ICT & the Student First Year Experience

A Report from the LEaD Project

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Setting the scene

Technology is embedded seamlessly into the personal and social lives of today's students, yet recent reports have questioned the widespread assumption that young adults have the sophisticated information skills and digital literacy needed to become autonomous learners. Furthermore, there is a small but significant minority who do not actively engage with information technology; the 'digital divide' may be narrowing but it has not disappeared. Our undergraduate population is quite diverse, especially with the increasing move towards widening access and adult returnees and the emphasis on lifelong learning. An increasing number are International students attracted by the University's world-class reputation. We believe that it is dangerous to over-generalise findings from some groups of students to all others, and so understanding our present students' views and experiences is vital to us as education providers.

The LEaD project addressed these important issues. The aim was to understand the impact of technology, both institutional and personal, on students' transition to university and how this changed as they progressed through their critical first year. We investigated the utilisation of ICT and learning technologies by first-year undergraduates at the University of Edinburgh from a variety of different entry routes and academic disciplines, including Physics, Divinity and Veterinary Medicine, over the course of the academic year 2007/08. In particular, we addressed the following questions:

- What are students' expectations regarding the availability and use of learning technologies at university?

- How do students adapt and change their approaches to e-learning during their first year?

- What are the key factors that influence students' choices of e-learning strategies and how these are utilised?

- To what extent do students use non-institutional online technologies to support their learning?

Research approaches

The study focused on the student year through students' own voices. The overall shape of our research was based on two underlying principles. Firstly, to take a *student-centred* approach, whereby the students' own views and opinions are central to the study. Secondly, to adopt a *holistic* approach in which students' use of ICT and learning technologies is set within the context of their learning experiences as a whole. To capture the breadth and complexity of students' experiences a mixed-mode approach was followed, including a series of reflective diaries recorded by students themselves (in video, audio or text format) together with surveys and focus groups.

The methodology used in this study is described in a companion methodological report "Techniques for Gathering Student Views of their Experiences at University", available from the LEaD project website www.epcc.ed.ac.uk/projects/lead.

Key messages

Students do not form a homogenous group, and findings in this area are inevitably complex. However, some of the main messages that emerged from our work include:

Expectations and experiences

- Students are confident with technology and find computers and the internet helpful, have their own laptops and gadgets and a range of abilities. This, coupled with their high expectations, offers huge potential for universities to engage with students from a very early stage.

- There may be a window of opportunity to reach students before arrival to help smooth the transition to university life. As the student population becomes more heterogeneous and diverse, and possibly less well prepared, this could become more important.

- However, there is a risk in assuming too much about the technology-immersed young adults, who may use very limited features of their devices and gadgets. Students do not always recognise the potential of technologies that they have as learning devices.

- There is still a small minority of students who are not confident with technology, or have no access to the internet or do not recognise the value of technology for studying their particular subject.

Institutional use of technology

- Technology is part of students' lives: the term e-learning does not mean much to them. There is simply teaching with strands of technology running through.

- Students are not pushing us to use particular technologies.

- Students are quite traditional in their views and value the "tried and tested" methods. They have limited vision of what the future of technology holds for education. This is reflected in their strong desire for face-to-face contact, with technology to supplement and enhance this.

- Students want clear explanations about technologies that they are expected to use. They recognise that some staff do not use technology, but would like more consistency across courses.

- The use of technology should be based on needs and be education driven not technology or product driven. Students should have control over how and when they use technology.

Personal use of technology

- Students are social; learning and support often takes place informally in groups, often facilitated by technology.

- Students find their comfort zones and ways of working that are personal to them, and use technology to suit their own ways of learning.

- Skills do not belong to a particular generation. Students will switch skills and learn from each other if they find the skills useful and there is a need.

- Technology should not intrude on students' personal space.

Technology provision across the University of Edinburgh

- Students expect systems and services to be robust, accessible and visible. Students with work experience may be more critical, viewing university systems as less polished than commercial systems.

- Students rate the "MyEd" portal highly as it organises everything in one place using a single sign-on approach.

- Technology is becoming mainstreamed into teaching and learning at the University of Edinburgh. There is nothing special anymore about e-learning, only learning and teaching with strands of technology running through.

Conclusions

Students thread technology through both their social and academic lives, learning new skills from the specific application of ICT and learning technologies and bringing their own use of technology to bear on their studies in ways that suit their own preferences. They do not generally have high expectations from universities in terms of novel or innovative uses of technology, but do expect reliability, predictability, and high quality use across their courses.

There is a continuing need to understand the student perspective as we move into an even more technology-rich world. The diversity of the student population, coupled with the changing nature of teaching and learning, offers both challenges and opportunities. Keeping students' voices central to research in this area will be key to the success in meeting all our students' needs and aspirations.

Checklists for Stakeholders

Short checklists have been constructed as a useful way to summarise the key points arising from our work to various stakeholders together with possible actions that they could take to enhance the student experience (following the approach used by Haywood et. al, 2007). We have identified four key stakeholder groups; new students, teaching staff; support staff, and senior management. Checklists for these stakeholder groups are given below.

Checklist for new students

It is almost certain that technology will be widely used for both your academic studies and for administrative tasks at university. It is well worth spending some time preparing before you arrive, especially if you do not have much experience of using technology for your studies at school or at work. Once you get to university you will find that there are many sources of help, but you will have to be pro-active in searching them out. University is about self-reliance and it will be up to you to ensure you have acquired the skills you need to support yourself.

Things to consider before arrival:

1. Should you be more demanding of your school in terms of ICT provision & training?

2. Have you researched the ICT provision at university?

3. Has the university given you access to any of its online services such as email, online library or VLE?

4. Are there any materials or activities available online for your courses?

5. Have you explored these resources and tried them out?

6. Have you checked online to see what help the university provides for IT-related problems? Do they provide help for problems with personal laptops?

7. Do you know how to use online journals, e-books, databases and search engines? Do you know what help the library provides in these areas?

8. Have you explored what the University offers and know how to use it, explored self tuition materials on the University library site.

If you plan to bring a laptop or PC to university:

9. Do you know how to perform basic maintenance tasks on your laptop e.g. updating the operating system and antivirus software, backing up files?

10. Does your laptop have commonly-used software packages e.g. MS Office, and do you know how to use them?

11. Will internet access be provided in your hall of residence? Do you need to register your laptop for this service before you arrive?

12. Is there wireless access on-campus? Do you know how to connect your laptop to a wireless network?

If you do not plan to bring a laptop or PC to university:

13. Have you checked the number of open access computer labs, opening hours, distance from accommodation / lecture classes etc?

14. If you do not intend to use the university computing facilities, what computer will you use? How will you access the internet?

Checklist for teaching staff

Despite the fact that technology is often integrated transparently into students' personal lives, new students may have limited experience of the ways that technology is used to support learning and teaching or for academic research. Students also value direct contact with academic staff, so it is important to explain how and why technology is used within the context of academic study, and what benefits it provides to students.

1. Do you provide "tasters" of online course material and activities that students can view and try out before they arrive? If so, how do you ensure against the danger of information overload with no activity taking place?

2. Have you considered setting up a forum in which current students can provide information and offer tips and ideas to help new students before arrival?

3. Have you considered setting up communities of practice, including current students, new students, alumni and staff, to share information and create a feeling of identity?

4. Does your website provide clear information about the ways that technology is used for your courses? Does it highlight any specific or unusual requirements in terms of software or hardware that students will need?

5. Is the use of technology driven by pedagogy?

6. Is there a consistent (minimum) level of provision of online resources across all courses in your school / department?

7. Do you provide resources in different formats (e.g. paper, online, podcast) to suit different students' needs?

8. Do you use a common delivery mechanism, so that students do not have to re-learn how to find and navigate through online resources for each new course they take?

9. Is relevant help and training offered by central and local support services (e.g. IT, library, e-learning advisors) clearly signposted to students at appropriate points in their courses? Do you work with support staff to tailor this for your particular needs?

10. Is there a "netiquette" policy for both students and staff?

11. Have you considered the role that technology might play in assessment and feedback?

12. Do you showcase examples of best practice?

13. Do you gather and act on feedback from students on the ways that technology is used on courses in your school / department?

Checklist for support staff (e-learning, IT and library)

Students often need to be pro-active in seeking help and advice from support services, rather than it being delivered to them in timetabled class time. New students in particular are likely to suffer from 'information overload' and may not know where to turn for help. It is especially important to provide clear signposts to sources of assistance, and for online information to be presented in a clear and coherent way.

1. Have you considered providing the same laptop plus software to all students?

2. Do you provide access to online resources before arrival, so that students can experiment and familiarise themselves with the online services and systems used by the university before they arrive?

3. Are sources of help from across the range of support services presented together online in a coherent way? Do you provide clear signposts to this information?

4. Do you work with academic schools or departments to provide targeted support and advice?

5. Do you help disseminate good practice between schools or departments across the university?

6. What support do you provide for facilitating peer learning and mutual support?

7. Are you working to provide facilities for informal social and group learning in addition to the traditional computer labs and personal working spaces?

8. Do you provide opportunities for students to feed back, and to ascertain user needs, on the services and support that you provide?

Checklist for senior management

Senior management must be aware of the range of issues facing new students, especially with the increasing move towards part-time and full-time adult return to higher education, the emphasis on the importance of lifelong learning and the increase in numbers of International students. They should ensure that the deployment and use of technologies are to a consistent standard across the university, and that this provision takes into account the needs of the student body.

1. Is ICT embedded in such a way that a consistent quality of service can be provided for students and staff across the institution?

2. Do you provide help and support for students who bring their own laptop / PC?

3. Do you provide help for staff for the effective use of technology for teaching and learning, both to support face-to-face teaching and for the delivery of online courses?

4. Does ICT provide opportunities for staff (and students) to engage with students before arrival, and if so, are these being fully utilised by your staff?

5. Are the mechanisms in place to assess the ICT skills and information literacy of incoming students and provide appropriate and timely training in these areas?

6. Are there opportunities to disseminate examples of good practice?

Acknowledgements

Background to the LEaD Project

Recent research into student use of technology

Recent reports into the current generation of young adult students' expectations of, and experiences with, the use of information technology (IT) to support their learning have highlighted a number of common themes. It is clear that students expect to use IT routinely as part of their academic studies at university [Salaway et al, 2008; JISC/Ipsos MORI, 2007, 2008]. Further evidence for this is provided by the fact that the majority of students now arrive at many universities with their own laptop, which is used for both personal and academic pursuits. The use of the internet as a communication tool is increasing, within both academic and social contexts. There is widespread use of social networking sites for communication, especially between peers, perhaps in preference to the now "traditional" email [Salaway et al 2008, Oblinger, 2008]. Despite this, the potential of Web 2.0 technologies (such as wikis and blogs) for learning appears to be less well-appreciated or understood by students. Furthermore, despite having a high degree of proficiency with common productivity software and web search engines, there is evidence that students may arrive at university lacking some of the information literacy skills needed to support fully their academic studies [CIBER, 2008, Oblinger, 2008]. In this context it is worth noting that, although the use of IT in UK schools to support learning and teaching is increasing, it is still patchy and is generally less well-developed compared to the provision offered by UK HE institutions [BECTA, 2008]. There is also evidence of a small but significant minority of students who do not actively engage with IT [JISC/Ipsos MORI, 2008].

The majority of these reports have been centred on young adult students (sometimes called "Net Generation", "Google Generation" or "Millennials" (Howe, 2000)) in the approximate age range 17-22, and one needs to take care not to slip unthinkingly into over-generalisations and stereotypes that might lead to inappropriate assumptions which then shape university actions.

