decks, and by encouraging students to use library collections as part of their exhibitions.

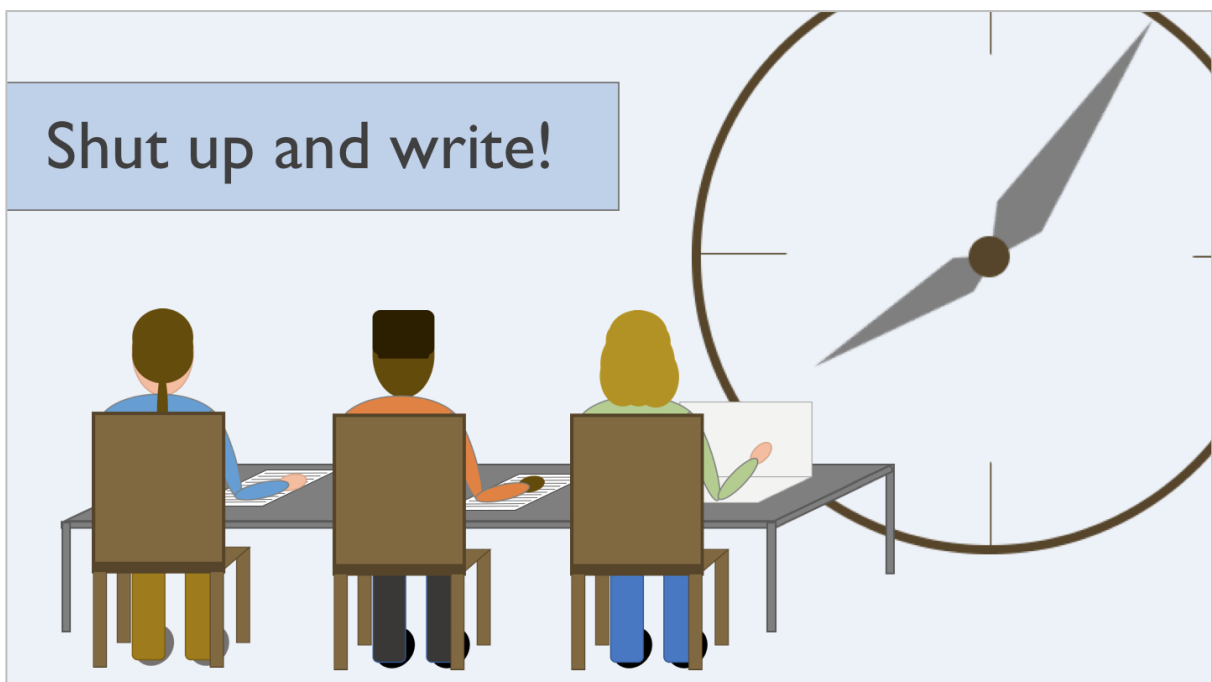
As much of the emphasis of Collab Cam would be on students sharing their work, it would provide an opportunity for library staff to provide their expertise and knowledge. This could involve recommending tools and approaches to students, assisting with referencing, data management and other information-related aspects of their work, as well as offering to provide further advice and support through one-to-one consultation sessions.



16.11. Digital Detox

Students often use library spaces to work in as they are free from the distractions they experience at home. They also value the opportunities provided by working surrounded by other people. In some instances this includes the ability to share their work and bounce ideas off other students working in the space, at other times students are keen to work surrounded by others as they feel an intrinsic pressure, which motivates them to concentrate on their work.

Cambridge libraries can capitalise on this existing behaviour by putting more formal shape around the opportunities offered to students in this area. Examples could include 'Shut up and write' sessions, where students work together for a set period of time, without talking and doing nothing but concentrating on their work. For students taking subjects with less of an emphasis on writing, but with an emphasis on answering example questions and problems, for example, time could be allocated and opportunities provided in a similar way but branded differently, for instance 'Example Time' or similar.



Related opportunities might include creating 'Digital Detox Zones' in libraries; spaces without WiFi or data connectivity in which students can concentrate on their work with fewer distractions and with no access to social media and email. Digital Detox zones could include storage for mobile phones and other technology to remove further distractions for students.

17. Conclusion

The Student Learning Journey project provided us with an invaluable opportunity to study in depth the experiences of taught students at the University of Cambridge. The scope of the project and the way in which we were able to approach the work meant that we could focus on broad and varied aspects of the Cambridge experience, with students across disciplines and at different stages of undergraduate and taught postgraduate study.

The project provided us with some tangible ideas for service design, development and delivery. Importantly, the data gathered and insights arrived at form a valuable evidence base which can be used to inform varied aspects of the ways in which Cambridge libraries continue to support and improve the learning experience of students at the University. It was very positive to see the research we conducted feeding directly into current developments across Cambridge libraries, including the work being conducted by the Cambridge Information Literacy Network.

The research we conducted over the course of the project was primarily qualitative in nature and involved the use of in-depth research methods, both remote and in-person. We believe that this approach has validated itself through the insights and findings of our work; it would have been very difficult to arrive at this nuanced knowledge of the Cambridge student experience through the use of more traditional, quantitative research methods.

The insights and service design opportunities arrived at from the project would not have been possible without the dedication and inspiration of the Student Learning Journey project team, whose experience and expertise were invaluable. Special thanks go to Libby Tilley, Helen Murphy and Niamh Tumelty for their guidance and advice, to Meg Westbury for sharing her experience of qualitative analysis approaches and techniques and to the Cambridge University Students' Union Sabbatical Officers, particularly Education Officer Martha Krish and Disabled Students' Office Florence Oulds, who informed our work from an early stage and remained interested and engaged over the course of the project.

The importance of working with students and other members of the University to understand their goals, motivations, routines, approaches and activities cannot be over-emphasised. Cambridge libraries are an important part of a wider University experience for students; it is only by understanding this experience that we can continue to design, develop and tailor Cambridge library services to the needs of their users.

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August 2018

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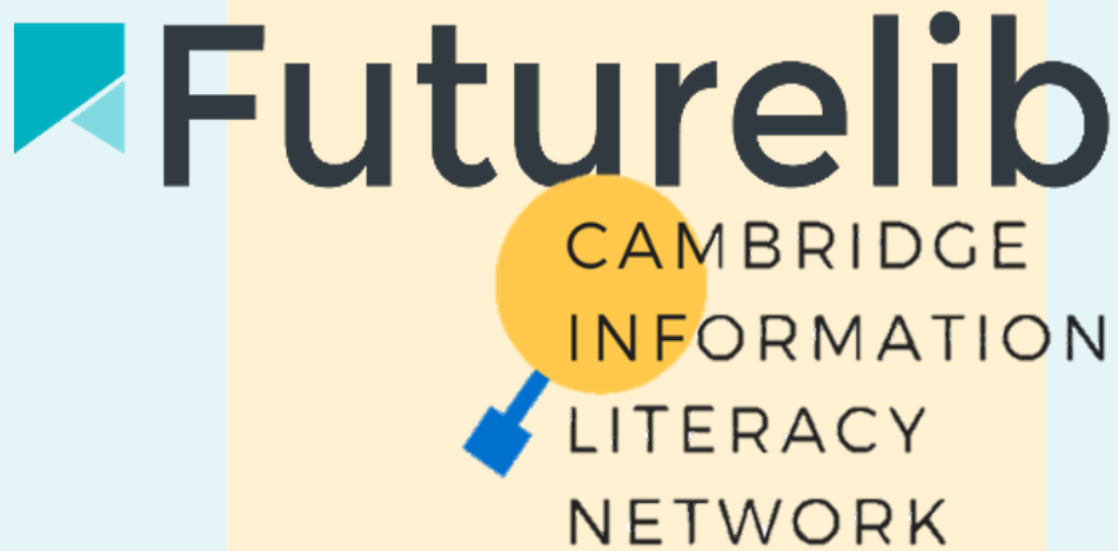
Appendices

The following pages contain the appendices for this report:

[Appendix 1](#): Report on the findings of the Futurelib Student Learning Journey project as they relate to the four strands of the CILN (Cambridge Information Literacy Network) Information Literacy Framework: Resource Discovery; Managing Information; Critical Assessment; and Creating and Communicating, along with other insights which are relevant to the work being done by CILN.

