Digital Literacies in Higher Education

Guide Information

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Description: Key messages from the JISC-funded project focussing on postgraduate students at the Institute of Education

Tags: digital libraries, diversity, information overload, mobile devices, mobile technologies, mobility, online user behaviour, pervasive technologies, social media, spaces, student resilience, support systems, time pressures

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Introduction

Definition: Digital Literacy

JISC's definition of *Digital Literacy* is 'to develop those capabilities which fit an individual's living, learning and working in a digital society'.

About this guide

The 'Digital Literacies as a Postgraduate Attribute' project was run at the IOE between 2011 and 2013 and is one of twelve recent JISC projects in the broad area of academic literacies. This guide summarises the findings and key messages from this study. Though the research project focussed on postgraduate students (the IOE being mainly a postgraduate institution until its recent intake of undergraduate students in 2012), the findings share similarities to other user behaviour studies such as the Google Generation and User Behaviour in Resource Discovery studies which focus on undergraduate students.

Introduction

The development of Digital Literacies is becoming an increasingly urgent priority across the Higher Education sector. If universities are to harness the potential of new media for education and graduate preparation, they must view the sustainable development of digital literacies as a mainstream priority. However, this is challenging where both staff and students have greatly varying degrees of experience of, and orientation towards, technologies and their associated social practices.

The JISC projects have found that the most effective means of achieving this is from development work to be specifically targeted, holistic, contextualised and mapped across programmes at an institution. The SLiDA study also found the introduction of appropriate graduate attributes was an effective means of mainstreaming this development. This is arguably challenging in contexts where mature postgraduate students predominate. The timeframe for postgraduate study is short, the curricular 'space' is severely constrained, and the burden of responsibilities outside university is greater in terms of work and family commitments.

About the Digital Literacies Project at the IOE

At the Institute of Education (IOE), challenging factors for students like time, space, other responsibilities prevail. The IOE also has a proportion of international students for whom taught master programmes present a considerable challenge in terms of literacies and modes of research and scholarship online. The challenge at the IOE is, therefore, different in several respects from that faced by a multi-faculty, predominantly undergraduate higher education institution.

Project Team

Lesley Gourlay, Senior Lecturer in Contemporary Literacies Director, Academic Writing Centre, Institute of Education
Martin Oliver, Reader in ICT in Education, Head of the Learning Technologies Unit,

Deputy Co-Director of the London Knowledge Lab
Jude Fransman, Postdoctoral Researcher, Culture, Communication and Media, Institute of Education
Wilma Clark, Research Assistant, Culture, Communication and Media, Institute of Education
Stephen Hill, Instructor in EAP, Culture, Communication and Media, Institute of Education
Nazlin Bhimani, Research Support & Special Collections Librarian, Institute of Education
Barbara Sakarya, International and Comparative Collections Librarian, Institute of Education

Aims and Objectives

Aims

1. To understand the needs of three main groups of students at the Institute of Education (IOE):

    - Doctoral
    - Taught Masters
    - PGCE.

2. To investigate institutional readiness for sustainable change around digital literacies in terms of:

    - Processes
    - Relationships
    - Staff Expertise.

3. To implement three initiatives, addressing different areas of need:

    - Developing approaches to support distance students' development of academic writing.
    - Exploring students' use of the library and develop a resource that shared this with the sector.
    - Exploring staff digital literacies and use this to create development materials that can be shared with the sector.

Objectives

1. To gain in-depth understanding of IOE students' digital literacies via analysis of existing datasets and new ethnographic research.
2. To evaluate the current provision and opportunities for IOE students.
3. To review IOE institutional readiness for change around digital literacies.
4. To implement three pilots developing digital literacies across different contexts.
5. To explore the needs of IOE staff tasked with developing student digital literacies.
6. To develop exemplar organisational strategies focused on digital literacies as a graduate attribute.
7. To maintain constant dialogue with partners SEDA, ALT and SCONUL, to ensure dissemination and sector embedding of project findings.

Methodology

Methodology

Research on the project was conducted over two years. In year one, an analysis of existing perceptions around digital technologies was effected using national and IOE student survey data and a review of the literature. This was followed by data collection conducted in 2 phases: firstly, using focus groups and semi-structured interviews focusing on engagement with technologies for study. At this stage students were asked to draw maps of their digital lifeworld and, in a second phase, to participate in a longitudinal multimodal journalling exercise in 4 parts using handheld iPod Touch devices. The focus

groups facilitated discussion of experiences of students on different types of course and pursuing contrasting modes and levels of study. The multimodal journalling task was designed to provide opportunity to gain insights into students' engagement with technologies over time, based on their day-to-day practices. In this phase, participants were asked to generate and analyse their own data via a process of assemblage and identification of themes.

