Research and development to support the next stage of the Harnessing Technology Strategy

The Learner and their Context

The technology-based experiences of learners as they approach and enter the world of work

Chris Davies, Anne-Marie Chase, Jenny Good, Dimitrina Spencer
University of Oxford

A report for Becta

February 2010
Contents

Introduction 3
Executive Summary and Recommendations 5

Section 1  Improved personalised learning experiences: the role of new technologies in the lives and future employment of learners in post-compulsory education 13
Post 16 education students 13
Higher Education Students 14
Social and collaborative practices 16
Developing skills for the workplace 17
Ambivalence towards technology 18
Learners’ views of technology in relation to future plans 20
Post-16 learners: visions for the future 20
Traditional university learners: pervasiveness of technologies 21
New university learners: a more technological future 22
The role of new universities in facilitating employability 24

Section 2  The relevance of learners’ experiences of using new technologies in their own contexts to the skills demands of the workplace. 26
Introduction 26
Part 1: from the perspective of employers 27
The role of technology in businesses 27
Changing technology practices in the workplace 28
Emerging practices: companies exploring uses of Web 2.0 / social networking 29
Flexible working 30
Issues of IT Regulation 30
Recruitment of new staff 31
Recruiting technology skills 31
The role of training in securing required skills 32
Internal training 34
Part 2: from the perspective of recent recruits 34
Using technology in the workplace 34
Technology regulation within the workplace 35
The process of recruitment 36
The history of the recruits technology learning 37
Further development of recruits technology skills and practices 39

Conclusions 41

Appendices 44
Appendix 1. Interview schedules and follow-ups for Section 1: post 16 and university learners 44
Appendix 2. Detailed Information about Companies Included in Section 2 46
Appendix 3. Information about those interviewed for Section 2 51
Appendix 4. Interview schedules for managers 52
Appendix 5. Interview schedule for recent recruits 54
Introduction

The Internet marketing blog on Hubspot recently asked “Do you have digital natives in your organisation?”¹, offering a number of characterisations of the digital age worker that could in equal measure perhaps appeal to or repel potential employers. Although sensibly recognising that digital natives are just a “cultural subset [our emphasis] of teens and young professionals”, the article still manages to articulate a good number of stereotyped views of what young people might be expected to bring to the workplace, having been immersed in the digital world for most of their lives: “digital natives grew up with computers around their house [and] in general they can navigate any kind of computer you put in front of them”; “digital natives hate asking for help ... Part of how they learn is through self-discovery, exploration and by making mistakes. If you turn their job into a series of puzzles ... you’ll find them burning night and weekend hours just to complete their goals”; “digital natives tell it like it is”. It is a stereotyped notion of the employee of the future, and inevitably the reality is somewhat more varied, and complex, than this suggests.

In this report, we present findings from our own research into the technology experiences of learners in college and university who are currently approaching the job market, and also talk to some who have already entered the workplace, as well as to some of the employers who recruit them. We are interested in seeing both how these learners view the role of technologies in their studies and in their future lives, and whether the ways in which they have been learning to use technologies as students and young people over recent years constitute a valuable basis for the world of work. We are interested in two main questions in these respects:

1. to what extent do young people’s self-directed uses of digital technologies in their own contexts influence the trajectories of their future learning and employment?
2. in what ways are the skills and practices that young people have developed through their self-directed uses of digital technologies valued with the workplace?

We intend to explore answers to these questions by discussing, in the first section, what a range of learners in sixth form colleges, further education and higher education told us about the ways they use technologies in their lives as students, especially for their studies, and their perceptions of the role that digital technologies might play in their future jobs. In the second section we shall explore a range of attitudes towards using digital technologies within a number of different workplaces, whether employers consider technology-related skills as a major focus of their recruitment strategies, and the experience of new recruits into these businesses in terms of meeting their employers’ expectations of technology skills and practices.

We do not present this as a comprehensive account of the issue of technology skills demand and capacity, so much as an attempt to capture and characterise the varied technology experiences of a disparate sample of learners as they progress through education and into work. We cannot hope to encompass the full range of differences between youngsters with respect to all the different kinds of study that they are engaged in at these various stages. Rather, we seek to explore some of the insights that have emerged during the course of this project, which has throughout given priority to the quality of learners’ own accounts of their experience and

perceptions. The insights that are most relevant to the present report relate especially to the question of whether young people do indeed engage with digital technologies in ways that are unique to their age group, and whether these engagements do offer some specific benefits, in terms both of meeting the needs of workplaces, and of enabling young people to construct future careers out of their personal technology interests.

In our previous report on learners’ technology experiences (Chase et al., 2009. ‘Skills for the Knowledge Economy: the trajectories of technology-based skills development within young people’s own contexts’), we characterised the mainstream ways in which we perceived teenagers especially using technologies in the following (abridged) terms:

- social networking & communicating via: MSN or Bebo\(^2\) (for the majority of secondary school students) and Facebook (for the majority of FE and HE students); texting; email;
- leisure activities including online games playing; games consoles (boys more than girls); music players (including mobile phones) and MP3 players; TVs, DVD players and computers for viewing TV and movies;
- creative activities using digital video cameras, digital still cameras & mobile phone cameras; digital instruments and music resources; video editing and picture editing; creative writing with word processing or presentational software;
- school or college work primarily using Word, PowerPoint, Excel; Google and Wikipedia.

We also observed that as youngsters progressed through education, towards GCSEs and beyond, whilst maintaining the same broad spread of activities, they gradually began to shift the balance increasingly towards the priorities of school or college work over their other regular activities. Also, we noted that within this mainstream picture there were some elements of diversity: a relatively small, but notable, group of learners were already intensive users by their mid-teens, whose engagement with technologies seamlessly encompassed their leisure, study and possible future uses; others went to some lengths to dissociate themselves from being seen as keen technology users, without actually giving up that usage; some, finally, were simply unable to get access to the advantages of technologies, and in terms of those we spoke to in our research, considered themselves to be disadvantaged when it came to their formal learning as a consequence.

Thus, in the present study, we look more closely at those learners for whom, because of their age, the imperatives of study begin to take precedence over leisure-based and social uses of technologies, and the demands of the workplace in turn become more dominant. We aim to understand the patterns that reflect different conditions of learning, and the individual differences that demonstrate that young learners are in fact far more complex and diverse than any generation-based stereotype such as the notion of digital native could ever hope to capture.

\(^2\) Bebo was popular with our interviewees in 2008 but already losing popularity in 2009.
Executive Summary and Recommendations

Section 1

Improved personalised learning experiences: the role of new technologies in the lives and future employment of learners in post-compulsory education

This first section investigates the roles of digital technologies in the lives, learning and future plans of 75 students taken from a selection of institutions encompassing post-16 study or higher education. The higher education institutions consist of two traditional and two post-1992 universities. It addresses Harnessing Technology system outcomes such as improving personalised learning experiences, with respect to their being ‘able to exercise choice among flexible learning options’ and having ‘engaging learning experiences which support deep and higher order learning’.

The section draws both on evidence discussed in a previous report ‘Skills for the Knowledge Economy: the trajectories of technology-based skills development within young people’s own contexts’ (Chase et al., August 2009) which indicated that students’ uses of technology develop as they advance along the different stages of their educational path, so that the typical habits of teenage use, (which focus primarily on socialising and leisure activities), gradually adapt in order to incorporate a greater degree of study-related uses, without actually abandoning many of the earlier teenager uses. Subsequently, in some cases, these study-related uses are further adapted to incorporate activities aimed at connecting with the world of work.

Post 16 education students

Key uses of technology at this stage of education involved supporting learning through Internet research (in addition to course requirements), typing documents (avoiding problems with handwriting and spelling) and creating unique work. A second major role for technology at this stage of a learners’ lives is the increasing impact of college and sixth form learning platforms, potentially enabling learners to develop understandings about the role of central management systems and shared servers in their future study and working lives.

Post-16 learners tend to have varied degrees of access to computers (for instance, sharing with other family members or borrowing the computers at college). Whilst there are a number who are particularly interested in the use of computers as a hobby itself, the majority balance their technology use with a variety of other activities. Nonetheless, it is evident that technologies play a key role in enabling their enjoyment of such hobbies.

Higher Education Students

Learners who have continued into higher education are increasingly required to use technologies independently for study and research related to their course. Several higher education learners mentioned the necessity to use their computers more intensively since entering university. Nearly all of the students in higher education owned their own computers and considered it essential to have sole use of this.

University learners were generally conscious that their needs for using technologies in relation to support their studies have increased. Learners studying for traditional academic degrees
generally tended to conduct research for their studies, most often citing regular online search engines, online or e-journals, Google Scholar\(^3\), Wikipedia and JSTOR\(^4\).

Learners studying for the vocationally-oriented degrees described a number of additional ways in which the Internet specifically was useful both for research purposes, and for advancing their subject-specific skills. Students in the new universities studied a wider range of subjects involving the computer-aided design of images, games and music, art, photography, and virtual engineering; vocational academic degrees involving business, travel, IT and teaching; along with more traditional academic degrees such as psychology and biomedical science. This emphasis on vocational technology-powered study also appeared to go along with a smoother and more direct transition into employment.

**Social and collaborative practices**

Discussion boards available on university learning platforms are intended to enable students to communicate with peers and tutors in order to share their views about particular aspects of their work. However, the university learners we spoke with often preferred to use non-university resources when it came to communicating with peers, as these were often seen as more flexible and advanced.

Some HE learners noted that they are actually using some aspects of technology less now that they are at university (due to a reduction in their uses for pleasure, particularly if their courses are not dependent on technologies), although this is sometimes balanced by evidence of an increased dependence on smart-phones for some of the tasks for which they previously used computers, such as accessing the university VLE or communicating with other students via email.

**Developing skills for the workplace**

University students often talk about accessing university learning platforms in similar ways to post-16 students, although a much heavier reliance on such platforms is described. Whereas post-16 students may use learning platforms to provide further website references to follow up or to communicate with tutors, university learners appear to make far more continuous use for obtaining obtain lecture notes and slides, and to download pre-lecture research briefs, assignment tasks, and podcasts of lectures. It appears that learning platforms at this level now play a pivotal role in the learning lives of many university students. The onus on the individual learner to make the effort to visit the website at regular intervals is a crucial self-management habit that university learners have to develop; one which is likely to be key for a number of future career prospects requiring responsibility to keep up-to-date with current processes in their work.

HE students display a range of different research behaviours beyond the typical uses of Wikipedia and Google, each harnessing the Internet in different ways. Such individualised methods of keeping ahead with research have the potential, in theory, to constitute the kinds of skill that might eventually appeal to future employers.

---

3 a beta service from Google without advertising, providing academic material only

4 a not–for–profit digital archive of academic journals and other scholarly content.
Ambivalence towards technology

There was some degree of ambivalence regarding the place of digital technologies in their lives, and this was encountered amongst students in both new and traditional universities. Those studying in traditional universities tended to view technology as integral rather than central to their lives. Technology is seen as a tool to help them conveniently carry out their work, but the importance of amalgamating such use with traditional methods of working is acknowledged by most and it is often a generally expressed consensus that technology should not be solely relied upon.

Learners studying in post-1992 universities tended to view technology as a central medium for their studies, and technology was considered as more vital for study practices, as well as for organising their lives, entertainment and peer collaboration through technologies. These learners also suggested that they could not live without technology to an extent not so evident within those learners in traditional universities, both for communication and personal development.

Technology use for developing and displaying the skills and profile necessary to get a job within a shrinking graduate job market very often seemed to distinguish new university students from those studying at traditional universities. A number of these learners have already begun their freelancing career whilst still at university, setting up their own companies and offering work to local university societies in order to develop their portfolios. It appears to be the learners from post-1992 universities in particular who are most closely integrating their uses of technologies for studying, entertaining and developing a work profile in readiness for the years ahead.

Learners’ views of technology in relation to future plans

Post-16 learners: visions for the future

Previous research for this project has shown that whilst some students in post-16 education are able to articulate the kind of role that they aspire to within the industry that they hope to work in, they generally know little about what working in that industry would entail. Post-16 students appear to be beginning to use technologies predominantly to access current knowledge of the field. Many of these learners were still uncertain about their future plans, with many being very much immersed in planning for university and dealing with their immediate educational challenges.

A lack of clarity about a specific career often meant that post-16 students found it difficult to articulate the skills that they felt they would need to develop in preparation for employment. The majority of students seemed to attribute importance to the more practical aspects of technology skill including the ability to search the Internet productively, or manipulating technology to organise their lives.

Traditional university learners: pervasiveness of technologies

Learners in traditional universities generally accepted that digital technologies would form an integral part of their future working lives, in terms of pervasiveness, and convenience and speed in communications, without necessarily being central to their lives. The Internet is acknowledged as a centrally important tool for the future, especially with regard to resources such as Google Books (which provides free access to a wide range of texts that are out of
In speculating about future trends in technology use, these learners tended to identify mobile phones to increase in importance owing to the increasing amount of work done away from the office and needing to organize work ‘on the go’. Many also felt videoconferencing will play a large part in their working lives, and those studying for more scientific subjects recognise that they will need to train in specific skills for the job, in terms of using software or hardware.

In general, these learners attributed particularly high importance to the development of a range of soft skills in general which they felt would enable them to become more employable, such as academic writing, presentation ability and confidence in talking in front of groups, organisational and business skills, and communication skills. It seemed that a number of students were unsure about the exact nature of skills that their future employer may be looking for, and therefore appear to be trying to compensate for this by developing a much larger range of both soft skills and software knowledge.

New university learners: a more technological future

Intensive technology users tended to express an ongoing desire to develop specific computer skills such as programming, and to keep updated with technological developments, possibly because they feel that this will make them more attractive to potential employers. This was also particularly the case with some of the learners studying for creative degrees at new universities who spent much of their time independently learning new digital creative technologies in order to be able to produce a higher quality piece of work and to become more appealing to potential employers. Learners in new universities tended to attribute a far greater priority towards specific technologies they would need to use.

The role of new universities in facilitating employability

Through discussions with learners at the two new universities, it became apparent that these universities placed a much higher emphasis on preparing learners for the upcoming job market. Vocational courses seek to enable learners to pass seamlessly into the industry for which they are studying, providing links to employers at an early stage of the academic course and in some cases supplying the necessary financial backing to allow the most high-flying learners to start up their own businesses.

Learners are encouraged to advertise and promote themselves to potential clients, increasing their chances of employability upon leaving university. They also seem to be encouraging learners to promote their work online via blogs (as part of a Personal Development Programme).

EXECUTIVE SUMMARY Section 2
The relevance of learners’ experiences of using new technologies in their own contexts to the skills demands of the workplace.