Within the University of Edinburgh we have been collecting information about newly arriving undergraduates' experience of, and attitudes towards, IT and its use in teaching and learning since 1990. We have observed interesting trends over the years [Macleod et al., 2002, Haywood et al., 2004]. In the early 90s, the great majority of students arrived with less IT experience than might have been expected, and these findings demonstrated our acute need for an institutional strategy and action plan to support students in the cultivation of their IT fluency in preparation for university studies. In recent years, we have seen students arriving with a wide repertoire of IT-related skills already formed, largely derived from their personal and social uses of technologies. We have noted a decline in gender effects but seen significant and enduring age effects, some of which emerged again in the Learner Experiences Across the Disciplines (LEaD) project findings. The differential between adolescents and young adults and older members of the UK and population has been noted in several recent reports, for example "Their Space" [DEMOS, 2007]. Overall, then, it is clear that the situation is complex and this vital time of transition to independent learning at university is exciting, though potentially disruptive. It affords staff and students great opportunities, although it also poses significant management challenges [Nicholson et al, 2005]. It is this rich and complex situation that the LEaD Project aimed, in part, to explore.

The *Learner Experiences Across the Disciplines* (LEaD) Project was funded by JISC under the e-Learning Pedagogy programme and ran from February 2007 to September 2008. It was one of the Learner Experiences of e-Learning (LEX) Phase 2 projects, which followed on from and were informed by a set of Phase 1 projects and scoping study.

The LEaD project was a study of a heterogeneous group of first-year undergraduate students from a variety of different entry routes who were studying several subjects at the University of Edinburgh, in particular Divinity, Physics and Veterinary Medicine. First year courses in all these disciplines have a well-established presence online, marrying the best of the online and real environments in a blended approach to learning and teaching. We have previously investigated the utilisation of online resources

by students [Hardy et al, 2005, 2006], and our findings illustrated a multiplicity of patterns of student use of these rich online environments. More recently, courses in all three subjects have begun to gain experience and understanding of how to embed Web 2.0 tools, such as weblogs and wikis, in support of more traditional teaching methods. The pilot use of these tools demonstrates a shift in these courses away from pedagogical models based on the transmission of knowledge, published by a respected authority, towards pedagogies with a more bi-directional and collaborative (learner-centred) approach.

The focus of the LEaD project was on "critical moments"; specifically, the involvement and impact of learning technologies on students' transition into university, and the changes in their use of learning technologies as they progressed through their first year. The overall shape of our research was based on two underlying principles, advocated in earlier LEX Phase 1 studies by Sharpe (2005) and Mayes (2006). Firstly, that it is important to take a learner-centred approach, whereby the students' own views and opinions are central to the study. Secondly, the research should adopt a holistic approach in which students' use of technology is set within the context of their learning experiences as a whole. Within this context, the key questions that we wished to address were:

- What are students' expectations regarding the availability and use of e-learning at university?

- How do students adapt and change their approaches to e-learning during their first year?

- What are the factors that influence students' choices of e-learning strategies and their utilisation?

- To what extent do students use non-institutional technologies to support their learning?

By way of setting the scene, in the following section we give a brief overview of learning and teaching at the University of Edinburgh together with the provision of, and support for, e-learning technologies both centrally and across the various academic Schools. This is followed by three discipline-specific case studies, in which we provide a more detailed description of teaching and learning together with a collection of quotations from students studying that subject. We then summarise the methodology that we employed, before presenting the main body of our findings in a section entitled "The Student Year", which is rich in direct quotations from our student volunteers. Our summary and reflections on the findings follow. Our key messages and recommendations for action to the various stakeholders of the project are located after the Executive Summary.

e-Learning at the University of Edinburgh

The University of Edinburgh was founded in 1583 and is one of the oldest in the UK, with a long tradition of providing high quality first and higher degrees in most subjects, including all professions. The university has very strong international relationships in both teaching and research, and draws staff and students from all countries of the world. In academic year 2007-08, the undergraduate and postgraduate student enrolment was 25,143 and the academic staff number totalled 7,691.

The educational provision is predominantly shaped by a campus-based model in which face-to-face classes (lectures, tutorials, labs etc) form the core of teaching, with substantial time spent by students in independent study, alone or in self-organised groups. Over the past decade, increasing use has been made of less traditional methods, such as formal group-work, placements, and student presentations. The excellent digital library has enabled staff to direct students with greater ease to primary literature online, and students themselves have become more adept at making use of these resources.

The University has a well-developed e-learning infrastructure, developed over many years and based upon robust ICT and training services. It supports e-learning both through central services (an integrated Information Service of library, academic IT, e-learning, classroom services; and the educational development unit, the Centre for Teaching, Learning & Assessment) and through local e-learning services within Schools (e.g. Medicine, Law, Education). In 2002 the Principal initiated a 5-year £5m e-Learning project fund and this has been used to set up projects in each of the three academic Colleges. The Principal's Fund projects are building on existing excellence and expertise in

e-learning, major aims being to innovate and spread the use of e-learning more widely through the academic community.

E-learning developments are guided at the top level by a University Strategic Plan, below which is an e-Learning Strategy, and the implementation of the latter is overseen by an e-Learning Committee with wide representation, including the student association. The University has been a participant in many ICT in education and e-learning research and R&D projects in a wide range of subject areas, and from many funding sources, which have informed strategy development and implementation. A small sample is given below.

As of 2008, e-learning is very widely used throughout the 21 Schools of the 3 Colleges and the University. There are well-developed e-learning support and development services which provide course teams access to VLEs, online assessment, web-logs, simulations etc. The great majority of courses outside Medicine and Veterinary Medicine use WebCT/Blackboard, in which around 30,000 user IDs are updated each night by download into the system from the Registry and HR databases. Students can reach their online course activities, the digital library and other online services through the student portal ("MyEd") taking advantage of a widely-used single sign-on authentication process. The major IT systems are integrated, robust and resilient and operated to high professional standards using best practice methodologies.

In the College of Medicine & Veterinary Medicine, bespoke dedicated VLEs are in use (EEMeC, EEVeC) which contain virtual hospital and virtual farm themes, offering student access to simulation and self-assessment tools of a highly innovative nature. In 2005, the Virtual Hospital Online was awarded the Queen's Anniversary Prize.

Pedagogical and technical advice and training in the use of e-learning is available both through courses and in response to individual requests. Advanced staff development is also available, and this is now offered through modules of an online MSc course (MSc in E-learning). This course has simulated pilots and explorations of novel online teaching and learning methods. All of the expanding use of online distance education has taken place in postgraduate and CPD, especially within the professional Schools of Medicine, Law and Education.

Recent developments have been in the areas of e-assessment (e.g. the use of laptops in traditional exams, wikis and blogs for summative assessments), use of e-portfolios, and classes in virtual worlds. E-learning activities are influenced and informed by regular and systematic research and evaluation – students' experiences of, expertise with and opinions of the use of ICT in education have been collected regularly since the early 1990s. Major new e-learning developments are evaluated to learn the lessons from successes and problems. Some of these results have been gathered and published as part of funded projects such as LEaD.

Students at the University come from almost all countries of the world, 72% taking undergraduate programmes, 14% taking taught postgraduate programmes and the remainder being research postgraduates. Of the 18,159 strong undergraduate population, 47% come from Scotland, 34% from the rest of the UK, 7% from Europe and 12% from other overseas countries. In 2006/07, the ratio of female:male undergraduates was 1.27:1. Approximately 13% of undergraduates are aged 17 or under at entry, while 12% are 21 or over. However, there are significant variations between degree programmes.

Most undergraduates (excluding Medicine and Veterinary Medicine) follow the Scottish undergraduate degree, which differs from that in the rest of the UK. The four-year honours programme offers a broad-based curriculum built on the principles of flexibility and choice, especially in the early years, with students able to select options from an extensive range of elective courses. One consequence of this flexible degree structure is that a significant fraction (often more than 50%) of students on many early years courses are not registered for a degree in that subject. Hence a wide range of ages, abilities, aptitudes and aspirations are represented on most large courses, a situation which presents a complex set of challenges for both students and staff.

The majority of courses at Edinburgh follow a campus-based model of teaching and learning based on a traditional lecture plus tutorial approach. The use of e-learning to enhance students' learning experience and to promote wider access is actively supported and encouraged by the University. There are well-established e-learning support services providing VLEs, wikis, e-portfolios and formative and summative assessment tools together with technical and pedagogical advice. Most e-learning services, together with other online services such as email, course & timetable information, online library etc. are accessed via the staff/student portal "MyEd", which supports a single sign-on authentication model. In 2002, the Principal's e-Learning Fund was established to spread the use of innovative e-learning across the academic community. More recently, the Principal's Teaching Award Scheme was launched to encourage innovation and reflective practice in teaching and enhance the quality of student learning.

The three subject areas, Divinity, Physics and Veterinary Medicine, were chosen to represent a cross-section of the wide range of disciplines available at the University. Organisationally, they sit within each of the three colleges that form the basis of the University's academic structure (Humanities and Social Sciences; Science and Engineering; and Medicine and Veterinary Medicine). Academic teaching staff in all three disciplines have wide ranging experience in the innovative use of learning technologies to encourage and support greater self-responsibility for learning. This goes beyond the "putting course notes in the VLE" approach which is now routine practice for most courses. Hence, to some extent the courses in this study may be considered a little atypical, however it is because of their strengths in elearning that this was an ideal time to study the student perspective.

Divinity: The first year cohort in Divinity includes a wide age profile from school leavers to mature returnees, providing a population with highly variable IT literacy levels and engagement with modern technology. E-learning uptake by the academic staff ranges from no engagement to courses with a rich blended approach where e-learning, including the use of Web 2.0 technologies, including weblogs and podcasts, is an integral part of the teaching programme.

Physics: Physics students tend to arrive with high levels of IT literacy, some having been previously users of Web 2.0 technologies. Within this discipline at Edinburgh, e-learning has been used to support face to face teaching on campus for almost a decade, with recent excursions into Web 2.0 territory, using podcasts and wikis to support teaching and learning.

Veterinary Medicine: These students are typically high achieving, highly motivated individuals. The traditional Bachelor of Veterinary Medicine & Surgery degree is a 5 year programme, however from session 2006/07 a 4-year graduate entry programme has also been offered which provides for a markedly different student cohort with widely varying experiences and backgrounds. All students have access to the school VLE "EEVeC" (the Edinburgh Electronic Veterinary Curriculum), embedded within which are a number of resources under the umbrella of the "Virtual Veterinary Practice". The resources include RSS feeds and webcams, and podcasts are under development. E-assessment is being piloted in selected courses and an e-portfolio is also due to be trialled. Individual teachers and courses vary in the extent to which they use these resources.

In the following section each of these disciplines is presented in more detail as a "stand-alone" case study. Each study includes a description of the curriculum and courses offered in the early years of the degree, the teaching and assessment strategy and the ways in which technology is used to support teaching and learning. They each conclude with a "postscript", outlining staff aspirations for students at the end of their first year, together with a selection of themed quotes (some of which are also used elsewhere in this report) from students in that discipline.

Case studies: The disciplines in more detail

MA Divinity Case Study

Context

The School of Divinity consists of four subject areas – Biblical Studies, Religious Studies, Ecclesiastical History and Theology & Ethics. Each subject area offers courses at introductory level (SCQF Level 8) and most academic staff are actively engaged in Level 8 teaching. Options offer a flexible set of courses including:

- Religion 1A: Religion in the Contemporary World: Judaism, Christianity and Islam

- Religion 1B: Religion in the Contemporary World: Indigenous Religions and the Religions of Asia

- History of Christianity as a World Religion 1A

- History of Christianity as a World Religion 1B

- Biblical Studies: An Introduction 1

- Biblical Texts in Translation 1

- Christian Ethics: Sources

- Christian Theology 1

- New Testament Greek 1

Each course consists of three hours of lecture and one hour of tutorials per week over a one semester period. For most courses the first week is primarily introduction and week 11 largely consists of revision. All Level 8 courses are team taught by mainly academic staff of the School with occasional lectures by senior postgraduates or Teaching Assistants. Tutorials are normally led by postgraduate tutors. In all courses students are expected to do substantial amounts of reading – for some courses course readers are supplied (at cost) in paper format for all or some of the readings. Extensive use of the Library is also strongly encouraged.

