This report summarises original evidence gathered by 12 funded projects between November 2011 and January 2012 to provide a baseline picture of digital literacy provision at their host institutions. Ten projects are based at UK institutions of Higher Education and two at institutions of Further Education. Of the latter, one project collected data from five partner colleges. In total, then, these reports present a snapshot of the situation in 10 HE and 6 FE institutions over the relevant period.

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Methods

Projects collected data using a variety of methods, working within a broad framework provided by the programme team. Many projects drew on the existing LliDA institutional audit tools while adapting them to the specific issues faced by their institution or addressed by their project. However, there is in practice very limited opportunity for comparison across reports. The framework described areas of data collection rather than specifying instruments, and projects were encouraged to focus on the issues most relevant to their own areas of intervention and influence.

Existing data that was reviewed for the baseline included:

- Strategic documentation, including institutional policies, other less formal statements of institutional mission and priorities, terms of reference of professional services and departments, student-facing statements, and documentation in support of curriculum validation and review.
- Existing data from national surveys such as NSS, PRES, iGraduate and ISB
- Existing survey data gathered by relevant services and departments
- Previous horizon-scanning and review exercises carried out by the institution or on its behalf

New evidence was collected through:

- surveys of staff, students, and sub-groups of staff and students, involving from around 100 to well over 2000 respondents;
- semi-structured interviews, reaching from 15 to well over 40 participants, often video-recorded;
- focus groups and less formal 'meetings', often designed to raise awareness of the project among stakeholders in addition to gathering data;
- reviews of existing practices, typically through conversations/interviews with staff in professional services, senior learning/teaching roles, and existing projects/initiatives;
- in one case an observed task to assess match between reported and observed levels of digital capability;
- in one case an analysis of meeting minutes to assess issues raised by student representatives.

All surveys were conducted online, with the exception of one FE survey which offered hard copy alternatives. Several projects noted that surveys might be preferentially answered by staff and students with existing confidence in their own digital capability. However, online surveys are increasingly the preferred method of gathering data – at least in higher education – and were felt to have a high degree of familiarity. Response rates were around the 10-20% level, and where projects had analysed the sample it was representative of the population as a whole in terms of obvious metrics such as subject area, staff role, or year of
study. Methods of promoting the surveys were designed to reach prospective participants regardless of their existing digital capability or interest. Several projects carried out essentially separate surveys to reach different groups of students or staff, sometimes with minor modification to the questions.

Projects on the whole took efforts to involve stakeholders throughout the baselining process, including student representatives. The process of baselining was reported to have been useful in allowing the landscape of digital literacy to be mapped at institutional level, and in engaging a range of stakeholders with a common set of concerns. Outcomes from the baselining process, in addition to institutional reports, included:

- new tools for assessment of digital awareness, confidence and adaptability
- new models of practice
- competency frameworks for different cohorts of staff and for learners
- new opportunities to raise digital literacy or digital capability/capacity as an organisational concern
- gap analysis of institutional provision
Policy and strategy

A wide range of formal documents were reviewed for this section, with the mode being 6-10. In addition, most projects took the opportunity to audit less formal expressions of mission and aspiration, including student-facing statements, for evidence that digital literacy is becoming a significant aspect of the institutional offer.

Why are digital literacies becoming a strategic concern?

Projects noted a range of drivers for a strategic focus on digital literacy:

- Accommodating changes to scholarly practice brought about by digital technologies, e.g. handling large volumes of information and vast data sets, communicating ideas via digital media, collaborating across national boundaries
- Accommodating changes to student technology use and study habits
- Enhancing the student experience in an increasingly demanding student market, though it has been noted that this can work both ways: student expectations and preferences can be quite conservative; and most institutions react to negative student feedback rather than promoting innovations that can then reflect negatively on other courses: 'once you get adequate feedback from your students on a module evaluation there’s no demonstrable mileage in getting better than that'.
- Needing students to take more responsibility for their own digital devices, services and skills
- Demonstrating the value of a degree in terms of employability in a highly competitive graduate market
- Preparing students to live and work in a globally interconnected society
- Demonstrating quality facilities and services to prospective students
- Capturing new markets, in particular delivering learning in settings away from the main campus
- Maximising productivity and efficiency in the core business activities, and growing organisational capacity

Some references were made to regional and national policies, e.g. the digital economy and the NUS Charter on the student experience. Only three projects made direct reference to financial constraints and new funding models in higher education. However, the funding environment was evident in two clear priorities: to rationalise curriculum design and delivery processes; and to attract new learners including those studying in non-traditional modes. The first requires teaching, administrative and professional staff to develop new skills and working practices, e.g. around newly rationalised institutional IT systems. The latter requires digital literacy on the part of students and teaching staff if the new modes of participation are to provide a learning experience of suitable and equivalent quality. The increasing assumption that students will take responsibility for their own digital devices and skills, while it appears to be pedagogically progressive, may be partly financially driven.
How are digital literacies expressed in strategy?

Statements about digital literacy from learning and teaching strategies provided an index of which institutions were taking a strategic approach to the issue and how they were defining it. Institutions are not identified here or throughout this report. Aspirations being articulated in this area include:

- ensur[e] students are prepared for study and employment in the digital age, with a range of Learning Literacies embedded into the curriculum in addition to the subject knowledge, specifically:
  - Academic and Professional Literacies - critical thinking, creativity, innovative thinking, problem solving, reflection, academic writing, teamworking, note-taking, time and self management, numeracy, analysis, synthesis, evaluation, self-directed learning, collaborative learning, inter disciplinarity, equality, dignity.
  - Digital Literacies - being able to use appropriately and effectively: communication tools, office programmes, digital devices, analysis tools, social software, profession-specific software, collaborative tools.
  - Information Literacies - searching, retrieving, analysing, interpreting, critiquing, evaluating, managing resources, referencing, sharing content.
- consider the potential of technology to promote knowledge building and reflective, student-centred, creative and collaborative learning;
- [develop] self-regulating citizens in a globally connected society, able to handle multiple, diverse information sources and media, proficiently mediating their interactions with social and professional groups using an ever-changing and expanding range of technologies and able confidently to use digital technologies to reflect on, record and manage their lifelong learning;
- provide training in information skills for academic and professional staff as well as to develop the critical and ethical information literacy skills of students;
- [develop] a digitally literate, skilled and confident workforce and student body - making use of a range of technologies and resources to enhance core teaching, learning and assessment processes at all levels and modes.

Learning and teaching strategies also made frequent reference to the use of digital technologies in course delivery and assessment. There were related aspirations to (further) develop distance, online, blended, flexible, open, e- or 'web-enabled' modes of learning. Other features of learning and teaching strategies were included in the audit where they were felt to be relevant to a digital literacies agenda, such as:

- internationalism – including global reputation, international recruitment, and delivery of learning in franchise colleges (often in developing countries)
- global citizenship, with the implicit use of technology to support inter-cultural and international exchanges
excellence and innovation in teaching – including staff development, reward and recognition

a general re-focusing on graduate attributes in addition to subject knowledge

regional development, where this was aligned with ambitions to develop a digital regional economy

employability

entrepreneurship and social enterprise

co-curricular and off-campus activities such as placements, internships, work experience, with technology providing the link to the 'home' institution and programme of study

flexible pathways, using technology to help integrate different modes and locations of study

flexible, cost-effective, efficient practices of curriculum design, often involving business process reform and rationalisation of information systems

Besides the learning and teaching strategy, institutions cited a wide range of other strategies as having a bearing on digital literacy development and support.

Some strategies covering specific aspects of learning e.g. e-learning, work-based learning, distance learning, in which the confident use of technology was a prerequisite for engagement.

Developing digital capability and the use of digital technologies in teaching/research were often mentioned in universities' Corporate Plan or similar. Digital technology was also often mentioned in the context of building the learning or research environment. Communications with prospective students often included images or text of ICT facilities.

Library/information literacy strategies

Strategies owned by libraries are generally very well informed by changes to the information environment and provide a mature model of provision. Several institutional strategies are

The University of Reading is focusing on students' readiness for employment in an increasingly digital workplace. In-curriculum opportunities for students to develop digital literacies for employability include work placements and the University-wide entrepreneurship programme. Outside the curriculum, accredited placement schemes and skills sessions are offered by student-facing services such as Study Advice, Library, IT Services and RUSU.

Students have access to excellent in-house resources such as the This is Me toolset which promotes the development of a positive digital identity, reputation and footprint. The Digitally Ready project will investigate what role these opportunities play in the development of students' digital literacies and career readiness overall.
currently being reviewed, perhaps coincident with SCONUL's reframing of the 'seven pillars of information literacy' model through a digital literacy lens. Library staff continue to be at the forefront of the digital knowledge revolution and are finding new ways of supporting students and staff to make effective use of new digital opportunities.