This section reports findings into the changing nature of how companies in the modern workplace make use of new technologies in their work, and the extent to which new recruits are able to or expected to bring the required skills into the workplace, and thus refers to the
Harnessing Technology strategy relating to ways in which ‘technology for learning improves engagement in work-based skills development’.

Ten companies were visited, providing an opportunity to talk with both managers and recent recruits about these issues. In all, thirteen managers and twenty new recruits were interviewed.

**Part 1: from the perspective of employers**

**The role of technology in businesses**

Despite inevitable variation in terms of levels of dependence upon specialist uses of digital technologies, the role of technology in the day-to-day life of the company was highlighted by all as being very significant, especially with respect to the following common goals:

- increasing efficiency and economizing;
- information storage and sharing;
- allowing distributed work and working from home;
- allowing new and cheaper ways for recruiting;
- increasing opportunities for better marketing and relations with customers;
- supporting paperless offices and sustainable green policies;
- ensuring competitiveness;
- helping with adapting to recent changes in communication and collaboration patterns.

**Changing technology practices in the workplace**

Although most companies depend on technology and are aware of this dependence, not all of them saw the wider meaning and role for technology beyond its practical applications. One of the key purposes of technology that companies reported was for communication and collaboration within the company or with clients. Distributed work and training were also seen as enhanced by technology by many.

**Emerging practices: companies exploring uses of Web 2.0 / social networking**

Many of the companies we spoke with were making some attempt to explore how they might incorporate Web 2.0 practices, or at least Web 2.0 tools, into a number of their activities and communication needs, both internally and externally. The growing use of new technologies for communicating and collaborating with clients is evident in new marketing practices and customer services. Not all attempts at integrating such technology uses into company intranets and regular practice prove successful, and some are rapidly abandoned (e.g. the use of blogging in one company).

**Flexible working**

As flexible work arrangements expand, and working from home becomes more normal, technology plays an increasingly important role in basic business activities. Some technology practices between home and work are currently constrained owing to concerns about issues such as security and efficient time use.
Issues of IT Regulation

All companies we interviewed reported various security concerns as the key reasons for restricting employees' freedom to manage their own computers, especially with regard to loading their own choices of software, particularly those downloaded from the Internet. It is recognised that greater flexibility in these regards will prove necessary in the future, both in the interests of company efficiency and future recruitment.

Recruitment of new staff

Technologies are enabling companies to take greater control over their own processes of recruitment, on occasions making use of Web 2.0 tools in the process, tapping into the possibilities offered by social networking and the Internet in general. We encountered little evidence from either employers or new recruits of employers attempting to snoop into applicants' social lives via social networking sites such as Facebook, although occasionally employers mentioned looking at recruits blogs, which are in general more public documents than social networking sites. In general, the privacy controls on Facebook are now well-enough understood by users that the scare stories of recent years about employers probing into applicants’ personal lives are less likely to occur now than previously.

Recruiting technology skills

It appeared that companies viewed the problem of basic IT competency as more or less non-existent now, reflecting a general belief that a reasonable level of computer competence can now be counted on, and where it is lacking it can be addressed once in post, either through informal peer support or organised training. Companies preferred to look at wider, non-IT qualifications and prior experience, and did not tend to look specifically at things like IT skills, as they expect recruits to pick these up ‘on the job’.

It appears that managers assume that skills such as basic operating system fluency are more generally learned in formal settings prior to entering the workplace and it was common for managers to view the home context as a site for learning IT skills.

The role of training in securing required skills

In virtually all cases, managers spoke of training as ‘the best route’ to achieving the levels of skill needed for particular jobs, especially in the case of specialist skills where the safest way of ensuring that someone can do the job is to train staff already known to them, whose reliability and competence they have good reason to trust.

It appears that managers increasingly expect new recruits to pick up required skills quickly and easily. Most companies rely explicitly on internal training: once an employee joins the company, the skills gaps are determined by their manager or by the employee themselves and training is initiated. Due to budget constraints and time management, most companies only offer external training courses when there is a key or urgent need.

Employers recognise the key role of the individual employee in this process and say that the employee needs to take responsibility for identifying and developing their skills themselves.
Part 2: from the perspective of recent recruits

Using technology in the workplace

Recent recruits reported using technology for a large part of their working day, and for a range of tasks from very basic to more complex. They cite both conventional office technology uses and sometimes more specialist technology alongside these. They see technology primarily in terms of supporting their work practices, and allowing opportunities for communication and collaboration both with clients and colleagues. They value security and flexibility as well as the opportunity for technology to improve teamwork, companies’ image and customer services. In most cases, new recruits felt that companies will embrace their initiatives regarding technology.

Technology regulation within the workplace

While most of these recruits accepted quite easily that they needed to follow different kinds of rule of IT usage in the workplace, a few recent recruits reported finding the restrictions they encountered quite frustrating, but most accepted the fact that restrictions regarding use of social networking sites are an inevitable part of being at work.

The process of recruitment

Recent recruits reported a variety of experiences with the process of recruitment. Recruits tended to report that employers made little distinction between basic IT skills and more complex skills such as those associated with uses of Web 2.0 tools. Companies tend to want recruits who are capable of picking up the new skills required to use any specialist systems.

It appears that recruitment processes for a range of jobs, requiring a range of technology skills, tend to focus far more strongly on soft skills and the right impression of competence in various respects, than on clear demonstration of strictly defined IT skills or practices. This reflects some degree of confidence on the part of the companies in terms of generally expecting to find the level of skills they require.

The history of the recruits’ technology learning

These recruits tended to have fairly uncertain recollections of their original learning processes but generally report these as combining learning that was picked up at school, even if they do not entirely recall when or how, with learning in their own contexts. Most appeared to have acquired at least a proportion of their technology skills at home through using a computer in their own time. This would often combine interactions with parents, partners or friends. Most of them have also had some experience with learning how to use technology at school. Some have taken IT GCSE or A Levels and a few had special qualifications. Several recent recruits talked about the important role of gaining experience with using technology in general or specific pieces of technology at their previous jobs or placements. Very often, it seems that they had learnt ‘on the job’.

Further development of recruits technology skills and practices

Recruits viewed the opportunities for self-learning and learning on the job as ongoing processes through which they would be able to work closely with colleagues and line managers. In effect, it appears that skills development in relation to using technology is generally viewed as something that is picked up informally, rather than provided at high cost to workers who appear
more than capable of learning for themselves. A number felt that technology skills would prove to be a significant part of what might give them ‘the edge’ as they try to move up the career ladder.

Technologies are more often than not viewed by these recruits – just as it appears to be viewed by their employers – both as essential and yet to some extent to be treated as a marginal concern, something to be picked up informally and with a minimum of fuss. The skills of using technologies that they bring with them to the workplace have largely been informally gained, and they are adapted to the demands of the workplace in equally informal ways, for the most part. But their ideas about their future careers, despite the occasional protestation to the contrary, seem in general to take the importance of continued and expanding technology usage for granted.

**Conclusions**

As understanding develops about young people’s technology activities in their lives, it is reasonable to suppose that more structured means of recognizing these will be developed. For instance, e-Portfolios might be used as a means of collecting and displaying evidence of young people’s skills and productivity in using the Internet for social, communicative and creative purposes in their own time, especially with regard to those uses that represent the beginnings of a trajectory towards future employment (e.g. music technology, photography, artwork).

As teachers and others responsible for young people’s academic and career decisions (e.g. Connexions) become increasingly aware of young people’s self-directed activities, it is also likely that they will be able to help them articulate the informal or incidental learning that occurs in the course of using digital technologies for a range of purposes in their own contexts.

An important aspect of the Harnessing Technology strategy is that partners – incorporating here educators and employers especially - buy into its vision, especially in terms of identifying and encouraging opportunities for innovation arising from the technology experiences of those just entering the workplace. It is evident from our findings that many employers are beginning to make respectable efforts to look for and give scope to the technology skills and understandings of new recruits in ways that might enable them to engage in new and effective ways with their business needs. Our findings suggest that there is still a good way to go yet in terms of employers understanding how best to identify and validate the technology-related practices of young employees, but it is evident across the variety of employers represented in this report that the need for this is becoming understood, which provides a promising basis for future development. The Harnessing Technology strategy should play a substantial role in articulating the nature of that development.
Section 1

Improved personalised learning experiences: the role of new technologies in the lives and future employment of learners in post-compulsory education

The following section explores uses of technologies by a sample of 75 students from post-16 and higher education institutions. Particular attention is also paid to the differing ways in which learners in two different types of HE institutions are directing their technology-based activities in order to enhance their career prospects. The issues in this section concern both the current learning experiences of these young people, in terms of Harnessing Technology system outcomes such as improving personalised learning experiences, with respect to their being ‘able to exercise choice among flexible learning options’ and having ‘engaging learning experiences which support deep and higher order learning’. In addition, this section touches on the central focus of Section 2, which concerns the ways in which ‘technology for learning improves engagement in work-based skills development’.

The section draws both on evidence discussed in our earlier report ‘Skills for the Knowledge Economy: the trajectories of technology-based skills development within young people’s own contexts’ (Chase et al., August 2009) and on evidence from a subsequent series of in-depth interviews with students at a post-1992 university in the midlands region. In total, the sample discussed below consists of 22 post-16 students interviewed from two sixth form colleges and an FE college across East London and Essex, 26 higher education (HE) students drawn from two long-established UK universities; and 27 higher education students drawn from two post-1992 UK universities. Our earlier report indicated that students’ uses of technology develop as they advance along the different stages of their educational path, so that the typical habits of teenage use, (which focus primarily on socialising and leisure activities), gradually adapt in order to incorporate a greater degree of study-related uses, without actually abandoning many of the earlier teenager uses. Subsequently, in some cases, these study-related uses are further adapted to incorporate activities aimed at connecting with the world of work. It is this trajectory from teenage use, through study-focused use and onto employment-focused use that is explored in the present section.

Post 16 education students

Learners in post-16 education with whom we spoke reported significant differences in educational activities after moving from compulsory education to FE colleges and sixth forms. This transition appeared to impact on how they made use of technology in a number of ways, with learners describing a need to spend more time on the computer for focused study relating to their course, and an increased amount of time carrying out their own independent thinking and research. Key uses involved supporting their learning through their own Internet research (in addition to course requirements), typing documents (avoiding problems with handwriting and spelling) and creating unique work. Their personal choice to carry out extra research is of particular relevance to the development of their ‘digital literacy’ at this early stage of their post-compulsory educational trajectory, as it requires a new level of academic motivation not

---

5 These consisted of two pre-1992 and two post-1992 universities, which are generally referred to in the text that follows as traditional and new universities.
demanded at compulsory level: it encourages learners to develop and test their own hypotheses through research, developing the much-important skill of accurate Internet navigation to find the right and relevant information.

A second major role for technology at this stage of a learners’ lives is found in the increasing impact of college and sixth form learning platforms. Learners generally seem to value the resources provided for them on these platforms, such as:

- links to helpful websites
- availability of software enabling higher level work (for instance, GeoGebra)
- access to file sharing servers, allowing learners to store work centrally rather than carrying it with them between home and college
- college email networks, which are valued particularly for the convenience of direct communication between teachers and tutors, as well as for submitting homework.

Beyond this level of convenience and immediate utility, it can also be argued that the opportunity to develop the habit of using learning platforms constitutes vital preparation for understanding the important role that such central management systems and shared servers may play in their future university and working lives, and thus even at this young age, students are learning to negotiate complex ways of storing and transferring data quickly and conveniently.

At this age, students also talk of beginning to harness personal networking practices in order to advance their academic capacity. FD (17) for example has a friend at college who will send him further references relevant to his course to read via his Facebook page, thus helping him to broaden the level of private research he carries out. Importantly however, the transition from compulsory education also leads to a number of differences in learners’ uses of technologies for activities outside of formal learning, and learners often cited changes such as reduction in the time spent on things like games playing and personal photo-editing. Some students do however suggest that the computer is now also used more for social networking practices as friendships become more dispersed and the need to stay in touch electronically becomes greater.

It is not normally the case that technologies are described by these students as being their central area of interest. Whilst there are a number who are particularly interested in the use of computers as a hobby itself, the majority balance their technology use with a variety of other activities. Nonetheless, it is evident that technologies play a key role in enabling their enjoyment of such hobbies. For example some learners talk of creating fan pages on Facebook or recording digital diaries on Facebook with photographs, using YouTube to promote particular groups that they are engaged with, and sometimes producing their own music or video using increasingly sophisticated software such as Fruity Loops, Reason and CubaseSX.

**Higher Education Students**

Learners who have continued into higher education are increasingly required to use technologies independently for study and research related to their course. Several higher education learners mentioned the necessity to use their computers more intensively since entering university. Whilst post-16 learners commonly describe having varied degrees of access to computers (for instance, sharing with other family members or borrowing the computers at college), nearly all the students in higher education owned their own computers and considered
it essential to have sole use of this; and if they did not, this was something that they were hoping to own soon to prevent limitations on access through having to share.

One key difference between students in post-16 study and those in higher education is the extent to which research constitutes a core requirement of study. University learners were generally conscious that their needs for using technologies in relation to support their studies have changed since leaving post-16 education: ‘I use the Internet a lot more for research and things like that’ NG (female, 19, traditional university). Those learners studying for traditional academic degrees generally tended to conduct research for their studies, most often citing regular online search engines, online or e-journals, Google Scholar\(^6\), Wikipedia and JSTOR\(^7\).

Learners studying for the vocationally-oriented degrees described a number of additional ways in which the Internet specifically was useful both for research purposes, and for advancing their subject-specific skills:

- those studying for creative-based degrees often described a need to gather ‘reference imagery’ and develop inspiration for their creations. These learners frequently discussed finding images via the Google search facility, visiting illustrator or graphic designer websites and blogs (a combination of actions which are mentioned by nearly every learner studying for this type of degree) as well as library books, magazines and art galleries.
- for the technology-focused degrees which often require students to have a detailed working knowledge of a variety of different software packages, learners often spoke about undertaking their own private learning so that they can broaden their knowledge about specific packages. For example, CV (female, aged 21) studying Graphic Design at a new university uses an online software training library (Lynda.com) in order to develop her knowledge about specific programmes, and LO (male, 19) also studying for Graphic Design at a new university explained that he visits the Deviant Art website, both for inspiration, downloading art tools and tutorials on how to complete complex art requests. ‘I look at other people’s work and get inspiration off tutorials and see how people do stuff’. He uploads his own writings, pictures and photographs to this website in the hope that he will receive critiques which can guide him on improvements.