In 2007/08 a new course was introduced, IT Skills for Divinity Students. This course is delivered completely online, and all first year students are encouraged to complete it within their first semester (at this time the course is not compulsory). The course consists of five modules released selectively throughout the semester with links to resources and exercises tailored to the content being delivered. Each module also has a small online multiple choice assessment to demonstrate completion of the work. The course is non-credit bearing but does appear on student transcripts.

Assessments

For all Level 8 courses, assessment consists of 60:40 split with 60% from the final exam at the end of the semester and 40% from class work. The final exam for each course is made up of one two hour exam essay-type questions (with students choosing the questions they answer). Final exams are generally marked by the teaching team for each course.

The class work component depends on each course:-

- Biblical Studies: An Introduction 1 – 2 essays (15% each) and weekly tutorial attendance (10%)

- Biblical Texts in Translation 1 - 2 essays (15% each) and weekly tutorial assignment (10%)

- New Testament Greek 1 - Fortnightly quizzes (20%) and a class exam (20%)

- Christian Ethics: Sources – Weekly reflections (20%) and essay (20%)

- Christian Theology 1 – Tutorial attendance and contribution (20%) and essay (20%)

- History of Christianity as a World Religion 1A – essay (20%) and weblog and tutorial contributions (20%)

- History of Christianity as a World Religion 1B – essay (30%) and class assessment (10%)

- Religion 1A: Religion in the Contemporary World: Judaism, Christianity, and Islam – tutorial presentation, (5%), tutorial attendance & contribution (5%) and essay (30%)

- Religion 1B: Religion in the Contemporary World: Indigenous Religions and the Religions of Asia - tutorial presentation, (5%), tutorial attendance & contribution (5%) and essay (30%)

Most of the class work is marked by tutors.

Technology in use

All the courses make use of WebCT – exact usage being at the discretion of the course organiser and the team teaching the course. The School to date has no policy on the extent to which staff should use WebCT; this is left to the pedagogic requirements of each course. The School has its own WebCT template. Staff are encouraged to use this but are not required to do so, and the course organiser may change it to suit their needs. For most Level 8 courses the online component includes access to lecture materials and additional resources (including links to appropriate websites).

The School has been successful in obtaining various sources of funding for e-learning initiatives over the years and these can be seen in action in some of the Level 8 courses:

- History of Christianity as a World Religion courses make weekly use of blogs as a preparation for tutorials – each week within the four tutorial groups one student elects to post the blog on the topic of the week and the remaining students must comment on this prior to the face-to-face meeting.

- This course also makes use of Flash animated map - see http://www2.div.ed.ac.uk/courses/Animated_Maps/. These were produced as part of various funded projects and aim to provide a visual view of a highly complex time and global subject area.

- Christian Theology 1 was part of a funded project in 2007/08 investigating the use of computers in exams for essay-type examinations. The final report is available at http://www.div.ed.ac.uk/content/1/c4/06/84/eexamsreport_final.pdf

All essay submissions must be in typed script and consist of one electronic version via the WebCT assignment tool and one paper copy. The paper copy is marked by the first year tutors and feedback and marks given back on hand-written essay marking sheets. Additionally for the Biblical Studies, Religious Studies and Theology & Ethics subject areas the students must submit weekly tutorial sheets – these can be typed or hand-written.

Within the actual lectures most of the content is delivered by traditional lectures – usually assisted by PowerPoint presentations or viewing online resources. Some use of film material and music is made although this is limited for Level 8 courses. Most students elect to hand-write notes during lectures but increasingly more students are bringing along laptops (all the teaching facilities offer wireless access). Tutorials are mainly discussion based with no technology in use.

The School has two undergraduate computer areas open 9:00-17:00 Monday to Friday and all students can access wireless in the New College Library, teaching areas, reception and the Rainy Hall (the

dining area). Increasingly students are electing to work either individually or in groups with their laptop in the Rainy Hall – a feature that has grown from the students themselves.

Technology use within the student cohort in variable – the School has a high percentage of mature students, some of whom are highly IT literate, while others are largely inexperienced.

Subject area and technology use

The School's subject area in general does not lend itself to the use of technology. Much of the work relies on sourcing primary and secondary sources – most of these use book, manuscript or images rather than being IT based. However, the School traditionally has been innovative in its use of technology and was one of the first Humanities based Schools within the University to make use of IT. Initially this revolved largely around language teaching – with Hebrew and Greek lab-based classes. This particular usage has declined but the School has been active in looking at ways that IT can enhance its teaching. With the wealth of online resources the School actively encourages students to make use of online digital materials provided by Museums, Art Galleries etc as well as access online journals (a growing area). Staff are also anxious to explore new methodologies in teaching – blogging is used extensively and the use of wikis is now being explored for collaborative work. The School has its own IT and e-learning staff, which provides a definite advantage over Schools without this local support. In common with all Schools, the IT literacy of the academic staff is variable but most staff are willing to take on and try technology if they think it will improve their teaching. Being a small School with a strong collegiate atmosphere, good practice rapidly spreads and is taken up widely within the School.

Postscript

At the end of the first year we hope that students have had a good introduction to the subject areas within the School and feel equipped and ready to proceed to more advanced studies. In particular, we hope that students have been excited by the subject matter and feel challenged to go out and explore more (be it using technology or not).

Students' voices: Divinity

Expectations and experiences

> "I rarely used the internet for studying during high school. My schoolwork didn't really involve much extra reading outside of the textbooks that the school distributed. The only reason I really used computers in schoolwork was to type essays for English classes."

> "Electronic resources should aid and not replace paper but all the time the two should work in harmony and it's brilliant that the WebCT service has been very useful."

> "I guess it depends on the class. In Greek, I'm about 82% paper and 20% 'e' and the electronic is used for translations of texts. The rest (of the classes) was all paper using my books, notes, handouts, everything. The other courses are 90-95% 'e' mainly because I took notes online and the readings were online and because of that, that's how I do my revision."

Institutional use of technology

"Even in the first two weeks we were asked to keep a blog for the "History of Christianity as a World Religion" course. I was aware of blogging as I look at online newspapers, but I had not done blogging in a work context or personally previously and I quite enjoyed it, it was good fun."

"Lecturers did eventually put everything on WebCT following encouragement (by the students) One was very good and put a good selection of different things – podcasts, connections to internet sources, further reading, as well as her own power points and lecture notes. But it was very lecturer dependent."

"Lecturers did not have a way to email everyone on a course altogether. If there was anything new or important that had been put up on WebCT, they didn't know of any way to let us know. So it was up to the students to check back, week after week or day after day to see if something was there or not."

"I think handwritten exams are a blast from the past. I can hardly believe that this is still how universities conduct final assessment. I think it may change in years to come and hope so. New technologies give opportunities, not just to review how exam answers are recorded, but to review the whole process of end assessment."

"I am taking part in a pilot of examination using laptops. However, the scope of the pilot seems to be fairly limited and the exam is to be conducted as a 'mock' exam only. The exam proper will be in the old pen and paper style. "

"Feedback from an essay ? — written works for me, paper or e-mail."

"If you are going to be asked to write a response using a pen and a piece of paper then that colours how you will be using the online resources on the lead up (to the assessment) and you are more likely to 'have a go' at what you would be doing in the exam. If the nature of the exam was different and there was an online aspect to the exam or you could use a laptop, then all of the dynamic might be entirely different. I am aware that I am using paper as the system I am operating within encourages me to use paper but its not natural or the best way of doing it."

Personal use of technology

"I find using Facebook very useful for keeping in touch with friends both at Uni and at home. I find it really useful in that you don't have to know people's email addresses - you can just search for them using their name. On Facebook you can keep threads, email more than one person at once and upload photos which is good from a social point of view and also to ask people about work queries."

"For myself, I found in my own revision, that the use of my own personal computer and 'Inspiration', the Mind Mapping software, was helpful. I did a lot of mind mapping and also going over podcasts, audio files, MP3 files as a revision aid and also for constructing my revision."

"I am supposed to be using FaceBook to get together with some other people from our Religion class to revise for our exam. But we are all going to get together in person and email our notes to each other. So that is one way of using technology to share information."

"I find it really helpful to go over material with other students, whether I'm organising that through IT discussion boards or just emailing a person I know on the course and asking their opinion on something."

Technology provision across the University of Edinburgh

"At our home university in [USA] you get 400 free prints each semester and you never use them all but you can use them for any review materials, lecture notes, short readings that you can do online. Here I only print out the bare essentials."

"Students arriving at the University of Edinburgh should take two things into consideration: 1) the importance of a computer (desktop or laptop) and 2) the need to understand the library and its IT services. A personal computer can save the student considerable time in projects, readings and essays.."

BSc/MPhys Physics Case Study

Context

Physics 1A: Foundations is an introductory (SCQF Level 8) course in the classical Physics of space and time. It is mandatory for all students entering the first year of a Physics programme at Edinburgh, and also taken as an elective subject by students studying towards other degrees, chiefly, but not always, based in the sciences. The class sizes have expanded greatly over the last 5 or so years; this year's (2008/09) cohort is nearly 300 students, of whom approximately 60% are reading towards Physics degrees. The age profile of students is typical of many science subjects: predominantly young adults (aged 17-20), 270 of whom approximately 24% are female.

Delivering the course presents a range of challenges. The cohort is diverse, not just in their motivation and reason for studying the course, but also in their background and preparedness. Approximately 30% have Higher physics only, the remainder split evenly between Advanced Highers and A-levels, with a small number entering with international or other qualifications. The well-documented "maths problem" (the decline of mathematical competencies of entrant undergraduates) is an on-going issue as is the wider context of differences in the styles of teaching and modus for learning between secondary and tertiary levels. Finally, the subject matter – though at an introductory level – has been shown to harbour many student misconceptions, which must be actively dislodged.

Students take two other (20 credit) courses in their first Semester concurrent with Physics 1A. One of these is mandated to be mathematics, the other is free choice. Many students take optional courses offered by the School of Physics and Astronomy, in either Astronomy or Musical Acoustics.

Course teaching philosophy and practicalities

The full course team comprises 19 staff in total, undertaking duties as follows:

1. Lectures, 3 per week for 11 weeks, are delivered (individually) by three members of academic staff, two of whom have been teaching on the course for 5 or more years. For several years, the focus in lectures has been on interactive engagement, facilitated by provision of incomplete lecture notes (to actively aid note taking skills) and the use of electronic voting system handsets (EVS, see below). Lecture topics include a small number of optional "forward look" lectures on special relativity, chaos etc

2. Workshops; one per week (but running every afternoon except Wednesday to accommodate the whole class), 3 hrs duration, in the new "teaching studio". These are staffed by an academic, acting as Head of Class, aided by 3 postgraduate Teaching Assistants (TAs). Workshops entail a variety of different activities, fostering both quantitative and qualitative thinking skills.

3. Assessment is 67% end-of-course exam, 33% in-course assessment. The latter comprises a weekly assignment (they do 9, we use the best 8 of these) and a pre- and post- course diagnostic test, the better of the two marks counted to be the equivalent of 1 weekly assignment. In the current presentation of the course, we have also used a mid-term exam as preparation for the degree examination, which takes place before Christmas at the conclusion of the course. Extensive formative assessment and feedback is built into the online course material (see below).

4. A strong staff training development network exists within the course. One of the TAs acts as a Head TA and mentor to new staff on the course and there are also a series of in-house training sessions (developed in conjunction with TLA) and we have a "mark-in" session, to help them get a feel for marking student work and resolving issues collectively. Academic staff regularly observe each others teaching and provide informal and constructive feedback.

More details of the design and pedagogy of the course are available from Bates et. al. (2005) and Bates (2005, 2007).