[Appendix 2](#): Outputs of a brainstorming session conducted with Cambridge library staff at an open invitation session during the early stages of the Student Learning Journey Project.

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Futurelib 'Student Learning Journey' project

*Key insights for Cambridge Information Literacy
Network (CILN)*

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1. Introduction

Between October 2017 and May 2018, the Futurelib programme, Cambridge University Library, conducted a qualitative research project, 'Student Learning Journey', investigating the experiences of undergraduate and taught postgraduate students at the University of Cambridge. Throughout the project there was a focus on perceptions and experiences from students in terms of the underlying academic skills required in order to study and learn successfully at the University. An additional focus was on student experiences at different stages in the student learning journey. One aim of the project was to capture data and look for insights that can be used to support the activities of the Cambridge Information Literacy Network (CILN), which, amongst other objectives, aims to establish an Information Literacy Framework for Cambridge libraries.

The Student Learning Journey project was conducted in two distinct phases, beginning with an initial exploratory phase (October to December 2017), which aimed to uncover, in a very broad sense, as much as possible in terms of the needs, activities, behaviours, motivations and experiences of taught students at the University. This was achieved through research mechanisms including: short, ad hoc interviews; feedback walls; comment cards; online and printed questionnaires. The data from this initial phase was analysed by the project team and informed the latter stages of the Student Learning Journey research. In the second phase of the project (January to May 2018) a three-week digital diary study was conducted with 36 undergraduate and taught postgraduate students from various disciplines. The diary study took place during Lent Term in February 2018. 11 of the diary study participants were interviewed in depth after they had completed the study. The construction of the diary study and the follow-up interviews focused on exploring student experiences of and reflections on academic and information literacy skills. Various other methods were employed alongside the diary study, including in-depth interviews with students in the Natural Sciences, as well as activity-based methods such as card sorting, which were used to examine specific areas of student activity, perceptions and approach, related to their academic skills.

This document outlines the observations from the Student Learning Journey project that we feel will be the most valuable in terms of informing the work being conducted by CILN.

2. The CILN Information Literacy Framework

The following section outlines the key insights gained from working with students, as they relate to the four strands of the CILN Information Literacy Framework, i.e. Resource Discovery, Managing Information, Critical Assessment, Creating and Communicating.

3. Resource Discovery

Undergraduate students in Arts, Humanities and Social Sciences (AHSS)

During our research, we found a number of commonalities amongst undergraduate AHSS students, in terms of experiences and practices relating to resource discovery. These students were often working from reading lists, which provided a basis for their research and reading. Students often struggled to interpret and interrogate these lists to an extent with which they were satisfied and felt confident. Specifically, many students were unsure as to which items on a reading list they should prioritise, particularly when the academic who had set them the reading list had included little or no indication of the relative 'importance' of the sources of information listed. This led to difficulties for students in narrowing down their reading, which was seen as an essential early stage in producing essays and other assignments. When students had arrived at a strategy for dealing with this issue, it had often taken a considerable amount of time.

- "The way I read things in the third year is very different to how I did in the first. In the first year we were given huge reading lists - I would skim through everything and find stuff that was vaguely relevant. I now ask my supervisor what he would recommend reading first and this has been really useful." (3rd year undergraduate History student)

Linked to this experience was the fact that students often wished to explore a topic they found interesting or engaging in more depth than they could, due to the rapid cycle of essay submission deadlines.

- "... with essays being set so regularly and deadlines almost on top of each other, there really isn't the luxury of studying something when you particularly feel like it." (1st year undergraduate Theology student)

Another key theme related to workload was a desire on the part of students to develop skills in speed reading. Students often mentioned that they felt lacking in ability in terms of being able to quickly assess sources of information to decide on their relevance, and in absorbing the information they needed to at a fast-enough rate.

- "I am finding good resources but I need to try and get to the relevant reading within each resource quicker." (2nd year undergraduate Land Economy student)

Most of the undergraduate AHSS students we worked with were familiar with using iDiscover, the main University of Cambridge resource discovery system. When these students needed to make use of other, subject-specific databases and search platforms, this was seen as more challenging and

students often felt frustrated or underprepared, believing that they lacked the necessary experience and knowledge to use these databases in a satisfactory way.

- “I had an issue with finding the right resources. Law cases can be quite tricky to find so I had to use a legal database, which is full of actual cases and reports, which is quite confusing.” (2nd year undergraduate Land Economy student)

An aspect of study that relates to the ways in which resources are discovered and evaluated, which students during our research often found difficult, was taking notes on what they were reading, the content of lectures and information they found in other sources and media.

- “I feel like I lack strategic listening/note-taking skills.” (4th year undergraduate Modern and Medieval Languages student)

Taught postgraduate students in Arts, Humanities and Social Sciences (AHSS)

Our research showed that these students had similar experiences and practices in some areas to those of undergraduate AHSS students. There were, however, some differences in terms of how taught postgraduate students in AHSS approached and experienced resource discovery.

The taught postgraduate AHSS students we worked with were using a wide range of information sources. Alongside books and journal articles, these included archives and special collections, both in and outside of the University of Cambridge, current media and educational podcasts, amongst other things. Routes to these sources of information varied across students, but were often more specific and sophisticated than the routes taken by most of the AHSS undergraduate students we worked with.

- “I am doing research trying to figure out what my research question is for my dissertation. I’m doing a scan of regular news media to see how the topic has been covered recently, and as a quick way to find out what studies have been talked a lot about recently.” (MPhil Land Economy student)
- “I compiled a source list from WorldCat and then used iDiscover to check Cambridge’s collection and am now cataloguing it.” (MPhil History student)

Another experience which students in this group shared was that as they specialised in their studies, resources became harder to find and access. The sources of information they needed were harder to locate through commonly used routes and gateways, and, on occasion, not accessible due to licensing restrictions and firewalls.

- “I’m in the Library, developing my literature review and chasing missing articles. The article [I need] is still unobtainable without paying membership fee.” (PGCE student)

Our AHSS taught postgraduate student participants were sometimes looking for and using data, aware of the distinction between data and information. Practices related to this were often unfamiliar for these students and, on occasion, this led to them feeling anxious and underprepared.

- “I am doing research trying to figure out what my research question is for my dissertation [...] I do not feel I know how to figure out what to ask, how to analyze data in a sophisticated-enough way, or what data is there.” (MPhil Land Economy student)

Undergraduate students in Science, Technology, Engineering and Medicine (STEM)

We noticed patterns in terms of behaviours and practices related to resource discovery amongst the undergraduate students we worked with in the STEM subjects. Due to the nature of their teaching and assessment, many undergraduate STEM students, particularly in areas such as the Natural Sciences, rely heavily on lecture handouts for their studies and learning, many of which include excerpts from text books, journal articles and other academic sources. Most of the students we worked with were unfamiliar with iDiscover and other academic information resource search platforms and databases, relying heavily on Google to look for what they often saw as ‘extra’ sources of information.