The sample for the second phase was drawn from focus group volunteers who were invited to participate further. 12 volunteers were selected to reflect a representative spread across four groups of study (MA, OMRES [Online Masters in Research], PGCE, PhD), genders, nationalities, ethnicities and age (participants were all in their 30s and 40s). Volunteers were given handheld iPod Touch devices which were used to document their experiences and practices. The devices were offered as an incentive, to be retained by participants on completion of the full project.

Three or four interviews were held with each participant throughout the data collection period, with interviews being structured thematically around the images, videos and notes created by the students, or focusing on presentations created by them. Final interviews focused on students' engagements with particular texts, and how technologies and devices had been deployed in the various processes of searching, reading, notetaking and writing. Interviews were transcribed and analysed using close reading for emergent themes.

Scope and Boundary

- Within the IOE
- Baseline data sets analysed and used to design focus groups
- In-depth analysis of student practices across groups
- Scope and focus to attend to breadth and depth in order to gain a better understanding of student needs
- Reflective analysis of institutional readiness for change around technologies
- Implementation case studies – **scale of a module or unit of service**

IOE JISC Project Methodology

IOE JISC project methodology from **Lesley Gourlay**

Diversity of the Student Experience

Diversity of the Student Experience

The contexts within which students are engaging with digital technologies are as many and varied as students themselves. Variables include such things as:

- level of study and prior levels of study;

- mode of study (full, part-time, distance, blended);
- economics (diverse 'hidden' costs of technology adoption and use);
- individual orientations towards technology use;
- available time;
- access to and skills in the use of new technologies; and
- resilience in the face of change/ transition, etc.

The attached is a vignette of an international PG student at the IOE: An International PG Student

Academic Practice is Both Digital and Textual

- Academic practices are overwhelming textual.
- These are situated in social and disciplinary contexts.
- Textual practices are increasingly digitally mediated.
- These practices take place across a range of domains.
- Students create complex assemblages enrolling a range of digital, material, spatial and temporal resources.

Key Messages

1. Understand the students' prior learning and level of confidence in using institute-provided and recommended software and provide appropriate training at all levels, both face-to-face and online so that it can be available in a timely manner.
2. Provide a clear site/visual map of the digital platform in order to provide a holistic overview of content and services available to students.
3. Simplify e-infrastructures bearing in my students' workflows and use of space.
4. Simplify guides and provide a choice of audio/visual/written guides in different media.
5. Expand the availability/opportunities for training/workshops/tutorials, both face-to-face and online throughout the year.
6. Recognise that digital literacies are now part of the academic literacies students need to study and embed these in the curriculum.

Evidence

The 'student experience' is not singular:

- Evidence of marked difference is experiences and priorities across these four groups of students in the IOE study:
  - PGCE, MA students, PhD students, Online masters' students
- Different 'orientations' towards technology use
  - Curation (saving for later reuse), combat (access permissions) and coping (information overload)
- Each student showed different orientations at different times; therefore these were not 'types' of students - the students' use of technologies evolved over time.

Increased Mobility

Increased Mobility

The findings indicate that there is increased mobility among many students. This is evidenced by the following:

- They often travel between sites (work, home, place of study, country-to-country, work commitments away from home, conferences, etc.).
- The majority of participants used more than one library and more than one institution to support their studies.
- Nearly all turn to technology to support remote and immediate access to digital resources for study and other purposes.
- Ownership, size, portability, connectivity (and quality/ reliability thereof) as well as access to, and 'readability' of remote resources are important factors.

Evidence

'A lot of times, ... I'm on the train fairly often... it's easy for me to ... throw the things that I need to read into my bag and do that.'

'I love to get books from the library to go and read on the bus. I feel like I'm very productive on the bus.'

Key Messages

1. Recognise that students expect the following from shared and collaborative spaces:
   - flexible spaces,
   - ease of use of mobile and handheld devices and fast wifi connectivity,
   - multimodel and audiovisual content and
   - video conferencing facilities.
2. Standardise service provision across all stakeholders within an institution in order to ensure familiarity with systems across all contexts, e.g. IT, Library, Academic Writing Centre, etc.
3. Ensure agreements are in place to enable students to use other libraries (either for ease of access or because of subject relevance) via collaborative schemes and to communicate these agreements so that these are understood and widely used.

Evidence

'...if it is [a]... clear day and I have time I like to go outside but if I... do writing ...I prefer my room and using [my] PC ....'

Pervasive Technology

Pervasive Technology

The study found that students' perceptions were that technology is everywhere -- pervasive to the point of intrusion. Some went so far as to describe the presence of technology in their life as 'saturation'. Students expressed concerns at:

- expectations/assumptions that they would be 'always on' or 'always connected',
- the blurring boundaries between personal/social and formal/institutional and
- the need for complex skills in negotiating/controlling their personal and social spaces in an increasingly digitised world.