**IT Strategy, information strategy** or similar
These strategies typically cover: consistent provision of digital tools and services; secure, reliable physical IT infrastructure; well managed digital resources for research and teaching; effective user consultation; integrated systems; systematic working practices and associated staff development. Information strategies – whether integrated into IT strategies or free-standing – demonstrate the need for secure and integrated management of information assets whether these are generated in the process of research or in other activities such as learning and teaching, or administration and business processes.

**Student Charters, learner voice initiatives**
Handbooks and student induction materials now routinely include a statement on digital technologies in learning and teaching e.g. 'teaching and curriculum should, where possible, incorporate new and varied technologies' (Cardiff University & Student Union 2011); 'you are entitled to standard, consistent provision of course materials, information and services via a Virtual Learning Environment (VLE)' (Institute of Education Student Handbook). The language of entitlement and even of contract is increasingly in evidence in these statements.

**Human Resources Strategy** or similar
These strategies typically cover CPD, professional review, career and leadership development, sometimes with an explicit statement about the need for staff roles, responsibilities and training to keep pace with digital technology developments. Health and safety and legal/ethical issues relevant to ICT use are also covered in some HR strategies.

**Estates, resources and accommodation strategies**
These strategies overlap to a growing extent with ICT strategies as learning spaces become hybrid locations of real/virtual interactions. Assumptions about students' digital practices are being literally built into campuses.

**Research and knowledge transfer strategies**
Enhancing research performance and ratings continue to dominate universities' strategies, but the development of a world-class digital or 'virtual' research environment comes a close second. Communications about research often emphasise the role that digital technology is playing in distinctive research centres and specialisms. Digital technologies such as analytics are helping to demonstrate research impact, while digital forms of communication and collaboration are increasingly essential to the research effort. However, only two institutions explored research strategy in any detail.

**Integration and implementation**
Looking across the diversity of strategies recorded in their audit, one institutional team reflected that 'the diversity of documents covering... digital matters for staff and students means there are few members of the University aware of it all – and so policies may be
devised and revised without much engagement across departments... With regard to the rapidly changing world of information technology, it may be argued that the traditional mechanisms for developing and agreeing strategies lack sufficient agility.' Fragmentation was typical, though possibly just a sign that digital issues are entering into strategic thinking in a diversity of ways.

Two examples of an integrated approach

**Oxford Brookes University** has taken a wholesale and strategic approach to developing digital literacies across the curriculum. The Brookes Strategy for Enhancing the Student Experience 2010-2015 requires all programmes to include the development of five graduate attributes, one of which is Digital and Information Literacy. From June 2012 every programme will produce a new programme specification and a narrative explaining the digital and information literacies their graduates will develop and the learning activities and assessments that will support this development. The strategy is taken forward by faculty Associate Deans (Student Experience) and Digital Media and eLearning Developers (learning technologists), supported by a central Course Design initiative and wiki-based resources.

At **Worcester College**, a strategy of Personally Accountable Learning (PAL) is being rolled out to all full-time BTEC First and National Diploma students. This 'defined model' of curriculum delivery meets a number of strategic requirements: preparing learners for independent study, dealing with reduced LSC funding per student, providing differentiated learning support, and incorporating peer and group learning. PAL relies heavily on learners' digital abilities and the capacity of staff to design effective learning content and activities using digital technologies. Training for PAL is being offered to teachers, personal tutors, learning support, the IT team, study centres and library staff, while support for students is offered in an integrated way through 'study centres' aligned with their subject areas.

Several projects commented on the misalignment of strategic thinking with actual practice, especially practices of curriculum design and delivery (taken up in the following sections). The mechanisms for sharing new strategic priorities with frontline staff and embedding them into day-to-day practice may be weak. For example at one institution, despite a strategic commitment to digital literacy, 'neither the programme specification, guidance notes or checklist mention or give examples of digital literacies; the same applies to the definitive documentation for 2010-2011'.

However, most projects are building on previous initiatives, especially HEA benchmarking and pathfinder projects and JISC e-learning projects, through which real change has been effected. Legacies of these initiatives demonstrate how a strategic approach to digital development can influence practice. For example:

- exemplary courses/modules incorporating digital technologies and/or being informed by e-learning research and development;
- shared spaces (committees, SIGs etc) for discussing digital issues, even if a shared language remains elusive;
• a formally constituted hub-and-spoke model or a more loosely constituted community of e-learning 'champions' and pioneers, based in schools/faculties/departments;

• locally produced guidance materials or summary resources;

• models, frameworks, 'pedagogic templates', curriculum documentation etc supporting reference to technology issues in mainstream learning and teaching processes.

Forward thinking universities and colleges are:

• Creating opportunities for digital issues to be discussed across policy arenas. This might mean appointing a 'digital champion' whose remit crosses existing strategic boundaries, or providing forums where senior managers meet to discuss digital challenges and opportunities. A digital literacies audit also provides opportunities for strategic alignment.

• Embedding digital literacy issues into high level strategies including the Learning and Teaching Strategy (or equivalent) and ensuring strategies translate into practical actions with indicators of success

• Describing carefully what is meant by 'digital literacy' or 'digital capability' or similar terms where they appear as aspirations

• Drawing on the lessons and legacies of previous change initiatives at the institution

• Engaging students as partners in evolving and implementing strategy in this area
Support and professional services

As identified in the 2009 study *Thriving in a Digital Age*, support for digital capability of all kinds is widely dispersed on university campuses, though the situation seems to be more coherent in FE colleges.

Services described in these reports include IT/Information Services, Media Services, the Library, Learning Support or Development, Education Enhancement or Development, Careers/Employability service, Staff Development, e-learning/Technology-Enhanced Learning, Registry, the Students Union, Graduate or Researcher Development, Disability Assist, and a variety of specialist initiatives with an ICT or learning and teaching focus. At some institutions, support for staff and students in digital matters is integrated or at least co-located while at others it is clearly separate.

Libraries

University and college libraries offer the most highly evolved and mature model of supporting digital literacy, with a wide range of formats offered and with subject librarians working alongside academic staff to establish tailored provision within the curriculum. The focus is naturally on information management but library staff have been broadening their remit at some institutions to take in other aspects of digital literacy such as sharing and communicating ideas, referencing, and using open data.

IT training/support

The approach to IT training seems to be very diverse, though the needs of staff engaged with university business systems are always well met and in some cases this appears to be the main function of the support service. At one university ‘other aspects of training have largely been withdrawn or outsourced’. At another no less than eight professional services were involved in delivering IT support, of various kinds, to staff and students. Almost all of the IT support available was accessed on an as-needed basis, focused on solving immediate problems rather than on progressing individuals’ own skills in a coherent way. What was described as ‘becoming more than just practically proficient, but [using] technology in a more advanced and thoughtful way’ and ‘[being] inspired to explore new ways of working with technology’ is everywhere seen as desirable but is not obviously the job of central IT services.

The IT support model being developed is one of self-help through online resources, with induction in the basics of major institutional systems, and a mix of other support that might include help desks, student mentors, informal peer support, and support within programmes of study for key professional or subject-specific technologies. The philosophy of ‘bring your own device’ is being extended to ‘bring your own services’ and even ‘bring your own skills’, as most staff and students have achieved basic levels of digital access and are choosing technologies for themselves. This rationale, however, is not always expressed clearly, and nor are policies always in place to identify and support those with less digital capital to draw on.

Student partners/mentors

An important development of recent years has been the involvement of students in IT support, both as help-desk volunteers and in peer learning situations. There were examples
of weekly ‘clinics’ being run by postgraduate and IT support staff, and of user groups (e.g. nVivo users) being set up to share tips and tricks. At several universities the students’ union provides support for students’ digital literacies both directly through training courses and indirectly through e.g. mentoring and students as change agents programmes. Increasingly, student bodies seem to be playing a role in general study support as well. Some institutions are involving students in the development and testing of new services and apps.

At the University of the Arts, London, the 'Learning zone' is a peer support and co-mentoring initiative which employs students alongside professional staff. The student's union president has suggested that the Learning Zone is among the most forward-thinking aspects of institutional provision. It is a dynamic social learning space that supports the development of study and transferable professional skills. It combines traditional and modern tools alongside state of the art technology in a flexible and informal space where group study can take place alongside individual study. Student assistants and professional staff are available to advise and guide students as they explore innovative ways of doing their coursework. The Learning Zone is fully accessible to all users including hearing loop, adjustable workstation, and specialised software.

e-learning/TEL

At most institutions, an e-learning or technology-enhanced learning team bridges the gap between IT services and learning/teaching development. Historically located in a variety of services, these teams seem to have settled in most places within learning and teaching/educational services rather than within IT support. The virtual learning environment dominates their work. Several comments from staff indicate that e-learning specialists in schools and departments are regarded as a crucial but over-committed resource. It will be part of the programme’s task to investigate how the hub and spoke model that has come to dominate e-learning provision is working. It appears that in the current financial climate, departments may be cutting back on funding for ‘spoke’ posts, while opportunities to share ideas and generate momentum for institutional change at the ‘hub’ are also in some cases being squeezed.