Technology in use

The course has had a long history of utilising online and e-learning resources to supplement the face-to-face teaching activities, stretching back a decade. Extensive online resources are served to students through the MyEd portal and the institutional VLE (currently WebCT Vista). These resources comprise over 1500 learning objects including:

- Additional support material for weaker students, and off-the-beaten-track material for more able students or those seeking further details or challenge

- Extensive (formative) self-assessment materials in the form of interactive MCQ questions embedded in the course content.

- Course questions and solutions.

- Videos, applets and online simulations external to the course, but "wrapped up" in a local context.

- Online discussion forum for student queries, support and conversations about the course.

Additionally, we have used EVS handsets for 5 years now, as a means of enhancing student engagement and understanding in the lectures; all the questions and student responses to these questions are also available online through the course material. All staff on the course use EVS questions in their lectures, with a focus on illumination and conceptual understanding of material. Students are given their own handsets at the start of the year.

More details on the aspects of e-learning that are used in the course are available on the School e-learning microsite http://www.ph.ed.ac.uk/elearning

Postscript

At the end of the first year of study in Physics, we aim to have consolidated the fundamental physics and mathematics that students will need for further study of the subject. Additionally, we hope that students have been made to feel part of a learning community in the School, and they have taken the first steps on the road to becoming more independent and autonomous learners.

Students' voices: Physics

Expectations and experiences

> "Assessment and feedback once the bane of my school life, assessment now appears to have been given a purpose - to provide feedback in an environment where it is rather more tricky to judge just how well one is learning."

> "Perhaps one of the most useful pieces of feedback has been in Physics, where for the first two weeks of assessments I had neglected to check just what was being asked for. Instead of the minimal exam-oriented answers requested at sixth form, the markers were looking for fully explained methods. This of course meant that I lost marks, but at the same time taught me where I needed to focus in my answers."

"...sometimes is easier for me to read rather than to listen because English is not my tongue, so I can read it twice, or even look for it in my own language."

"Its essential to have paper notes. I need to be able to make mind maps, look at my strengths and weaknesses and use different colours, different things that come to mind, arrows in a diagram are fiddly to do. On a computer by the time you have done it, you have forgotten why you are doing it."

Institutional use of technology

"In physics we have clickers which are genius, very good. It means you can interact with a lecture and see as a class the mistakes people are making and how your idea fits into what other people are thinking …. it makes you pay attention to the whole lecture if its interspersed with clicker questions."

"They use power point and the projector screen all the time which is really good I think and does help."

"A very helpful and interesting thing is the Discussion Board in WebCT, in the Physics course. It's a shame that only a few people use it, because is very very useful"

"I think for multiple choice tests, computer-based assessment is possibly better than handwritten assessment, and probably easier and safer to mark electronically."

"Up until last week I was not aware that the answers for the maths tutorial questions were on the maths website and after looking for them last night I have still not found them."

Personal use of technology

"I can't revise if I'm not in front of my computer. I use WebCT a lot, or msn for asking someone who knows about what I need to know (if there's someone). Also, there are many blogs where you can find many interesting things that you can't find in course books most of the times I use to Google the thing I'm looking for, like "logarithms properties" or something like that."

"Although I feel equally reliant on both, if it came to a definitive choice, I just could not cope without electronic sources and materials!"

Technical Provision across the University of Edinburgh

"Emphasise and standardise availability of online and interactive material for each course, lecture notes, bank of questions, group work based activities, games..."

BVM&S Veterinary Medicine Case Study

Context

The Bachelor of Veterinary Medicine and Surgery (BVM&S) degree can be achieved by following either a five year undergraduate or a four year graduate entry (GEP) programme. The GEP starts 5 weeks prior to start of standard BVM&S programme. All students who enter the GEP have a degree in a relevant biological science.

The BVM&S Curriculum Mission Statement

- The curriculum is outcomes based and produce graduates competent to enter veterinary practice and with sufficient generic skills to allow a career in public practice or scientific research.

- The curriculum is vertically integrated, emphasising abnormal structure and function in the context of the normal animal.

- The curriculum emphasises the importance of problem solving skills and lifelong learning.

- Learning outcomes define the content of the curriculum and assessment is aligned appropriately.

Both the 5 year and GEP programmes have discrete courses within the1st year and also students begin the study of "vertical themes" that run across years – notably the population medicine and veterinary public health course and personal and professional development/ professional skills.

Courses studied by students in the 1st year of the 5 year programme.
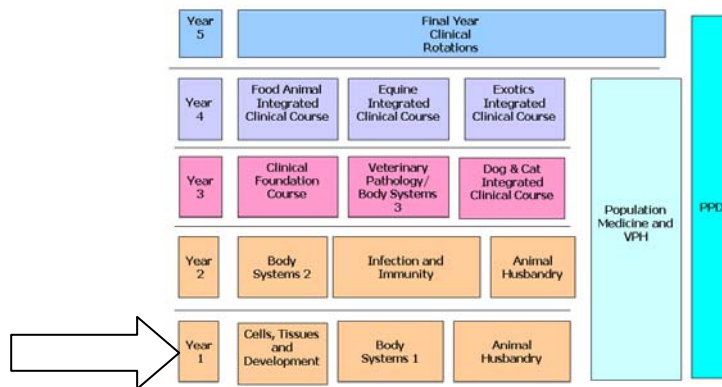
Figure 1 BVM&S 5 year programme curriculum overview

Cells Tissues and Development: This course looks within the cell at the molecular machinery, and beyond the cell at the interactions that form the basic tissues and govern cellular behaviour. The course emphasises Cellular Physiology which underpins the Systems Physiology that is taught in Body Systems and Infection and Immunity.

Body Systems 1: A main theme of this course is homeostasis, the maintenance of the internal environment of the body in a stable and consistent state. Additional themes are the locomotory

apparatus and small animal topographical anatomy which run in parallel with the relevant system where possible. The course includes the structure and function of the major control systems (nervous, hormonal, cardiovascular, respiratory and renal), responses to environmental changes and stress, together with locomotion and small animal topographical anatomy. Clinical lectures and demonstrations illustrate the importance of a sound knowledge and understanding of the normal animal as a basis for the later study of veterinary medical and surgical problems.

The 4 year Graduate Entry Programme

Figure 2 BVM&S GEP curriculum overview

BVM&S – Graduate Entry Programme

The Animal Body: This course focuses on integrated anatomy, physiology and biochemistry as they relate to the body systems in the normal animal. The course provides introductory cellular level material followed by coverage of all body systems, utilising cases where appropriate to place the basic sciences into a clinical context. At the end of this co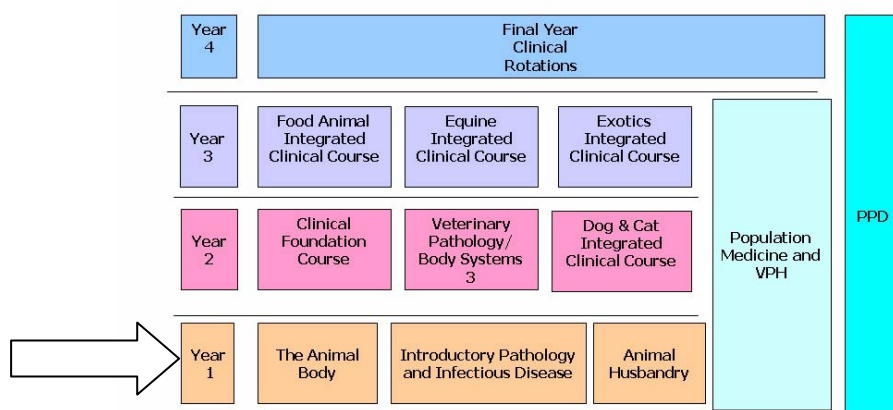urse students should be able to: Describe the gross and basic microscopic structure of the body systems; explain the anatomical, physiological and biochemical aspects of the body systems as they relate to normal function; describe and discuss the physiological principles of homeostasis; discuss and explain principles of small and large animal topographical anatomy; and apply basic clinical techniques to the investigation of body system function.

Introductory Pathology and Infectious Disease: This course deals initially with the scientific principles and basic mechanisms of the molecular, cellular and tissue changes in disease including inflammation and host immune mechanisms. Bacterial, viral, parasitic and mycotic diseases are introduced beginning with the general features of the biology of infectious agents followed by more detailed coverage of the mechanisms of pathogenesis, immunity and control of specific diseases of domesticated animals. The course includes laboratory methods for diagnosis of diseases and practical instruction is given in appropriate laboratory techniques.

Courses studied by both GEP and 1st year BVM&S students

Animal Husbandry: Animal husbandry is an understanding of how to care for and manage domestic animals so that the animal's requirements for good health and welfare, and man's requirements for the use of these animals are met. The course provides through lectures, practicals and extra mural studies the basis for the care, handling and management of animals. These concepts can be applied to the benefit of the animals, the practice of veterinary medicine and the productive use of animals.

Population Medicine And Veterinary Public Health: This course comprises a group of related subjects which have, as a common theme, the study and control of disease in populations, in contrast to the individual. The populations are both animal and human; the course therefore includes control of zoonotic infections and food hygiene.

Personal and professional development (PPD): Students keep a portfolio of evidence gathered against items which include generic transferable skills and experiences on extra mural studies placements

Technology in use

Our homebuilt VLE EEVeC is electronic "hub" for all curriculum information, timetables, discussions groups, lecture materials etc. Courses vary in their additional use of EEVeC e.g.:

1. Animal husbandry is building up a resource of videos of core practical/ basic clinical techniques within their wiki.

2. Cells Tissues and Development staff have been very active in generating small computer assisted learning (CAL) objects and revision quizzes to support specific parts of their course. Also often pose questions on discussion board.

3. The Veterinary Teaching Organisation (VTO) in general has been creating pod and vodcasts for use by all students although emphasis is more on clinical years. Similarly with use of breeze/ adobe connect for audio annotated powerpoint.

Wikis and blogs are also available in EEVeC but these are currently not embedded into any specific courses or activities in the first year. Some of these have been established to allow student sharing of images e.g. from dissection classes. The curriculum is very "image heavy" and a recent survey indicated that many students own digital cameras and most use them in their learning. see below.
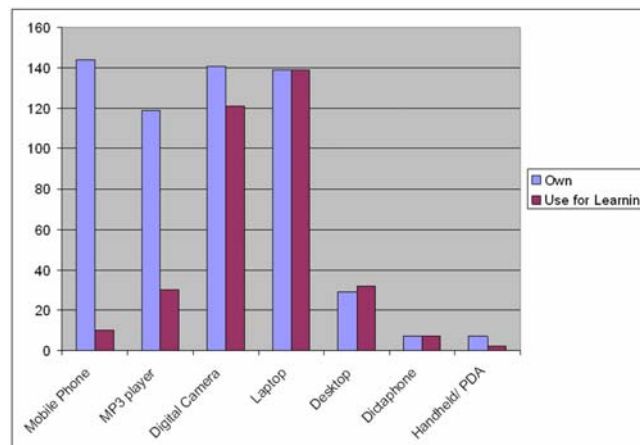

Figure 3 Use of Personal Technologies by Vet. Students

Experience to date would indicate that technology use within the VLE for sharing or "spontaneous web 2.0" activity is relatively low level unless it is a course "requirement" (as in the current 3rd year pathology in course assessment which requires the use of a wiki).

Assessment and assessment strategy

Assessments are written (in first year, many essay based), practical "spot" exams (e.g. identification of anatomical specimens), practical animal handling exams (in 5 species groups, all compulsory to pass for progression), oral (whole class, communication of concepts/ understanding). One in course assessment (animal husbandry) is run on computers using a college built assessment system called "OSCA".

Courses are encouraged to adopt a range of assessment types – essays, short answer, MCQ, practical and oral examinations are all used.

In-course assessment varies but will include practical reports, course essays and anatomy lab books.