Evidence

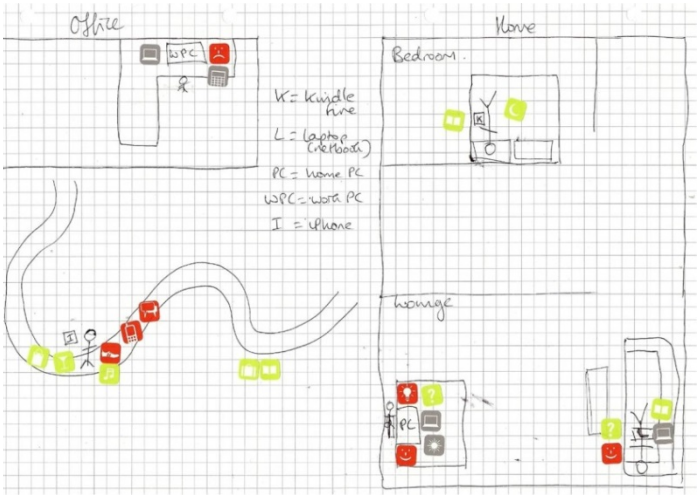
- Students use a wide and constantly changing array of technologies in their studies.

- The technologies included a mix of personal and institutional services and devices.
- All students used sub-sets of the list of technologies; for any student, many technologies are irrelevant.
- Lists are time specific, rapidly becoming dated.
- 'Stable' uses of technology involves development and old practices may no longer work (e.g. obsolete versions of software).
- The same technology can be used at different times for different ends (e.g. browsers for searching, shopping, etc.) and different technologies get used for similar purposes (e.g. Facebook and LinkedIn for social networking).

Key Messages

1. Ensure students develop a meta-level awareness of digital platforms, including social media, for various purposes.
2. Provide training for students to manage their digital footprint and become aware of the long-term implications of their digital activities.
3. Provide appropriate training in managing and organising digital information.
4. Recognise that digital literacies are now part of the academic literacies students need to study and embed these in the curriculum.

The portability of technology



'For me the most important thing is portability, because I use technologies ...everywhere I go, anywhere I go.'

Time Pressures

Time Pressures

Time was one of the key influences on students' engagement with digital technologies – it was their most limited resource.

- Institutional digital resources and access were frequently felt to be too slow, complex, regulatory or unreliable (in an infrastructure sense) for efficient and fast working.
- Students would turn to easier, more open avenues for access, e.g. Google Scholar instead of Library Catalogues or Databases, and Zotero instead of EndNote.
- Support workshops offered by the institution/library were sometimes felt to take up valuable time, perceived not to be timely or sufficiently fit for purpose (too high/broad a level).
- Students believed library workshops were delivered at a

time that suited institution, rather than students' need.

Evidence

'The library has been really very supportive. I mean, sometimes I think to myself it they weren't around, I don't know where I would be. I often find that they're probably the more, kind of, approachable staff that you can just go to ... they give up their time to really explain things to you ...even when you've sat there and ...you just still can't work your way through it. They're very patient and they really do take their time, which is really reasonable.'

Key Messages

1. Ensure the availability of online tutorials (interactive video if necessary) to fit in with the needs of students - timeliness and relevancy being of utmost importance.
2. Embed digital literacies (including information literacy - to be able to search, find, access, evaluate and use information in an ethical manner) into the academic curriculum in order for it to be relevant to the student's learning and to counter the issue of the lack of time.
3. Ensure support services (Library, IT Academic Writing Centre) collaborate so that there is a clear understanding of students' needs and a lack of duplication in training content.
4. Establish pre-orientation sessions (on and offline) to relieve time pressure at the start of the academic year or course.
5. Ensure that systems are designed for maximum efficiency so that, for example, students' workflows are given priority and the user can be taken to the relevant point without having to click numerous times or use multiple logins. This access should appear seamless from both inside the institution and remotely.

Evidence

'Well, it probably took longer than necessary because I did what I usually do and, sort of, dismissed the...workshops. ...here they tell you … how to go about research, dismiss that as being I didn't need that, I can figure it out. So it took probably about six months longer than necessary and… it was... basically through trial and error and I now realise, being a bit better at it and doing another degree, that I probably missed a lot.'

Information Overload

Information Overload

In the study, students frequently mentioned a feeling of being overloaded and overwhelmed with information (both in the digital sense and course related). This is closely linked to the issue of time pressures particularly at the beginning of

an academic year/course.