- “I have found it hard to find citations for this, possibly due to the fact it isn’t a good topic to Google, but possibly as I’m looking in the wrong places.” (2nd year undergraduate Natural Sciences student)
- “I don’t know how to find readings that apply to me (the keywords I use on Google Scholar don’t seem to be specific enough).” (2nd year undergraduate Geography student)

When undergraduate STEM students during our research did need to use subject-specific databases and routes to information, this could be a new and frustrating experience. Students found it difficult to formulate appropriate and useful ways with which to search, using what were unfamiliar digital environments and platforms. Often, the main priority for these students was quick and easy access to electronic resources.

- “I am struggling to cope with the amount of databases because I’ve never seen any of them before and have no idea how to use them or where to begin or what to search.” (4th year undergraduate Management Studies student)
- “A lot of material of this course is about very recent research. So, this involves a lot of reading of journal articles. Thankfully, they are all available a click away.” (4th year undergraduate Natural Sciences student)

Along with the processes involved in finding relevant and appropriate sources of information, the undergraduate STEM students we worked with also often felt less than confident in their ability to

'drill down' through the resources they found to the information they needed to support their studies. Students mentioned that they would have appreciated more guidance in this area.

- "I would benefit from a class about how to find relevant articles for an essay and how to discern between the good and bad." (1st year undergraduate Psychology student)
- "There's loads of literature but I can't seem to zero in down on a solution." (4th year undergraduate Natural Sciences student)

The undergraduate STEM students we worked with were using a variety of media in different ways to support their studies. For some, this involved listening to podcasts and watching videos, either as part of their compulsory assignments or to develop a deeper understanding of a particular topic.

- "[I'm] currently studying gynaecology – just watching a video plus using a reference text. It's going well – it helps to have two sources of information." (5th year undergraduate Medicine student)
- "For palaeontology course a part of reading is TV series on evolution. The task is both learn a bit from it, but mostly to track carefully and critique, raise and oppose or support ideas discussed and provide robust scientific reasoning rather than a bit vague popular tone." (3rd year undergraduate Natural Sciences student)

Due to the nature of some of the STEM subjects, students we worked with were trying to find information in various forms, not limited to text. Specifically, students mentioned the importance of finding relevant and suitable diagrams, drawings and figures. These included anatomical drawings and diagrams showing the relationships between chemicals:

- "[I'm] finishing up my presentation from yesterday. I'm done with reading and putting all the words in, but I'm still looking for diagrams. My supervisor said to insert appropriate figures but I literally have no clue 1. Where to find them 2. How to cite them." (2nd year undergraduate Geography student)

Specifically in relation to resource discovery, some undergraduate STEM students we worked with were looking for more advice, guidance and instruction from academic staff than they were currently receiving. When these students were given a level of autonomy in terms of the sources of information they used and cited in their work, they often felt confused and unprepared for the task. This may have been partly due to the fact that this was an unfamiliar experience for these students, who were used to a much more prescriptive model in terms of finding the resources they needed.

- "We have no textbook or references for this module so I have nowhere to look for help with the basics. I need to use BBC Bitesize or something similar." (4th year undergraduate Management Studies student)

- “I would prefer more concrete advice about how much I need to know.” (1st year undergraduate Psychology student)

Taught postgraduate students in Science, Technology, Engineering and Medicine (STEM)

There was a marked difference between behaviours and approaches related to resource discovery between the undergraduate and taught postgraduate STEM students we worked with, although some aspects, such as the importance of varied media, diagrams and figures, applied to both groups. The taught postgraduate students had a much higher level of autonomy, in terms of the ways in which they approached finding the information and data they needed to complete assignments and support other aspects of their studies. They were dealing with a wider range of sources than the undergraduate STEM students and using these in different ways and for different purposes.

Taught postgraduate students in some areas of STEM need to work with partners in, for example, industry and government organisations, as part of their course programmes. For the students we worked with, this often meant having to find and assess data and information from sources outside of published academic literature, for example industrial and governmental data sets. Students often felt that they lacked the necessary experience to approach this to an extent with which they felt satisfied:

- “This study aimed to do a market research about [named market], we hoped to gain an insight view of this type of markets. Finding the resources was a big challenge as we are still not sure of the best way to collect data for the research.” (MPhil Engineering student)
- “[I am part of a group] working on formulating a project plan for an industrial project. [...] [We have] poor knowledge of marketing terminology and appropriate data sources.” (MPhil Conservation Leadership student)

The taught postgraduate STEM students who took part in our research often needed to use subject-specific databases and routes to information. Students sometimes avoided this by using platforms that were more familiar to them to look for the sources of data and information they needed. When students did attempt to use subject-specific databases they often struggled, due to being unfamiliar with the databases themselves, along with the discipline-specific terminology needed to search and the ways in which to effectively formulate search queries.

- “It’s also hard just Googling in the dark for energy use data of different countries. My process is a bit slow.” (MPhil Engineering student)
- “I have found an appropriate database and the required SIC codes. I was not previously aware of SIC codes and would have liked to have access to this useful tool earlier in the project.” (MPhil Engineering student)

More than any other student 'group' we studied, taught postgraduate students in STEM relied on people as sources of information. This could mean conducting interviews with partners in industry, or communicating with research students, supervisors and other academic staff. Finding information in this way requires a very different approach to established routes to more 'traditional' academic sources and this was an area in which students often felt that they lacked the necessary experience and confidence.

- "I'm starting my MPhil dissertation project [...] I just need to be confident enough to contact the people in my supervisor's lab, ask for help etc., which can sometimes be intimidating!" (MPhil Engineering student)
- "I'm contacting providers of [specific area of service delivery] to try and ask them how they use specific technologies, as part of a market research project [...] I have little experience conducting interviews and structuring my conversations" (MPhil Engineering student)

4. Managing information

Undergraduate students in Arts, Humanities and Social Sciences (AHSS)

The undergraduate AHSS students who took part in our research had a number of different approaches to managing the information they used. Perhaps surprisingly, few were making use of reference management software, most relying on their own techniques and approaches to store documents and references to revisit at a later date. Often, these students were aware that their approaches were not as productive as they could potentially be, but seemed reluctant to change and persisted with practices and procedures that felt natural to them. For some of the students we worked with, these behaviours had persisted into the latter stages of their undergraduate degrees.

- "I have been quite bad at filing my notes, so this [using lecture notes to inform an essay plan] would have been much easier if they were all sorted!" (3rd year undergraduate Education and Modern and Medieval Languages student)

We worked with students who had consciously changed their approach to managing information, but had done so without seeking any advice or guidance on effective tools and techniques. These students ended up with very individual approaches to information management, usually geared to a particular task, activity or assignment.