This is not to suggest of course that the learners in new universities – such as those studying for Illustration or e-Music courses – are not also encouraged to make extensive use of traditional book-based forms of research. UJ (21) explained that the scientific nature of his e-Music course meant that information is frequently more readily available in hard copy: ‘I don’t know, it’s like science based like sound waves, so I need to know the goings-on through like the books really mainly for research’. MGU (29) who is studying a science based subject at a new university has found a way of using online animations discovered through Google and YouTube to help him grapple with some of the more complicated medical science concepts: ‘(They) give you an insight of what you’re actually learning, say for example you know, heart anatomy, if you want to know more about how the heart actually works, you know, you can.’

Differences in actual use of technology and attitudes towards technology appeared to correlate to some extent with different kinds of courses (academic, vocational or creative) being studied

---

\(^6\) a beta service from Google without advertising, providing academic material only
\(^7\) a not-for-profit digital archive of academic journals and other scholarly content.
in traditional versus new universities. Students in the new universities studied a far wider range of subjects that involved the computer-aided design of images, games and music, art, photography, and virtual engineering, vocational academic degrees involving business, travel, IT and teaching, along with more traditional academic degrees such as psychology and biomedical science. This emphasis on vocational technology-powered study also appear to go along with what appeared to be a smoother and more direct transition into employment.

The types of technologies mentioned by traditional university students as specialist to their course included advanced statistical software, music editing software, e-journals, legal and translation programs, and graphical software. In comparison, whilst some of the same types of technologies were mentioned by those studying for more academic-based degrees in new universities, learners also frequently used design technologies such as Adobe Creative Suite, music editing software such as Cubase, In Design, Dreamweaver, Flash and After Effects.

Social and collaborative practices

Discussion boards available on university learning platforms are intended to enable students to communicate with peers and tutors in order to share their views about particular aspects of their work. However, the university learners we spoke with often preferred to use non-university resources when it came to communicating with peers, as these were often seen as more flexible and advanced. In respect of such uses, they tended to develop more sophisticated ways of using online communication than post-16 students’ collaborative uses of college email, mobile phones and Facebook. For example one learner at a traditional university described how it was fairly common for students on his course to upload and share essays via Google Mail with other students to enable fluid feedback. Students at traditional universities also talk of exchanging ideas on how to access online materials and perform searches, even inventing educational games to play such as tracing the links between two entries on Wikipedia. Learners from both types of university however also frequently noted the importance of Facebook for developing a collaborative experience, with large numbers of students regularly contributing to online groups studying for the same course, society or at the same college.

Such groups are noted as being particularly useful due to the ease of sharing meeting dates and society outings, networking with other like-minded individuals, the ability to share feedback and suggestions on created work, the sharing of information about competitions where they can to enter their work (especially with regards to creative courses) and the arranging of independent trips to galleries and places of interest relevant to their academic learning (outside the realms of what the university currently offers). TK (female, 21) a course representative running one such Facebook group notes how important such groups are in allowing shy individuals to have a voice: ‘it’s really good because some people that are really quiet and stuff last year are like opening up more. They’re like, oh I’ve got some ideas and stuff, and we’re like, yeah that’s good. And I think also people who are too shy to talk in class they can always email us as well or put it up on Facebook.’

Whilst some students in a traditional university mentioned their use of Facebook for organising their university societies, they also expressed a degree of unease regarding excessive use of Facebook for entertainment-related activities: ‘Facebook has stolen so many hours out of my degree’ (TO, female, 20) whilst LU (Female, 19) acknowledged it could be used as form of procrastination. Students in non-traditional university courses tended more to view Facebook as a useful medium for supporting their academic learning and, for some, a helpful self-promotion
tool. Indeed, self-promotion is a major activity that a number of individuals were involved in (in particular those in more vocational study) through the use of blogs, online magazines and online radio. UI for example studying ‘new media journalism with radio broadcasting’ runs his own blog using Photoshop, Dreamweaver, HTML and CSS where he gets to practise his journalism skills in a public environment. He uses this both for his course and to let others know what he’s up to, leaving approximately 100 entries per week. Another student, MU (20) studying illustration and animation appreciates that a number of her colleagues use Facebook for self-promotion of their work in order to gain feedback, as well as passing around information on the latest news relevant to her subject: ‘some people from other courses will put up on their status, like oh check out this artist, it’s really good, or this exhibition or something... A lot of people put up their work as well on there, you know ... and then everyone leaves feedback or comments like, oh I really like this drawing, or why did you do the eyes red or something like that’.

Networking online is a particularly important feature of technology use for university learners (particularly with regards to a number of those in new universities), and particularly in the cases of those students who have come from other countries to study in England and who wish to balance their technology use with maintaining contact with family and peers at home as well as keeping up-to-date with news and politics from the area. Learners commonly reported that it would be routine to switch their computers on first thing in the morning, and off last thing at night, with the extent that some learners consider technology to be totally pervasive throughout the 24 hours of everyday (GU, male, aged 25).

On the other hand, some HE learners noted that they are actually using some aspects of technology less now that they are at university (due to a reduction in their uses for pleasure, particularly if their courses are not dependent on technologies), although this is balanced by evidence of an increased dependence on smart-phones (an effect of mobile phone contracts becoming more accessible to new users). Indeed for some, the iPhone in particular was becoming the hub for some of their daily activities, changing the ways that learners communicate with other people and monitor their own personal goals. NF’s life is immersed in technology, and her iPhone plays a very large part in this, noting that ‘yeah I use it for everything and it’s like a little mini-computer. I’d be lost without it I really would.’ She plugs her iPhone into her car when travelling, records her daily weight and monitors a weight loss counter, uses it for cooking via the Jamie Oliver cookbook, accesses email on the go and also use Facebook, a pedometer, a Movie App for cinema times, Spotify; Ping (free messaging), Sky News, games, Google, the Underground tube map, her TV guide and Sky Plus Remote.

Developing skills for the workplace

University students often talk about accessing university learning platforms in similar ways to post-16 students, although a much heavier reliance on such platforms is described. Whereas post-16 students may use learning platforms to provide further website references to follow up or to communicate with tutors, university learners appear to make far more continuous use for obtaining obtain lecture notes and slides, and in order to download pre-lecture research briefs, homework tasks, and podcasts of any lectures which they have missed. It is clear that learning platforms at this level now play a pivotal role in the learning lives of many university students. The onus on the individual learner to make the effort to visit the website at regular intervals is a crucial self-management habit that university learners have to develop; one which is likely to be key for a number of future career prospects requiring responsibility to keep up-to-date with current processes in their work.
University learners also often speak of being engaged intensively in a large number of extracurricular activities of two main types: organisational work at colleges and university societies, and hobbies, many of which are at the level of semi-professional skills. Such activities very often take a significant proportion of students’ time and commitment, but also constitute opportunities for developing soft and transferrable skills that may support their future career paths directly or indirectly. Learners at both universities appear to embrace technology in a similar way to post-16 learners when supporting their role in extracurricular activities, through the use of the creative software, as well as email and Facebook. However, those learners studying for creative degrees at university also commonly referred to using creative software in their own time for personal entertainment. For example, LD explains ‘I may do some design work for myself, you know... because it’s quite important at the moment.’ For some learners designing has even led to paid freelance work on the side, allowing them to further develop their design skills in a client-oriented environment, and begin to build up a client base and work portfolio (a vital attribute for those wishing to enter the creative industry through freelance work alone). For example, UO (19) is considered the media leader of her Christian Union group and therefore designs posters, flyers and advertising for the group; and TZ (20) has set up her own company to raise money for her ‘end of degree’ show, involving the creation of promotional postcards, developing a company website and designing and selling DVDs and merchandise.

Advanced methods of research are necessary for the completion of most university courses, and learners are displaying a range of different research behaviours beyond the typical uses of Wikipedia and Google, each harnessing the Internet in different ways. Such individualised methods of keeping ahead with research have the potential, in theory, to constitute the kinds of skill that might eventually appeal to future employers. University learners also express a heavier reliance on learning platforms than their post-16 counterparts, as well as developing more advanced methods of collaboration and knowledge sharing with peers. Thus university learners can be seen as often developing significantly in their technology practices beyond what is typical for students in post-16 education, in terms of using technology for research, academic work, and social collaboration. In addition there are the differences in technology use between those studying for academic or creative based courses: whilst those studying for academic degrees in both types of university used the computer more intensively for activities related to their course or college and balanced these with social networking (particularly Facebook) and hobbies, the majority of those studying for creative degrees often also displayed an intensive use of technology (although as previously noted, this was not always welcomed), integrating this use into their own personal enjoyment practices, and blending this with part-time employment. Thus as particularly was the case with a number of the new university learners, a blurring of boundaries between required study, entertainment and work can be seen to emerge.

Ambivalence towards technology

There was some degree of ambivalence regarding the place of digital technologies in their lives encountered amongst students in both new and traditional universities. The following response to a question in a recent survey⁸ of first year fresher learners, asking the student to say whether they used technology for any special interests, represents in exaggerated form some degree of resistance to new technologies that is possibly more characteristic of the culture of a traditional

⁸ Freshers Survey (2009)
university than a new one: ‘I like to read books, but there is no option for this. They’re those papery things you find in libraries.’ Far more normal, though, was the recognition that, whether or not explicitly approved of, new technologies were now generally viewed as integral to the student working life at both kinds of university. PS (19) from a traditional university, explained that she currently uses Open Office and PDF files, online lecture notes, online journals and search engines: ‘I mean you could do without it but it would just be a lot more difficult.’ Similarly TO (female, 20), a dyspraxia sufferer at a traditional university, has found the ability to type and organise notes extremely helpful in successfully completing her tasks, as well as providing the opportunity to work from home as opposed to walking to the library: ‘it’s certainly easier and quicker than all the rest’.

TL (21) from a new university, despite showing some reluctance towards depending on graphic design software and a preference for raw illustration, recognises the importance computers play in his course ‘because there’s stuff you can’t do by hand but the computer can do it really well and it helps you a lot’. In fact, many of the students in newer universities expressed some degree of ambivalence, but only in the context of acknowledging the value that technologies bring to their studies:

- MU, studying Illustration and Animation, explains that creating animation from hand drawings is possible but time consuming: ‘(Clients) want it as quick as possible and computers make it faster. Which is a shame really because the hand drawn stuff is more unique.’
- Whilst TZ prefers the idea development of creations and would rather create them by hand, digital technologies are ‘crucial to me’. She cannot fully get away from technology as she will be ‘cutting her nose to spite her face’. However she believes it is important not to forget that technology alone will not develop the work: ‘it’s a tool. It’s not going to create your work for you. You’ve got to come up with the idea first’.
- NP (female, 21) who is studying Fine Art suggested that technology helps her with research and to find out about competitions which she could enter: ‘I’ve got a feeling (technology) will be crucial (for my career). I don’t know whether I want it to be or not, but I think it will be’

Thus when comparing across the two different types of university, it seems that those studying in traditional universities see technology as integral, but not central, in their lives. Technology is seen as a tool to help them conveniently carry out their work, but the importance of amalgamating such use with traditional methods of working is acknowledged by most and it is often a generally expressed consensus that technology should not be solely relied on (although this generalisation excludes those carrying out degrees focusing on technology, whereby this becomes a central focus of study). Within the internal university survey of freshers, referred to above, 25.4% of those who took part suggested that they ‘use technology merely as a tool to help me do things’.

In comparison, the first obvious division between the two different types of university is that those learners studying at the new post-1992 universities are more likely to view technology as a central medium for their studies, and technology is considered far more vital for study practices, even in the case of those learners studying more aesthetically-focused degrees such as Illustration and Fine Art who – despite sometimes having reservations about embracing technologies – still grapple with using basic design programs. Those learners who do suggest that they are not the unreserved fans of technology seem to be far more immersed in a
technological way of life than they acknowledge, organising their lives, entertainment and peer collaboration through technologies, and suggesting that they could not live without technology to an extent not seen within those learners in traditional universities, both for communication and personal development.

Indeed it is one particular focus of their technology use on developing and displaying the skills and profile necessary to get a job within the shrinking graduate job market which very often seemed to distinguish new university students from those studying at traditional universities. Many learners show an awareness that the more software that they can fluently use, the more likely they will be able to bid for unusual briefs from clients and thus the more successful a freelancing career could be. Indeed a number of these learners have already begun their freelancing career whilst still at university, setting up their own companies and offering work to local university societies in order to develop their portfolios. It appears to be the learners from post-1992 universities in particular who are most closely integrating their uses of technologies for studying, entertaining and developing a work profile in readiness for the years ahead.

**Learners’ views of technology in relation to future plans**

*Post-16 learners: visions for the future*

Previous research for this project has shown that whilst some students in post-16 education are able to articulate the kind of role that they aspire to do within the industry that they hope to work in, they generally know little about what working in that industry would entail. Post-16 students appear to be beginning to use technologies predominantly to access current knowledge of the field (for example, FD aged 17 uses physics forums to update him with the recent developments within his industry) and the career trajectory itself (for example MN, a male aged 17 who researches the requirements for university and GT, another male aged 17 who researched the role of a solicitor to see what jobs are available). At post-16 level, technology interests are not surprisingly most evident in those studying a computing course and aspiring to work in some way with technology in the future. Many of these intensive users have a fairly unformed aspiration towards an eventual career with computers or programming, music editing, game design, or with machinery (i.e. power plant, paramedic). It was, though, clear that many were still very uncertain about their future plans, with many being very much immersed in planning for university and dealing with their immediate educational challenges.

A lack of clarity about a specific career often meant that post-16 students found it difficult to articulate the skills that they felt they would need to develop in preparation for employment (with the exception of those who have clearly researched the industry or have a much more developed idea of the role they wish to take). The majority of students seemed to attribute importance to the more practical aspects of technology skill including the ability to search the Internet productively, or manipulating technology to organise their lives. Nearly all post-16 students could see a role of technology in terms of improving communication, convenience and organisation but few (except for those who will be working within the industry) could pinpoint the specifics of how technology will be useful to their everyday lives.

We monitored post-16 uses of technology over a number of months via email conversations, to investigate the developing views of learners towards technology use within their daily lives. Learners were asked about which of their currently-used technologies they felt would be the most useful in their future plans, and all suggested that computers and laptops would be the
most vital technology, along with the Internet. Learners cited a number of reasons why computer technology will play such an integral role, particularly in terms of organisation, time-saving, connection to wider networks, and the fact that computers are ‘more flexible than traditional mail and handwritten techniques’ (NP, male, 18). Some students suggested that computers ‘keep me informed about my daily life’ (IC, female, 17), presenting a portal to a vast amount of important information, even making it ‘easier for job searching’ (GT). The pervasiveness of technology within the workplace has also appeared to have an impact on these learners who recognise that this is now a fundamental aspect of office life, so that learners must ensure that they have a good grasp of the basic computer software that may be used: ‘jobs are made easier with computers’ (MN), and DF acknowledges that ‘every company uses them, (it’s) unavoidable really’.