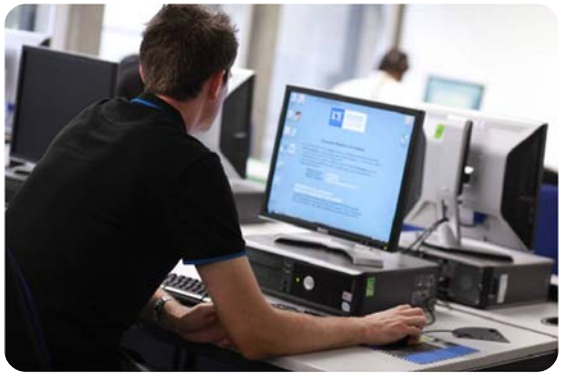
A more serious issue under this theme was students' difficulty negotiating with the following resources and felt that institutions and libraries too often went with traditional choices:

- library catalogues,
- databases and
- referencing software.

Another key issue for students in this area lay in developing skills in effectively organising their digital work (personal digital libraries, digital notes, etc.) and transferring their existing analogue practices to the digital (annotating, notetaking/notemaking, data capture/storage, etc.).

Evidence

'And it's just like, you just end up completely bogged down without any sense of ...progress or achievement or, you know, there's not even, it's not even like kids get a tick, you know, when they've done, you know, when they get a sum right they get a tick ... I just can't cope with it, I just can't do it. As far as I'm concerned it's very easy to just forget all about it. It just sits in the computer somewhere or other and I don't know what I need to do and what I haven't done, I have no sense of how to organise my work.'



Key Messages

1. Introduce pre-orientation week (on and offline) to deal with information overload at the start of each academic year or course.
2. Provide training in both traditional, subscribed resources and and open source resources.
3. Provide training in managing and organising information in digital and analogue platforms as well as the training on how to work across both platforms.
4. Provide training in information literacy, including information evaluation and embed this into the curriculum.

Evidence

'I haven't been in education for a while now... my last experience of education was at the IOE and we didn't have Blackboard and we didn't have this and we didn't have that...I thought oh, I was coming home, you know. I was, like oh, brilliant, you know, I know how everything works. And then you're just, um, bamboozled with, you know, this database and that database... it's like information overload... And that's not because you're attempting to be ignorant or you are ignorant, it's just information overload.'

'There (are) guidelines on everything and there is a lot of information and resources and help available but when you start ... I felt also a bit overwhelmed with not actually knowing where to turn for definitive type answers. So, it took

me a bit of time also to work through it. So, I think it was like a bit of information overload for me as well.'

'...I feel like I can't process the amount of information I'm supposed to process in any other way than using IT and yet when I do it using IT I don't gain anything. I ...feel like I'm just throwing it all into a black hole and I don't know where it is ...'

'I think the danger with having referencing software is that you tend to just, it's like having a great big box, you know, you just, sort of, throw things in there, you think, oh, I'll read that later, I'll read that later, and then you don't really remember what you've read and what you know.'

Transitions and Trajectories

Transitions and Trajectories

Students' engagement with and orientations towards digital technologies manifested themselves in a process of continuity and change in two key ways: temporal and spatial.

Temporal:

- Those who had greater engagement with digital technology in their earlier experiences or through work, generally felt more open to exploration and experimentation when faced with new forms of technology than those who lacked that wider experience/engagement with technology.
- Many students consistently made comparisons between technologies available to them in their present studies and those they had access to previously or elsewhere, and this impacted on their perception of/orientation towards institutional/library systems in their current mode of study. They have a broad awareness of the current state of the art in digital technology and this leads to high expectations and a desire that the digital in their academic/ study lives should work better, faster and more efficiently.

Spatial: in addition to the temporal shifts outlined above, students' perceptions of, and orientations towards, digital technologies changes is adapted as they move between spaces.

- Students often move between institutions/libraries/public spaces to seek out better, faster, less complicated systems (for searching, printing, copying) or ambient spaces (able to make noise, quieter, isolated, social, comfortable, etc.).
- The portability of students' personal digital devices (mobile phones, tablets) supports their spatial mobility and they frequently use these devices to read, make notes and find information. Pressed for time, students also use these mobile devices as opportunities to recapture time in 'downtimes' e.g. when travelling, sitting in the park, relaxing in the bath such that new and unexpected spaces for study are emerging. This portability, however, generates other issues: readability (screen size), access (connectivity, ability to download and store), health (tired eyes), etc.