- "I have been feeling a bit lost in Economics lectures with key terms so decided to go through some notes and create online flashcards using [named software]. [...] It did take a while also to find a good online flashcards resource that covers phone and computer." (2nd year undergraduate Land Economy student)

- “[I’m] writing out lecture notes for tomorrow – I don’t like trying to add information in the lecture via text boxes onto the PowerPoint, so I try to type out the PowerPoint into a Word document the night before a lecture.” (2nd year undergraduate Land Economy student)

Although most of the undergraduate AHSS students we worked with seemed confident in terms of referencing, citations and bibliographies, they sometimes mentioned feeling less prepared when it came to citing material which they saw as more complicated. One student made the following diary entry in response to the prompt *“In detail... Are there any areas in which you feel/felt under-skilled, or under-prepared while completing this study task? (We’re particularly interested here in your ‘study skills’, i.e. not academic knowledge but things like planning, time management, essay/report writing, finding the right resources, etc.)”*:

- “Referencing!!! Especially complex referencing (essays in books, online articles)” (4th year undergraduate Modern and Medieval Languages student)

Taught postgraduate students in Arts, Humanities and Social Sciences (AHSS)

The taught postgraduate AHSS students who took part in our research needed to use and manage diverse sources of information as part of their studies. Many were working on dissertations, collaborating and sharing information with other students and using sources such as special collections and archival material. These students were often conscious of their information management practices and more likely to be using software to manage information sources and references, but were still sometimes aware that they could be more efficient in this regard. Surprisingly, many students were not using bespoke reference management software, instead, relying on more general-purpose office products.

- “I am cataloguing [named period of authors in named field] in the British Library.” (MPhil History student)
- “I am logging source materials on a train. [...] I would like to know more about Excel – I never had Excel training and think I could use it much more efficiently.” (MPhil History student)

Some of the taught postgraduate AHSS students we worked with had developed their own approaches and practices in terms of sharing information, without any formal guidance or instruction, but on an ad hoc basis, primarily through conversations with their peers. One MPhil student had arrived at a novel solution in terms of spreading work across their peer group:

- “My classmates and I are using Google spreadsheets to divide up the readings for seminar tomorrow. Each of us are voluntarily (with no instructor involvement) assigned a text that we should focus on especially, so we don’t miss any important details about it in class. [...] It

goes well every week! The system has worked very well and ensures that at least one person is ready to speak on every reading in class.” (MPhil History student)

A factor which had a strong influence on the information management practices of our taught postgraduate AHSS participants was the fact that they were more mobile than their undergraduate counterparts, working in different locations, often, for various reasons, away from University buildings, networks and infrastructure. These students were also often using mobile-friendly tools and approaches to manage information whilst in Cambridge.

- “[I’m listening to a podcast on situation ethics, looking for analytic and evaluative questions. [...] Couldn’t make notes while driving. Had to take quick notes while picking someone up from the station. Perhaps if I had telephoned myself I could have left a message (hands free) and so taken notes.” (PGCE student)
- “I am taking secondary reading notes for an essay I must write, based on pictures of pages I took on my cell phone. I do this when I don’t want to check out a book (because I have taken a look in the index and decided that I would not need all of it), but it is definitely not the most ideal way to read! [...] Although I know it is environmentally problematic, sometimes I do wish there were ways to have all of our class / paper readings in hard copy without having to lug around big books in our bags.” (MPhil History student)

Undergraduate students in Science, Technology, Engineering and Medicine (STEM)

When asked about the sources of information they used over the course of their studies, the large majority of undergraduate STEM students we worked with cited lecture handouts and notes as being of paramount importance. In some subjects, such as those within the Natural Sciences, particularly during the early stages of undergraduate study, students were confident that they could prepare for and succeed in their exams and assessment by relying solely on these sources. In addition to lecture notes, many undergraduate STEM students during our research relied on a few core textbooks for more in depth information, referring to these when they wanted to explore a topic in more detail or when they were looking for a different academic ‘voice’ to clarify a concept they were struggling to understand. When asked in interview about how they kept track of and managed the information they referred to over the course of their studies, many undergraduate STEM students were surprised and confused by the question, often asking for clarification.

- “...basically, everything will be kept until at least third year. I probably won't have it in Cambridge, like my organic notes will probably come back with me next year, because I'm doing Organic Chem [sic] next year, and the bits of the Physiology that I'm interested in, and

apply to Pharmacology will probably come because they apply, but then again they're on Moodle, so you might not bring them. Or have them in some kind of form. But I think the stuff, the stuff that I'm not going to use again, that I have no interest in, like Genetics, will probably stay at home, so I can dig it up, but it will probably never be touched again. (1st year undergraduate Natural Sciences student)

In some subjects, particularly those which were more essay-based, students were making use of and referring to academic articles. This activity and approach was more prevalent amongst, for example, students studying subjects such as Geography, Psychology and Biological Anthropology. When students studying more exam-based subjects did delve into the academic literature, this was largely out of personal interest in a specific topic. This behaviour was common amongst students who were interested in pursuing further HE study and careers in academia. Undergraduate STEM students who were engaging with academic sources in this way had rarely developed sophisticated approaches to managing their sources, references and files. Most did not seem to be particularly conscious of or reflective about this, but those that were understood that a more systematic approach to managing information could be of value to them and on occasion regretted not having put these steps in place.

- "I am not very disciplined about saving my citations right away and I end up having to search for the Harvard style citation in Google Scholar again when I finish writing essays and coursework – this is annoying and I do not yet have a good workflow set out for this." (2nd year undergraduate Geography student)
- "[I'm] sorting out files on my laptop and trying to go through old supervision essays with feedback from supervisors. [It's] a bit confusing because I've got so many versions of the same file and I don't always keep track of my supervisor's emails/files. I wish I'd organised stuff better from the start but I guess I've just got to work with this now." (2nd year undergraduate Geography student)

In many STEM subjects, undergraduate students are managing a large number of printed and digital information sources. This has implications for information management, and also informs other aspects of the ways in which students study, including workspace needs and preferences.

- "I am finishing a lab report, but this requires me to collate a lot of information from disparate sources, which requires a big space and so I need to do this in my room." (2nd year undergraduate Natural Sciences student)
- "... whereas the [named Cambridge library] you get a lot of desk space, we can sort of spread out, but we do feel odd, and have to hide our calculators a bit, because we feel like we're slightly traitorous for using the arts library!" (1st year undergraduate Natural Sciences student)

Despite often relying less on traditional academic sources such as books and journal articles than, for example, undergraduate students in AHSS, information management processes and considerations for undergraduate STEM students can be complicated and multi-faceted. One Physical Sciences student we worked with described the process of collating and structuring various different forms of data and information related to a specific fieldwork project:

- “[I’m] spreadsheeting fieldwork data (transferring from field notebooks). One of a few remaining tasks after the field project that is also my BA work. Data might be useful later and it’s just a good thing to take care of early [...] Combining information from the field guide with my own field notes and sketches.” (2nd year undergraduate Natural Sciences student)

When prompted to talk more about this process during interview, the student mentioned that they had, in the past, attempted to digitise their field notes, but had struggled to do so due to the nature of the waterproof material from which the note books were constructed.

Taught postgraduate students in Science, Technology, Engineering and Medicine (STEM)

We worked with taught postgraduate STEM students from a range of disciplines. These students were using and managing a wide variety of sources, ranging from academic articles and conference proceedings to large industrial and governmental data sets, alongside quantitative and qualitative data they had gathered through their own research. These students were often tasked with analysing data in a sophisticated way, as well as with assessing and reflecting on the ‘quality’ of the data they found.

- “[I’m] working on my thesis [...] currently struggling with the format of some data, though. I struggled a bit to get access to the data I required, and now that I have it it appears to have the wrong format. Will see how to solve this. [...] The dataset is very big and not very easy to interpret.” (MPhil Engineering student)

These students were often using specific statistical software for data analysis, as well as for reporting and visualisation. We found that many students felt underprepared in the use of these products, often feeling that they could have benefited from more guidance in this area.