Post-16 learners were also asked to comment on whether there were any technologies or software that they were not yet using but thought that they would need to embrace in their working lives, and may therefore need to learn new skills to use. OC (aged 17) thought that ‘mobile phones are becoming more and more of a necessity rather than a choice because of its essence in times of emergency, contact abroad and general communication to loved ones’, whilst others mentioned a range of mobile devices that would be used for staying connected to the Internet and personal contacts on the go, continuing with work whilst travelling on business, such as mobile dongles, Blackberry phones (‘good for organisation and business purposes, it’s like a computer on the go, allowing you to access email, make phone calls and record data’ – GT), PDAs, and laptops. Learners also noted the importance of learning to use the most up-to-date versions of software, such as Microsoft Office programs, external backup drives for the more sensitive data that they may be dealing with (thus the learner was showing some recognition that they will need to alter their way of dealing with sensitive data), and specific software that they may need to use over the course of their job (for example 3D modelling software.)

Traditional university learners: pervasiveness of technologies

Learners in traditional universities (similarly to many of those in post-16 education, and a few of those in new universities) generally assumed that digital technologies would form an integral part of their future working lives, in terms of pervasiveness, and convenience and speed in communications, without necessarily being central to their lives: ‘the whole work runs on (computers), and this is only going to increase – as they become increasingly integrated throughout all aspects of our lives’ (VI, male, 20). Similarly, the Internet is acknowledged as a centrally important tool for the future, especially with regard to resources such as Google Books and Skype (which provides free access to a wide range of texts that are out of copyright, and limited access to texts still in copyright) and communications systems such as Skype, which enable audio and video communication globally over the Internet at no cost.

Likewise, email is acknowledged as being ‘generally (...) indispensible for instant communication and can be geared to be formal or very informal which makes it versatile’ (LJ, male, 20); and for allowing more typically hands-on scenarios to be carried out in far more a convenient way, such as online banking, shopping and job applications. To most individuals, a sound knowledge of basic IT packages is a given requirement as a result of the extensive use of computers within offices, and throughout the interviews all learners had expressed that this skill level had been met.
These learners however did differ from their younger post-16 counterparts in placing a much heavier emphasis on the likely use of mobile phones because of increasing emphasis on working away from the office and needing to organize work on the go. QE (male, 19) for example particularly saw the importance of mobile technology, believing that it will become increasingly more useful as further software and hardware applications are added to the handsets. Thus it is of little surprise that nearly every learner at traditional university suggested that they would like to own a smart-phone of some form (most commonly the Blackberry variety) when entering the world of work, with one learner, MS (female, 20), suggesting instant access to email is the main reason behind their success: ‘I can see email becoming so important that it is vital to be able to check it at all times: it will become more an instant messaging device than simply a messaging device’. Traditional university learners however also commonly report that they think videoconferencing will play a large part in their working lives, and those studying for more scientific subjects recognise that they will need to train in specific skills for the job, in terms of using software or hardware.

In general, these learners attributed particularly high importance to the development of a range of soft skills in general which they felt would enable them to become more employable, such as academic writing, presentation ability and confidence in talking in front of groups, organisational and business skills, and communication skills. It seemed that a number of students were unsure about the exact nature of skills that their future employer may be looking for, and therefore appear to be trying to compensate for this by developing a much larger range of both soft skills and software knowledge. For example, LO (19) studying at a new university expresses his dilemma with regard to employer requirements:

LO: ‘I’m not sure what they’re looking for, that’s the thing. I know what skills are employable, but it matters what they actually want. Because they may not want them skills...
Interviewer: So it’s more like keeping a range of skills?
LO: Yeah really. Most people like specialise in a certain skill but they still have a range that they can do other stuff.’

Thus for the most part, it seems that those in traditional universities (along with a few individuals in new universities) reflected a very similar attitude to a number of the students in post-16 education, viewing technology mostly as a vehicle to achieve their goals whilst keeping this in balance with the knowledge that a larger range of employability factors are just as important.

New university learners: a more technological future

The more intensive technology users that we spoke with in new universities especially tended to express an ongoing desire to develop specific computer skills such as programming, and to keep updated with technological developments, possibly because they feel that this will make them more attractive to potential employers. This was also particularly the case with some of the learners studying for creative degrees at new universities who spent much of their time independently learning new digital creative technologies in order to be able to produce a higher quality piece of work and to become more appealing to potential employers. For example, CV (21) would like to become more experienced in the packages she already uses, including learning more about video programs ‘because I’m not very capable with video’. She currently tutors herself on new software programs via Lynda.com and would like to complete a Masters
degree as this will help build up her business knowledge and give her a ‘bit of an edge’ over other applicants. UJ (21) is another example of a student who knows that he will need to learn a range of technology skills to pursue a career in e-Music. However he also recognises that the technology he is working with now will have adapted by the time he is ready to work and he finds this both daunting and frustrating:

‘I haven’t even scratched at the surface I don’t think yet, like recording equipment and Internet design. I’m just learning the mere basics. So there’s still a lot to learn I’d imagine with computers... And it’s always constantly changing and being updated and upgraded.’ UJ (male, 21).

Very many of the learners studying at the new universities with whom we spoke appeared to treat technology as central both to their current situations and for their career, and this was even true of the few students who displayed some reservation regarding technology. This may partly be due to a much greater understanding of the demands of their chosen industry, and the fact that a number of these careers are dependent on the learner having a good understanding of IT: for example freelance graphic designer, online photo studio owner, journalism and photography, eLearning, games designer and medical illustrator. However the most typical characteristic of most of the new university learners was their sheer determination to begin to market themselves correctly for an upcoming job hunt, and as demonstrated by the vast number of students spending time developing their personal profiles, practising their skills, researching the current job market and taking it upon themselves to study for new courses in order to present themselves with a wider skill-base when looking for work:

- MM (28) has decided that she wishes to forge her own future by setting up her own online photo studio. However in order to do this she realises that she needs to learn web-design skills, which she is currently doing via Internet tutorials.
- TL (21) would like to go into medical illustration due to his interest in human anatomy. He spends some of his spare time looking into design and medical websites to research the feasibility of such a prospect.
- CV currently does freelance work for people she knows to build up her work profile, and she has her own website for promoting her portfolio of work and showing off client testimonials’... really just sort of getting myself out there and showing me off.’
- LO is in the process of setting up a number of his own websites where he creates corporate designs for companies, sells T-Shirts, and publicises his personal writings to encourage people to buy his future books. He also intends to take part in official graphic design competitions to have his work noticed.

When individuals studying at new universities were followed up via email contact later in the year, they expressed a slightly different view of the impact that technologies would have in their futures when compared to most post-16 and traditional university learners. Whilst similarly stating that the computer and mobile phone would be two very important features for ease of communication and organisation, learners in new universities tended to attribute a far greater priority towards the technologies they needed to use. For example, those hoping to move into computer-related industries such as graphic design recognised that access to specific kinds of hardware and software were essential:

WD (female, 18): ‘Computers drive all of my university work (if I can help it, I dislike traditional media), and this includes packages such as Adobe and Autodesk –
applications make things more perfected and easier, something the human hand and eye cannot do.’

The Internet is also discussed as being fundamental in terms of promotional capacity and interactive information sharing and collaboration. Learners talk freely of the importance of creating their own websites and web portfolios for marketing their skills to potential clients, as well as the ability to research clients to enable them to cater their skills personally. They also talk of the ability to send work electronically to clients via email, SharePoint systems, and email groups, even through the use of newer collaborative Beta software such as Google Wave. Facebook, wikis, blogs, and other Web 2.0 technologies are mentioned by some of the learners as being crucial tools both for social networking, and shaping the way that professional data can be shared. As put by one of the learners at a new university, DE (male, 30), the evolving potential of the Internet as a communication tool is one that we should try and keep in tune with: ‘we have only really began figuring out how to make the most of totally wireless Internet. Communication is being revolutionised, it will permeate all aspects of our lives and revolutionise most aspects of it sooner or later in ways we are still now only just discovering’.

Learners hoping for a future in the photographic or journalism industry often regarded their digital cameras as the most fundamentally important technology to their career, claiming that it ‘will always be with me’ (RU) and that ‘the camera will be the most importance device I am going to use in the future’ (MM). Thus it seems that – in the cases of those studying for creative degrees at new university – it appears to have become generally accepted that technology will form the basis of their working lives (to an extent not seen with learners at other universities and in post-16 education), and thus it can be hypothesised that new university students already hold an expectation to form the skills necessary to deal so integrally with technology. Perhaps then it is this expectation that strives to push learners into spending so much time focusing on professional activities whilst at university.

The role of new universities in facilitating employability

Through discussions with learners at the two new universities, it became apparent that these universities placed a much higher emphasis on preparing learners for the upcoming job market. Vocational courses seek to enable learners to pass seamlessly into the industry for which they are studying, providing links to employers at an early stage of the academic course and in some cases supplying the necessary financial backing to allow the most high-flying learners to start up their own businesses. Thus these key aids may in part be responsible for the higher emphasis on professional development for those studying at new universities, and also possibly the clearer understanding of which industry they wish to move into after finishing university.

Learners talk about the provision of work placements early in the second year of their course, where they will be able to learn firsthand which skills employers are seeking, and can make their own personal contacts with clients and employers. Students who have not yet had the opportunity to go on such placements look towards the experience as a valuable source of development. Learners also talk about frequent opportunities to take part in ‘competitions’ where their personal design work can be displayed to clients and companies to receive much-wanted contracts, as well as receiving the free publicity required in order to develop their own freelance portfolio. Some of these competitions are even run as part of the university course with ‘end of year shows’ being organised as an event whereby all students get to pitch their work to potential clients. As such it seems that new universities are far more orientated to
providing opportunities for learners to build their own profiles before leaving the safety of the university and moving into the world of work. Another scheme mentioned by learners was the ‘Speed’ programme, whereby the university allows students to pitch for £3000 to start up their own business. One learner, NF (female, 25) was fortunate enough to have received this funding, and now claims to spend every waking hour on coursework or her freelance business. For another student, such an opportunity enables her to set up her wallpaper design business, including helping her wallpaper design website to go live.

Another part of the university course system, the Add+vantage scheme, requires students to take a separate module counting towards part of their overall yearly grade which aims to ‘improve your employability while you are studying at university’ and which covers a variety of disciplines including academic writing, psychology, specific computer packages, basic life skills (such as managing money), leadership and negotiation, beginners languages, and a number of other options relevant to increasing the students’ employability. Throughout the interviews, we noted a number of individuals who were taking up this opportunity to develop particular computing skills, including WD who would like to learn more about how to design flash websites and use action script. A number of students (especially those studying for illustration degrees) mentioned that tutors were encouraging them to create and upload a website which would advertise their work to potential clients, and yet this requires them to learn how to use software such as Dreamweaver: Add+vantage courses again are another method allowing this to happen.

These new universities also seem to be encouraging learners to promote their work online via the upkeep of blogs (as part of a Personal Development Programme). Whilst encouraged to carry this out online due to the enormous potential for publication, learners are given the option to formulate a blog on paper. Importantly, the university is also touching upon the laws of copyright by allowing such personal blogs to be printed online: as MU (female, 20) noted, she has to be extremely careful with which aspects of her design work that she publishes on the Internet due to its incompletion and the danger of ideas being stolen.
Section 2
The relevance of learners’ experiences of using new technologies in their own contexts to the skills demands of the workplace.

Introduction

In this section we report findings from our research into the changing nature of how companies in the modern workplace make use of new technologies in their work, and the extent to which new recruits are able to or expected to bring the required skills into the workplace. Thus, this section of the report addresses the key issue from the Harnessing Technology strategy, in its exploration of ways in which ‘technology for learning improves engagement in work-based skills development’.\(^9\)

We visited ten companies in all, in order to talk with both managers and recent recruits about these issues. In all, thirteen managers and twenty new recruits were interviewed. These are the companies we spoke with, all of course given false names in order to ensure confidentiality.

- **Global Energy** is a large multinational energy company involved in exploration, production, refining and marketing of the final product.
- **Green Power** is a small company that generates green energy which is sold directly to consumers.
- **Water Works** is a supplier of water and wastewater services in the south of England.
- **Docu PLC** is a global document management company, positioned in the communications and information area of the tertiary sector.
- **Mobile Comms** provide mobile phone services and also represents the information and communications sector.
- **Edu Computers PLC** is another organisation in the information and communications sector supplying information technology resources to the education sector.
- **Insure & Fin** is a large multinational organisation providing insurance, asset management and banking services in the tertiary sector.
- **Local Media** is the regional service of a national broadcasting organisation, they provide representation for the arts, entertainment and recreation sector.
- **Engineers Ltd** is a multinational, employee-owned management, engineering and development consultancy.
- **Local Gov** is a local authority in the South East of England responsible for the provision of key local services.

\(^9\) We would like to acknowledge the valuable help we received from David Kay and colleagues at Sero in exploring issues relating to Next Generation User Skills.
Appendix 2 provides further details about the companies visited (including information about their IT policies). Appendix 3 gives information about the people interviewed, whilst Appendix 4 presents the questions we asked.

**Part 1: from the perspective of employers**

**The role of technology in businesses**

The companies we visited represent a range of technology uses as well as diverse views about the role of technology for the business. Some companies clearly had developed strong and cutting edge technology cultures whilst others remained fairly conservative in the technology solutions they adopted to meet the demands of their work. Some companies’ main products and operations were technology-based, whilst in other cases technology was clearly not central to the organisation. Despite these differences, the role of technology in the day-to-day life of the company was highlighted by all as being very significant (‘it is the backbone of the company’ - EP, Manager; Engineers Ltd), and everyone reported its growing importance. It was broadly the case with the companies we visited that technology was seen as playing an important part in:

- increasing efficiency and economizing;
- information storage and sharing;
- allowing distributed work and working from home;
- allowing new and cheaper ways for recruiting;
- increasing opportunities for better marketing and relations with customers;
- supporting paperless offices and sustainable green policies;
- ensuring competitiveness;
- helping with adapting to recent changes in communication and collaboration patterns.

The following example illustrates well the important role and pervasiveness of technology in a company:

> It’s very central ... every aspect of the business uses technology ... e-mails which is the way we communicate across all our sites ... a customer management system ... we help them over the telephone so all the information and data is recorded; we have workflows so people at the front end need to use the technology as well ... we’ve got various accounting programs and systems and it’s all computer based and then the data held on our customers is all electronic so we store the data electronically ... even our wind turbines send messages now electronically to handheld phones for the service engineers to go out and, it tells them 'I’m broken, please come and fix me' ... it’s prevalent across the business in every aspect (GPC, manager; Green Power).