Learning development

Learning development was not covered in detail by any of the reports though mentioned as a service to students in many of them. Some learning skills/academic development teams are engaging with the digital agenda and with students' changing habits, and two such teams are closely involved in the relevant projects.

Personal guidance and supervision

At many institutions, the range of services are coordinated on behalf of learners by a personal tutor, supervisor, or equivalent person. But while the best tutors clearly do address personal readiness for study and even provide guidance on digital study practices, others lack expertise or interest in the specifics of study support. There was evidence from one university project that personal tutors expect students to progress simply by engaging in their course work: they do not see the need for targetted support:
At the beginning of the [dissertation] year [academic literacy] is pretty dire but by the end when they've completed it they improved a 100% from where they were. To some extent, part of that is that they are actually up against it and they've got to get it sorted.

Personal tutors in FE, in contrast, have a more pro-active role in developing learners' study habits and skills. At one audited college they deliver sessions throughout the academic year focusing on issues such as study skills, career planning, e-safety, CV's and writing assignments. These personal tutors will play a key role in developing and delivering a new digital literacies qualification to students.

**Support for learning and teaching development**

Support for learning and teaching development takes a number of forms:

- involvement in curriculum design, e.g. through development of documentation and guidance, intensive support to curriculum teams
- delivery of HEA accredited programmes for new teaching staff and other development opportunities
- providing advocacy, support and consultancy on behalf of learning and teaching at the institution
- running workshops for teaching staff on current issues, often in tandem with TEL/e-learning staff
- managing projects in the area of learning and teaching development

In all of these areas, the use of digital technologies by staff is addressed. Staff are also supported through informal communities of practice in their departments or faculties, and by sharing ideas in more formal contexts such as committee meetings and learning and teaching events. There is beginning to be more focus, for example through course design projects and initiatives, on how students' own uses of technology are progressed and assessed and how learning experiences can be made digitally rich and relevant.

Expertise has been developed in different areas of digital literacy, usually by project teams in learning and teaching services. One such project provides detailed guidance and learning opportunities to students on *developing their digital literacy in terms of software use, social responsibility and building their digital identity*. Another offers workshops to staff on web awareness and writing for the web. A third has initiated a programme for researchers designed 'to place social media firmly in the context of research, focusing on the processes and purposes of use’

**Support for researcher development**

Researcher development programmes play a significant role in preparing postgraduate students for digital scholarship. At the three institutions focusing on the experience of researchers and research students, training was provided in a range of relevant software. Once again, though, researchers were largely self-directed in developing digitally-mediated methods, or relied on close colleagues. There were several initiatives to formalise these
processes through seminars and peer networks, for example in the use of social media in research contexts, or specific data analysis tools.

At the University of Plymouth, support for the development of digital literacy is provided by a wide range of services, many co-located in the Learning and Teaching Directorate so as to allow better integration. Support comes from:


Each service supports a different aspect of digital capability or a different context of digital participation. The hub and spoke model operated by the TEL team is an example of how professional services can build relationships with subject specialists and be responsive to local issues, while developing their own professional expertise and ethos.

However, even at universities offering very comprehensive support services, it was acknowledged that these may not be well coordinated at the point of use. For example, there may be no systematic means of identifying struggling students or of identifying emerging issues and convening a strategic response. Uneven provision is common and may be exacerbated by university and college mergers, partnerships and franchise arrangements, and by new partnerships and modes of delivery. One report concluded this section by recommending that: ‘Policies around access and entitlement need to be thought through for the University conceived in its widest sense’.

In FE, support for students' digital literacy is generally better coordinated, perhaps because of the small size of colleges and small number of professional staff involved in student support, or perhaps because of the focus on individual students' learning needs. Support tends to be provided in a wider range of formats, from training sessions through online support to hand-outs and videos. Personal tutors are one way in which support is channelled to students as they need it: subject-based study centres are another. However, even the small number of FE colleges included in this audit demonstrate variety in where digital literacy support is located, whether aligned with staff development or with learning services.

Changing approaches to student support

At one university, a focus group of professional service staff was asked how their offer to students was changing to reflect new needs, expectations or priorities. They suggested:

- more use being made of online guidance and support, including both generic and personalised guidance e.g. via audio recordings, email
- specialised support being offered to groups of students with various learning needs (e.g. work-based, international distance and open access learners)
• growing awareness of digital literacy issues across services and efforts towards coordination, partly as a result of external project funding

• consultation with students about enhancements to the learning environment e.g. mobile access to course information, cloud computing solutions, podcast lectures

• responding to greater use of technologies in the curriculum, leading to students presenting with different issues and needs

Forward thinking universities and colleges are:

• addressing the digital capability of professional staff

• working across professional and support services to articulate what digital capabilities students should be developing if they are to be successful in their studies and future employment

• involving students in supporting other students' development, and even reverse-mentoring staff

• providing staff and students with clear signposts to support and guidance

• ensuring that the professional development of staff enables them to design learning experiences that are digitally rich and relevant, rather than focusing only on the use of specific technologies
Practices

So far this report has summarised how institutions are providing for the use of digital technologies in academic contexts, drawing on official data such as policies, strategies, central initiatives and terms of reference, and institutional statistics. The remainder of this report summarises findings on how digital technologies are actually being used by staff and students, and how digital and academic know-how are actually developing. These issues are inevitably complex and difficult to capture. Through surveys, interviews and focus groups, projects have been able to provide indications of the general situation at their institutions and of the many ways in which practices differ. For many if not most projects, this snapshot is only the start of an institutional research process that will continue throughout and beyond the lifetime of the project. Baselining in this sense allows projects to identify what is not known, and to put in place processes for gaining more insight and understanding.

Another purpose of baselining is to identify qualities or values that may change in a positive manner through the lifetime of the project. The practices we are most concerned to develop are critical to institutions - the core practices of learning and teaching, research and knowledge transfer, and the necessary administrative and managerial activities that support them. Such complex practices are extremely difficult to benchmark, and there is a temptation to focus on issues that are more amenable to measurement such as access to and use of specific technologies. Our collective characterisation of digital literacy, of its development, and of the contexts in which it develops, will be enhanced by the discussions that follow on this baselining process.

Also on the basis of these reports there are very many examples of excellent practice in developing both individuals and organisations to be more capable in a digital environment. These are highlighted in a few cases: the original reports should be consulted for more detail and inspiration.

Study practices

A number of practices emerge from these reports as indicative of ‘digitally literate’ study or learning:

- using digital technology effectively to gain access to learning resources and opportunities – this is particularly the case for students with disabilities, and disadvantages of time, distance and availability on campus.
- using digital technology to support general academic practices and habits of study, for example producing academic assignments, taking notes, revising
- information behaviours, including both advanced searching and online research, and academic information management (referencing, data and file management).
- managing time and task using e.g. online calendars, project management software, and managing distractions associated with digital services.
- critical thinking and analysis, including use of tools for data analysis, and understanding the provenance and credibility of digital communications.
• acquiring the digital practices of a particular subject area and/or profession, including the use of specialist functions and tools, and the application of data and data analysis tools to specific research questions or professional tasks.

• associated with this, acquiring an appreciation of ethical, legal, political and social implications of digital data and its management.

• managing a professional profile and presenting oneself online in a professional manner.

• developing a personal repertoire and style of technology use.

At one university, a poll of 'critical moments' among focus group participants found that it was often the most complex and academic applications that had led to the most profound changes in study practice. Databases, library catalogues, computer-aided design and simulation packages, data analysis software and referencing systems were frequently cited. These findings were echoed at another university where postgraduate students described their mature practice being dominated by research applications with steep learning curves and complex functionality. Students are unlikely to adopt such technologies without structured support.

Students lead complex lives and one of the chief ways they use technology is to organise this complexity. Complaints about access often involve the interface of different settings: the desire to use mobile devices in transit between home and campus, on placement or in the field; unreliable wifi interrupting access to information; slow or multiple log-ins creating delays; software settings, preferences and services not transferring from one context to another. Students were found in three surveys to be heavier users of mobile and social technologies than staff – one of the few reliable differences in technology use across the stakeholder groups. This may lead to some misalignment between the choice of learning resources made by academic staff and the formats preferred by students.