Student performance

As we attract academically very able students who are generally highly motivated, our attrition rate is low. Students who struggle generally do so in their first year. The students involved in the LEaD project generally performed very well in their assessment and all have progressed successfully to the next year of the programme except for one student who suspended studies on medical grounds. One student resat the animal body course in September and passed well.

Veterinary medical education and technology

As a tightly contained programme which leads to a professional degree registrable with the Royal College of Veterinary Surgeons (RCVS), community building and a sense of "professional identity" is something we like to emphasise from the earliest stages of the curriculum. Over recent years we have been developing this further by the introduction of a more substantial professional studies course (PPD). This aspect of building a Community of Practice (CoP) we believe can be enhanced by the use of technology, central as it is to the lives of many of our current students.

In addition, BVM&S students are required to spend 38 weeks of their vacation time working on farms and in vet practices – technology can provide a means to keep them in touch with the "community" and from a more practical point of view, with resources that they may need whilst on placement.

Finally, as a profession where CPD and lifelong learning are required, technology provides a means both for delivery in terms of eCPD and also in managing portfolios which are central for postgraduate training in many of the subject specialties. Familiarity with technology and the way it can support lifelong learning is therefore a "day one competency" within our programme.

The staff context.

The 1st year of the five year programme, is taught mostly by basic scientists amongst whom there are a range of views on the use of technology from those enthusiastic to embrace technology to those who actively resent it. The enthusiasts until recently have engaged mostly with the use of technology to develop interactive revision aids, quizzes etc however a few are now engaging with web 2.0 – notably podcasting and wikis.

The first year of the GEP is staffed by a combination of clinicians and basic scientists so students are exposed at an earlier stage to material in a clinical context. Again, amongst the clinical group there is a range of engagement with technology although overall, there is greater engagement with technology in this group; partly resulting from involvement of a much larger number of staff in the GEP courses, especially the animal body course.

The school over the last few years has been strongly supportive of e-learning developments and encouraging innovation in this area. The main barriers as expected are staff time to create new materials or activities and the fact that a number of staff are still reluctant to engage with the VLE. Student pressure however helps in this regard!

Postscript

At the end of the first year in our school, we would hope that our students feel part of the vet school community and we would expect that part of this community building process would be facilitated by the use of technology. We also increasingly recognise the heterogeneity in our student body which is no more apparent than in their use of technology to support their learning!

Students' voices: Veterinary Medicine

Expectations and experiences

"My mother would chase down garter snakes when we were kids, and so I have no fear of creepy crawlies. The reason I mention it, is that this kind of curiosity is what drives my desire to learn. Both my parents showed me early that life is fascinating, and worth exploring."

"I have come to reflect yet again on the technology which plays such an essential role in my education as a veterinary student".

"This is the first time I have had my own computer and usually I left all of the technical stuff to my Dad."

Institutional use of technology

"The wiki is useful for collaborating with my anatomy dissection partners. We have been able to save and upload dissection pictures in order to share them with all members of the group, and they are also available to other of our classmates."

"There are aids to use to revise for the exam in February - from notes, to online quizzes, to computer programs on uni computers to the box of bones I have in my room particularly for anatomy!"

Personal use of technology

"In dissection we take a lot of pictures and it's important to be able to share them with our group, so attaching them to an email and saving them upon receipt is important. I feel confident about doing this now and have been sending emails with attachments regularly throughout the semester."

"My digital camera has become indispensable. It is essential for my anatomy course, both as a selfhelp aid and also has a virtual requirement for the pictures required in our anatomy notebooks, with labelled photos of the muscles, tendons, and bones being part of the overall mark for the book"

"I have also been able to record video footage at my first attempt at suturing which is now recorded for posterity."

"My digital camera has become indispensable."

"I do find the reproductions of the pictures and diagrams makes the difference, and having copies of things large enough to read on the wall allows me to stare/read it as I'm just going about normal stuff. I have tried the digital camera, but I have a tendency of

making large summaries, so I have a hard time taking a picture that can encompass everything I did. I've got one on my wall right now that took five pages to put together!"

"WebCT I use just to get access to my e-mail, but that's mostly because we have Eevec, which has the discussion boards and timetables and all that on it. Discussion board usage has dropped lately, but most profs will offer to answer questions if we post. Still, mostly it's just us keeping in contact with each other about ideas/questions/concerns (like for our Class reps and stuff). Usually, it's gets used. Looks like our group (graduate entry) uses it more than many groups"'

Technical Provision across the University of Edinburgh

*"I'm not too picky. I tend to just work with whatever system I've been given, so I'll manage whatever they have set up. I think I would like someone to talk to about my **portfolio**, since I'm not used to working with what is essentially a Wiki (I think- I don't know exactly the definition). Instruction, or advice on Wikis would be good, since I had no idea what they were and had never used one before coming here and they are getting very popular now."*

Outline of methodology

The methodology used in this project is described more fully in the accompanying methodological report (LEaD Report "Techniques for Gathering Student Views of their Experiences at University", available from www.epcc.ed.ac.uk/projects/lead), therefore only a brief summary is given here. A mixed-method approach was used to collect a range of quantitative and qualitative data. This included:

- An institution-wide survey, conducted at the start of the year;
- A series of reflective diaries recorded by students in the three target disciplines;
- An end-of-year survey of the participating students;
- A number of focus groups.

The reflective diaries were recorded at key points during the course of the academic year. These are summarised in Table 1.

	Semester 1	**Semester 2**
Early	First impressions & transition	Return after first vacation
Mid	First assessed assignment	Nearing the end of first year teaching
Late	Exam revision	Return from vacation, exam revision,

Table 1 Diary themes and key points

The surveys were conducted online and using paper. The reflective diaries were recorded in either video, audio or text format. Information from paper surveys was collected by scanning. Survey data was analysed using MS Excel and SPSS. Information from the diaries and focus groups was organised and analysed using NVivo8.

The student first year

In this study we have followed a group of volunteer students through their first academic year at the University of Edinburgh. We made contact with them in their first classes soon after arrival, and maintained that contact, lightly so as not to be intrusive but sufficiently so that they never felt "dropped" by us, until the very end of the year when their exams were over.

In this section we will present our analysis of the information that they gave us and that we gathered independently, at each stage of our study. We will make clear where our findings contribute to the major themes of the study (Transitions etc) in our reflections at the end of this section. We found many more commonalties than differences between students from the different disciplines; therefore our approach is to present general findings, i.e. those applicable to all students, with subject-specific findings signposted where appropriate. These also link to the subject-specific case studies (for Divinity, Physics and Veterinary Medicine) presented in the previous section.

Arrival at the University – Survey 1

We asked a large sample of all incoming students, including those who were to form our study cohort for the Project, to complete a survey that asked them about their experiences pre-university and their expectations of university (Survey 1 – see Appendix 3, LEaD Report "Techniques for Gathering Student Views of their Experiences at University"). We have classified their responses under a small number of headings: pre-arrival access to information; comparison between pre-university (mostly at school) and anticipated experiences at university; ownership and use of technology, and support for its use.

Pre-arrival access to University online information

All our incoming students are given their login/password to access a limited set of the University's online services at the point at which they become "Unconditional Firm" (UF), meaning that they have committed to taking the course for which they hold an unconditional offer. (The online services for new students are changing annually as more services from enquiry, application, matriculation etc take place online, and the University offers more supplementary information to intending students at each stage.) Thus our newly arriving students had had access to the student portal (MyEd), and through it to the appropriate VLE, the digital library and to student email in particular:

> *"MyEd I also found really useful in seeing what my timetable was like and getting lots of other useful information before even getting to university, other friends not at Edinburgh University did not have anything like this and they thought it would have been great to have had."*

The majority of students now do access the portal from UF stage:

Entry date	Sept 2005	Sept 2006	Sept 2007
Proportion students accessing MyEd prior to entry	60%	75%	75%

Table 2 Pre-arrival access to student portal

In addition, of course, they have had substantial insight into the University from the first time they decided to look at our website:

> *"Honestly, I did not have any idea what it would be like here in Edinburgh. I did not have to come for an interview, nor did I visit the city before making my choice of University. In fact, I had never been to the UK before this. I chose this University because it was recommended by my sponsor. However, I did try to find out more about this place through the internet a few months before coming over. I searched for weather conditions, lifestyle, cultures and any review regarding student life here. The pre-departure guide given by the British Council in [country] was quite useful, although a more specific one from the University would have been better."*

Increasingly, it is possible to make personal contact with future classmates that was almost unachievable a few years ago:

> *"The final year students set up a group on FaceBook for my year and it has enabled me to find, talk to and get an idea about the interests of a large proportion of my year prior to my arrival and beyond."*

> *"In addition there is a [Facebook] group for the house I stay in at [hall of residence] which has again enabled me to get to know people in a far more intimate way than would be possible rushing around corridors or at the many, often cramped and noisy Freshers week events."*

Thus we can see clearly that the point at which students "enter" the University has become very "fuzzy", and is a substantial departure from what was the case a very few years ago, when paper and physical presence dominated pre-arrival information and transactions.

Those with relatives with recent experience of UK higher education will probably be the best informed:

> *"I feel the (high) school didn't place enough importance on the use of computers and the internet and I knew how useful they were from my sister as she used them extensively for her university work."*

Nevertheless intending students mostly still have a limited view of the extent of use of different online services in practice, and also of teaching and learning in anything other than a superficial sense. The transition into higher education from school, college, work or home is significant, often personally challenging, and is shaped by their expectations.

Comparing school (or work) and University
Studying

When asked in what ways they thought studying at the University of Edinburgh would be different from studying at school, all of the LEaD students who replied said that they expected materials would be less prescribed, that there would be more group-work. One Vet student said *"more group-work to share the load"*. Our students expected less formal teaching (i.e. classroom) work and more independent study, using the library. One undergraduate Vet student mentioned *"more freedom"*, which was a common response in the larger university-wide survey. The expectation of more independent learning than at school was reflected in responses such as *"more self direction"*, *"more self-management"* and *"more personal responsibility"*.

Students also described what they thought would be the features of the university, saying that it would be less structured, would have a greater variety of students than at school, and that they would go to *"lectures not classes"*. Other responses described their anticipation of studying as having *"greater depth and detail"*, *"fewer but larger assignments"*, and *"more practicals and hands-on"*. One Vet student thought teaching would be more interactive. Concerning studying online, some thought there

would be more and others thought less, but in general there was a view of expecting substantial use of technology in their university education.

Using computers and the internet

Students were also asked how they thought their use of computers and the internet in their academic studies at the University of Edinburgh would differ compared to their use at school. All who replied believed there would be more use, or availability, of IT (apart from a single Physics student who thought it would be the same). More *"use of discussion boards"*, *"notes online"* and the anticipation that the *"University of Edinburgh sites would be useful"*, were mentioned. Everybody thought that they would use different software. All expected that there would be more collaborative groupwork. Students anticipated that there would be more information sources and more, or a wider range of, support and help. One person thought there would be less formal training and the rest were expecting more formal training.

Being at university would create *"more opportunities to proactively use technology"* and one Physics student thought that although there would be *"good help, being more independent they would need to seek help"*. One Vet student was looking forward to having her *"own computer to work on with more time to use the internet"*.

The great majority of new undergraduate students are very confident and positive about the role of technology in their education. Males tended to express somewhat more confidence than females about using technology at university, in agreement with previous studies [Macleod et al, 2002], and very few students expressed significant apprehension.

	Very confident	Quite looking forward to the challenge	A little apprehensive	Very apprehensive
All	43%	38%	17%	2%
Male	54%	33%	11%	1%
Female	38%	41%	20%	2%

Table 3 "How confident are you about using technology in your University studies?"

> *"I was taught IT up to GCSE, and although the teaching wasn't particularly good I did at least have some support. When I had access to a computer at home I started using it for homework, which wasn't discouraged. That meant I'd had the chance to get to grips with Word and Excel (and get the frustrating experiences out of the way) before I got to Uni. I think I'd begun to feel 'self-reliant' with basic computing by the beginning of GCSE, so I've been confident in using the Uni machines."*

They are very positive about the usefulness of technology for education, females tending (not significantly) to be a little more positive than males.