- “[I’m in a] small group seminar on management of routine data in primary care research. Useful information. Statistical software daunting and unfamiliar.” (MPhil Primary Care student)
- “I’m in the Library trying to understand the MATLAB models created by a past student who worked on a project related to my dissertation [...] I feel a bit bad about this since I should

be further along than I am and I don't want my supervisor to be disappointed." (MPhil Engineering student)

In some areas, Graduate Medicine for example, students were also having to manage a large number of lecture notes and handouts in a similar way to many undergraduate STEM students and, due partly to the intensive nature of their course programmes, had specific concerns in this regard.

- "It's frustrating that we have to print our own handouts and also the lecture handouts come out very late, sometimes after the lectures. [...] We should be provided with handouts." (2nd year Graduate Medicine student)

Most of the taught postgraduate STEM students we worked with had to complete either a final project (for example with an industrial partner) or dissertation as part of their degree programme. This meant that they needed to keep track of a large number of information sources over a comparatively long period of time. Some students were using reference management software to do this, but often thought of their approaches and practices as in need of development. These practices had often developed haphazardly and individually, with little advice from peers, librarians or academic staff.

- "I still have trouble getting Zotero to look professional, which is definitely my fault since there are plenty of people who can teach me to use it properly, I've just been too lazy to do that." (MPhil Engineering student)

The focus on group work in some of our participants' course programmes led to issues related to information management, specifically the ways in which students shared information and collaborated on documents. Approaches to this activity had generally developed through groups of students using the tools with which they were familiar and designing processes to fit their needs for an individual task.

- "[I'm attending a] group meeting for making a presentation on a consultancy project to design a [specific conservation engagement event] for students. We were hoping to get our ideas together and decide what to include in the presentation. It went well, but we agreed we needed one document with all the information." (MPhil Conservation Leadership student)

5. Critical Assessment

Approaches and practices related to the critical assessment of information were not often mentioned by our student participants. It is worth noting, however, that the critical discussion of academic sources was an integral part of the work many of our student participants were undertaking. It may be that, as this was so embedded in their work, this led to students mentioning it less. The fact that our research in this area, and the questions we asked students, focused on their

underlying 'academic skills', may also have led to less emphasis and comment from students in this area during our work.

Undergraduate students in Arts, Humanities and Social Sciences (AHSS)

The AHSS undergraduate students we worked with generally did not reflect to a great extent on the academic 'worth' of the information sources they were using. This may have been due to the fact that, for the majority of the time, their reading was dictated or guided by supervisors and other academic staff. We found that students rarely considered, or articulated that they had considered, the ethical implications of using and citing different information sources. When they did reflect on their practices in terms of choosing sources to read and cite, the motivation often came from a wish to produce something different to their peers, or to find sources that they would enjoy reading and writing about.

- "[I would advise students to] read about things that interest you and cultivate your niche [...] because they make your degree more satisfying. Also, it's easier to write 2,000 words on something you're genuinely keen on." (2nd year English undergraduate student)
- "I am still learning to be more selective with secondary reading. It's difficult to guess which book will be relevant to my essay or dissertation, or will be enjoyable to read." (2nd year English undergraduate student)

Our AHSS undergraduate student participants did, on occasion, mention that they struggled to discern and assess which information was important and relevant to the assignment or task they were undertaking. This was closely linked to a desire to be able to read and process information effectively. For these students, the perceived relevance of the source to their current essay question or assignment was the primary factor which influenced whether or not they would include it in their discussion.

- "[I'm] not sure if it falls under particular academic knowledge but reading and understanding the work to do with Law always takes so long. Whenever I do the reading it really pushes my comprehension and I have to read sentences over and over to actually understand what is being said. I feel I lack the skill of speed reading and being able to find relevant bits of the text efficiently." (2nd year undergraduate Land Economy student)
- "I usually find readings take me far longer than I anticipated, and I find it difficult to balance efficiency in reading them with thoroughness of note-taking and making critical

notes / putting down ideas simultaneously.” (3rd year Education and Modern and Medieval Languages student)

- “Using a long reading list, I have been able to narrow down the works which are useful for me by coming to the University Library and carefully deciding whether or not they will be of use before borrowing them. I have found the Library to be very useful in helping me find the right resources as I can peruse the shelves and take down books which look of interest, without needing to know exactly what books I am looking for beforehand.” (1st year undergraduate History student)

Taught postgraduate students in Arts, Humanities and Social Sciences (AHSS)

The approaches and behaviours of the taught postgraduate AHSS students who took part in our research were similar to those of the undergraduate students. Often, approaches to assessing sources of information were haphazard, with students focusing on what they needed to do to achieve their current task, rather than reflecting on their practices and on ethical issues related to the nature of the information they read and included in their work.

Undergraduate students in Science, Technology, Engineering and Medicine (STEM)

As mentioned previously, these students were often working with very prescribed sources of, and routes to, information. When looking for additional sources of information, the undergraduate STEM students who took part in our research, similar to students we worked with in AHSS, made judgements about the sources of information they read and cited this was often with a focus on using different sources to their peers, in order to produce work that seemed ‘original’.

- “I [...] also want to find another text that hasn’t been recommended to the whole class to make my essay different.” (2nd year undergraduate Natural Sciences student)

When these students did reflect on their practices related to assessing sources of information, it tended to be in terms of how relevant they perceived those sources were to their assignment, rather than in terms of wider considerations around the integrity or value of the sources themselves.

- “[I] wish I was better equipped at finding out which readings matter more than others.” (2nd year undergraduate Geography student)

- “I’m reading the abstracts of lots of studies to decide what to read in more depth. [...] I’m not very good at being harsh and clear and getting rid of things – basically ascertaining what is useful and what isn’t.” (1st year undergraduate Psychology student)

Taught postgraduate students in Science, Technology, Engineering and Medicine (STEM)

We noticed an increased awareness and relatively high levels of reflection from the taught postgraduate STEM students we worked with, in terms of using ‘the right’ data and information, i.e. that which they could use in a credible way for the outputs they were tasked with producing. Similar to the undergraduate STEM students we worked with, this was mainly in terms of whether or not the data and information they found would sufficiently support their work. During our research, these students rarely reflected on wider issues around the comparable ‘worth’ of information and the ethical implications of its use.

- “[The] reason for my being slow is probably due to excessive precision in the search for reliable sources and counterchecks. Still, probably better so than having flaky content.” (MPhil Engineering student)

Our taught postgraduate STEM student participants did, on occasion, reflect on the reliability of the sources of data they encountered over the course of their studies. They were also more aware of having to make checks between different data sources in order to verify the reliability of data.

- “[I’m] doing background reading to try to come up with a business idea for a marketing project [...] It feels like we are slowly making progress. Struggling to find the right information sources. We don’t know how to do real market research or what data sources will be useful and reliable.” (MPhil Engineering student)
- “[I’m] working for an assignment. [...] It’s taking some time to put together the correct data, as it is very diverse and I need to counter check any calculation I make with other sources. All data taken from institutional webpages.” (MPhil Engineering student)

6. Creating and Communicating

Undergraduate students in Arts, Humanities and Social Sciences (AHSS)

Most of the undergraduate AHSS students we worked with were primarily communicating information in a written form, producing essays (assessed or unassessed) and dissertations. Although these did not represent the full breadth of the forms in which these students were creating

and communicating information, alongside written exams, coursework essays and similar outputs were the primary mechanism by which these students were assessed. As a result, the AHSS undergraduate students who took part in our research tended to be conscious of and reflective about many aspects of their essay-writing approaches and practices.