The VLE provides a continuous connection with the course of study and a sense of reassurance. Here students expect to find all their key documents, notes and assignments in one place, and an answer to all their questions. This does not stop many of them finding the interface clunky and uninviting. One report states: ‘There is a mismatch between the technology that students use on a regular basis to support themselves in their personal lives... and the tools they are expected to use when joining the University (dated look and feel, asynchronous, etc)... Students report that they feel less connected in their 'learning life' than they do in their personal life outside the University.’ Students’ relationship with the institutional systems emerges from these reports as one of grudging dependency rather than enthusiasm. As they are presently used – largely as document repositories – VLEs seem unlikely to challenge existing habits or expectations about the learning and teaching process.

In FE contexts, where social media and personal/mobile access are less likely to be enabled, and where e-safety is a more prevalent concern, learners are sometimes ‘bypassing’ college technology in order to use technology which they are more comfortable with, have personal control of and which is, possibly, more advanced.
One student survey found that 34% of students use either ‘just’ or ‘mainly’ electronic learning resources for study, but that only 5% of students can ‘always’ find the journals they are looking for, with 7% ‘never’ and 24% only ‘sometimes’ successful. When these sets of results are cross-referenced, it appears that 43% of students at this institution would rather use electronic formats but are unable much of the time to find the resources they require.

Google and associated search functions are universally used to find information for assignments. Research by one FE college found that ‘success in sourcing a reliable or correct answer was alarmingly low’. However, some university students have sophisticated strategies for producing academically ‘acceptable’ texts through online work. One set of student focus groups found students working from general reference sources (Google, Wikipedia), checking this work against ‘official’ sources such as lecture notes on the VLE, and finally making judicious use of references – from both official and unofficial sources – to lend credibility. ‘Checking against’ what was sanctioned or deemed ‘appropriate’ by lecturers was described by all students in this study. While they remain so focused on the expectations of their tutors, it is important that students receive consistent messages about, for example, online collaborations, the value of wikipedia, the use of facebook to exchange course notes, and the recording of lectures.

Use of online journals was felt by the majority of HE participants to be a significant advance in study they had made since coming to university. However, students who had not been given guidance found Athens and online library catalogues difficult to use. Online journal use was associated with terms such as ‘judgement’ and ‘quality’, and an understanding that to get a good grade you had to use of a range of resources.

Students make extensive use of materials posted on the VLE – in fact they are reliant on this and complain when lecturers do not make materials promptly available – but they often find the interface clunky and the reliability poor.

We always find access to learning central is confusing to them in the first three or four months and I think that comes down to how they get access to Learning Central.

My experience of Blackboard now is that I go to it when I have to. And I do as little as I can on a daily basis.

VLEs are very little used as social/collaborative spaces by either staff or students. One staff members wrote that: [Students] are far more comfortable with third party stuff than things that are so specific to [the] University, like [the VLE]. It is so cumbersome.'

Social media and online services are increasingly used by students, most commonly Facebook, Google Search and Twitter, though to some extent also YouTube and iTunes. There is anecdotal evidence of students using Facebook to share scanned handouts and to discuss issues such as Turnitin/plagiarism and acceptance this will happen and that academic staff must expect it. Student focus groups at one university explored distraction by social media and found this to be very much a matter of individual habit with some students ‘rewarding’ a period of work with a short burst of social interaction online, and others ‘unplugging’ or denying themselves social contact in order to concentrate.
Students in HE are often cultivating more than one digital identity and also using different networks for academic connections – twitter, Linked-In or academia.edu, ELGG, google docs/groups and delicious for example – from those they use for personal connections – typically facebook, youtube and flickr. FE students seem both happier to engage with learning via their social spaces, and more comfortable maintaining a single identity with which they manage learning relationships alongside other kinds of contact.

Students studying away from the main campus have perhaps the most to gain from effective use of digital technology, but currently have the lowest levels of support. They may, for example, be based in workplaces where access to social media is prohibited, or in areas of limited mobile connectivity.

Considering postgraduate students, one report found that PGRs were using a mix of university systems and public digital services to design their own collaboration/sharing environments, e.g. Dropbox, SharePoint, Basecamp, Citeulike, flickr, GoogleDocs, GoogleApps. These same students felt that current undergraduates were already moving ahead of them in their capacity to design environments, apps and services to meet their own learning needs. Undoubtedly there are taught students whose study practices are closely integrated with their digital practices. A few are active participants in communities of knowledge building and sharing, though this remains very much a minority interest. An institution that invested in a wordpress server for student blogging has elicited less than 30 blogs.

**Administrative practices**

Two projects investigated the practices of administrative staff. These staff are at the forefront of the use of institutional business systems to rationalise processes, including curriculum processes. They generally have more focused training available to them than other groups and have high levels of confidence in the systems they use. The graphic from UCL (below) shows that teaching administrators are interested in using a very wide range of new tools, particularly those where they lack existing expertise. There is an appetite for innovation among innovators, but like other groups of staff they do not always feel that their suggestions for better use of digital technology are acted on, or that their expertise is keeping pace with change.

**University College London** has identified that Teaching Administrators are critical to the effective management of learning and teaching processes across the College. The Digital Department project is analysing the diverse skills and abilities needed by this cadre of staff, and exploring how best to develop, share and recognise their digital practice through a certification framework. In parallel the project is exploring how technology can enhance the business efficiency and educational effectiveness of academic processes. Data collected from TAs, like this infographic of tools in current use, will support benchmarking of current practice and help to articulate aspirations for the future.
Learning and teaching practices

Different subject areas are leading the way at different institutions, but it does seem that once a head of steam has built up in a particular department (perhaps around one or two key individuals?) a whole range of learning and teaching innovations may follow. These may revolve around subject-specialist practices such as the use of GIS, particular kinds of modelling/simulation or digital design, the use of digital instruments in the field, or new methods of analysis; or they may focus on the use of generic digital technologies such as blogging and microblogging, the use of shared bookmarks, producing learning outcomes in public virtual spaces, and collaborative knowledge building in wikis.

At the University of Bath, the PriDE project has reviewed the use of digital technologies in different faculties, and is involving members of teaching staff in defining digital literacy for their subject areas. With 60% of undergraduate students undertaking some kind of placement or study abroad, digital practice can be seen to emerge as an aspect of professional identity as well as subject specialism. The project is building on excellent links with teaching and learning champions in the faculties to ensure 'small steps in developing skills and practices [which] give learners a solid base from which to develop their digital identity... there are strong links between digital identity, industry placements and professional identity which may necessitate support for students in developing awareness'.

How students are introduced to digital technology in their studies, what uses are made of digital technology in curriculum activities, and how students' skills are assessed (if at all), seems largely to be the prerogative of individual lecturers. Diversity of approach may be a strength, particularly if it allows for different subject areas to develop their own strengths. However, at only two HE institutions were digital literacies and practices being 'designed into the curriculum' as a matter of course, suggesting that there is some way to go before practice in this area is widespread enough for a useful repertoire of different approaches to be generated across subject areas.
One baseline report found from focus groups that students seemed to appreciate consistency in the following areas: basic technical skills and know-how of staff; access to essential course materials and personal information; access to networks; and 'rules' about practices such as referencing, plagiarism, collaboration, recording of lectures, submission of assignments. At another university which studied student needs in detail, only 41% felt that the digital aspects of their course were clearly communicated. Also in recommending specific digital approaches or resources, it seems that staff may not be in tune with the features that matter most to students – typically ease of access and cost (including time cost).

At present, staff are rarely present in student owned and run digital communities. Some think this creates an appropriate separation:

    'I suspect that's to do with them seeing Twitter and Facebook as their thing. And they don't really want us to be in there'

Others perceive the value in occupying a space where students are more willing to engage. There is concern, however, both from staff already engaged and those who are not, about the workload involved in responding to a large cohort of students in a social space and about meeting student expectations about staff availability.

VLEs continue to be widely used for learning and teaching, but mainly as a document repository.

    Personally, I only use it ... as a repository for people to submit work to. We do put lecture content in there. One of the other tutors in fourth year puts all her lectures up there. Some tutors put videos of lectures up, but that probably kills the server.

Video and audio is being used in some cases to give feedback and in others to capture learning or to provide introductory materials that can be reviewed alongside lectures/seminars. Teaching staff doing this have typically taught themselves using third party software such as audacity, jing etc. There is a perception that responding to students in online environments is extremely time-consuming, and this is shared both by those who practice it and those that do not. Incentives to engage in these activities is therefore low.