Key Messages

1. Recognise that not all students are confident with new technologies and need additional support in using technology for their studies.
2. Make training available off and online so that it can be accessed as and when required.
3. Collaborate with other libraries and relevant bodies to establish a common standard for library systems and online access to digital libraries as post graduate students come with expectations based on prior experience of having used the library at their previous place of study.
4. Acknowledge that students will use other libraries both for space and for accessing

relevant resources and facilities such as printers, scanners etc.
5. Ensure that online resources are compatible with all types of mobile devices.
6. Acknowledge that reading online resources on mobile devices can affect health (tired eyes, posture, etc.).

Evidence

'I find I have to work in the library; I can't be distracted in any way whatsoever....'

'I've titled this [the chart describing my workflow] 'the library in me', kind of, like a love story, but it's not that. I work in the library as a,sort of, part-time librarian/library assistant, but apart from that when I do my phD... it's a physical space where there's usually silence and where I can concentrate, so I like to sit there and just read'.

Complex Contexts

Complex Contexts

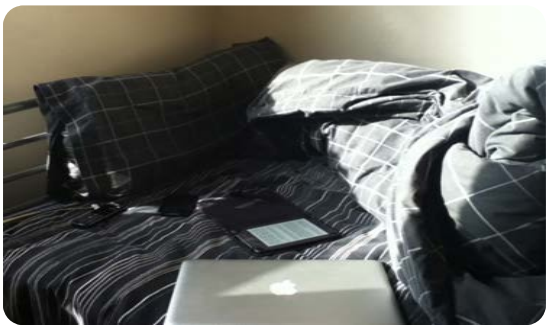
A key and common feature of students' engagement with and orientations towards digital technologies is that their 'study spaces' are becoming increasingly distributed and at times ad hoc, whatever their mode or level of study.

This shift (away from the locus of the institution into the 'cloud') has important implications for institutions and libraries in terms of the ways in which resources are shared and accessed, especially on personal, mobile and handheld digital devices which may or may not have wi-fi connectivity in open spaces (e.g. parks and public transport).

Students' distributed study practices also focus on links between home, workplace, public spaces and learning at a distance (e.g. other countries). In all of these, elements of digital infrastructure such as permissions and bandwith were raised as potential issues by students.

Evidence

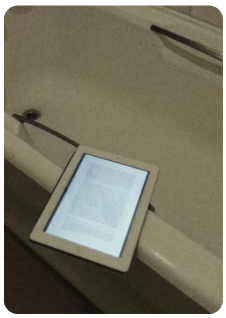
'Actually I've always been more comfortable working in my home instead of the library. I don't know why. It has been so in my home country as well. I like working in my home. It's probably the music is a big issue; I always listen to music when studying and I like to bar out the world which is not possible in the library ....'



Key Messages

1. Recognise that students are increasingly studying on the go -- in the bathroom, on the train, in the park -- and mobile access needs to match learning in new spaces.
2. Acknowledge that mobile use of the digital library is increasing and becoming part of the students' learning and research workflow.
3. Ensure that the way in which students access resources remotely mimic the ease with which they are able to access digital resources internally.
4. Consider that permissions and bandwidth have implications on how students can access resources remotely and ensure a parity of service for all students.

Evidence



'I read some materials for my course in the bathroom

Support Systems

Support Systems

Students were generally positive about support given by both the library and IT services, especially at an individual level (both in terms of face-to-face and remote enquiries/problem-solving).

However, students felt that there was scope for:

- workshops to be more timely, supported by online alternatives and focused on audience level, e.g. beginner, intermediate and advanced;
- workshops to extend to new digital tools, including open source (e.g. online reference managers, a range of search engines, etc.);
- more support in developing a meta-level understanding of practices and processes for both study and use of digital tools and infrastructures (e.g. the 'why' of referencing as well as the 'how'); and
- more support in managing information when confronted by a plurality of digital environments, e.g. how and when to perform digital annotation, note-taking, tracking activity).

Less formal support systems adopted by students were: themselves, family, friends, peers, colleagues, tutors, supervisors, library staff, online tutorials and websites (Google, Wikipedia, YouTube videos, although none mentioned TED).

Evidence

'I've used ... YouTube... sometimes when I'm having trouble understanding something that a journal article or a book was saying, I'll go on YouTube and sometimes, not all the time, but sometimes there are, like professors and stuff that make short videos of the journal article that I'm using.'

Key Messages

1. Make printing, scanning and photocopying systems cost efficient.
2. Provide cloud storage for mobile access in a manner that acknowledges students' workflows.
3. Improve laptop support for international students (e.g. foreign characters on keyboards, etc).
4. Ensure tutorial/workshops are available off and online for both home and overseas students in a variety of media.
5. Recognise that digital literacies are now part of the academic literacies students need to study and embed these in the curriculum.

Evidence

'And you've got the librarians work really well with the IT department and ... they're really knowledgeable here ...so I think that's really positve actually and they seem very, very sort of IT [oriented].'