Although many of the students we worked with were confident in terms of their approach to reading and researching for, planning and writing essays, there were some areas in which they felt unsure, or in need of more advice and guidance. Some of our participants experienced a level of anxiety related to balancing their own voice with the academic discourse and literature.

- “I am also working on how to engage with the critics in my essays; how to not drown out my own voice with their views.” (2nd year undergraduate English student)
- “I am also not sure where/when I am being insufficiently or too critical, and different supervisors value your own voice differently. Some want a citation/proof for everything, others are happy for your own critique and thoughts to come through as they are, provided they have good grounding/you can justify them.” (3rd year undergraduate Education and Modern and Medieval Languages student)

More generally, students were often unsure about the style in which they should write, specifically to create what they often referred to as ‘a good Cambridge essay’. Many AHSS undergraduate students who took part in our research mentioned being confused in terms of broad aspects of essay-writing practice such as structure, style and tone, this confusion often exaggerated by the fact that individual supervisors and academics had different expectations and preferences in these areas.

- “[I wish I had] a more clear understanding of what makes a good Cambridge essay from the get-go, rather than having to guess based on supervision feedback, which isn't always that consistent.” (3rd year undergraduate Human, Social and Political Sciences student)
- “I find structuring difficult. I have gotten better with signposting but a lot of the feedback [from a recent supervision] was about indicating the relevance of a paragraph and framing the beginning and end.” (3rd year undergraduate Education and Modern and Medieval Languages student)

With such a strong focus on communicating information and ideas in a written format in their programmes of study, the undergraduate AHSS students we worked with had often had little experience presenting their work in other ways, as a result feeling under-practiced and underprepared when they were tasked with doing so. This was particularly the case when students were asked to give in-person presentations to their peers. Students often felt underprepared and confused as to what was expected of them, as well as feeling worried and anxious.

- “[...] I also wish there were a clearer set of explanations about what is expected from class presentations. I used to really enjoy presentations but lately I’ve found them unnecessarily stressful – I can never convey the amount of information I want without stumbling over my words.” (4th year undergraduate History student)
- “I need to do the background reading and then write the short essay for submission tomorrow, as well as prepare a presentation which I will be giving in the class on Tuesday. [...] I feel nervous about this task as this will be the first time I will be giving a presentation to a class since coming to Cambridge.” (1st year undergraduate History student)

Taught postgraduate students in Arts, Humanities and Social Sciences (AHSS)

The taught postgraduate AHSS students we worked with over the course of the Student Learning Journey project were very conscious of and reflective about their academic writing and the associated outputs they were tasked with producing. Most had developed their essay writing style over the course of their undergraduate studies, so were often more confident in this regard than the undergraduate students. One issue, however, was that at this point in their academic careers students often wanted to produce in a way that they felt was sophisticated and professional. This led to feelings of frustration when students felt they had less time than needed to produce the work they had been set. The individuals we worked with had sometimes received little support or guidance in this area, which led to them developing very individual practices. Some of the students we worked with specifically mentioned that they would have liked to have had more formal teaching and training in terms of how to best approach writing essays.

- “[...] Per usual I feel I don’t have enough time to both read and write properly. [...] I really wish I were faster at reading/taking notes/writing. That way I’d actually have time to do a second draft and produce ideas I am proud of.” (MPhil Land Economy student)
- “I feel like I could have received an additional refresher on essay planning and time management specifically in the context of essay prep/writing. My friends and I often talk about how we drill ourselves into a perpetual reading hole (we would just continue to find new sources to read) to avoid the start of writing.” (MPhil History student)

In comparison to AHSS undergraduate students, these taught postgraduate students also often needed to communicate their work in different ways and to different audiences. This led to an increased awareness amongst these students in terms of their approach to creating information, specifically aspects such as language, tone and ‘voice’. Students undertaking study in AHSS at this level are often specialising in reasonably niche areas, as a result needing to carefully consider how they communicate their work, including amongst their peers.

- “I am writing up an abstract for a talk I will give on my dissertation work. [...] To approach this task I’m basically just putting together the most basic background bits on my research, because the talk will be for a general audience.” (MPhil Land Economy student)

As with many of the students we worked with, our taught postgraduate AHSS participants often felt less confident when asked to present their work to an audience in-person.

In addition to outputs such as essays, dissertations and in-person presentations, the taught postgraduate AHSS students we worked with were occasionally creating and communicating information in less traditional ways. One example was a PGCE student who was creating a ‘knowledge quiz’ for students:

- “I had a free period in which I researched [specific area of education] on the internet to create a knowledge quiz. [...] I wanted a quick true or false assessment. In so choosing I was applying assessment learning from yesterday. Not yet sure this is well applied.”

Undergraduate students in Science, Technology, Engineering and Medicine (STEM)

The undergraduate STEM students who took part in our research were studying a wide range of subjects and were creating and communicating information in a number of different ways. Although many of the subjects these students were studying were primarily exam-based in terms of their assessment, students were tasked with producing varied outputs alongside this, both individually and as part of groups. These included essays, reports and presentations, alongside some less traditional outputs.

- “We are writing a 2000 word business-style article that we should aim to publish in a magazine and in our last group meeting we divided the topic into three parts but no longer want to continue with the industry we have chosen to research. The supervision is on Thursday so we need to submit a provisional idea and argument of our article but the article is dependent on data.” (4th year undergraduate Management Studies student)

Students undertaking undergraduate study in STEM are often working with data; finding, analysing, and visualising. The students we worked with often needed to produce reports and other outputs which featured data visualisations alongside written text.

- “[I’m] running visualisation of a numerical model (of [named geological occurrence]). It is an important part of my hoped research project and I am now checking it to complete a proposal. Now I’m just cherry picking best views and making a list of which areas will be most suitable to analyse first. Visual aspect is calming but generally writing is more difficult and stressful. A lot has to be compacted to a short coherent document.” (2nd year undergraduate Natural Sciences student)

- “[I’m currently doing] compiler construction supervision work [...] The questions were long and required setting out work very neatly in order to be legible (large, complicated graphs)... I am not the best at this.” (2nd year undergraduate Computer Science student)

As with the other student ‘groups’ under study, our undergraduate STEM student participants often felt uncomfortable when they were asked to present and communicate their work and ideas in-person, particularly when this involved presenting to an audience of more than a few people. A lack of familiarity and experience meant that it was more difficult for these students to communicate information in this way, i.e. verbally and concisely.

- “[I’m] preparing to tackle a presentation due next week [...]. Need to know what readings to do which are relevant to the presentation. [...] Being able to condense [the presentation content] succinctly is a challenge for me.” (2nd year undergraduate Geography student)
- “Repeating your essay argument orally is quite difficult, but [I’m] getting better with practice.” (2nd year undergraduate Geography student)

Some of the students we worked with were creating and communicating information in various other ways, both as part of their curricular activities and as part of non-curricular activities which related to their studies. This was particularly the case for students who were interested in pursuing further HE study after their undergraduate degree.