**Curriculum design practices**

Several reports confirm the finding that 'students' digital literacy practices are predominantly contextualised within their programmes of study' – that they tend to adopt technology uses recommended by tutors or required by the curriculum. At most institutions, programme documentation does not require digital aspects of a course to be represented, though there are exceptions within the portfolio of projects, and for others this is a project aim. One university undertook a detailed review of validation documentation from 13 programmes of study and found only one example of digital literacy being clearly articulated as a learning outcome. Other outcomes did refer to or imply the use of relevant technologies, but these references were always to formal technologies, especially subject-specific software packages. A review of guidance documentation suggested that no useful terms for thinking about digital literacy as a set of practices or attitudes were being offered to curriculum teams.
As discussed in the section on study practices, an ad hoc approach to acquiring digital capability can push students to become more self-reliant. However, it was observed in several reports that this approach can make it more difficult to develop reflective and critical approaches to digital technology in use:

*What's going on when they're producing a kind of finished product? What is happening on their computer? Because everyone... is taught how to use these complex tools once they have been made... Their experience of using these tools comes with a fundamental misunderstanding of how they work.*

The **University of Greenwich** is launching a new initiative, the Greenwich Graduate, to embed graduate attributes into all programmes of study. Digital literacy is included under the category of Creativity and Enterprise and implied in other areas of aspiration. The JISC-funded DDL project is working to develop a model of digital maturity linked to graduate attribute development. Building on work of the JISC funded UG-Flex project, the team anticipates that successful embedding of digital literacy into programmes of study will involve targeted staff development around programme and course review. The project has already undertaken a detailed mapping of the student lifecycle and identified that many moments of transition with learning potential take place in the first year of study. The first year experience has itself been mapped in terms of these transformational moments, to support the alignment of digitally rich experiences with key moments in the student learning journey.

**Research practices**

The three reports which focused on this area found that digital technology has had a profound and positive impact on research activity, especially in the areas of data capture, data analysis and visualisation, project and task management, collaboration and networking. Access to new forms of data is in many cases opening up new areas of research or new methods. Two of these reports found significant differences between researchers at different stages of their career, with early career researchers more likely to use mobile and social technologies, more focused on personal productivity, and more likely to innovate in the areas of data capture, virtual collaboration, and building contacts. Later career researchers were more focused on project management and funding issues, on e-publishing and open data, and on developing a legacy or profile. The third report detailed significant differences in the use of technologies by research students and other postgraduates.

Digital technology is changing research practices as follows:

- New research methods including data capture and analysis, simulation, working with digital archives and databases.
- New research questions, both arising from new methods of data collection and analysis, and (in the humanities and social sciences) arising from the influence of digital technology in culture and society.
- New forms of academic communication including digital presentation technologies, e-books and online publishing, data visualisation, and hybrid forms of media.
- New modes of collaboration across academic, institutional and national boundaries.
- Sheer quantities of data that can be accessed and analysed are changing the nature of research and in some cases opening up whole new avenues of enquiry.
- Open publishing and open research

The Cascade project at the **University of Exeter** is working with a group of postgraduate researchers to identify 'hybrid' practices that are informed by research expertise and digital know-how. These practices are significant for innovating research culture in departments, but are also being used to develop interventions in taught programmes, enabling students to experience learning activities that are digitally rich as well as research intensive. Postgraduates are seen as key change agents at the University. They are influencing research teams through their enthusiasm for digital methods, and they are also involved in undergraduate teaching where they are bringing new practices into the classroom. The interns themselves believe that they have much to learn from the next generation of undergraduates, who they see taking more creative control of digital media and developing their own environments and tools for learning.

**Institutional practices**

At institutional level, social media such as twitter, facebook, blogs, open content sharing etc are being widely adopted as an aspect of branding and corporate communications. Although this can make the media themselves more visible to staff, it can also generate concern about using them and teaching because of a perceived need to be 'on message'. Staff in several surveys expressed a reluctance to engage in new media in the absence of clear organisational guidelines. Mobile and social technologies are, at present, more widely used to disseminate organisational messages and course-related information than to support communications around learning and teaching.

Few HE institutions are addressing the problems faced by learners with limited digital capital. Although it is increasingly difficult to engage with learning, or even to enrol on a programme of study, without functional access to internet services, universities are not stating this explicitly to prospective students. FE colleges, again, are much more proactive in spelling out the expectations and supporting students to reach the standards required. Some are also providing personal devices such as laptops on loan.

**Forward thinking institutions are:**

- supporting and rewarding staff who are innovating the use of digital technologies in their roles, whether administration, teaching or research
- recognising a diverse ecology of digital practices, including the use of non-institutional tools and services, as a resource rather than a threat
- making explicit to students what kinds of digital practice are expected and/or positively supported in their context of study, as well as what kinds of digital practice are not tolerated (these often dominate communication with arriving students)
• developing agile curriculum processes which allow new professional and scholarly practices with technology to be introduced into learning contexts, and assessment methods to be adjusted accordingly

• differentiating the use of social media for corporate and for educational (learning/teaching) purposes and providing clear and supportive guidelines for the latter
Developing capability

Many baseline reports treated the adoption and confident use of specific technologies as the main indicator of digital capability, though because of the context of data collection this was usually taken to mean 'in a particular context of professional or academic practice'. Across all categories of staff and students, and regardless of contexts of use, good decisions about technology use seem to be made by those who have:

- a repertoire of previous software experience;
- confidence to adopt software not supported by the University or College, especially web 2.0, open source and cloud solutions;
- a critical approach to the available technologies, and a willingness to use manual methods if they work better;
- peers with whom they can share digital tools and methods;
- experience in acquiring digital skills under self-direction, e.g. the use of YouTube, online forums, help menus.

Whether because they have already acquired basic skills in technology use at home, or because of a lack of support, the majority of University staff do not feel they acquire these skills at work. Though the question was not explicitly asked in the FE colleges, the provision of training at all levels would suggest that it is at least possible for staff to acquire basic skills as a direct consequence of their employment. Among those HE students who were asked about IT skills (in focus groups), most did not see the University as having any responsibility in this area. However, these groups were almost certainly biased towards confident users.

The rest of this section looks at how well prepared individuals feel for the practices required of them in their roles, both in terms of adopting and using technologies effectively, and in terms of adapting the core academic practices of learning, teaching, research and administration to meet the challenges and opportunities that digital technologies present.

Administrative staff

A survey of Teaching Administrators compared current use with 'interest in using' specific technologies and concluded that there is an appetite for adopting technologies into practice, especially social media and newly implemented institutional technologies, that are not currently used with confidence. Like other groups, administrators were confidently adopting new technologies in their personal and social lives and brought at least some of this confidence to their professional roles. A key difference from other groups, however, is that administrators work intimately with institutional business systems. These systems and their professional practices are to a large extent designed around each other, so training is both necessary and in some ways more tailored to their roles than training for other groups.

Administrative staff still wanted more and better training in the institutional systems they use routinely, and also for systems to be better integrated so that the time spent learning new interfaces and procedures could be cut down. However, there was interest in developing expertise beyond the basic demands of the job. Specific ways in which this group of staff wanted to develop themselves were:
Knowing what is available to use and its benefits/disadvantages

Using mobile devices and some social software e.g. blogs

Integrating technologies better into efficient workflows and processes

Understanding some general principles of technology use to support student learning

Making use of students' own skills

Like other groups, administrators developed their digital expertise best in contexts with peer support and time for experimentation.

Teaching staff

Personal/social technologies and associated skills in use were predominantly acquired through self-directed exploration, supplemented by online materials where necessary, and informal peer support. Some respondents identified that they would like more support with such technologies, but most were happy to be proactive in adopting and learning to use them. The main technologies being adopted in this way were blogging, Twitter, audio/lecture capture technologies, and visualisation/presentation technologies such as Prezi. This route is not open to those who lack basic digital competence, who may therefore fall further behind their peers.

Institutionally-owned academic systems such as the VLE, library catalogues, repositories and portals, assessment systems and e-portfolios require structured induction or training for staff to use them effectively. In general these systems are not perceived as intuitive or easy to use, and staff with the confidence to do so are often using third-party services instead to support their teaching and research. It is interesting to ask whether institutional systems are badly designed ('clunky', 'non-intuitive', 'ugly') as perceived by some, or whether the nature of the practices they support would always require complex systems with multiple menus and options, and a relatively steep learning curve.