It is not only the role of technology that is significant but also the variety of technology tools and practices in the company that staff in various industries are expected to be fluent with. For example, in the local broadcasting company Local Media, all staff had access to a touch screen phone system, instant messaging, screens around the office providing access to current information, whilst those making the programmes worked with specialist scheduling and production software. Engineers Ltd used a wide range of specialist software for CFD modelling, for sunlight and daylight modelling, for mechanical and electrical design, as well as AutoCAD for drawings, a 3D modelling package for modelling buildings, and so on.
More typically, companies such as Edu Computers PLC, Mobile Comms and Docu PLC depended upon largely proprietary software and packages such as Excel, SPSS, online survey software like SurveyMonkey, aggregators like Google Reader, iGoogle and News Now, Outlook, CITRIX and some specialist research and survey software. But as DJ, a manager from Docu PLC, pointed out, document control in large organisations is becoming a big issue, with build-up of layers of information over years, so that they find themselves ‘drowning in information, starved of knowledge’, needing to manage resources and create systems where ‘people can find stuff’. DK, manager; Docu PLC also expressed her company’s concern that it needed to find ways of accessing and preserving the knowledge and expertise of senior managers whilst they were still in the company, which required new kinds of facilitation systems. She felt that social networking provided a means for creating the collaborative knowledge sharing that was needed to preserve knowledge within the company.

Changing technology practices in the workplace

Although most companies depend on technology and are aware of this dependence, not all of them saw the wider meaning and role for technology beyond its practical applications. In one of the companies, senior management were more aware of the wider implications of technology in shaping learning in the company, not just in terms of tools but as a form of cross-generational exchange of skills and knowledge. DK, manager; Docu PLC also spoke of the company’s determination to accommodate different learning generations: ‘baby boomers, generation X and Y, new guys coming in. Cannot fall behind, need to have the technology available for the different generations so we can use the methods they are familiar with …’

One of the key purposes of technology that companies reported was for communication and collaboration both within the company or with clients. Distributed work and training were also seen as enhanced by technology by many. As several interviewees pointed out, face-to-face meetings, and particularly flying people from different countries (in the case of multinational companies) are not economically viable anymore. Video conferencing, Skype or telephone are becoming more important tools for communication, as are sharing of documents, information and projects online, through companies’ tailored Intranet systems, or in some cases through SharePoint. Some companies also need to share documents between different sub-companies such as Engineers Ltd who ‘have our own Intranet as well, across all the companies and across the world’ and use this to ‘communicate across the world’ (EP, manager; Engineers Ltd). Similarly Edu Computers PLC is constantly using the Internet to conduct and communicate research round its different branches globally, and also uses Adobe Connect Pro for online focus groups with customers ‘a bit like a webinar, but with lots of people using a combination of telephone and video conferencing’ (ED, manager; Edu Computers PLC).

IJ, a manager at Insure and Fin, suggested that printed material is gradually fading out from the company as opposed to when he joined a year and a half ago when a number of employees preferred traditional methods of storing information: ‘The way things are moving that sort of thing is phasing out by necessity, so for example in claims now we have workflow and image so there are no paper files anymore so that doesn’t exist in commercial underwriting at the moment - it will come. I also think that as people join, newer people are getting less used to working with paper.’
Emerging practices: companies exploring uses of Web 2.0 / social networking

Many of the companies we spoke with were making some attempt to explore how they might incorporate Web 2.0 practices, or at least Web 2.0 tools, into a number of their activities and communication needs, both internally -

we’re moving to instant messaging sometime next year ... speed of response and I think also it allows that conversational approach in a much more dynamic way than e-mail would allow. (IA, manager; Insure and Fin).

- and externally:

they are sites we use as a company to promote Green Power and green electricity. We go to Facebook or Twitter or whatever. So I think certainly therefore in the marketing area and in the sales side, having an understanding of social networking and social networks and how they function and work is becoming a bit more of a need ... if you go onto the Blog site and read what’s on there, there’s an awful lot of people communicate through that way. (GPC, manager; Green Power).

The growing use of new technologies for communicating and collaborating with clients is evident in the new marketing practices and customer services. For example, Mobile Comms encourage the use of Facebook among their employees. The employees are using it for personal reasons but in this way they promote their company. This means that Facebook was not blocked at work so all employees could promote the offers to friends and family. In this case, employees are encouraged to use some applications as it is ‘sold’ to consumers. Other companies are more cautious about this, though express some readiness to consider this kind of flexibility in the future. For example, IA, a manager of Insure and Fin would allow use of Facebook on occasion: ‘if one of my staff came to me and said ‘I need Facebook because...’ and I thought it was a reasonable request then I would authorise it’ (IA, manager; Insure & Fin).

Edu Computers, not surprisingly given their strong technology focus, appears to be moving ahead with its uses of technology within its own business activities, building Web 2.0 resources into the company intranet:

... part of the problem is there is so much stuff you don’t know where to look ... a lot of senior managers do blogging now, I suppose it’s not because of technology but we have Skype as well now, instant messaging, that type of thing. There are social networking groups within, there are groups of graduates who get together, they all communicate through Facebook ... which is less intuitive to some of us, but because they use those tools you have to communicate with your employees effectively you need to use the tool they are comfortable with and they use so you have to bring it onboard (ECD, manager; Edu Computers PLC).

But not all attempts at integrating such technology uses into company intranets and regular practice prove successful. In the case of Mobile Comms for example, a blogging system which was set up has been unsuccessful in take up: ‘it’s not even live anymore, but there’s no reason why you can’t do it, because we have so many different types of media like the team rooms, it’s just another thing that can be used’ (ML, manager; Mobile Comms). Even at Edu Computers, it is the more basic functionalities that are most often found useful, it appears: ‘The biggest things,
the thing that really encouraged people to use this... they put the employee search on here’ (ED, manager; Edu Computers PLC).

Flexible working

As flexible work arrangements expand, and working from home becomes more normal, technology plays an increasingly important role in basic business activities:

We have home workers and we provide them with everything they need to do and to broadcast work from home and that’s everything up to television editing as well. We’ve now ... recently acquired a couple of laptops that allow video journalists who file their stories to edit their stories from location so they take them with them ... (LS, manager; Local Media)

It is indeed possible to see home-workers becoming agents of interrelating technology practices between home and work which at the moment are rather constrained by a number of concerns that companies have regarding issues such as for example, security and efficient time use as discussed in the next section.

Issues of IT Regulation

All companies we interviewed reported various security concerns as the key reasons for restricting employees’ freedom to manage their own computers, especially with regard to loading their own choices of software, particularly those downloaded from the Internet. LS, a manager from Local Media, explains that ‘anything that appears on our systems has to be cleared and tested ... so only certain administrators can add things onto our desktops. If I wanted to add Adobe Premier to mine I can’t do it, I’d have to get an engineer to come and do that and get it cleared.’ IA, a manager from Insure and Fin, presents this aspect of the reality of using technology in the workplace very clearly:

I think it is a particular issue in large organisation, effectively we’re managing 5500 desktops, and hundreds of bit of software - all of that is expensive and very cumbersome to manage in an environment that needs to have availability, the network availability on the system needs to be 100% our systems availability has to be 99.9% so we cannot do anything that endangers that availability, we can’t be in a position where some numppty has downloaded something off the Internet and completely buggered the whole network and that’s very easy to do and I think one of the struggles is guys ... who sit at home ... who use Skype and say why can’t we use Skype here?

However, this same manager recognises that such severe restrictions may need to gradually be resolved:

... from a security point of view things are locked down, we have to limit access to drives and so on but when you look at my kids or some of the graduates that are coming in, the flexibility of some of the technology they’re use to is far greater than we currently have or we intend to have in the next couple of years. I think we’ll always be behind but it’s a question of how far behind do we allow ourselves to get.

This manager acknowledges that great flexibility in these regards will prove necessary in the future, both in the interests of company efficiency and future recruitment. He points out that things of necessity move quite slowly in large organisations, but that small advances have been
made already – ‘we’re already relaxing the USB stick’. All this suggests a very different IT world from the one that most young recruits will have grown up in, where restrictions of this kind that they will have experienced previously would have been softer or non-existent. At Local Media, the aim was to be tolerant, with regard for instance to how much latitude was allowed to employers to look around on the Internet or use Facebook, but in the end ‘if people are distracted too much... then you step in and say, look, switch off or we could switch off from the systems’.

A tension between different cultures of using technology, or different ‘generations’ have been observed in other companies too, such as Docu PLC, which recognised that employees were changing, and younger staff were bringing in new skills, and new ways of learning, and that companies such as theirs needed to be ready for them with new opportunities.

**Recruitment of new staff**

Technologies are enabling companies to take greater control over their own processes of recruitment, on occasions making use of Web 2.0 tools in the process, tapping into the possibilities offered by social networking and the Internet in general. For example IJ, a manager in Insure and Fin, a company that uses ‘video conferencing, IPT telephones,’ and ‘all of those things make communication much easier’, explained that ‘we use technology quite happily to communicate with a vast number of potential candidates so last year we had over ten thousand applicants with some people being interested in a possible graduate role with us, and then filtering it down to the 23 who started with us that is all driven by technology’:

> our recruitment process requires people to have technology, sort of the basic skills I suppose, so you have to apply online, so you have to have an electronic CV, the tests that we put people through they’re all done through a web browser and we actually text people. (ECD, manager; Edu Computers PLC).

And, as has been well-documented in the press in recent years, potential recruits have to understand the exposure that potentially results from making themselves visible on the Internet. Inevitably, if a candidate for instance includes the fact that they have a blog on their CV, a company is very likely to check that out nowadays:

> if we’re selecting them for interview yes we would (look at their blog), it depends what position they’re applying for as to how relevant it is ...just out of interest to see what sort of person they are more than anything (GPC, manager; Green Power).

Recognising that applicants are now all likely to be ‘computer literate in this day and age and if they’ve got a blog it’s the norm’, this particular manager did say that they would not go so far as to look up a candidate’s Facebook page: ‘one thing we don’t do is the social networks. We don’t go and look on anything from a recruitment perspective’.

**Recruiting technology skills**

We encountered fairly consistent views across companies in terms of whether managers consciously looked to new recruits to bring new kinds of technology skill and practices into their companies. At Insure & Fin, they preferred to look both at qualifications and prior experience, and did not tend to look specifically at things like IT skills, as they expect recruits to pick these up ‘on the job’. Edu Computers PLC looks for specialised technical skills where needed, but are most interested in finding the necessary soft skills, such as the ability to make presentations. If
the role is more technical, they look for specific qualifications which, in time of recession, they expect to be able to find quite easily. Local Media assumes that all new recruits will have basic skills, such as emailing, and using Office software and they will look either for specialist qualifications or strong experience for certain roles:

we’ve got operators, directors, camera crew, engineers and so on, we would definitely check their technical skills and that could be through written tests as well as practical. For journalist and program makers we probably wouldn’t, but what we would be doing is look(ing) through their CV for evidence of where they’ve been, where they’ve needed to operate equipment, what job where they in, what job where they doing and through the interview process we would ask competency-based example questions ... we’d get them to tell us in what context they’d used the technology and I suppose if we had any reasonable doubts after those questions were finished then perhaps we’d score them down on that level, but they might be great journalists in which case we’d say well they’re worth training then, because they’re fantastic (LS, manager; Local Media).

The ambivalent attitude to specialist qualifications was found in other industries too, along with a more general expectation that basic computer skills can generally be expected:

it’s not the be all and the end all: they can bring a portfolio in and demonstrate what they have actually done, then we’ll also look at that and ask them questions about how they manage to do it. The guy who runs the team is very technically competent so he’ll know whether they’re actually telling the truth (GPC, manager; Green Power).

According to this manager, the problem of basic competency is more or less non-existent now, reflecting a general belief that a reasonable level of computer competence can now be counted on, and where it is lacking it can be addressed once in post, either through informal peer support or organised training:

the expectation is you can use a spreadsheet... Can you do some basic calculations where maybe they haven’t done? etc or they haven’t done it to the same level so this internal learning kicks in where they have to ask a friend or do some training to achieve that (IJ; manager, Insure & Fin)

Despite the recognition that new recruits are discovering their own ways of approaching well-established practices, it did not appear that managers tended to think about where such skills came from, or that they might reflect self-managed processes of learning to use technologies in the home. For example, WC, a manager at Water Works believed that use of technologies at home will not necessarily lead the employee to become more skilled at work: (I’m) not sure how useful this will be if people have personal use at home, people need to use it a bit more than that to be more proficient’. Indeed, it appears that managers assume that skills such as basic Windows fluency are more generally learned in formal settings prior to entering the workplace: ‘it’s all Windows-based but again we don’t test that before they come in. We just I suppose assume and expect that it’s there as part of their education’ (GPC, manager; Green Power).

The role of training in securing required skills

In virtually all cases, managers spoke of training as ‘the best route’ to achieving the levels of skill needed for particular jobs, especially in the case of specialist skills where the safest way of
ensuring that someone can do the job is to train staff already known to them, whose reliability and competence they have good reason to trust:

Bringing people in at graduate level and training them is our most successful route to get people. Because recruiting people with 3, 4 or 5 years of experience behind them is quite tricky, people don’t want to move, it’s patchy, growing your own it’s a lot more reliable, really (ECD, manager; Edu Computers PLC).

We train people in-house, we try and do more in-house training anyway than recruit people with the skills, we’d rather train somebody in-house (...) Because, two reasons really - one you’re giving the staff who want to, who already work for you, the opportunity to build their skill base and it probably means (that) they’ll want to stay with you if you’re giving them opportunities to increase their skill base and it has benefits for the company: it’s better to grow from within than to buy skills from outside (EP, manager; Engineers Ltd).

It appears that managers increasingly expect to find in new recruits being able to pick up required skills quickly and easily. For example LS, manager at Local Media explained ‘when people were interviewed, one of the things that is looked for is the aptitude and the flexibility to that type of work i.e. multi-skilling’. Most companies rely explicitly on internal training. Once the employee joins the company, the skill gaps are determined by their manager or by the employee themselves and training is initiated. Due to budget constraints and time management, most companies only offer external training courses when there is a key or urgent need. In some cases, when companies identify aptitude among their employees, they may offer them the opportunity to develop their skills through specialised training courses – this is how companies build internally their skills bank. Here, it is important to note that the majority of companies stressed that they would externally train soft skills and that technical skills seemed to be acquired mostly informally or on internal courses.