'But even if you contact them from home ..., they're brilliant at replying and even spending the time on the phone talking you through it, you know. I can't get onto Athens, don't worry. They're brilliant, really good.'

Student Resilience

Student Resilience

The majority of students were resilient in their use of digital technologies even when faced with many difficulties and frustrations.

More often than not, students would reject digital processes that did not work well, fast enough or reliably enough or which were deemed too complex to master (more often than not, library catalogues and traditional referencing software such as EndNote or analysis software such as SPSS fell into the latter category).

Most students, however, saw the digital as a necessary part of their studies (and lives more generally) and many saw (and were often surprised by) its utility in different areas.
At the same time, there was an increasing feeling amongst students that there was too much technology creeping into all areas of their lives; that this was an inevitable encroachment and that it was 'here to stay'.

Students were more likely to become frustrated by technology than to fear it. Where fear was evident was in students' perception of a loss of control over time spent on the digital, over privacy and personal data, over identity and an increasing inability to keep disparate parts of their life separate.

Despite a willingness to tackle issues, the intrusion of the digital and an ensuing sense of disconnect from the 'real world' was a serious issue for a notable minority of students.

Key Messages

Resilience did not generally equate to persistence with a problematic tool, but rather, persistence in pursuance of a digital solution.

1. Note that students will give up if they do not see relevance to using software for their work or if there are quicker alternatives to the digital library, e.g. Google Scholar.
2. Ensure students understand the pros and cons of using different resources (subscribed library vs. freely available resources on the internet).
3. Ensure students are made aware of the long term impact of their digital identities and provide appropriate training.

Alternative Software Solutions for Referencing

RefWorks EndNote MENDELEY otero colwiz COLLECTIVE WIZDOM

The Digital Library

The Digital Library

The Digital Library is a core element in students' study and orientation towards the digital. The concept of a digital library would appear to be an important one for students, irrespective of mode or level of study – this is largely due to the increasingly distributed nature of their study practices (see previous key messages).

Students on face-to-face courses (MA, PhD, PGCE) make frequent use of the physical library space and its resources but also rely heavily on its digital resources. They use the physical library space to study, browse and borrow books and other resources, for training and workshops and, less frequently, as a social space.

Students studying wholly at a distance (OMRES) or in a blended mode of study (PGCE) rely more heavily on digital library resources, using these to access journals, ebooks, course materials and to participate in online study communities (discussion, collaboration, sharing).

Online User Behaviour

The evidence provided by one student who created a story board of his searching trajectory (see 'Research' on the opposite image) noted the following*:*

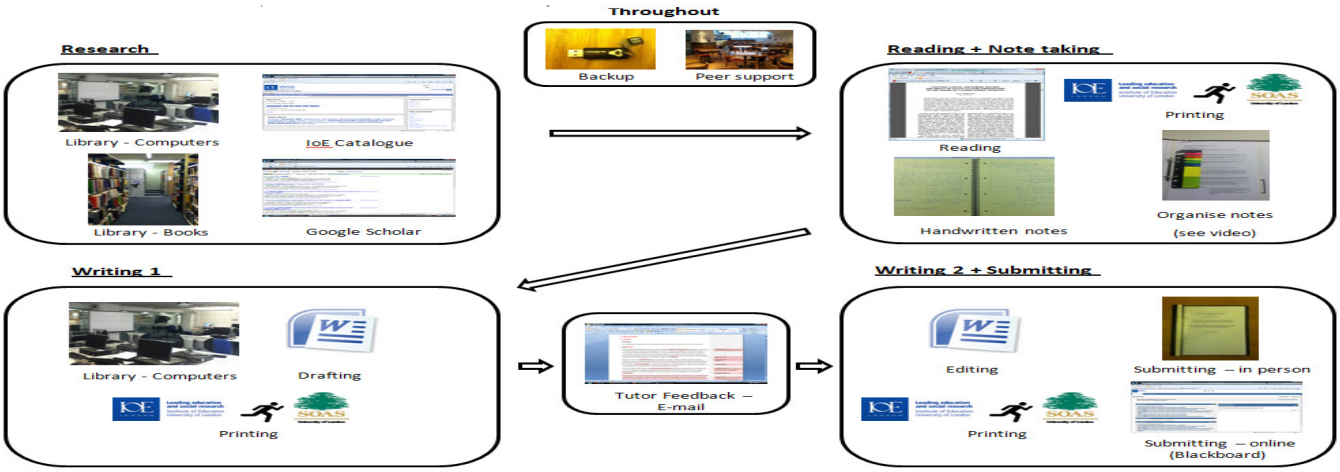
- the clunkiness of IOE Library Catalogue;
- the expectation that the Library Catalogue would operate like Google and provide access to online resources;
- that IOE Resources are limiting (unlike Google which provides a wider context) but are directly related to the student's studies;
- that the student wants the Library Catalogue to mimic Google Scholar so that it shows abstracts and provides citation information;
- that it is frustrating to have to click so many times to get to and authenticate electronic journal articles especially when accessing remotely;
- that the current browser setup (IE opening links in new windows) is confusing and irritating;
- that knowing how to store information is as important as finding and accessing relevant eResources; and
- that there is an assumption that Google Scholar provides access to subscribed resources rather than the Library.