While adoption of technologies has a relatively low skills threshold for the digitally aware, using them effectively in academic practice is considerably more demanding. Practices of technology use in teaching, such as supporting new methods of investigation and data analysis, introducing the use of professional and academic tools, helping students judge the academic quality and rigour of online information, or assessing academic ideas in different media – these are complex habits in which a small minority are leading the way. In general, other members of staff seem to acquire these habits through contact with the pioneers, either informally or through organised sessions such as seminars, lunch-time teaching workshops, away days and meetings. Pioneers themselves report that they can feel isolated in their roles and departments, and frustrated with the limited opportunities to effect what they see as beneficial changes in the practice of others.

Academic staff often reported that the digital expertise required of them was discipline specific. At the same time, the expertise they most wanted to enhance was often rather generic and similar to the aspirations of administrative staff, especially to make better use of social media and to work more efficiently: "joining up the dots that's the problem for me. A digital workflow for the way I do things." It may be that general aptitudes need contextualising culturally to different roles and subject areas if they are to be perceived as relevant by staff.
Studies surfaced a perception that the level of organised training for digital technology use had declined at several universities, though more support is undoubtedly available in the form of online materials for self-study (one university in this study has recently bought a campus licence for lynda.com, though most academic staff seem happy to rely on YouTube). In a predominantly self-reliant culture of developing digital capability, it is especially important that experts are on hand to be consulted when trial-and-error-and-Youtube fall short. Where they are available, learning technology staff with subject specific expertise or local (departmental) champions are seen as a critical resource for supporting the development of new digital practices. However, provision for these roles seems also to be diminishing.

One institution asked staff to rate the statement: ‘I have access to sufficient digital literacy training and development opportunities’. Although 54% agreed and 7% strongly agreed, this still left a significant minority of respondents who were not happy that their development was being supported. Comments from focus groups suggested that a key to developing confidence was practice and repertoire, i.e. opportunities to experiment with a wide range of digital and non-digital modes of practice. Only this allowed confident assessment of what was going to work.

At the same institution, it appeared that only very closely co-located colleagues were routinely involved in peer support. In response to the prompt ‘I have active peer group networks in which digital literacy best practice can be shared and developed’ there was a tendency to disagree. In free text responses to surveys and in interviews, it emerged that many staff felt quite isolated when it came to using technology in their work. The most common suggestion for digital literacy support across all reports was for peer networks to which role-specific or function-specific inquiries could be made, and through which collective expertise could be shared. In several HEIs and one FE college such informal communities of practice already exist, and all projects plan to extend them.

All projects based in HE institutions are also planning to work with the local HEA-accredited programme for new lecturing staff, to further embed digital capability into teaching practice and to address the issue of students’ digital literacies in that context. Two institutional surveys found that it was staff who had recently qualified from such programmes that were mainly pushing the digital literacies agenda, and two other surveys found ‘younger’ or ‘early career’ staff to be similarly ahead of the game in adoption of new technologies. However, such staff are not always influential in their departments. The other critical point of intervention is seen in project plans to be the curriculum design and approval process, where digital issues can be discussed in the context of learning and teaching aspirations more generally.

In FE, staff training in both institutional and personal/social technologies is more widely available and indeed a number of hours per year training in ILT is becoming mandatory at many colleges.
Staff can feel intimidated by what they perceive as the digital expertise of their students: on the other hand, checklists of this kind emphasise the professionalism of teaching over the use of specific devices. The use of certain technologies, especially those of collaborative knowledge building and sharing (blogs, wikis, twitter, reference sharing), appear in any case to be higher among academic staff than students. At one university about a quarter of academic indicated that they learn about new technologies from students, but this compares with findings from this and other institutions that students are very dependent on guidance from teaching staff in acquiring academic habits of technology use, even if the underlying technologies are familiar to them.

A critical area of development for staff, then, is in their capacity to diagnose, progress and assess students’ digital capabilities, recognising that what they offer to even the most digitally aware students is support for the use of technology in academic and professional practice. Coleg Llandrillo (again) provides a checklist of developmental practices that staff need to acquire: introducing learners to a wide range of information sources; introducing learners to professional and workplace technologies; encouraging learners to choose, use and personalise their own technologies; fostering a critical attitude to digital technologies and media; encouraging collaboration and sharing in online spaces; encouraging repurposing of media; helping learners to use technology for reflection, planning and evidencing their learning. These are skills that require staff to keep up to date not only with the potential of digital technologies but with advances in teaching, learning and student support.

In summary of many contributions to this question, teaching staff feel their expertise can best be developed through:

**Coleg Llandrillo**, as part of the PADDLE project, has identified a range of digital skills and attributes needed by teaching staff to carry out their roles effectively. These have been mapped both the the LLUK (LSIS) Teaching Standards and the HEA Learning and Teaching Standards. Among many valuable checklists provided by the project is the following. The list is in descending order of the confidence expressed in each of these by staff surveyed at the college, but the levels of confidence were generally high.

- I manage my online identity and reputation
- I am aware of e-safety issues
- I express myself creatively, professionally or academically in a range of media
- I review the appropriateness of different technologies and make informed choices about their use in the curriculum
- I have input to the design of the curriculum, including choice of technologies
- I participate in digital networks focused on pedagogy/teaching technique
- I am aware of digital rights and responsibilities
- I participate in digital networks focused on my subject area
technology training sessions and workshops that are tailored to their subject area and role

free-standing, self-directed learning opportunities that can be fitted in around other commitments

more information on what technology is available and how it is being used to support learning and teaching

opportunities to audit their own expertise and received personalised support: ‘if someone could show me how a tool could benefit me in my role, and then train me how to use it and encourage me to practise on my own, that would be ideal’.

peer support opportunities

Researchers and research students

One project focused on how postgraduate researchers become digitally capable scholars and another reviewed researchers’ development more generally. These projects found that the use of digital technology should not be regarded as a separate aspect of the research process but as integrated throughout.

Just the opportunity of technology is not of great interest, it's bringing it to bear within your own discipline. That is something that is only understood by the people who are more experienced actually, who are best placed to understand the importance of it.

Data capture and analysis, communicating research outputs, building virtual research environments for collaboration (especially internationally), and digital networking and reputation management are aspects of research practice that are being changed radically by new technologies. An area in which researchers would like more support is the effective communication of the outcomes, perhaps reflecting the greater emphasis on research impact. Researchers invariably described themselves as dependent on technology to some extent. PGRs and early career researchers make extensive use of social media in research contexts, while more established researchers rely on email (and do not always regard that as particularly helpful!)

These two studies found that digital skills are acquired most effectively in the context of research practice, when researchers face specific problems for which digital technology can provide a solution. Resources used by researchers to support their digital development were: self-help with online support, asking a fellow researcher, approaching a more senior member of staff such as a supervisor, or accessing formal training. However, respondents at the two institutions differed markedly in how useful they found training provided specifically to researchers. For most general research software such as SPSS, NVivo and Endnote, generic training covers only the most basic functionality: any help researchers need quickly becomes focused on specialised issues and advanced functions. Researchers at both institutions wanted more tailored training to be available, but the mode of development they would value most would be access to close peer-group (i.e. cognate research area) support. However, the biggest barrier to becoming more digitally confident and proficient was time:
The problem is that the time is not available. It’s too unsettling, I just haven’t got the time for it. And that is a problem because it means that some of the key tools for researchers, you know, one doesn’t really have the time to explore them.

Always there is this opportunity but I simply don’t have time to start doing that thing as well as what I’m already doing which works for me.

The majority of PGRs described themselves as self-reliant in the use of digital technology, and regarded this as an important aspect of their identity as postgraduates. More senior researchers indicated that they often learn about digital technologies and methods from their PGRs, and some were dependent on them for support in this area. All researchers value specialist support as close as possible to their home department and research group and subject specialist technicians are a highly valued resource.

Taught students

Most discussion of the gap between expertise and required practice centred on taught students. It was agreed that students over-estimate their own digital capabilities – at one university only 20% of academic staff felt that students were digitally proficient compared with 45% of students themselves. These students may miss out on training opportunities and on understanding the more advanced or academic uses of technologies that are familiar to them. There was further agreement that students can have highly advanced skills in the use of personal and social technologies while failing to understand the relevance of these skills to academic contexts.

At most universities students are expected to produce coursework electronically, access online information, and increasingly also to submit work and receive feedback online. There is also an increasing awareness of the need to develop skills for a digital jobs market:

‘things like digital image processing, computer aided drafting, illustration software, illustrator or whatever, desktop publishing. You know, making beautiful pamphlets etc. So we are trying to introduce that. My sense it that these types of skills are really basic skills that should be introduced as early as possible’

Beyond this, some academics felt that digital literacy requirements were being driven by the relevant professions, for example GIS in geographical subjects or biological data modelling in life sciences. Others felt that employers were not really driving the agenda, or not in a coherent way, and that it was up to university departments to be proactive in embedding digital experiences that would give students resilience and flexibility in the future. Students themselves are beginning to articulate ambitions for their learning achievements to be more digitally rich and publicly visible, recognising that university offers an opportunity to develop their digital profile and reputation as well as gain a qualification. One focus group reported that:

Students would like more information and guidance in developing their own personal unique web environments, they like to use institutional and social
tools but they would also like to be able to develop their own websites. They would like this integrated into study as preparation for professional practice.