	Very helpful	Helpful	Not helpful	A hindrance
All	59%	37%	3%	<1%
Male	55%	42%	3%	<1%
Female	62%	35%	3%	<1%

Table 4 "How useful have you found computers & the internet to be for your studies?"

For those who come to Edinburgh **from a UK school**, ICT in education is commonplace (although not consistently used):

> *"We had extensive computer training at my school from when we were eleven, and we had our own school intranet which was very similar to WebCT, we had our own school one. And we were taught how to use all the different things from quite a young age. We were taught touch typing. We had touch typing lessons. I could make my own cv without using a template".*

> *"I just used the template my Mum had used to create a cv from when she was younger and I just kept the template. We didn't get the use of computers that much at our school."*

> *"The internet was not really introduced into our school until I was in 5th year."*

> *"We didn't get a use of it and never really got taught it. We just kind of went on and got slapped if you went on chat rooms. "How did you break down the fire wall ?!!!" "I don't know, I really don't know !!" You know that sort of thing."*

> *"But I mean in second year we had to take a picture of ourselves and put it on the computer but that's all I remember, we didn't get an awful lot."*

An Education student commented:

> *"At school you used computers to type up essays or find information occasionally, whereas at university your whole study depends on computers, so it's quite hard if you can't really use a computer."*

A student in History of Art and Music, who rated herself as a confident computer user, said:

> *"I never used computers much at school but I think computers will be used more at university as more resources are available online and it's how we keep in contact with lecturers/tutors."*

One student even reported that: *"We never had computers at school".*

These last two comments indicate that there may still be pockets of low use of ICT even in UK schools.

Those from **schools in other countries** will probably have a wider range of experience, varying from very low to substantial:

> *"I rarely used the internet for studying during high school. My schoolwork didn't really involve much extra reading outside of the textbooks that the school distributed. The only reason I really used computers in schoolwork was to type essays for English classes."*

> *"We had WebCT, which is similar to what Edinburgh has. I had to use it sometimes for notes when I missed days."*

Those **from work**, may well have experience of more, and more intensive use of technology, often quite sophisticated, but not always:

"Regarding the use of technology, most of my knowledge was gained as a computer enthusiast, and thus I did not have much to learn from work. The only program that I learnt how to use in Microsoft Office, which comes in useful now, is Outlook"

Expectations about support for use of technology

Most incoming students will have been using some sorts of supported services, and will have expectations about what "support" means.

"We could send the papers to our teachers with our network so then they could put them into the proper format for however they would like to read it."

This may also apply to those who have been in a technology-rich **home** environment, where someone looked after the hardware and software, possibly invisibly. Having a networkable computer of their own, out of that supported environment, is a novel challenge for some:

"I am learning a lot about using computers and keeping them updated as this is the first time I have had my own computer and usually I left all of the technical stuff to my Dad, but I now know how to, for example, alter the configuration in my Anti-Virus software which I find particularly reassuring since I wouldn't have had a clue about anti-virus software before having to play around with it. The same applies to updates on certain software packages."

Using IT has resulted in a shuffling of family roles, perhaps especially for mature students, to draw on local expertise, something identified in other studies [Keisler et al, 2000]. One mature student commented on the merits of studying at home:

"I have instant computer technical help from my programmer son, (grumpy but effective)".

But for others, there is no local support:

"Beyond my Dad helping me buy the kit I've had no support at home in learning from computers."

"...I am quite an independent learner and did not receive any help from my family."

Ownership of technology

Most new undergraduates report that they own a PC (94%), with the great majority now owning laptops (90%). The proportion of new Edinburgh students arriving with a computer has been rising steadily since 1990, but essentially reached a plateau at ~50% ownership around the year 2000. About one-third of these student PCs were laptops. Since then, student PC ownership has increased rapidly to close to 100%, with laptops increasing rapidly as a proportion of the total (from 35% to 90%), and laptops now comprise almost all computers owned by new students. It appears that the barrier to acquisition of a PC around the turn of the century (size, lack of portability, techie image for example) was suddenly overcome by falling laptop prices.

Eighty percent of the laptops are reported as having wifi capability, although only 43% of students say they have experience of using this facility. Despite this, 93% of students with a computer say it is or will be connected to the internet. As very many of these students are living away from home, their ability to support their use of their computers is important to them. Backup, operating system updates, anti-virus software updates etc are standard technical tasks for the independent computer owner. An individual's skill with use of applications and information (IT/information literacy) may not be the same as their "technical literacy". Several students mentioned in diaries and comments through the year that they made use of the University online and staffed support for these tasks, rating them both highly.

	Do this alone	Need some help	Never done before	Don't know/unsure
Backup	65%	20%	11%	5%
OS updates	62%	26%	8%	4%

Table 5 Self-rated ability of students to perform simple PC maintenance

At the end of his first year, one of our cohort of students offered this advice to incoming students:

"I would also suggest that it is not a newly bought laptop: meaning that you are familiar with how to use it, how to protect against viruses and internet attacks, and how to fix any minor problems that occur. This is very important since you are on your own and need to be able to fix most problems yourself. There are a few laptop check-up sessions run by the university, but it is easier if you can sort things yourself."

Almost all new students have mobile phones, of increasing sophistication with respect to internet capabilities (94%); they have digital cameras (70%); they use flash-memory portable storage ("USB sticks") (78%). From previous surveys we know that personal printer ownership is widespread but not as complete as PC ownership.

Use of technology

Incoming students report high usage of some popular online activities.

	Daily / weekly	Regularly but less than weekly	Never done	Never heard of
Downloading music	30%	39%	30%	<1%
Downloading spoken word	6%	15%	73%	6%
Internet messaging (IM)	58%	22%	19%	1%
Internet telephony (VoIP)	14%	16%	60%	10%
Purchase over web	21%	57%	21%	1%
Social networking	70%	16%	13%	2%
Social recommendation	5%	16%	45%	35%
Social sharing	12%	20%	50%	18%
Webcam	12%	19%	64%	5%
Blog (personal)	6%	14%	72%	8%
e-diary	5%	11%	74%	11%

**Table 6 Reported frequency of use of online services and applications
by new students**

Common activities are music download (69% regular or more), IM (80%), web purchasing (78%) and social networking (86%), which is comfortably the most frequent regular activity. Less common activities include blogging (20%) and listening to spoken podcasts (21%).

It is therefore not surprising to see uptake of some of these activities in early university life:

> *"I find using Facebook very useful for keeping in touch with friends both at Uni and at home. I find it really useful in that you don't have to know people's email addresses - you can just search for them using their name. On Facebook you can keep threads, email more than one person at once and upload photos which is good from a social point of view and also to ask people about work queries."*

The usage of online services showed interesting age profiles, with some being very much the domain of younger students (instant messaging, online music and social networking) whilst others were more age independent, with online purchasing being frequent in all age groups (Graph X below). (*No meaningful conclusions can be drawn about peaks and troughs of use in the age bands above 35 as the numbers of respondents were small.*)
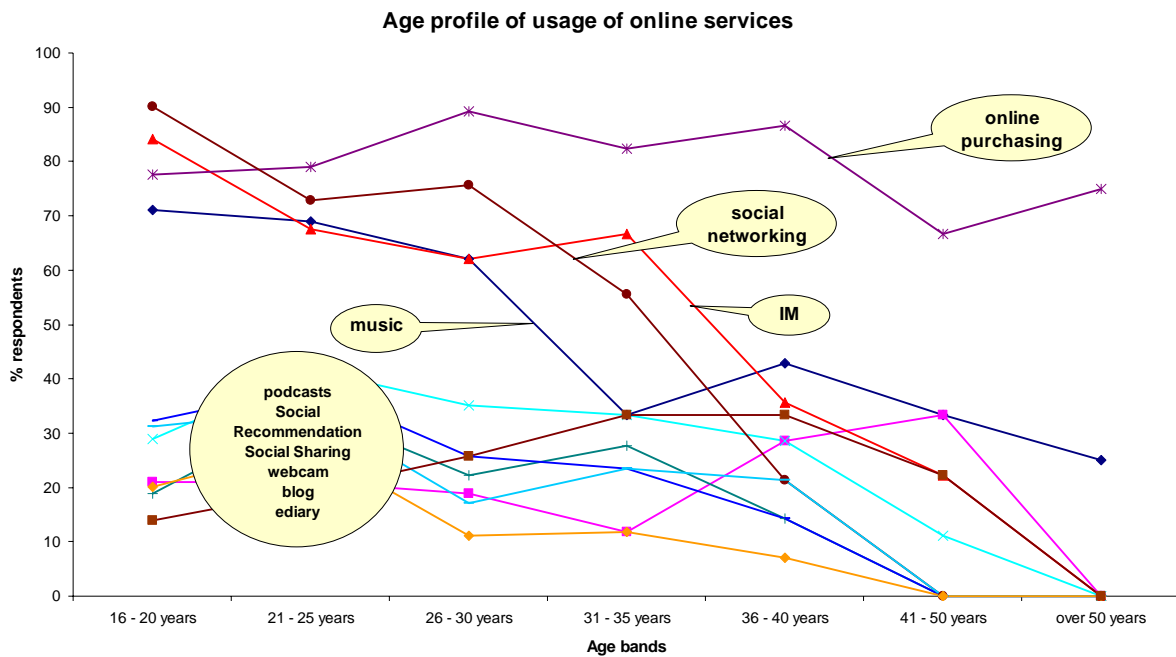
Figure 4 Age profile of use of online services

The reported skills of new students on specific, objective tasks (LEaD Report "Techniques for Gathering Student Views of their Experiences at University") is generally high, and has risen steadily since we started recording these data in the early 1990s. As expected, word-processor, email and web browser skills are reported as highest, but skills that a few years ago were little in evidence (presentation managers, bibliographic databases) are now catching up.

	Do this alone	Need some help	Never done before	Don't know/unsure
Wordprocessor	93%	6%	<1%	<1%
Email	96%	3%	<1%	<1%
Presentation manager	71%	23%	6%	1%
Web browser	94%	5%	<1%	<1%
Bibliographic database	55%	34%	9%	2%
Specific internet search	83%	15%	2%	<1%

Table 7 Reported skills with common IT applications & tasks

The widespread use of, and confidence with, technology is not uniform however, and there are important variations.

Older students may be bringing experiences of use of technology for study, or perhaps even in their social lives, that are quite distinct from those of younger students. This doesn't necessarily mean that they are negative about technology, but that their personal experiences of it are different:

> *"I have done a degree at the University of Edinburgh before and my children have been through university so what I felt about the technology was excitement."*

> *" There were only a handful of computers in the school library so I haven't used the internet pretty much <u>ever</u>."*

Some students, regardless of age, may not recognise a value or use for the internet for studying their particular subject:

> *"I've been to university before … and the internet wasn't very helpful for the course so again I didn't need it. [Now I am returning] they also have the internet system but I haven't signed up for it because it wasn't going to be useful for me and my laptop isn't used for going on the internet as I've had it for six years which is … useless. All I can do is word processing."*

There are also risks with regard to assuming too much about even the technology-immersed young adults, who may in fact use very limited features of their devices and software. For example, many of our younger student recruits to the Project had never captured digital video via webcams, or transferred it to portable media or uploaded it to a remote site. The range of abilities on this task in our cohort was from skilled to novice, as demonstrated when we asked them to make video diaries.

Early semester 1 - Diary 1

We gathered the experiences and expectations of our cohort of students from Divinity, Physics and Veterinary Medicine through their first diary (Diary 1), completed a few weeks into the academic year (October 2007). We asked them to reflect and comment on: *"Your expectations about starting at university, your thoughts around this key point in the semester, including the part played by technology."* This was an interesting point in time for the students in two respects. Firstly, they were now just coming to grips with life in the University of Edinburgh, and secondly, they were being asked to create reflective diaries, with strong encouragement to do so in video format. (For the proportions who submitted diaries in different formats, see Appendix 6 of the LEaD Report

"Techniques for Gathering Student Views of their Experiences at University".) As expected, some things in university life came easily, others were more of a challenge, and some aspects provided surprises.