Key Messages

The overarching message from students is that they want a digital library but ...

1. They want it to be open, efficient and relevant to their needs (for study, access to information, managing and organising information, community-building, sharing and discussing, collaboration, training, etc.).
2. They want digital resources to be made available easily and quickly (single logins, one-click access, ability to download and store on personal devices) and they want to be able to edit/annotate these digital resources. They are cost-conscious and have limited finances for multiple subscriptions.
3. Where orientations are less positive, this is not so much focused on the technologies themselves but on the issues, practices and processes around their use.
4. A majority of students appear happy to use digital technologies to support their learning but express a desire for support in identifying relevant, useful, time-efficient technologies and adequate, reliable, more open infrastructures for using them in a distributed manner.

Workflow of a PG Student producing an Academic Text



Conclusions

Lessons Learned for the IOE

1. The data support the notion that 'digital literacy' cannot be understood just in terms of individuals and skills; it needs to take into account who is doing what and where.

2. There is a need to understand digital literacies holistically, rather than focusing on any one element in isolation. On the basis of this, a project that ignores issues of access is as unlikely to be effective as one that ignores practices or identities.

3. The discussions emphasised that digital literacy changes over time. People both learn and forget; their literacy can either be developed or lost; also, technologies develop and settings are adapted. For this reason digital literacy should not be seen as a one-off achievement, but as something that is constantly enacted.

4. IOE students use a wide array of technologies for their studies including many that are not institutionally supported. These tools and services were used either because they enhanced the students' ability to act in some way or because they were required to, and were strongly intertwined with uses of 'official' IOE technologies.

5. Students had a sense that some technologies were for a specific part of their life only (study, work, entertainment) while others crossed these areas. Students differed in the extent to which they saw specific examples of this 'convergence' as desirable.

6. Many students found that the vast array of resources on and around the VLE and online library resulted in ‘information overload’. In response, they developed different strategies by utilising official course guidelines and also developing individual strategies. Similar strategies had to be developed to cope with the volume of postings on VLE discussion boards.

7. Technology is seen as 'doing things' to students, not all of which are positive. In the best cases students adopt technologies in order to act more effectively or efficiently. However, technologies can also make students feel powerless or alienated, or even controlled.

8. Students sometimes opt out of technologies that they feel are controlled by the institution in order to use ones that they feel in control of instead. This included using personal email instead of the institutionally provided accounts and using Skype rather than the VLE for communication.

Implementation Projects

This analysis led to three implementation projects run by project team members in the second year in their respective departments, supported at an institutional level through the IOE Open Mode Steering Group:

1. The project in the Learning Technologies Unit with academics from the same four areas as the students (holding responsibilities for PGCE, Masters, distance taught courses and PhD supervision), which has resulted in the development of staff development materials. These are available from the JISC design studio.
2. The implementation project based in the Academic Writing Centre addressed the use of Blackboard Collaborate for online writing tutorials and classes and developed a report on the implementation process and a new set of mode-specific resources. Again, these are available from the JISC design studio.
3. Students across the baselining study reported struggles with negotiating the various electronic journal databases and library systems. The second year implementation project based in the Library addressed this with the introduction and embedding of new, mobile friendly online guides, 'IOE LibGuides'. These were used to scaffold the learning and support digital literacies on the compulsory MPhil/PhD module 'Information and Literature Searching' and in the new Distance MA Education (which also had embedded audio visual training materials to supplement the written guides). Library staff also introduced an online enquiry service, 'IOE LibAnswers', in order to provide parity of service to distant learners. Further, in response to user feedback, the team are investigating the implementation of a federated search/discovery system and asynchronous chat.

In addition, the project provided evidence to inform the development of institutional policies. The strong degree of interaction between personal devices and institutional hardware, official and unofficial applications, institutional and non-institutional spaces, and student, private and professional identities has implications for how the institution creates infrastructures for study. The diversity of practices that were evidence needed to be acknowledged as standard practice and actively facilitated by not only maximising the simplicity and efficiency of interfaces with institutional technologies, but also proactively supporting the use of networked mobile devices.