A survey at one university found that curriculum experiences offered the most important resource for digital literacy development, followed closely by independent study. At other universities, students identified that their chosen course or subject area was where they expected support for the technologies they would need in their studies. This suggests that the curriculum needs to closely reflect the digital practices required for professional or academic success, and that learning experiences should include digital opportunities wherever this is appropriate.

The Institute for Education identified that they did not have reliable evidence of students' digital practices and identities. IoE students differ in several important ways. Some are practising educators and bring with them well-established identities from their established roles: others are not. Some attend on a part-time basis and in the case of PGCE students large chunks of their course are spend on school placement, while taught masters students may be full-time but have a relatively short-term relationship with the institution. The distance students are based in locations all over the world and may never visit the IOE or meet a lecturer face-to-face. The student body includes a significant proportion of international students from a large number of countries, with a broad range of educational cultures, and varied experiences of digital literacies. The project set out to discover, through in-depth interviews and focus groups, how these different background experiences and study settings would be reflected in students' digital literacy practices. They have concluded that setting, available technology and subject area are all factors.

Students' strategies for using technology in learning were also typically a product of their course requirements, or the requirements of specific lecturers. Focus groups at one university found a lack of consistency in the guidance students received about study practices from different lecturers on the same course: this was echoed in other places. In relation to public/social technologies, students are typically given no guidance beyond some general prohibitions on using Facebook in class or referencing Wikipedia in essays and assignments.

While there is agreement that digital expertise needs to be fostered in subject areas, there is much less agreement about how. Research skills and digital information handling may be practiced at induction, and specific disciplinary tools or methods will be given time in the curriculum. Apart from this, it seems that students are developing digital capability in an ad hoc fashion, falling back on their own or their immediate peers' resources, and solving the problems of each new task as it arises. One project report noted that this approach enhanced students' self-reliance and general digital literacy. Another commented that acquiring expertise 'just in time' like this can make it difficult for students to develop a rounded and critical approach to digital technologies.

In this study, compulsory, embedded activities or short modules at key transition points were found in retrospect to have provided the most significant step up in digital study practice, though they were not always appreciated by students until later in the course.
We had like a personal studies module last year. It was go off and do a report, and do an essay. And it wasn't so essential the mark you got, but it was learning how to do that and then the feedback. So that helped.

Alternative means of developing student capabilities that are being explored by projects include:

- assessment criteria and/or examples to show how digital literacy will be recognised and rewarded
- tutors modelling the use of different technologies
- tutors comfortable with students' use of their own preferred technologies in class e.g. for note-taking, lecture capture
- activities that require academic ideas to be communicated in different media
- opportunities for learners to reflect on and plan their own development e.g. using e-portfolio, diagnostic resources
- making resources available for learners to develop their own digital literacies in their own time
- peer group learning opportunities e.g. in groupwork and seminars, co-mentoring and PALS schemes
- using reflective approaches to encourage more critical engagement with digital technologies and better self-analysis of capabilities
- creating more publicly visible outcomes of the learning process to support the development of professional identities

In general the aim is to provide a coherent approach to assessing and progressing students' digital capabilities across their learning experience. One member of academic staff commented: 'We need to identify and support students who lack key, basic digital skills which may be hidden until they reach a crisis'.

A problem for any strategic approach to developing expertise in this area is the variation among students. Two reports dealt with the experiences of international students, some of whom arrive from educational cultures with much higher levels of digital know-how than is typical in the UK, and others of whom have never used a mouse or read from a screen. Other differences in background and cultural experience can be equally significant. Poor search practices, lack of judgement about the quality of information, inappropriate use of social networks, and use of inefficient manual methods are all routinely observed student behaviours. This is the counterpart to the assumption that students will 'bring their own device'. Although student-facing strategies are beginning to articulate this assumption in contractual or entitlement terms, few universities on the evidence of these surveys are putting in place safety nets to catch students with poor levels of digital know-how and access before this significantly impairs their learning experience.

In FE, it was identified that students need the following support if they are to flourish:
• diagnosis of ICT skills on entry to their course
• support and progression throughout their course, in all of ICT skills, information skills, media skills and general study skills (with digital tools understood as integral to all of these skill sets)
• digital experiences integrated into curriculum activities and assessments

All the FE colleges involved in the programme are working to make this a reality for their students. HE institutions, where the focus is more on curriculum change, will need to learn from this experience.

Challenges to developing capability
The conclusion to one HE report identified the challenges to staff and students becoming digitally literate, despite the support available. These conclusions are largely borne out by comments from other HE institutions.

• Time – both staff and students perceive that they lack time to practice and become proficient in new technologies, even if they are generally aware of their potential. Over-committed people need to see clear benefits before they will invest time in something new.

• Transferability – although the majority of students are comfortable with using digital technology for social and personal ends, they can struggle to transfer these skills to academic study. The same may be true for staff i.e. personal and social use of technology provides a good basis for professional digital practice but is not enough.

• Assumption – many staff believe that students are 'digitally ready', an assumption which is challenged when they set students specific tasks to do. Anecdotally, this assumption may be shared by the students themselves.

• Motivation – there is low take-up of learning opportunities that are obviously skills-based as students can see them as remedial, irrelevant to their main programme of study, 'not for me'. Generic provision suffers particularly from this perception.

• Conflicting beliefs of academic staff – there are fundamental debates over how far digital technology is 'spoon feeding' students and whether 'traditional' academic methods have value that should be asserted as an alternative to habits of reliance on digital technology

• Overload – a sense of being overwhelmed by the availability of information and services, and the pace of technological change

• Digital divide – a minority of staff and students have real problems accessing digital technology, either for reasons of background, culture, previous educational experience, or simply a lack of means.

Forward thinking universities and colleges are:
• Providing face to face training in the use of academic systems, as early as possible in programmes of study but also on a rolling basis for those catching up
Embedding key technologies, methods and aptitudes into programmes of study

Developing the roles of subject librarians or developing similar subject-specialist roles with a TEL or digital capability remit

Articulating to arriving students how digital technologies will support their experience of study so that they can anticipate requirements – for devices, services and skills – and know what is expected of them

Identifying the sources of digital disadvantage and planning to remediate them

Sustaining support networks, for example around specialist technologies, practices or roles

Maintaining directories of digital expertise

Offering clear rewards to staff and students for developing and sharing their digital expertise

Creating technology mentor or champion roles where appropriate
Cultures and attitudes

Some projects investigated individual attitudes to technology in learning, teaching and professional practice. Others were more interested in broad cultural attitudes and the impact these were having on the capacity to develop digital literacies institutionally.

Attitudes to technology

Individual staff and students have, as would be expected, an infinite variety of attitudes to technology and its role in education. In student focus groups it was interesting to find that the use of specific technologies was often attributed (by students themselves) to the subject being studied, while a choice not to use technology where others were doing so was generally put down to personal preference or style. Digital doubters and refuseniks often showed a high level of discrimination – for example evidence was found for students electing to use only open source software, or positively refusing to use facebook, google, or apple products because of objections to company practices. Other students simply knew themselves and their study preferences well enough to reject methods that would not work for them.

If some students are highly discriminating in the technologies they will invest in, and others will try anything once, very few could be described as generically sceptical towards technology. Students are, as noted, grudgingly dependent on institutional systems such as the VLE and are generally in favour of more systematic use, along with newer services such as online submission/marking, and lecture capture. They seem to like the use of online tools such as discussion alongside face to face teaching, but tend to prefer third-party systems such as Facebook.

Many staff believe that student expectations are changing: that they expect 24/7 support and feedback, ‘instant answers’, and personalised services. In fact, a survey of staff and students at one university found that students were far more positive about their digital experiences during induction than staff perceived them to be. Students do not, when they arrive at university or college, seem to have clear expectations about how technology will be used, but survey results show that they do notice when staff use technology with very different levels of proficiency or when messages about what is expected of them in digital environments are conflicting.