Employers recognise the key role of the individual employee in this process and that the employee needs to take responsibility for identifying and developing their skills themselves. Managers note the different proclivities that individuals have and the role these play in selecting the mode of training. As is evident from the examples above, managers look for a balance of basic skills and an interest in being trained. Whether employees learn on the job, or online or go to courses depends on their role and position in the company and as such, a number of managers also place some degree of responsibility upon the employee to drive learning forward: no one is standing over you with a big stick, people are expected to be responsible, adult and drive that along yourself ... in every role there is mandatory training and voluntary training or self development, so the way we work with individuals is to get the best and maximum from each individual. That is the manager’s job, so the individual is assessed and their performance gaps identified i.e. skills, knowledge, behaviours and seeing what routes we have to fill those gaps, whether it’s formal learning, something informal, a piece of e-learning, buying themselves a book, downloading a book, which we do 24/7 - whatever it is, it’s driven by the learner (DK, manager; Docu PLC).

There’s an Insure & Fin training provider for skills if you needed to sit down, there’s an online reference if you cannot ask a colleague (IJ, manager; Insure & Fin).
Internal training

Providing training with respect to IT skills appears to be mainly reactive rather than pro-active, and informal approaches are preferred where possible. Where not possible, internal training or use of online resources is preferred, and only in specialised cases is external training resorted to. For example, Docu PLC decided to deliver the majority of their training online in view of the current economic climate, and to limit air travel unless specifically needed. Other companies suggest the following types of training:

very basic technology skills like Word or Outlook might be taught by someone else in the department, and it’s a thing between the individual and their manager to identify what gaps there are and how to fill them (ECD, manager; Edu Computers PLC).

we’ve got one lad that we’ve identified, he really does have the brain for it and so the aptitude so we’ve put him onto an Excel course to enhance those skills. He’s progressed so far by now we are thinking of putting him onto an Oracle database course so can actually understand how to manipulate databases (GPC, manager; Green Power).

Part 2: from the perspective of recent recruits

Using technology in the workplace

Recent recruits reported using technology for a large part of their working day, and for a range of tasks from very basic to more complex. They tend to cite classic office technology uses – ‘just general office computer technology really’, as GPS, a recruit at Green Power, puts it – but very often reveal wider engagements with technology alongside these. Thus GJ, a recent recruit from Green Power, explains that ‘we use the system the company has, the SAP system for the billing. I also use Microsoft Word and Excel for where the information is stored, updating information, sending out letters, sometimes drafting of letters if we need to … and emailing of course as well to contact the customer.’ IM at Insure & Fin also mainly uses Office - Excel in particular but also uses a bespoke application for insurance policies. He regularly uses the Internet and some Adobe products, but also his own iPhone at work so he can access e-mail (hotmail). Social networking sites are blocked by Insure & Fin, which he does not object to as this is something IM feels does not make up part of the working day.

Although employees’ views about technology may vary across individuals, most of them share similar views to their employers. Recent recruits also see the role of technology as supporting their work practices, allowing opportunities for better communication and collaboration both with clients and colleagues. They value security and flexibility as well as the opportunity for technology to improve teamwork, companies’ image and customer services. In most cases, new recruits felt that companies will embrace their initiatives regarding technology. LA, a recent recruit at Local Gov thinks that technology at her workplace should support what she needs to do. She thinks technology has to be secure, because her office is dealing with people’s age, ethnicity and disabilities. She also thinks technology needs to be flexible, as one should be able to work from home. LB, a recent recruit from Local Gov thinks that technology facilitates the day-to-day business at work and helps improve and speed up communications: ‘For example using the intranet to do a lot of information processing and finding out about the local government. And it helps to communicate more effectively with each other.’ LB thinks she would be encouraged at her workplace to introduce new technology.
GJ, who only recently returned to work at Green Power, notices marked changes in terms of the impact of technology from how things were when he worked there previously.

my skills seem to have accelerated since I’ve been back, in the new system I do more than I did before ... I’ve learnt more. (...) And yeah I do I really enjoy contacting customers and being able to vary what I do from day-to-day ... when I first was here I never called a customer. I’ve noticed technology has changed because we are more frontline I suppose in the way it has helped us as a team, we aren’t relying on somebody else who may have limited information or may not take all the information.

Some recruits perceived limitations in how their companies made use of technology and were not always confident that any suggestions for improvement that they might make would be heard. EM, a recent recruit from Engineers Ltd, felt that, although his company invests a lot of resources into technology and developing databases, all this was not very well managed. He has offered his opinion about that to his company, but he is not sure they will take it into account. He believes that technology should be playing a central role in managing knowledge within his company, and is concerned that it is not doing so as well as it might:

Like, I was putting a bid together the other day and there were specific questions in the bid questionnaire, ‘expression of interest’, and I am thinking ‘they are looking for key types of fairly specific experiences’. So, could I type this experience requirement into GEGE, into the search engine, and come up with three great things? No, I couldn’t (EM, recruit; Engineers Ltd).

For the most part, the recruits we spoke to seemed reasonably satisfied with the role that technology played in their company, and reasonably happy with their opportunities for doing so. WS, a recent recruit at Water Works for example feels that ‘technology drives the company forward. We use it in all aspects: emails, presentations, running the computer systems, running life and facilities, communications, assets control’. On the other hand, we encountered recruits for whom the whole notion of technology held very different meanings. GO for example, a recent recruit at Global Energy feels that technology is more about ‘specialised pieces of equipment that allow us to use or to measure certain properties of oils and so on... you need to be trained to use them and so on... there’s only one area of work I’m in at the moment that uses technology’. Asked whether or not such communications constituted uses of technology, this same recent recruit was genuinely confused by this use of the term: ‘I’m using spreadsheets but I’m not using any modelling software anything like that. I’d say the role I’m in at the moment apart from, something that says takes up 20% of my time, otherwise it’s just sending e-mails ... I take that for granted’.

Technology regulation within the workplace

While most of these recruits accepted quite easily that they needed to follow different kinds of rule of IT usage in the workplace, some found the restrictions they encountered quite frustrating. IFA told us that:

there are things that are blocked. Interestingly enough, one thing that is blocked is Google Documents, and that’s one of the technologies I wanted to look at to try it ...it’s probably easier to finish work a bit early, to go home and check it out there, because otherwise it’s just such a hassle of getting it done through the other channels (IFA, recruit; Insure & Fin).
For many, restrictions regarding use of social networking sites are seen as mildly frustrating, but understandable, as this recruit from Water Works explained: ‘You are not supposed to get on social networking sites and it is about maintaining certain professionalism – wait till you get home but many can do it when the manager is not looking’. This is precisely what GS, a recruit at Green Power, was generally able to do, normally checking his Facebook page for five minutes in his lunchbreak. GPS, at the same company, however discovered that this was not allowed outside of his lunch hour as his browser kicked him off Facebook when he tried. EM, at Engineers Ltd, found the same thing happening when he tried to use Skype: ‘their policy is ‘no Skype’. They are just paranoid about it. You obviously can talk and do videos, but you can also simultaneously transmit files, and they don’t particularly care for that, because it doesn’t go through the firewall, presumably.’ The impression from the interviews as a whole, though, was such restrictions were generally seen as minor irritants, rather than as major problems – simply part of the process of being socialized into the new workplace.

The process of recruitment

Recent recruits reported a variety of experiences with the process of recruitment. However, most of them stressed that employers were more interested in learning and less likely to probe specific qualifications. Companies also test for experience or ask for examples of past projects, and generally seem to take the ICT skills of their employees for granted. During interviews, most recruits have stressed their experiences with using different technologies except in cases where evidence of qualification was required. Some recruits reported that at interview, they were asked about their ability to learn new technologies and rely on transferable skills. It did not appear that employers made any distinction between basic IT skills and or more complex skills such as those associated with uses of Web 2.0 tools. However, indirectly, some companies seem to know how to look for whichever type of skill they need:

I did not have to demonstrate skills but was asked to express what skills I had and bring some examples. I mentioned I knew CADS and was asked to bring in an example of what I did on that. It was on a piece of paper. They also rely on certification of your degree – engineering. Generally employers understand and have the relevant people interviewing and understand what the recruit will go through in their education (WS, recruit; Water Works)

When IFA of Insure and Fin was recruited, he was asked at the interview about the qualifications he has in IT, but was not asked to demonstrate any kind of IT skills. He was however asked questions about his history and what kind of things he had done in the past, related to technology and related to projects with which he had been involved, as well as to perform basic numerical and literacy tests for the job interview. In similar fashion, when EA, a recent recruit at Engineers Ltd was recruited, he was asked what software he had used: ‘I think the conversation came to what kind of software I’d used, kind of mainly industry software, rather than general IT skills’. But EA was not asked to demonstrate any technology skills, nor was he asked whether he would have any IT qualifications.

This is a very common pattern with nearly all the recruits that we interviewed. GJ, a recent recruit at Green Power said that when he was first recruited ‘it was just basics as in if I could use like word processing and the very, very basics ... for my position it was just very basic understanding of how to use the computer.’ The company’s main concern was to find someone who was capable of picking up the new skills required to use their specialist system. Another
recruit at the same company had a similar experience: ‘I was asked about how computer savvy I was I suppose as a way of learning new packages and spreadsheets and general things like that.’ In addition to that, he discovered that his relatively straightforward knowledge of Excel was enough to stand him in good stead with the company: ‘I’m not brilliant at Excel by any stretch of the imagination but I’m pretty good so obviously I think I probably got the upper hand on people in my department. So it was a case of you know, what I could bring in to be able to manipulate data and to get the reports out... obviously I’d had... through university I’d had various placement(s), all of them using computers. So I’m reasonably good at taking experience from one system and using it on another, and just generally being... yeah able to find my away around a computer program reasonably’ (GPS, recruit; Green Power). Unlike GPS, the third recruit at the same company actually had an IT qualification (AS level ICT), but this was of considerably less interest to them than the fact that she could answer a question about what her favourite Excel function was.

The selection process for jobs at Local Gov involved no probing at all in interview about IT skills, and IT knowledge was apparently not part of the person specification, but interviewees were asked to prepare a PowerPoint presentation. IM, a recent recruit at Insure & Fin, was asked indirectly how he had used technology in previous role, but little interest was shown in his technology skills, as there appeared to have been an assumed aptitude, and interest was directed towards other skills. IM presumed that as he was on a specialized graduate scheme it was not surprising that there was not great interest in his general technology skills. Similarly, EM, a recent recruit at Engineers Ltd was not asked during his selection process about his computer or technology skills and did not have to demonstrate them in any way: ‘It was more kind of “what’s your work experience, and will you fit personality-wise” possibly.’

This was also the case for a post at Edu Computers PLC, where the recruit we spoke to was not asked to demonstrate his technology skills when he was selected, although they were indeed referred to. He was, instead, asked to demonstrate problem solving and management skills, and the level of his technology skills was established through reference to his prior experience rather than formal qualifications. The selection panel was particularly interested in his team management skills rather than any technical skills, although he was expected to have an overall knowledge of what is ‘out there’ in terms of platforms they use and whether he would have the capabilities to manage teams using those technologies.

Thus it appears that recruitment processes for a number of jobs, requiring a range of technology skills, tend to focus far more strongly on soft skills and the right impression of competence in various respects, than on clear demonstration of strictly defined IT skills or practices. This reflects some degree of confidence on the part of the companies in terms of generally expecting to be able to find the level of skills they require. This is to some extent amplified by the current conditions of low graduate employment (as most of the recruits we interviewed were indeed graduates), so that assumptions about capability could be made on the basis of evidence of undergraduate experience or prior employment. It was not necessarily the case, though, that such assumptions reflected the actual conditions of new recruits’ technology learning, which is what the next section will consider.

The history of the recruits technology learning
Prior to joining their current employer, most of the recent recruits we interviewed appeared to have acquired at least a proportion of their technology skills at home through using a computer
in their own time. This sometimes included interactions with parents, partners or friends. Most of them have also had some experience with learning how to use technology at school. Some have taken IT GCSE or A Levels and a few had special qualifications. Several recent recruits talked about the important role of gaining experience with using technology in general or specific pieces of technology at their previous jobs or placements. Very often, it seems that they had learnt ‘on the job’:

I have had training on the job, you learn something new everyday. I have always messed around like lads do and I have fixed my motorbike and have always used technology and I have a computer at home but I learn from trial and error but it is not proactive, at home, when you try and figure a problem it is not as targeted as a work problem. I played lots of computer games and I know a few people who have a particular interest in computers and have learnt to program but I have not done that (WS recruit; Water Works).

LL, a recent recruit at Local Gov, used the computer quite a lot at home. She did an ICT A-level. ‘It was kind a bit of both really, going to school and using the computer quite a lot there, and also doing it at home, going through things and generally messing around.’ LL does not think she has really gained new technology skills since she started her job, but has learned how to use PAL, a specialized course booking software, and has polished her knowledge of Word and Excel. In a similar fashion, LA, also a recent recruit at Local Gov was largely self-taught, and continues to be so. She uses ‘help’ buttons if she is stuck with a problem or goes online, but does not use online forums. Mostly, she just asks her partner for help as he is proficient in using Excel, and also she has found she is ‘quite good at just figuring out how to do things’.

It is frequently the case that these recruits have fairly uncertain recollections of their original learning processes, in fact, but generally see these as combining learning that was picked up at school, even if they do not entirely recall when or how, and extended in their own contexts. LGL, another of the Local Gov recruits, had followed the ECDL, and felt that she was sufficiently familiar with Word, Excel and emailing before starting work, having learnt those skills at school without, as she saw it, actually having studied IT as such. IFA, an IT graduate at Insure & Fin, has Microsoft qualifications in addition to his degree in equity and business, but also sees himself as being largely self-taught in technology:

My skills, apart from things like Microsoft Word, which I think everyone just knows from school work, the other skills I picked up were things were a bit of... coding for work development, that was self-taught, physical computer architecture, that was self-taught as well... I just go on the Internet and print out a 100 page document and learn it. Just because I wanted to know more about that specific part of technology when I was at school (IFA, recruit; Insure & Fin).

GJ, a Green Power recruit, expressed a very similar perception in saying that he did IT throughout the years but for GCSE did not do IT, so that he saw himself as having the basics only, having not taken it further within higher education. Thus we can see a very consistent picture building, at least with regard to the present sample, of entrants into work who are able to cope with the demands of the workplace (and appear to be viewed as such by their employers), and yet who consistently characterise their own knowledge as somewhat improvised and lacking the formal recognition of qualifications for the most part:
... through university I’d had various placements, all of them using computers. So I’m reasonably good at taking experience from one system and using it on another, and just generally being... yeah able to find my way around a computer program reasonably. ... I did IT GCSE [laughs] (GPS, recruit; Green Power).