Consequently, these recommendations informed the establishment and scoping of an IT Services User Group, with representation from the four groups of students. A paper addressing staff use has been submitted to the Information Strategy Committee to act as a point of reference for forthcoming strategies.

Recommendations

Academic Content and Communication

Drawing on our analysis of study data and using the strategic vision of SCONUL as an organising framework, we conclude by offering the following recommendations for the future development of the digital library:

The current scope of SCONUL's strategic vision in this area is in line with findings from the project and reflects many of the areas of concern raised by students relating to access, content, cultural change and managing information. Some additional qualifying points might be:

- *ease* of access as well as open access;
- *simplification* of e-infrastructures as well as increased standardisation;
- *flexible* use of e-books and e-journals rather than basic access;

- provision of clear *site maps* to provide a holistic overview of content and services;
- *simplification* of written user guides (brevity is key);
- *expansion* of tutorial/workshop systems to include independent study online (with interactive tutorials or videos); and
- *alternative* communication approaches to avoid indiscriminate use of mailing lists (improved use of Twitter perhaps as news/events scheduler coupled with site feed).

Shared and Collaborative Spaces

This strategic vision is particularly pertinent in light of students' indicating that they access multiple resource centres (both physical and digital). This and the focus on the development of seamless access are perhaps key here. In this respect, the study data suggests that:

- links between stakeholders should be *clear* and *transparent* and *easy to identify* (e.g. with some sort of site map or portal);
- shared collections should be *easily accessible* (preferably via a single login);
- *standardisation* of service provision across stakeholders is desirable (enabling student familiarity with systems across contexts);
- availability of collaborative spaces (physical or digital) with appropriate *ambiance* (in physical environments – lighting, proximity, comfort, ability to make a noise or be quiet) is a desirable feature;
- the concept of a digital library should be understood to comprise *digital* resources in *different spaces* and the move between the two should appear seamless;
- shared and collaborative spaces should include recognition of the increased turn to (a) *mobile and handheld devices* with a need for *wifi connectivity,* (b) *multimodal* and *audiovisual* content and (c) an increasing desire/expectation of being able to make use of *videoconferencing* facilities (e.g. Skype); and
- *clarity of scope* between closely related service provision (library, course of study, academic support) is desirable/useful in orienting students (and practitioners).

Performance and Quality

Results from this JISC project suggest that libraries need to go beyond the concept of *evaluation* in terms of their focus on impact, performance, provision and future development towards a more open *exploration* that allows for a holistic perspective not only on students' engagement with existing or future library provision but also on how that provision dovetails (or not) with contiguous areas of their academic and social life. More specifically, libraries may also benefit from a focus on students' engagement with the digital:

- as an inherently *distributed* and *complexly connected* activity;
- across *multiple contexts;*
- across disparate *spaces;*
- at *particular times* and over *longitudinal time;*
- as an *emergent process* with constantly developing/changing *practices;*
- as an opportunity for *ongoing dialogue* between students and service professionals (with appropriate infrastructures to facilitate such dialogue); and
- comprising a *range of content types* (text, image, audio, video, etc.) – many web-based and accessed via open platforms like YouTube and iTunesU.

User Experience and Success

With the exception of research excellence, which few students made reference to in the project, the remaining foci of this strategy group were very pertinent to students' orientations towards digital technologies and their broadly-developing digital literacy. There

were strong links/associations between library services and students' hopes for academic success, future employability as well as their attention to spatial design and concerns over increasingly complex contexts for information management. In order to improve students' experience in these areas, libraries may wish to consider how best to support students in:

- *navigating* between more formal digital platforms (EndNote, etc.) and open digital platforms (Zotero, Mendeley, etc.);
- *managing* and *organising* digital information (both provided and created);
- *transferring* existing practices (annotation, highlighting, notetaking, reading, etc.) to digital domains;
- *developing a metalevel awareness* of digital platforms for various purposes (managing information, supporting academic writing, building a professional network, managing digital identities, tracking and/or curating digital data) to help them understand how the practices and processes of academia link together and how the digital can support this; and
- *narrowing their focus* when confronted with (a) a wide range of digital technologies and digital infrastructures; and (b) the complex practice of academic reading/writing (how to deconstruct an article, how to recognise value in an article, etc.) – the latter in conjunction with e.g. the Academic Writing Centre or equivalent.

As can be seen from this report, it is not only the students that are operating in an increasingly complex, digitally-enhanced contexts, but also the libraries and institutions that serve them. For this reason, it is important for libraries to understand the user experience both as it applies directly to library provision and also as it applies to the broader contexts within which students operate. To assist students to navigate the digital successfully, libraries need to focus on a metalevel engagement with their users that not only outlines the scope and role they play but also how this maps onto related stakeholders such as partner institutions or internal departments offering related services.