A survey of postgraduate research students found that all saw their work as dependent on technology. They differed in the extent to which they felt this dependence was making their work more scholarly, or advancing their discipline. Academic staff occasionally expressed more negative attitudes:

*I feel that basically the quality of much academic work has declined over the last ten years because it’s too quick. The circulation of information is too quick. The time taken on projects is not enough. The time taken for ideas to mature is not enough.*

*As soon as I look at my emails I know that my productivity goes down.*
Attitudes to digital literacy

Digital literacy was interpreted in a variety of ways, with one university asking stakeholders to contribute definitions – and finding a bias towards the terms ‘ability’ and ‘understanding’, ‘learning’ and ‘knowledge’ – while others focused almost exclusively on the use of specific technologies. An FE survey compared ‘digital natives’ with more mature students and found that the latter understood digital literacy less in terms of specific tools and more in terms of ‘doing’, ‘understanding’ and ability.

Also widely reported among staff in HE is a belief that digital literacy needs to be addressed at the level of subject/discipline or profession. At the same time, there are no obvious opportunities for staff themselves to discuss the meaning of digital capability in their subject area or how digital technologies are changing scholarship and professional practice. In fact most staff seem to experience ‘technology’ as those institutional systems and initiatives over which they have least control.

*When it comes to specific skills for specific domains... there is resistance to university wide initiatives.*

If the meaning of digital literacy is not securely rooted in the demands of the subjects students choose to study, and confidently owned by teaching staff, there is a risk that it will be seen as irrelevant or remedial, or simply as a geekish interest the latest gadgets and apps.

**Cardiff University** carried out one of the most comprehensive audits which included questions on attitudes and beliefs across different staff and student groups. Although significant personal differences emerged, there seem to be many needs in common across staff and student groups. In response to the findings, the Digidol project has begun to map a range of activities that staff and students carry with the help of digital technology, such as communicating complex information. The belief is that with a task or activity focus, the project can bypass some of the attitudinal barriers and help individuals access the tools, resources, people and processes they need to be effective.

Attitudes to innovating practice

Broadly speaking, at universities where staff and students have been highly successful in 'traditional' modes of learning and scholarship, there can be less incentive to incorporate digital tools into practice. Students may be recruited on the basis of 'traditional' values such as face to face contact and learning from leading researchers, and may actively resist alternatives. This was noted in two reports. The 'academic generation gap' was described in one report as determined not by age but by the date at which an academic had become successful in his or her field. If this predated the use of digital technology in that field, there was less reason to find technology relevant or helpful. There are of course issues of professional identity at work here.

University type and student demographic are not determining factors, however. Of two universities with very similar student profiles, one offered 'no formal guidance and nothing...
to help students understand the issues concerning privacy, security and etiquette online' while another had a high profile initiative that had addressed this area specifically.

One attitudinal change that seems yet to happen in higher education is a shift of attention away from how teaching staff are using technologies towards how technologies are being used by students. Although undoubtedly students benefit from digitally confident staff in roles of influence and support, they benefit more from well-designed curriculum activities that have them make use of digital technologies themselves in meaningful ways, and from assessment regimes that recognise and reward their digital expertise where it augments subject knowledge. Comments from staff in HE sometimes show more concern about being 'left behind' by digitally proficient students than excitement at allowing them to demonstrate what they can do. When asked about the support they need, staff tend to mention specific functions in specific software rather than support for embedding digital literacies into the curriculum or for assessing and progressing students' digital know-how. Both reports from FE show a greater focus on students' capabilities with technology, though obviously the sample is not large enough to conclude that this is a feature of the sector as a whole.

Developing digital capabilities, along with other graduate attributes, requires a perspective across the entire learning experience. A lack of integrated thinking about programmes can leave those staff who do innovate and improve their teaching feeling frustrated:

> you can feel like a complete isolated fish out of water sometimes because you
> know, well you might have an impact on one area of your module but to
> broaden it out would be much better, and to follow it through is a problem.
> You can have wonderful ideas in your second year module, but if that doesn’t
> get carried through to the third year module they go backwards.

Also there are very few incentives for staff to do this innovative work. There were depressing comments in one report about staff not sharing ideas because of a very competitive professional culture, and of hostility to innovators from staff who felt their own teaching and research might be exposed. In the absence of professional rewards, staff will only adopt new approaches if they can see clear results in terms of time and effort saved, or better responses from students.

### Processes of change

Given that embedding digital literacy into the curriculum and into staff development practices entails a degree of organisational restructuring and re-prioritisation, some reports gave attention to current change management processes and culture. Generally, and in line with the belief that digital literacy is a subject-specific capability, change was felt to happen when led by individual champions in departments.

> It’s good practice, followed by good student feedback, that then sort of drives it. I would argue that in this department bottom-up would be the strongest, because certainly there’s no true inspiration at the top.

practice evolves because there is always a handful of people who would be interested in research it, and interested in moving things forward
However, several aspects of the institutional environment audited in these reports – such as infrastructure and professional services – can only innovate through central policies that are championed at a senior level.

**Forward thinking universities and colleges are:**

- celebrating innovations in learning, teaching and scholarship, and in institutional processes
- recognising students' digital preferences and identities while making explicit the practices of academic spaces (e.g. peer review, positive critique, language, referencing)
- enabling departments and professional services to evolve their own definitions of digital capability and their own means of developing it (but also)
- providing cross-departmental forums for sharing issues and ideas
- engaging students as digital ambassadors and change agents
Conclusions and recommendations

Institutional baseline reports provide a rich view of digital literacy policy and practice, though one that is difficult to generalise from across the sectors. The process of gathering baseline evidence has been found valuable both to projects, which have been able to make clearer plans on the basis of findings, and to institutions, which have explored issues in digital capability across diverse areas of policy and practice. In some cases recommendations have already been made, while in others the work of the relevant project is in part to develop recommendations as more information emerges.

Recommendations on ICT infrastructure, access and support:

- Promote tools and systems in ways that are relevant to their contexts of use
- Ensuring a robust data, information and network infrastructure, moving towards platform and device neutrality where possible
- Continue to support a portfolio of applications and services to meet users' preferences and the specific needs of academic subjects
- Ensure a strategic oversight is maintained and that developments are sustainable, with effective governance of the process of IT procurement, implementation and support
- Develop improved methods of involving users in strategic planning
- In striving to deliver a comparable experience, ensure consideration of the needs of international students, mature students, students on outlying campuses or sites, and students with low levels of digital capital and expertise

Recommendations on curriculum and learning practice

- Focus on meaningful learning tasks which can incorporate the authentic use of digital technologies
- Enable students to mentor each other, for example in group learning situations
- Engage students as partners in the curriculum development process
- Promote activities that leave a digital footprint i.e. allow students to publicly showcase their achievements
- Consider how digital literacies are assessed in the curriculum, and how they are recognised in co-curricular activities and awards
- Introduce subject- or profession-specific technologies as appropriate and ensure they are practised routinely
- Ensure students are confident in the use of academic media such as online journals and associated portals/catalogues, databases, reference management systems, research blogs and wikis, and other research communication tools
• Ensure teaching staff have timely and accessible opportunities to find out about the use of technologies in learning and teaching

• Ensure innovation in learning and teaching is recognised and rewarded

• Ensure curriculum design processes support consideration of digital literacies, whether this is mandated or guided

Recommendations on administration and business systems

• Work with HR to specify digital literacy expectations in relation to staff recruitment and PDR

• Ensure staff views on the implementation of existing systems and on systems innovation are considered

• Enable students to make use of administrative systems as appropriate to support their meaningful engagement in learning processes, e.g. uploading lecture recordings and notes, booking rooms etc

Recommendations on research

(i.e. all research-like activities, which may be undertaken by taught students and different categories of staff)

• Provide opportunities to share digital scholarly practices e.g. via networks of expertise, research seminars, working groups

• Integrate digital methods into researcher development and induction into research-like processes e.g. third-year projects and dissertations

• Support open approaches to the management of research data and outcomes wherever possible and appropriate

• Support the use of digital media for communicating research outcomes

• Ensure researchers have access to appropriate virtual tools and the means to use them across institutional boundaries – essential for international research collaborations and for multi-site supervision arrangements

Recommendations for institutional development

• Collate current organisational good practice and existing research into digital literacy practice and provision, e.g. through a digital literacies audit

• Open up spaces for conversations about digital literacy across boundaries

• Profile what digital literacy means in different disciplines, colleges, faculties etc ensuring that the organisation draws on diverse strengths and sources of digital expertise
• Communicate clearly what a student can expect from their study experience, including digital provision (networks, devices, applications, skills addressed) – and ensure that all staff are on board

• Similarly, communicate what the university or college expects from students and where students can be supported to attain these standards

• Ensure support for digital literacy development is well signposted to users: ideally integrate this support through e.g. personal tutoring, regular diagnosis and personal signposting

• Develop means of sharing practice and expertise among peers, whether this is role-specific, subject-related, or around specific widely-used applications