Settling in to university life

For many students, settling in to university life does not prove especially problematic. The "flow" from their previous study or work settings is fairly straightforward, and they find the use of ICT in their courses is mostly free of challenges. They may be able to establish study-life balances that suit them:

> *"It's been very easy in that I am told what to do and I go and do it, and that's it sorted."*

> *"I feel I'm becoming better at balancing my habits, such as coming home from school, exercising, relaxing or doing something other than academic work for a few hours, and then returning to light study."*

> *"My last physics teacher (at high school) was like our university lecturer in their way of teaching and used a lot the internet with us, sending us past exams, exercises, etc."*

> *"It's been a big change, the most in the way of teaching and the worst the language, but it's really good."*

> *"You can visualise things a lot better if you can see animations on the web, you can visualise a concept better if you can see things moving rather than just static pictures in a textbook."*

> *"In physics we have clickers which are genius, very good. It means you can interact with a lecture and see as a class the mistakes people are making and how your idea fits into what other people are thinking …. it makes you pay attention to the whole lecture if its interspersed with clicker questions."*

> *"They use power point and the projector screen all the time which is really good I think and does help."*

Surprises

Universities are very different organisations from the school and work settings that new undergraduates come from, and can offer **pleasant** surprises:

> *"One thing that was I was not expecting was the large range of foreign students, it's great to have loads of people from diverse cultures and to learn about where they're from."*

> *"I knew the University have a lot of resources (I don't know if that's the right word) which were going to give me a lot of facilities. But I couldn't believe when I saw how much computers and internet are used in each course."*

Challenges – technological

Even for students with their own computer and good ICT skills, the intensity of use of technology from the outset in University courses and admin processes can be seen as a challenge.

> *"There was an over-reliance on computers in the first two weeks!"*

This was commented by a student with his own laptop and generally high comfort with IT. This was a common view, suggesting that the recent movement in all universities to high reliance on ICT has not

yet been perceived and internalised by intending students. The non-optional nature of use of technology may be part of the challenge, for most personal and social use is self-regulated to a large extent. The expectations of most new students may be set particularly by use of ICT in schools, which is still generally much less pervasive than use of ICT in universities.

Four of our twenty four students arrived with no computer, but all had acquired one after a few weeks.

> *"I did not come with a laptop computer."*

> *"My computer did not arrive on time, for the first two weeks I was without one."*

> *"I had no computer but am a confident user."*

> *"I had no computer at home."*

> *"I came with a desktop computer but then also bought a laptop some months later, as I realised it would give me more flexibility."*

Clearly, owning a laptop gave students easier access to the internet and university services.

Several students mentioned difficulties with technology, in particular connecting to the internet during the early weeks of semester. The majority of the difficulties centred around the outsourced internet service in student accommodation (ResNet). Some of the comments about this problem of getting quickly online demonstrated resourceful use of peer support:

> *"Not got connected to ResNet for 2 weeks – I used friends' [computers] to check emails."*

> *"Connecting with my Director of Studies (DOS) was hard in the first week as I could not get connected with ResNet and had to use the microlabs."*

> *"ResNet and MyEd were difficult, there was one person in my block who managed and helped others to set up."*

> *"ResNet was really easy to register and plug in if you followed the instructions correctly although I know some students left it too late and took ages before getting ResNet in their room."*

However, even for those students for whom connectivity was not a problem, finding their way around complex e-learning systems was not always easy. The variety of online sources, some not integrated into single systems with consistent access were a point of frustration:

> *"I am disappointed that [specific vet e-learning material] is only available in the university computers, it would be better to be available on EEVEC as I do not like to study in the computer labs."*

> *"I feel that a lot of time is wasted when searching in online resources for studying and the content is not really worth the time spent searching. I can't wait to receive my textbooks which should provide better reference material."*

Challenges - educational

Over this period students adjusted to new routines, not always with ease:

> *"Being that we have lecture nearly all of the day, I find my mind quite exhausted by the evenings and unable to do much more than an hour or so of studying."*

> *"I feel that I'm always lagging behind in lectures whenever we move on to a new topic. I guess I'll just have to study on my own to keep up with the pace of teaching. Drats."*

> *"The resources I have used so far to do my studying are what the lecturers have recommended us to buy and the WebCT on MyEd. It's a bit different to what we did at school as we never got recommended books. We just used to Google everything and use*

search engines to find out as much information as we could. Its good to be recommended books because you actually know you are on the right lines, and although it's expensive, at least we know we are working from the same resources."

"I was surprised to find there was no "vetstudentrevision.net" or any other similar sites that were readily accessible. From this I came to the conclusion that my style of learning would have to adapt at university to one which was more centred around the library and books! I accessed EEVeC for the first time yesterday and was delighted to realise I couldn't have been more wrong. Immediately I had a whole world of veterinary technology at my finger tips."

"Physics stuff is covered in 6th or 5th year so there has not been a lot of self study put into that – it will all change next week."

"So far I have found that the teaching within the vet school is more like school than university – in terms of some of the lecturers' styles of teaching i.e. lots of copying word for word from a blackboard ..... the main type of activity I have undertaken has been to write up my notes from the day's lectures."

"Even in the first two weeks we were asked to keep a blog for the "History of Christianity as a World Religion" course. I was aware of blogging as I look at online newspapers, but I had not done blogging in a work context or personally previously and I quite enjoyed it, it was good fun."

Mid to end semester 1 - Diaries 2 & 3

Around the middle of the first semester we asked our students about their views of assessment and feedback, how it could be used to aid learning, and whether, or in what way, technology has a role to play (Diary 2, November 2007). At the end of the semester as exams approached (scheduled just before or just after the Christmas/New Year vacation), we asked about exam revision and whether/how IT helps. How do they revise? Do they favour paper, electronic or both? What is the role of online discussions for supporting their revision, and study in general? We also wanted to understand their views of the relative costs of paper versus digital study materials (Diary 3, December 2007).

General views of assessment and feedback

It was clear from the answers to these questions that, for most students, there was a sharp break between the assessments of the past and those of university, and that this greatly suited some students:

"Assessment and feedback once the bane of my school life, assessment now appears to have been given a purpose - to provide feedback in an environment where it is rather more tricky to judge just how well one is learning."

"Perhaps one of the most useful pieces of feedback has been in Physics, where for the first two weeks of assessments I had neglected to check just what was being asked for. Instead of the minimal exam-oriented answers requested at sixth form, the markers were looking for fully explained methods. This of course meant that I lost marks, but at the same time taught me where I needed to focus in my answers."

Revision and study generally

The majority of comments in the diaries were about the general sorts of study and revision problems facing our students, with some specific issues for students from particular backgrounds. Making time for study was a recurring theme:

> *"I think I am not spending as much time as I should be studying currently as I am working a part time job in order to pay for my fees. So, I would say I am spending less time than usual considering I am pretty close to my January exam"*

> *"Just when everything seem to be going nice and slow at the start of the semester, I just found out that I've got another class test in week 7. This just means more study, study and study the next few weeks."*

Some reported managing to find a good balance between study and other activities, showing signs of getting into a university-based rhythm, whilst others demonstrated increasing awareness of the necessity for good study methods:

> *"I have taken more hours per week to self study then the last 2 weeks as I am getting more familiar with the lifestyle of studying and doing all the house work now."*

> *"I actually spent almost 4 hours this week reading through lecture notes. I think I should make it a point to read through all notes taken during lectures before filing them, or face the possibility of not understanding what I actually wrote many months back when revising for my exams."*

Study location can be problematic for some students, perhaps for many, either due to crowded or noisy surroundings in halls or flats, limitations on facilities or distractions of other activities. The learning spaces the University provides, particularly libraries, are heavily used.

> *"...have tried to start revising during my placement, but I found it difficult to concentrate at unfamiliar places."*

International students often find limitations in their language skills, and find listening to one-off presentation more difficult than reading. They value text-based notes and podcasts (provided by the course or homemade with digital recorders):

> *"...sometimes is easier for me to read rather than to listen because English is not my tongue, so I can read it twice, or even look for it in my own language."*

Revision & study using technology

In general, technology was seen as providing a valuable contribution to effective study. One advantage was through making university materials easier to access:

> *"I am able to use EEVEC more efficiently to help my study."*

> **"***Lecturers did eventually put everything on WebCT following encouragement (by the students) One was very good and put a good selection of different things – podcasts, connections to internet sources, further reading, as well as her own power points and lecture notes. But it was very lecturer dependent."*

Another advantage was fast access through the internet to general information sources that aid study and revision:

> *"IT supports me my many other ways, I use online dictionary to look up words meanings and their pronunciation. If I found any thing I don't understand, I will try to look in to more details in Wikipedia, or other resources online."*

"One of the most notable sites I have used is Wikipedia, as often lengthy explanations are given with long and numerous examples. Coupled with the aforementioned university courseware, this has been my preferred method of study."

"I can't revise if I'm not in front of my computer. I use WebCT a lot, or msn for asking someone who knows about what I need to know (if there's someone). Also, there are many blogs where you can find many interesting things that you can't find in course books most of the times I use to Google the thing I'm looking for, like "logarithms properties" or something like that."

Some students had preferences for software that assisted them in studying:

"For myself, I found in my own revision, that the use of my own personal computer and 'Inspiration', the Mind Mapping software, was helpful. I did a lot of mind mapping and also going over podcasts, audio files, MP3 files as a revision aid and also for constructing my revision."

Technology also made other students easier to access for group work, both formal and informal. It is difficult to be certain to what extent this is common practice across all students, or whether we are observing particularly committed, studious or tech-savvy groups. The students with most apparent use of online group activity were the Vets, perhaps because the opportunity had been established for them before they arrived (Facebook community set up by the preceding class), or the evident encouragement and support of staff, or simply that these students **regard** themselves as a budding professional cohort (Medicine is similar in this respect). However, although these professional education classes may be the more active, they are not the only subject areas with use of online groups, and we can expect these tools to rise in popularity with time:

"I am supposed to be using FaceBook to get together with some other people from our Religion class to revise for our exam. But we are all going to get together in person and email our notes to each other. So that is one way of using technology to share information."

"I will sometimes also check to see if there is anyone online on the social network 'FaceBook' that I could send a quick question to – so in this respect I would use IT to help me problem solve."

"This weekend has been a blitz on studying in groups!"

"I find it really helpful to go over material with other students, whether I'm organising that through IT discussion boards or just emailing a person I know on the course and asking their opinion on something."

"I use a lot of MSN and forums to communicate with fellow students and teacher, where I can ask questions and discuss with my colleague."

"The vet school has an electronic system called EEVEC that has an 'academic discussion' board, on here students can reply to this which creates a thread. I have found this has been very useful when doing practical reports if I've struggled to answer the questions alone – sometimes you only need the 'nudge' in the right direction or it simply helps to build your confidence by confirming what you had already suspected."

But alongside the advantages of technology in studying were some important disadvantages, often due to limitations on the way they were used by teachers, inability of students to navigate to important information (either due to poor guidance or failure to take note of it when offered) or access restrictions:

"Up until last week I was not aware that the answers for the maths tutorial questions were on the maths website and after looking for them last night I have still not found them."

"Spent 6 hours over the weekend getting the online self-teaching assignment done. It was horrible. Bad layout, poor interface, lousy programming. The program (Authorware) used to run the self-teaching modules was so badly compatible with Microsoft internet explorer. I had to turn off internet protection before it could get running. Well at least I could still run it from home. Pity those Mac fans who cannot even install this program. I have no idea why the university wants to use such a poorly supported program for learning. This substantiates my point that online learning just isn't right."