Neither did EA, a recent recruit at Engineers Ltd, have any IT qualifications: ‘You just kind of pick it up as you go along, I think’. He learned a bit of IT at school, but learned most of it by himself: ‘To be honest, the IT that I learned at school... I still learned most of it outside of school.’ He learned most of it at home, at work and at University. ‘Most software, you can just pick it up as you go along, you kind of just work it out. I have got friends who are pretty good with IT stuff, not the actual software, more sort of the workings of a PC I’ve learned from friends I think.’ In fact, although he claims not to know how to install, link and network hardware or software, EA clearly has developed a good level of understanding of technological operations and concepts. He says that he knows how to manage personal infrastructure and data and he uses a range of digital and interactive devices, and feels confident that he would know how to choose the appropriate ICT tool for the job he is doing.

The final example of EM, a recruit at Engineers Ltd, is entirely consistent with this picture also. He developed his IT skills through consultancies and the people he worked for, and picked things up along the way. He did not attend any IT courses, but he used to do hydraulic modeling, having had substantial training in that, so that he was able to give training courses to clients: ‘I actually was unemployed for a little while and I sat down with a book and then I went through and I taught myself the basics of CAD like that. That was a bit of one off to be honest with you. Generally I am a ‘press-all-the-buttons-and-see what happens’ kind of guy. I like to think that I am fairly intuitive with those things.

This picture relates very well, in fact, to the picture we were able to build regarding younger learners during the first year of our research, where we regularly encountered this same combination of informal experimentation and self-directed learning, supported and in some cases initiated by a patchwork of experiences in school, both at primary and secondary levels. This pictures adds slightly more depth, in different respects: it suggests that formal school ICT lessons are viewed generally as often being of less significance than the patchwork of opportunities to use technologies that these learners encountered across the curriculum; it also suggests that as these learners moved through higher education, and in some cases into initial forays into the world of work, this same hybrid, self-directed approach continues to pay dividends in terms of building up confidence and capacity to self-teach key skills and practices. This does, it appears, sometimes leave these young adults with a slight unease about their lack of formal IT skills, but in reality that absence seems to have caused them no problems, either in terms of their capacity to carry out the required tasks of their work, or to satisfy the expectations of their managers.

Further development of recruits technology skills and practices

In general, it appeared that recent recruits viewed the opportunities for self-learning and learning on the job as positive ongoing processes through which they would be able work closely with colleagues and line managers.

[the] emphasis is on me to just go and learn if I need to, and if I get stuck with anything, I can ask someone for help. I think it’s a positive thing that we are not put through lots of
courses and have to learn basic stuff. I know that some of the other grads are doing basic
courses on how to use technologies which I wasn’t given any training for, simple
technologies, but I didn’t need to because of my background, there’s no need to spend
time someone training me to do stuff if I can learn it in 5 minutes myself (IFA, recruit;
Insure & Fin).

GJ, a recent recruit at Green Power, considers that he is being tutored on the job: ‘We have our
senior team leader… and there are other team leaders that will help out depending if they’re
available or not. So there’s a good hierarchy of experience.’ Similarly, GS, at the same
organization, recognises that he is encouraged to keep developing his technology skills in order
to cope with the key requirements of analyzing data, and communicating outside the company
for trading purposes: ‘with using Excel one of the guys might find a new function that’s quite
useful and then we’d tell each other in the team I guess’.

Whilst EA, at Engineers Ltd, does not think he has gained any actual new technology skills since
he started at his job, he does recognise that he has gained more general experience and routine
in using specific software. He does not think that he will learn new technology skills in the future
at his work place, mainly due to cost issues: ‘the problem always is, if you spend a day learning
how to use a new software package, you are not earning any money, so it’s difficult, because it
takes up too much time. But in my experience, most of the time when you get a new software
package, you pretty much sort of learn as you go along.’

In effect, it appears that skills development in relation to using technology is generally viewed as
something that is picked up informally, rather than provided at high cost to workers who appear
more than capable of learning for themselves. The evidence of these young recruits rather
supports this view. IS, a recent recruit at Insure & Fin, thinks she has learned to handle Outlook
better since she started work with the company. Particularly, she has learned how to send
meeting requests, something she initially asked a colleague to explain to her, before going on to
work things out for herself. Although she aims to get some formal training in coming months on
Excel, she does not see the development of such skills as central, however necessary:

To be honest, I don’t think I see technology as a vital part to get where I want to go. I
think technology nowadays is more like a given, you need to know these things in order to
work it, so the skills that I have, probably 99% of everyone else in the company has as
well. So my career aspirations to separate myself from other people would not necessarily
be by improving my technology skills so much as improving some other skills (IS, recruit;
Insure & Fin).

Many others nonetheless felt that technology skills would prove to be a significant part of what
might give them ‘the edge’ as they try to move up the career ladder. IM, also at Insure & Fin, is
clear about the importance of continuing to learn new skills, even though he expects this to
happen mainly on the job. He sees this as part of his trajectory towards a job in management.
EM, at Engineers Ltd., likewise hopes that the further development of ICT skills such as Go-to-
Meeting, intended to enable people to share their screens and phones with colleagues in
different offices, will play a part in taking his career forward. GJ, currently working in Green
Power, also sees the development of technology skills as playing a part in thinking future career
developments:
I intend at some point to be involved in counselling. So I’m sure technology will be important on the basis... in a similar situation to this, a database of customers, and contact information as well as of course in that situation there will be medication, history of their situations, which will all be recorded on the computer (GJ, recruit; Green Power).

LB, a recent recruit at Local Gov, believes that she will learn new skills as her role progresses. Her particular focus is on learning about how to use the computer for social and community engagement. Technology as such does not really fit in her career aspiration, nor does she have much confidence in her abilities with it, but as she sees it, certain aspects of using technology will nonetheless facilitate doing work, such as using social networking or Twitter to be able to give very speedy information to specific groups of people:

I am thinking for example of students, who might want a mobile phone based information system. I might be looking at a text based system for people, so you know, people can register their postcode and if something happens within a post code, we will text-message what’s happened and why and what to do. That sort of thing (LB, recruit; Local Gov).

Once again, the picture is consistent, despite some minor variations in terms of priority. Technologies are viewed by these recruits – just as it appears to be viewed by their employers – as both essential and yet somehow to be treated as a marginal concern, something to be picked up informally and with a minimum of fuss. The skills of using technologies that they bring with them to the workplace have largely been informally gained, and they are adapted to the demands of the workplace in equally informal ways, for the most part. But their ideas about their future careers, despite the occasional protestation to the contrary, seem in general to take the importance of continued and expanding technology usage for granted.

Conclusions

The learners’ experiences and views on the role of technologies in their lives without exception consider that they represent an integral and necessary means of achieving success in education, and will prove to be essential aspects of their working lives. As indicated in the Introduction, not all share an equal level of enthusiasm for placing their uses of digital technologies or the Internet at the centre of their lives, and not all wish to achieve the levels of skill or sophistication that supposedly mark out the ‘digital native’ stereotype. But all students, whether in post-16 education or higher education, use office suite software and the Internet as a matter of course in their work, and expect to do so in their future jobs.

As they advance into higher education, a considerable proportion integrate the use of specialist software into their studies, whether studying in traditional or post-1992 universities. It tended to be the case, though, that those studying for more traditional kinds of subject, in traditional universities especially, tended to hold digital technologies at a slight distance, recognizing that their academic credibility did to some extent require that they continued to acknowledge the primacy of traditional modes of study. This was not the case for many of those studying vocational subjects in the post-1992 universities especially, who were more likely to embrace digital technologies both as a means to achieving their goals in terms of study and future employment, and as embodying a core element of expertise within their areas of interest.
Whilst the students in post-16 education were very often focused on their future vocational directions, it appeared within the sample interviewed for this research at least that there was a general lack of specific understanding about the detail of what that work would involve. Through opportunities such as work placements and internships, students in HE tended to have better understanding of these issues, but were still finding themselves needing to second-guess what future employers would want from them in terms of technology skills especially. This was very much confirmed by our findings from workplaces, where it generally appeared to be the case that employers take it increasingly for granted that recruits at a certain level of education (especially graduates) would come with sufficient capacity to use technologies, and that they would find it relatively unproblematic to develop any skills that their jobs would require.

In general, the employers we spoke to did not go to great trouble to check for specific technology skills in their recruits, but rather looked for the capacity to learn and develop as required once in post. It appeared that, whilst they did hold certain stereotyped views of young people as technology users, they had not thought in depth about the issue of technology skills that might be learnt in self-directed ways by future recruits, within their own contexts. As a result, there was the possibility of a failure to identify and use any informal technology skills brought into businesses by young recruits especially, and the recruits themselves tended to defer to the views of using technologies that they encountered in their jobs, although a minority did attempt to encourage what they perceived as more enlightened approaches.

At the same time, we did observe some understanding on the part of employers that the Internet and Web 2.0 tools in particular introduced new possibilities for achieving success in their business, by improving internal communications, by connecting more effectively with customers, and by seeking new recruits through the medium of Web 2.0. Generally, it appeared that businesses are a long way as yet from being able to embrace or benefit from any skills that some of their new recruits have developed through their own personal engagements with technologies in their own contexts, but at the same time we do observe a fairly realistic understanding that, by one means or another, it is reasonable to expect most young people to be able to cope with a broad range of technology demands in their work.

As understanding develops about young people’s technology activities in their lives, it is reasonable to suppose that more structured means of recognizing these will be developed. For instance, e-Portfolios might be used as a means of collecting and displaying evidence of young people’s skills and productivity in using the Internet for social, communicative and creative purposes in their own time, especially with regard to those uses that represent the beginnings of a trajectory towards future employment (e.g. music technology, photography, artwork). As teachers and others responsible for young people’s academic and career decisions (e.g. Connexions) become increasingly aware of young people’s self-directed activities, it is also likely that they will be able to help them articulate the informal or incidental learning that occurs in the course of using digital technologies for a range of purposes in their own contexts.

An important aspect of the Harnessing Technology strategy is that partners – incorporating here educators and employers especially - buy into its vision, especially in terms of identifying and encouraging opportunities for innovation arising from the technology experiences of those just entering the workplace. It is evident from our findings that many employers are beginning to make respectable efforts to look for and give scope to the technology skills and understandings of new recruits in ways that might enable them to engage in new and effective ways with their business needs. Our findings suggest that there is still a good way to go yet in terms of
employers understanding how best to identify and validate the technology-related practices of young employees, but it is evident across the variety of employers represented in this report that the need for this is becoming understood, which provides a promising basis for future development. The Harnessing Technology strategy should play a substantial role in articulating the nature of that development.
Appendix 1. Interview schedules and follow-ups for Section 1: post 16 and university learners

Students at Post -16 institutions and universities were firstly interviewed for approximately 45 minutes at a mutually convenient location and asked about their development with technologies and the importance of these for their current studying practices and future careers. They were then asked to complete 1-2 follow up tasks (depending on the point at which the initial interview was carried out, as in some cases there was limited time to carry out two follow-up questions). Follow up questions were sent to the student via an email address they had provided (or via a postal address in the case of 1 learner who admitted to not frequently checking his email). Most students received the first follow up task between 1-3 months after their initial interview, and then a second task 1 month later. Those students who were interviewed late received only 1 email task containing a selective amalgamation of tasks 1 and 2.

Initial Interview questions for Higher Education and Post-16 students – Approx 45mins

1. Ask about the student, and find out all about their life. What are you studying? What do you do for your course? How do you spend time in your study room / at home? Interests, favourite activities? Places you go regularly? University/college groups?

2. In a typical day in your life as it is right now, what is the range of things you do that involve using technologies? (work through the day) (music, TV, emailing, Facebook, word processing, specialised, VLE) (if you are unclear, probe: are there any of those where using the technology is the main focus of what you are doing?)

3. Have any of these things changed over the last year/ year and a half?

4. Okay – what about your early teenage years? When you were around 13/14? Were you a big user of technologies at that time? What things did you do?

What were your main interests at that point in your life? (How long had you been interested in that sort of thing by then? have these changed a lot since then?) (How central was technology to those interests?)

5. Tell me about your development as a user of technologies then. Where did it all begin? What age were you when you first used a computer? When did you first get one at home? Who, if anyone, first introduced you to using a computer? What did you first do with it when you got one? Can you remember how you learnt to do those things?

6. Back to the present – are there any ways in which technology is crucial for your particular area of study?

7. Will technology be crucial within the job you expect to do in the future?
8. And finally, are there any technology skills you’re keen to learn now or in the future? *(Does this relate to any of your interests – maybe an interest you would like to do more with in the future?)*

**Follow up email task 1**

1) After our first chat with you all, we looked at how you were using technologies and tried to draw up a set of classifications of technology use. The categories that we drew up were:

a) high level technology user  
b) mainstream technology user  
c) moderate technology user  
d) minimal technology user

Which of the above categories do you think best describes you? Please say why.

2) Can you please give us some examples of your technology use over the last week, and comment on what you got out of using this. E.g.

a. Used a car GPS – convenience, time-saving

**Follow up email task 2**

1) Which of the technologies that you are using at the moment do you think will be the most useful to you in the future? (e.g. in work) Please explain why.

2) Are there any technologies or software that you do not use presently, which you think will be important for your working life?

**Follow up email task - Amalgamation of tasks 1 and 2 for later interviewees**

1) After our first chat with you all, we looked at how you were using technologies and tried to draw up a set of classifications of technology use. The categories that we drew up were:

a) high level technology user  
b) mainstream technology user  
c) moderate technology user  
d) minimal technology user

Which of the above categories do you think best describes you? Please say why.

2) Can you please give us some examples of your technology use over the last week, and comment on what you got out of using this. E.g.

a. Used a car GPS – convenience, time-saving

3) Which of the technologies that you are using at the moment do you think will be the most useful to you in the future? (e.g. in work) Please explain why.
Appendix 2. Detailed Information about Companies Included in Section 2

Total number of companies researched 10
Total number of employers interviewed 13
Total number of recruits interviewed 20

Docu PLC.
- a global document management company, positioned in the communications and information sector, which manufactures and sells a range of printers, photo copiers, digital production printing presses and related consulting services and supplies. The employer interviewed was located in the south east of England. Docu PLC. has its headquarters in America. The companies core values focus on satisfied customers, quality and excellence, premium return on assets, use of technology for market leadership, valuing employees and responsible corporate citizens.

Mobile Comms
- provides mobile phone services and represent the Information and Communications sector. They are a publicly owned company with head offices in the south east of England. Their goal is to be the world’s mobile communications leader, enabling customers’ to be more connected in a mobile world.