- “[I’m] managing a page and Instagram account where I try to engage people with science and especially geology. It might not seem like exactly a study activity, but before posting I research every topic I want to introduce and get some engagement from the readers/viewers. So at the same time it’s a revision and a way to learn clearly and formulate my thoughts about often complex scientific concepts.” (2nd year undergraduate Natural Sciences student)

Taught postgraduate students in Science, Technology, Engineering and Medicine (STEM)

The ways in which our taught postgraduate STEM student participants were creating and communicating information were varied and diverse. Due to factors such as working with partners in industry, and due to the practical, applied nature of their course programmes, these students were often communicating their work to different audiences, each with different levels of academic knowledge in the students’ areas of study. This led to specific concerns related to how to best approach communicating ideas and approaches. Students often had to communicate aspects of the same project or assignment to people both in and outside of academia.

- “[We’re] working on formulating a project plan for an industrial project. We needed to unpack the terminology and identify appropriate data sources, as well as communicate our approach to the client and tutors.” (MPhil Engineering student)

Some of the students we worked with had attended lectures and other events which dealt specifically with communicating academic work to different audiences and through a variety of media. This was often due to the fact that this would be an important aspect of how they would go on to apply the knowledge gained through their course in the work place. Some of these events were compulsory for students and some were attended in addition to their compulsory study activities.

- “[I have just attended a] media workshop, learning how to communicate clear messages in traditional media. It went well, I learned how to construct a focused and interesting message and engage in interviews.” (MPhil Conservation Leadership student)
- “[I’m attending a GSLS [Graduate School of Life Sciences] course on academic writing. [...]] Very useful session on how to best present your work for publication, how to choose a target journal and tailor your paper accordingly etc. This course has filled a gap in my knowledge and made me feel more confident to approach the task of writing up my work for publication when the time comes.” (MPhil Primary Care student)

Alongside writing content and visualising data in convincing ways, for some of the taught postgraduate STEM students we worked with, an important part of their studies involved creating drawings and diagrams, particularly in terms of preparing work for practical sessions and revising for exams. This was similar to activity we witnessed amongst some undergraduate STEM students, particularly those studying the Natural Sciences. Two Graduate Medicine students who participated in our diary study made the following entries:

- “[I’m] preparing for the practical session laboratory organised by the University. Making notes and diagrams. [...] It is difficult to study for a laboratory session because the manual given doesn’t have any pictures or diagrams and you have to make yours. Study session would go better if I would be more talented at drawing. Manual doesn’t have pictures or diagrams and because it is so dense you spend 3-4 hours per session to make notes and diagrams to aid learning.” (2nd year Graduate Medicine student)
- [I’m doing] some anatomy colouring because (a) the vascular teaching reminded me of how much vascular anatomy I’ve forgotten and (b) not feeling like doing anything requiring too much brainpower. Got some teaching at half 5 so want to be productive until then.” (4th year Graduate Medicine student)

Taught postgraduate students who are interested in pursuing further study within HE are often applying for funding to do this at a reasonably early stage in their studies. Due to its nature this process is almost by definition new for students and requires them to communicate information in an unfamiliar way. One of the taught postgraduate STEM students we worked with described their experience:

- “My current study activity is filling out the application for a Wellcome Trust award for my doctoral studies. [...] It is going relatively well, though I’m having some trouble figuring out the best way to format it. I will be very relieved to finish it! [...] This is definitely not something that I’ve done before, so I’m basing the formatting on two sample applications that my supervisor sent me. It would be good to have more experience grant writing - but the only way to get the experience is to do it!” (MPhil Health, Medicine and Society student)

In addition to creating and communicating information in the various forms outlined above, some of the taught postgraduate STEM students we worked with were doing so in very specific ways, due to the nature of their discipline and the work required of them. This ranged from using specific software to produce documentation and other outputs, to designing and developing research tools.

- “[I’m] working on an essay. [...] I’m probably not very good at essay-writing, plus LaTeX is not the most friendly environment for creativity.” (MPhil Engineering student)
- “I’m starting a new bit of coursework for [specific named module]. We have to design scaled down wind turbines that we can 3D print and test.” (MPhil Engineering student)
- “[I’m attending a] small group survey design practical session. [It’s] daunting to have to design a survey, having no previous experience of this research method.” (MPhil Primary Care student)

7. Other key insights from Student Learning Journey project

The following section of the report contains themes with a number of the insights gained over the course of the Student Learning Journey project, which we hope will be of use in informing the continued activity of CILN.

7.1 Pre-arrival and arrival

Arriving at University is a key transitional period for students, which often involves a great deal of change, in terms of their teaching and learning, and in other, varied aspects of their lives. Key insights from our work with students in this area include:

- For students, understanding their course structure, projected workloads, levels of contact time, and so on, allows them plan efficiently and work out where they will need to focus their efforts during their course, as well as over each academic year. Being informed from an early stage about what is involved in their course and what is expected of them can be extremely beneficial

to students and increase their confidence. Students often mentioned wanting more clarity around course structure etc. before arriving at the University, in order to be able to plan, prepare and aim to 'hit the ground running'.

- Undergraduate student expectations in terms of contact time, nature of teaching, etc. can be informed to a large extent by experiences at A-Level- or other previous- study. For some students, when they arrive at University and these expectations are not met; this can be a confusing and stressful experience.
- Some students enjoy and respond positively to the level of autonomy they are given early on in their course. This is often the case when students have had more 'life experience', i.e. a gap between A Level (or equivalent) and undergraduate study, or between undergraduate and taught postgraduate level study.

7.2 The student journey

Student approaches, perceptions, goals and motivations can shift dramatically over the course of the time they spend in taught Higher Education courses. The research we conducted with Cambridge students over the course of the Student Learning Journey project highlighted that:

- Student knowledge of what Cambridge libraries can provide often takes some time to develop; positive student perceptions of these libraries and their services often increase over time. For students enrolled in one-year taught postgraduate course programmes, which can in fact often take place over fewer than 12 months, this knowledge sometimes only develops in the latter stages of their studies at Cambridge.
- Taught postgraduate students during our research mentioned that, due to the short nature of their course programmes, they did not see an opportunity to produce work and receive feedback, in order to produce work again having refined their technique and approach.
- Students, particularly taught postgraduate students and latter-stage undergraduate students, are often looking to learn and develop skills and practices which will be applicable beyond their studies, in the 'real world'.
- Undergraduate students who are aiming to pursue research in the future are actively looking for opportunities to develop the necessary research skills.
- Some students only understand the depth and breadth of their course when it 'all comes together' at the end of their programme of study. This is particularly true for undergraduate students in areas of the Arts, Humanities and Social Sciences. Students can be confused and frustrated at having to study a large number of topics at a relatively low-level of depth, as they are keen to specialise early and struggle to see how their course will allow for this.

7.3 Student approaches to learning

The ways in which students approach their learning experience can differ greatly, on an almost individual basis. There were, however, some identifiable themes amongst the students we worked with over the course of the Student Learning Journey project:

- The size of a student cohort, particularly for taught postgraduate students, has a large impact on the experiences students have and the ways in which they approach their studies, for instance in terms of the routes they take when looking for information and for guidance and assistance. An example would be a student enrolled in a Masters programme with 20 other students, which may mean a higher likelihood for the student to turn to their peers for advice in all or most aspects of their studies.
- Students will often return to a central place or person for support with their academic skills. For undergraduate students this often means a supervisor; for taught postgraduate students it can mean a course convener or similar figure. The nature of Cambridge teaching means that students often see the person who has set or is responsible for an assignment as an authority and point of contact for all aspects of that work, which means that they will in many cases approach them for everything related to it, including the underlying academic skills involved.
- Many students have 'added' compulsory activities, for example Theology students may be learning a language and Natural Sciences students may be taking papers in Maths. These can be assessed regularly so students often approach these aspects of their studies in a similar way to supervision work, often on a similar cycle. Scheduled study events for these papers can clash with other timetabled events. Students sometimes miss these and this can add to anxiety and feelings of being overwhelmed.