Intranet:
- Use ‘team rooms’ to enable storage of shared information.
- How the team rooms operate is down to individual managers to negotiate with their teams. “I don’t know if there is any kind of official policy, I guess some people manage there team rooms better than others, there are some team rooms where you have to submit something to a co-ordinator.” ML, manager, mobile comms.
- The Intranet is central to the work practices of Mobile Comms, “I use my laptop for everything I do even if it’s just simple admin stuff through the Intranet like timesheets things like that” ML, manager, mobile comms.
- Use of the Intranet is included in induction training offered by Mobile Comms “there’s an induction course that everybody does, whatever role they are joining in, from what I can remember it coves things like, this is the Intranet, this is my world, this is where you go if you need to book holidays, this is where you go if you need to complete your time sheet using the system” ML, manager, mobile comms.
- The intranet also acts as a host for communication through Blogs “We have a blog here (looking at Intranet) that is not actively used but there is no reason why, it’s not even live anymore, but there’s no reason why you can’t do it, because we have so many different types of media like the team rooms, it’ just another things that can be used”. ML, manager, mobile comms.

Insure & Fin
- a large multinational organisation providing insurance, asset management and banking services in the tertiary sector. Their aim is to be the most successful competitor in their chosen market. They prioritise technical, commercial and leadership skills and being professional, responsive, dynamic, innovative and focused combined with pace, confidence, passion and style to achieve this. The employers interviewed were located in the south east of England.
**Recent Recruits:**
All the graduates were on the Insure & Fin graduate scheme and had graduated from University within the last couple of years.

**Policies:**
- The acceptable use policy is part of an employees contract “and as part of their induction they have a walk through of IT security” IA, manager, Insure & Fin.
- One of the graduates was aware of the companies IT Policy but did not see this as restrictive on work or personal use he felt is could help employees if they were unsure of what was or wasn’t acceptable but also felt it did display a lack of trust in employees.

**Intranet:**
- The Intranet is used as a knowledge repository and for completing standard processes such as booking training, monitoring of the press news and industry news, market news and general news.
- There is always an alternative to using the Intranet in order to complete a task or access information. One manager has found that “there are many people who still prefer to have a printed copy, a folder or a binder, something very traditional to have at their desk and really hold on to that” IJ, manager, Insure & Fin.
- The Intranet is used for internal networking offering a sports and social section, an area for sale of items amongst other things. There is an internal address book providing contact details for each employee. One of the managers at Insure & Fin commented that this is “sometimes maybe over used, it’s the bible” IJ, manager, Insure & Fin, another manager described it as “It’s the master source of information about an individual” IA, manager, Insure & Fin.

**Local Media**
- the regional services of a national broadcasting organisation. They provide representation for the arts, entertainment and recreation sector. Their mission is to offer services that inform, educate and entertain. They aim to be independent, impartial and honest and focus on their audiences, quality, creativity, respect and collaboration.

**Policies:**
- There is a protocol around what you should be looking at on the Internet, after a number of incidents where people have been using or watching inappropriate material in the work place it has been necessary for Local Media to define what it means by inappropriate. However, the manger at Local Media sates that “Often a lot of that is down to local managers to work out how tolerant they want to be” LS, manager, Local Media.

**Global Energy**
- a large multinational operating in the primary, secondary and tertiary sector. They are involved in exploration, production, refining and marketing of the final product. The employer interviewed was located in the south east of England.

**Recent Recruits:**
All the graduates were on the Global Energy Technology graduate programme and had recently completed PhD’s.
**Policies:**
- One of the recruits at Global Energy described the acceptable use policy as “day one stuff” GO, recruit, Global Energy, however he couldn’t remember what the policy was and took his cues form the practices of work colleagues.

**Green Power**
- a small energy company representing the primary & secondary sector. Green Power generates green energy which they sell directly to consumers. They reinvest profits in building new renewable energy sources. The employer interviewed was located in the west of England.

**Policies:**
- Green Powers acceptable use policy allows employees to have open access to the Internet for two hours during lunch time, this use was monitored.
- Non of the employees interviewed saw this as a problem, although their awareness of the policy was vague. One of the recruits was unaware of the policy and only found out when following up access concerns with the IT department. “I’m just grateful to be able to go on it at lunchtime” GPS, recruit, Green Power. Another recruit sated “I think certain sites are blocked. I know Facebook is blocked except for at lunchtime. I’m not quite sure if any others are blocked” GS, recruit, Green Power.
- Green Powers Manager discussed the companies use of monitoring “it’s part of our policy to monitor, but we don’t do it religiously, we tend to do it more as a reactionary thing” GPC, manager, Green Power

**Engineers Ltd.**
- a multinational, employee-owned management, engineering and development consultancy. They represent the professional, scientific and technical activities. They work in a number of areas including transport, energy, buildings, water and the environment to health and education, industry and communications. The employer interviewed was located in the south east of England.

**Policies:**
- The company policy focuses on security and confidentiality with consideration given to licensing.
- Security and confidentiality are also highlighted in the Internet use section of the policy. Appropriate conduct is also highlighted in acceptable use. The IT policy is included as part of the conditions of the contract of employment.
- One of the recruits felt the policy was too much “We wanted to use skype, actually, but their policy is ‘no skype’. They are just paranoid about it” EM, recruit, Engineers Ltd. Despite this EM still sates that he is not affected personally or for work reasons by the companies IT policy.
- Another recruit also did not think the policy affected him in any way in his work practices or him privately.

**Intranet:**
• The manager described the Intranet as being used for absolutely everything e.g. communication, databases, training courses, company policies, project management information system “it’s the backbone of the company” EP, manager, Engineers Ltd
• Use of the Intranet cannot be bypassed
• Project web tools are used for sharing documents across project teams and companies in different locations. It facilities communication across the company locations worldwide.

Local Gov
- a local authority in the South East in England providing representation for local government activities. They are responsible for the provision of local key services and including schools, social services, the fire service, roads, libraries and the museums service, trading standards, land use, transport planning and waste management. They mange public funds in order to do this.

Policies:
• The purpose of Local Govs policy is to mitigate risks related to security issues, including data security and misuse of ICT facilities.
• There is an online learning unit on the intranet about IT policy, one of the recruits found it useful while the manager found it difficult to remember.
• All new starters have to complete an “ICT test about the do’s and don’ts on the computer”, LL, recruit, Local Gov. It covered things like what employees could and couldn’t access and what was considered acceptable. LL did not think that the policy and the restrictions had an impact on her daily work.

Intranet:
• The intranet is viewed as the main source of communication.
• The manger at Local Gov describe use of the Intranet as “I think that the thing is when we get it right people want to use it, when it feels simple and kind of intuitive, when we do things in a way that kind of relates, when people have got use to Internet shopping and researching their holidays and things like that, if we can do it in a kind of way that just sort of part of how they do things” LR, manager, Local Gov

Edu Computers Plc.
- an organisation in the information and communications sector supplying information technology resources to the education sector, this includes hardware, software, digital resources, consultancy and supporting services. The employers interviewed was located in the south east of England.

Policies:
• Individual policies have been developed around system and network security. Employee responsibilities are clearly outlined.
• The recruits had different views on the IT policy, one recruit agreed with the company IT use policy and doesn’t feel that it stops him doing anything he might want to do on the computer at work. While one of the other recruits found that the IT use policy is sometimes restrictive in that it blocks access to some sites - even for work purposes, such as Multimap.
**Intranet:**
- The Intranet is designed to be interactive, it contains information on green initiatives, information security, customer satisfaction, group objectives, internal survey and a people search which includes calendars, a skype link, e-mail, manager details.
- The intranet is heavily used.
- The company also uses SharePoint, which acts as a library of resources.
- SharePoint is used to manage work flow and share information across the sectors within the company.

**Water Works**
- provides representation of the secondary sector. Water Works is a supplier of water and wastewater services in the south of England.

**Policies:**
- The company restricts access to social networking sites.

**Intranet:**
- The company uses team rooms to store information.
Appendix 3. Information about those interviewed for Section 2

Total number of companies researched: 10
Total number of employers interviewed: 13 (6 male, 7 female)
Total number of recruits interviewed 20: (11 male, 9 female)

<table>
<thead>
<tr>
<th>Company</th>
<th>Manager</th>
<th>Recruit and length of time with company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insure &amp; Fin</td>
<td>2 managers (male)</td>
<td>3 Recruits (2 male &amp; 1 female)</td>
</tr>
<tr>
<td></td>
<td>Job Role: Learning Development Manager &amp; Information Technology Manager</td>
<td>1. Information technology graduate (6 weeks)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Underwriting graduate (6 weeks)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Corporate graduate (2 weeks)</td>
</tr>
<tr>
<td>Local Media</td>
<td>1 manager (male)</td>
<td>0 Recruits</td>
</tr>
<tr>
<td>Global Energy</td>
<td>1 manager (female)</td>
<td>3 Recruits (2 male &amp; 1 female)</td>
</tr>
<tr>
<td></td>
<td>Job Role: Head of graduate recruitment</td>
<td>All the graduates were on the Global Energy Technology graduate programme and had recently completed Phd’s.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Technology Graduate (2 weeks)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Technology Graduate (3 months)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Technology Graduate (12 months)</td>
</tr>
<tr>
<td>Green Power</td>
<td>1 manager (female)</td>
<td>3 Recruits (1 male &amp; 2 female)</td>
</tr>
<tr>
<td></td>
<td>Job Role: HR &amp; Training Manager</td>
<td>1. Billing administrator (2 ½ months)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Accounts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Pricing analyst on the trading team (2 months)</td>
</tr>
<tr>
<td>Engineers Ltd</td>
<td>1 manager (male)</td>
<td>3 Recruits (2 male &amp; 1 female)</td>
</tr>
<tr>
<td></td>
<td>Job Role: Director</td>
<td>1. graduate engineer (12 months)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Senior engineer (12 months)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Engineer (12 months)</td>
</tr>
<tr>
<td>Local Gov</td>
<td>1 manager (female)</td>
<td>4 Recruits (4 female)</td>
</tr>
<tr>
<td></td>
<td>Job Role: Organisational Development Manager</td>
<td>1. Data Assistant (3 months)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Administrative Apprentice (3 months)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Apprentice (6 weeks)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Emergency Planning (7 months)</td>
</tr>
<tr>
<td>Edu Computers PLC</td>
<td>2 managers (1 male &amp; 1 female)</td>
<td>3 Recruits (3 male)</td>
</tr>
<tr>
<td></td>
<td>Job Role: Research Manager &amp; HR manager</td>
<td>1. Development manager (14 months)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Programme manager</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Development Leader (12 months)</td>
</tr>
<tr>
<td>Water Works</td>
<td>1 manager (female)</td>
<td>1 Recruit (1 male)</td>
</tr>
<tr>
<td></td>
<td>Job Role: Environmental Sustainability Manager</td>
<td>1. Job title unknown (12 months)</td>
</tr>
<tr>
<td>Mobile Comms</td>
<td>1 manager (female)</td>
<td>0 Recruits</td>
</tr>
<tr>
<td></td>
<td>Job Role: Project Manager</td>
<td></td>
</tr>
<tr>
<td>Docu PLC</td>
<td>2 managers (1 female &amp; 1 male)</td>
<td>0 Recruits</td>
</tr>
<tr>
<td></td>
<td>Job roles: Learning Technology Manager &amp; Learning Technology</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 4. Interview schedules for managers

Section A: Technology and Your Company

1. What is the role of technology in your company and how central is technology to your goals?
   - Could we talk about the different aspects of your company and the role that technology plays in each of these;
   - Do you encourage the use of technology in different work practices (e.g. for networking; do you have an intranet and how do you use it; other examples)?
   - Have there been any recent changes in your company or your industry sector in the use of technology or thinking about technology?

2. Are staff allowed to use personal devices for work (phones, satnav, laptops, etc.) or work devices for personal needs?

3. The following list names a number of skills, which people might well have developed through their own activities outside work - which of these skills are particularly important in your company?
   3.1. Acquiring/downloading data or media
   3.2. Booking appointments; hotels, trips, other
   3.3. Paying for services or purchases
   3.4. Calculating costs, business plans, other
   3.5. Collaborating with groups or for leisure
   3.6. Communicating with and informing individuals or groups (including messaging)
   3.7. Composing messages, documents, other
   3.8. Designing with technology
   3.9. Managing disclosure of personal details, identity
   3.10. Learning from people, manuals or on courses
   3.11. Networking and meeting people
   3.12. Presenting information
   3.13. Publishing digital artefacts
   3.14. Searching for information
   3.15. Selling goods or other things
   3.16. Surveying and gathering information
   3.17. Storing and filing
   3.18. Expressing opinions and views
   Any other

4. Which of the following kinds of knowledge are central to your company? Please annotate as appropriate and specify specific sectors.
   4.1. Understand on-line safety, security & privacy
   4.2. Recognise social responsibility
   4.3. Understand and respect digital property rights
   4.4. Compose communications to suit target recipients
   4.5. Learn critically from reviews of published work
   4.6. Organise, format and enter data
   4.7. Understand technology operations & concepts
   4.8. Install, link and network hardware
4.9. Install and update software
4.10. Manage personal infrastructure and data
4.11. Use a range of digital and interactive devices
4.12. Make appropriate ICT tool selection
4.13. Explore and self-learn digital technologies
4.14. Synchronise devices and data

Section B: How the Company Recruits the Necessary Technology Skills

5. When you recruit, do you specifically focus on any technology skills? Which ones?
6. Do you define technology skills as represented by qualifications or by competencies (e.g. soft skills)?
7. How do you assess the technology skills of potential employees – do you look for qualifications, if so, which ones; or do you have other means of finding out?
8. How successful are you in recruiting people who have the technology skills you require? Or, people who bring new technology skills?
9. How do you make use of employee’s past or private experiences and skills with technology?
10. How much do they use technology for personal use? Do you have specific regulations?

Section C: Training

11. How do you ensure employees have the levels of technology skills you need – do you provide training; do they learn on the job, etc.?
12. Regarding training, how much budget do you allocate for such training and what proportion is it in comparison with other staff development budget?
Appendix 5. Interview schedule for recent recruits

1. What are your daily tasks and responsibilities?
2. What do you see as the role of technology in your company?
3. When you were recruited, did you demonstrate/were you asked to demonstrate any technology skills? Which ones?
4. How and when did you develop those skills (at school, at home, previous job, courses, anywhere else)? Do you have any related qualifications?
5. What technology do you currently use at work and how? Please tell us about all the ways you use technologies at work.
6. Are you encouraged to introduce technology in different work practices (e.g. for networking; do you use a company intranet; do you have any other examples)?
7. What proportion of your day is spent using computers at work typically?
8. Have you gained any new technology skills since you started work? If you have, how did you gain them?
9. Do you expect to gain any further new technology skills with this job? Will you be specifically trained or do you expect to learn on the job?
10. Do you use personal devices for work (phones, satnav, laptops, or anything else) or work devices for personal needs? Please give examples.
11. Do you have an IT use policy at work? How does it impact on your work or personal activities?
12. What are your career aspirations? How does technology fit with these? Would you need any specific training to get there?
13. These are all skills that someone might find themselves learning and using in the ways they use technologies. Which do you think you have learnt to do when using technologies?