7.4 Other key insights

- Cambridge taught-students, particularly postgraduates, are increasingly mobile, studying and learning 'on the go'. Students during our research were using educational podcasts to support their learning, visiting other institutions to use special collections and archives, as well as conducting more routine aspects of their studies (for example communicating with peers and academics, managing calendars and diaries, etc.) whilst travelling.
- 'Study skills', 'academic skills' and so on can be seen as very individual by students and therefore training in these areas can be seen as not useful when it is not delivered on a one-to-one basis. Students during our research mentioned that they would not attend training sessions as they felt their own approaches and practices were specific to them. It is possible that this perception and behaviour on the part of students is in part down to the terminology used, for example, 'study skills'.

- Terminology can be either a barrier or gateway to information. Students who participated in our research mentioned feeling underprepared and out of their depth when their peers seemed comfortable using terminology that was unfamiliar to them. Other participants mentioned that when they came to understand certain discipline-specific terminology this made the experience of finding and using information a lot simpler for them.
- There can sometimes be an expectation that students, particularly at taught postgraduate level, will have a certain level of knowledge and experience in what can be seen as 'basic' study skills and practices. Examples include being able to use aspects of functionality of MS Office products such as PowerPoint and Excel, and being able to manage and interact with information in the ways necessary to pass exams. Students who took part in our research often felt that they lacked the knowledge which was assumed of them in these areas, and mentioned that they had received little guidance from the University in this regard, for example, the 'front-loading' of training and advice in their course programmes.
- Dissertations can be seen by students as more important than the weighting they receive could, or should, dictate. Students we worked with mentioned that this might be due to the fact that these outputs are marked more 'closely' than other assessed work, regardless of the percentage of the student's final mark that they account for.

8. Conclusion

Our research over the course of the Student Learning Journey project has taught us a great deal about the ways in which Cambridge students study and learn at the University. Specifically, the digital diary study and in-depth interviews we conducted during the latter stages of the project highlighted the sheer variety of ways in which Cambridge students need to interact with information and data over the course of their studies. We hope that the summary of the findings of this work, as presented in this report, will be useful in information the ways in which Cambridge libraries continue to support the learning experiences of students at the University.

It is important to stress that the insights and observations above were arrived at as a result of an intensive period of qualitative research, conducted with Cambridge students from a number of disciplines and at different levels of undergraduate and taught postgraduate study. We do not claim to have provided a comprehensive overview of Cambridge student experiences and practices related to information literacy, however, we hope that through working with individual students in depth, we have uncovered insights into the varied and nuanced ways in which Cambridge students approach finding, managing, assessing and producing information.

Listed below are the questions and responses from the brainstorming exercise we conducted with Cambridge library staff in the initial stages of the project.

“What has been the most interesting thing that a student has said to you in the last year, in terms of how our services are perceived?”

“What do students know about and what don’t they know about, in terms of the services we offer?”
How might we better communicate to students the services we do offer (if you think a change would be desirable)?

1. Someone was really surprised at the lack of keeping resources over vacations (UL).
Someone described the UL as a ‘studying supermarket’ > different spaces, food, friends.
Some people are not looking for human interaction – at least in libraries. Shy people want automation and this is not necessarily a bad thing.
“Why can’t my Maths photocopying/scan/print credit work on [Moore] Library copiers/printers?”
“Why is iDiscover displaying the wrong classmark for the book in my hand (Marshall)?”
“Why can’t we have the FT?”
“Can we have a sleeping pod?” (!)
I was giving a talk to 25+ taught masters students when one suddenly asked, “Why can’t we have a digitised reading list?” and everybody nodded. I did do this and they were all very pleased.
A student at the open days (main UL) was not aware (before this) that he could access the main UL Library.
Library services reflect the personality and attitude of the library – past students remember us!
A dismissive non-user (potential user) of the library didn’t see themselves as having a role in developing library services which do suit them.
Students expressed pleasure and surprise at being able to recommend books for the library to purchase.
Student to group of prospective students: “It’s all right for what it is.” (Librarian scream)
“The UL terrifies me.”

2. *Do they?*

Can ask questions.
Can use different libraries, college, department,
BUT don’t know these have different rules.
Inductions – always expecting tours / inductions.
They know we have data / newspapers.
They are polite and appreciative – some of them / sometimes.
They know which libraries are 24/7.
Referencing and citations > they know we can offer advice.
They know we can help them find books in our collections and on the catalogue.
Expert advice on referencing and reference management tools.
Ask us for help accessing eresources.
We provide them with books.

Don’t they?

Print credit. Eresources. iDiscover.
Recommend books / ILL.
They can recall books from other people.
Don’t know we buy books on demand! Or scan on demand.
We support referencing.
Don’t know we have some books on iDiscover.
Don’t know how much it all costs.
VLE – Moodle. They don’t know that the Library runs it.
Ebooks – they don’t know where to request ebooks.
Research methods – I had a student asking for advice on doing Rapid Evidence Assessments when it was nearly hand-in day – they did not know which library could give this advice. > Points of contact.
Don’t know that Library provides eresources as well as print – all e is free!
Don’t know complexity of systems behind the scenes
Books requests.
Accessing electronic journals / databases – troubleshooting
Help with literature searching etc. (particularly college libraries).
Welfare + support.
Help accessing electronic resources.
Access to college libraries for non-members.
Access to faculty libraries that aren’t for their subject.
That Cambridge libraries work together!

3.

Work more closely with DoSs, fellows, tutors! > especially for lecture timetables and supervisions.

We should organise events to get closer to students. > Like speed-dating (librarians and different subject specialists Q&A that was English/MML.

More anonymous feedback opportunities.

Social media – tap into existing social networks. Best way of communicating information is students to students. In CU undergrads the most permeable way is colleges (propinquity).

Gamification, or instructional videos – more fun, and incentives to communicate the otherwise 'dry' info.

Better marketing.

Not social media – “too much noise”.

David Blaine-hypnosis > subliminal messages that get through the “noise”.

Desk in dept. / mobile desk (Moore). “Pop-up library”.

Free earplug dispenser – apparently this is really popular.

Pre-arrival & contact with details of how to... training, contacts, intro from faculty, your librarians.

Aware of events.

DoSs need to be aware of what is available. Need their buy-in to library training sessions.

More digital immersive ways of working, e.g. texting, Snapchat, etc.

Why not just email?

Ask them / use written walls. Faculty buy-in. Administrators – their buy-in too.

Good relationship to depts./libraries.

Every opportunity to communicate integral to the course / comms.

Needs to be instinctive for administrators to free flow information.

No more emails!

Focus on one service at a time and keep messages simple.

Use of whiteboards – can ask a specific q for feedback or promote a service.

Being visible (e.g. outside dining hall).

Getting academics on board and promote services.

Projects like Futurelib help! – Show that libraries are interested in the student experience.

A universal resource (website? Libguide?) allowing students to identify their subject and college and click through to resources/services that would be useful to them.

1-2-1 communication – also with key student bodies e.g. JCR.

Email, posters, social media used – BUT NOT necessarily effective.

Emails.

Posters in the library and around the college.

Induction information made available on social media.

Tea + biscuits / informal chat.

More centralised library information.