"I'm just starting to doubt the efficacy of MyED, EEVeC or any online university portal. They are just a maze to navigate through and I am not always able to find what I should. For example, we were promised of lecture material being easily accessible from our timetable page. However, till now, I still haven't seen a single link on the timetable page to any lecture resources."

"The flashcard programme which is only available at the school computer have given me an headache. I can only use it while the school opens and I tend to start studying after 9.00pm, so it is very hard to use the flashcard programme to revise on histology."

"..and I had to go to a pig farm for my placement straight after, where there was no internet."

"Lecturers did not have a way to email everyone on a course altogether. If there was anything new or important that had been put up on WebCT, they didn't know of any way to let us know. So it was up to the students to check back, week after week or day after day to see if something was there or not."

Advantages of technology for assessment & feedback

We had expected that asking our students about the actual and potential advantages of technology in assessment might elicit a range of suggestions for innovative uses. In fact, this question was rather sparsely addressed, and the few students who did respond did so only in terms of the sorts of technology-based assessments they had experienced or had recognised as assessment. Quizzes in VLEs or standalone software were most commonly mentioned. This tends to suggest that their limited experience of online assessment by this point in the year was restricting their view of what was possible. Having said that, their view of these e-assessments was generally positive and they would welcome more:

"I would benefit more if every topic has at least 1 quiz each term"

"I like the online quizzes, it is not long and I can access it all the time at home, so that I can do it when I am ready and gave the best result, well, there is nothing to blame if I get a bad result."

Paper & electronic revision & study balance

We asked our students about the proportions of their study and revision activities that were based around paper and around technology. The Divinity students mainly responded using words such as "a mix", "a combination", "both", etc, whereas the Physics and Vet students mostly gave a numerical, usually percentage, response. Overall paper was the preferred medium of most students across all three disciplines:

Strong preference for paper	Medium preference for paper	Equal paper & electronic	Medium preference for electronic	Strong preference for electronic
5	7	6	1	4

Table 8 Preference for paper or electronic media for revision

There were students who clearly favoured electronic:

"Although I feel equally reliant on both, if it came to a definitive choice, I just could not cope without electronic sources and materials!"

And others for whom paper was the "real" place to be revising:

"With the paper side of revising, that's where I do more active revision where I am actually working through problems myself – I would always do that with paper. Online revision is easier for online notes and WebCT.'"

Many felt this was about balance, where both media played an equal part:

"Electronic resources should aid and not replace paper but all the time the two should work in harmony and it's brilliant that the WebCT service has been very useful."

"I use the forums more as exams become closer to develop an understanding by talking to other people, work with friends which is great if either of you is stuck. To teach someone else is just as good as working through papers."

Not surprisingly, many activities are still reported to be much easier on paper:

"Overuse of computers during revision will shut down creativity – I prefer to scribble down things, even if you are going to type them up neatly later, take notes quickly while you think about them and compare to other sections rather than searching through and copy pasting, combine bits and pieces, write bullet points by hand."

"Its essential to have paper notes. I need to be able to make mind maps, look at my strengths and weaknesses and use different colours, different things that come to mind, arrows in a diagram are fiddly to do. On a computer by the time you have done it, you have forgotten why you are doing it."

"When I am doing revision I much prefer to have paper in front of me as opposed to using the computer as I find following writing on a screen more tiring and I tend to lose concentration faster."

Some have location-specific constraints that make one method or another more attractive:

"…was staying at the farm while I was doing the placement. I found that the lecture notes I have downloaded from eevec in to my computer are very useful. I have to carry a lot of stuff to the farm including wellies, boiler suits and other clothes? It is too much to carry another set of notes and travel on the train. Therefore, I downloaded all the lecture notes that is available from eevec and bring my laptop instead."

Some subjects lend themselves more to paper than technology:

"I guess it depends on the class. In Greek, I'm about 82% paper and 20% 'e' and the electronic is used for translations of texts. The rest (of the classes) was all paper using my books, notes, handouts, everything. The other courses are 90-95% 'e' mainly because I took notes online and the readings were online and because of that, that's how I do my revision."

There is an instrumental component in their choice because some current academic activities **preclude** the use of technology, and so working (and practising) in the traditional medium of paper and pens may be most pragmatic:

> *"If you are going to be asked to write a response using a pen and a piece of paper then that colours how you will be using the online resources on the lead up (to the assessment) and you are more likely to 'have a go' at what you would be doing in the exam. If the nature of the exam was different and there was an online aspect to the exam or you could use a laptop, then all of the dynamic might be entirely different. I am aware that I am using paper as the system I am operating within encourages me to use paper but it's not natural or the best way of doing it."*

Relative costs of different media & environmental impact

We wished to explore a topic that for some students we know is challenging, namely the cost of printing that many feel they cannot avoid if they are to study effectively. Interestingly this topic was not really contentious for our volunteers, but they did express a widely-held view amongst Edinburgh students about the environmental impact of substantial printing:

> *"I am very happy about the costs of these different methods of revision as none of them cost me any money at the moment! I am a little concerned about the cost to the environment my note taking is responsible for though as I d go through a lot of paper. Possibly enough to redecorate my flat with next year..."*

> *"As far as the materials online, I usually would not print them out just because I feel it is very wasteful. Often I would just hand copy it onto scratch paper, which again I thought was helpful in making me retain the info."*

> *"With regards to the costs, for me personally, the largest cost is if I need to print anything out such as past papers from the computer. It would be brilliant if the vet school could print them out for you, but I can understand why they do not offer that service. Other than that I mainly use pen and paper which is relatively cheap."*

> *"The costs of different methods... paper is cheap and plentiful (sorry about the trees!). The expense of a tape player is worth every penny."*

Other universities appear to have other practices:

> *"At our home university in [USA] you get 400 free prints each semester and you never use them all but you can use them for any review materials, lecture notes, short readings that you can do online. Here I only print out the bare essentials."*

Start of semester 2 - Diary 4

This diary was timed to cover the period just after our students returned from the winter vacation, and took up their classes again in the second semester. (Although we had non-UK students in our group, all of them returned home, which is not universal amongst international students.) Being aware that this is a significant transition period for first year undergraduates, we asked them to reflect on the first semester, look forward to the second, and tell us what they intend to do differently and what they will keep the same (lectures, tutorials, exams, assignments etc, social & personal). We also asked them about changes internal to themselves, their development into "fully-fledged" students.

These diaries were rich with reflective material, with reports of the changes they were making to their lives and study patterns. Only a minority of items referred to technology, but some interesting comments on this did emerge.

Our students were starting to get to grips with university life, becoming more confident, and more aware. This includes their use of technology; they have found what works for them and what doesn't, some of this being dependent upon the type of subject being studied, especially arts vs. sciences.

Although almost all of our students had made this transition successfully, some students had faced particular challenges and potentially stressful situations. Two students, in particular, demonstrated that university life can be affected by difficulties internal to the student or externally by life events and uncertainties, or a combination of both. It was interesting to see how technology influenced these two students.

One of our students who had arrived at university with particular health problems, left the university at this stage. During Semester 1 this student had moved house three times, starting out in university halls, moving to a private flat, then back to different university accommodation. We noted that the private flat had no internet connection and the student was taking a course that relied heavily on learning with web-based materials.

The University of Edinburgh has a 3% drop out rate during first year maintained by close academic advice. If a student is thought to be finding a particular course difficult, their academic advisor may suggest switching to a more suitable course.

The other student was dyslexic and had been made aware of the support that technology could provide by the Disability Office at the start of the academic year. Well into Semester 1, he was faced with a particular personal issue that required him to travel by car to visit and stay with his family who lived some distance away. This forced him to be away from the university for a portion of the first semester. His fellow classmates decided to support him throughout this time by recording all of the lectures that he would otherwise have missed. This was independent of adjustments made by the teaching staff. He used the travelling time to listen to these recordings, and so in this way no significant work was missed and he was able to complete the year successfully. A combination of technology and the good relationship that he had built up with his peers, enabled him to cope with a difficult situation.

Another mature student also used this strategy of recording lectures, so as to be able to listen to the recordings on her iPod during the long journey between home and university.

Awareness and personal growth

These diaries showed that our students had made the transition from Freshers (i.e. recently-arrived students) to confident and full members of the undergraduate population. They expressed the anxieties they had felt in the first semester, the "unknown", and that being at university had been somehow "unreal":

> *"Before the examinations I was terrified, because I didn't know how were they going to be. They might be completely different from what I thought"*

> *"I was a little apprehensive of things but I feel that I'm settling in better now and hopefully things get better. I've also learnt to be more independent."*

> *"I think before it had kind of felt like a sort of holiday and going home for Christmas was the end of it. This was kind of frightening to begin with but now I have come to the conclusion that 4 years might not be enough as I am enjoying myself so much."*

They also showed that they had gained confidence, and perhaps an appreciation of the challenges to come:

> *"Being a 'fully fledged' university student, I came to realise it's not a bed of roses with university life."*

"If I am honest I think I have changed in the sense that I have become more serious this semester as I have realised just how much work will be required in order to pass the summer exams! I am now more focused than perhaps before."

"Things that I intended to do differently this semester are to spend less time in my part time job (I have reduced my hours per week to a maximum of two shifts) as this should provide me with more free time to study."

"Academic wise, I'm now more comfortable with approaching lecturers to clear any doubts and I find all my lecturers really friendly and helpful."

Changes in study habits and styles

New study patterns and habits featured strongly in our students' diaries. For example, our international students adjusted to studying in the English language:

"I'm doing things much more in a day-by-day fashion, as I need more time than many people because of the language."

There was a theme of study moving from a solo activity to a more collaborative form, reflecting their need to draw on the skills and knowledge of others to lighten the load and gain maximum efficiency for everyone:

"I usually like doing things myself to minimize any possibility of error, but I've started to get help from friends and offering to help them as well in various instances"

"Work-wise I feel that this semester our lecturers have kind of thrown us in at the deep end. I am now beginning to see that I should make the most of having people around me"

Learning how much study is needed for success at university is a vital skill for new students, and the outcomes of this learning process could be clearly seen in this diary. Recognition of the amount of time needed for study, better organisation of that time, and achieving a balance between study and social activities were recurrent themes:

"In order to cope with the progressively increasing work, I have deliberately tried to break the bad habits formed in the first semester. As such I have tried to change where I study and when I complete assessed work. I am finding myself studying more in the library during this semester, using gaps between lectures to complete example problems - regardless of whether they are used as assessments."

"I will not waste any time in between lectures and practical to surf the internet, I will revise the lectures."

"I am also planning set times to study at weekends instead of doing it when I felt like it, as I feel this may mean I actually spend longer on set areas that I have planned to look at, or find particularly difficult."

"Thinking back to the first semester, I have not been able to balance my time between studying and playing. I have spent too many hours playing and putting a lot of work and reading behind. After the experience of my first class exam and another one coming up in mid February, I have a new plan to improve my time management."

"Now that I have completed one semester and embarked upon a second, I feel I have changed in a number of ways. I have performed a lot less procrastinating and have tended to get on and do things more pragmatically. I have also begun to keep a diary of all the various tasks which I need to do"

Making more effective use of technology

Although technology was not a major focus of this diary, there were spontaneous comments from some of our students on how they use ICT, and ways they have learned to make it work better for them. There were examples of balancing traditional paper and pencil approaches with computers:

> *"Although I always use my computer as a source of information, I prefer … by pen and paper, maths demonstrations or whatever, …it's easier to discover many key things when you draw or write"*

Valuing having study materials online was a common theme, either for ease of access or to alleviate uncertainty about what was expected, or to see what others were saying:

> *"I prepare for the lectures that day by reading through the lecture notes on the [VLE]. I am going to read though the lecture notes again after the lectures on that day…"*

> *"It was very helpful that previous exams were up on The Internet."*

> *"A very helpful and interesting thing is the Discussion Board in WebCT, in the Physics course. It's a shame that only a few people use it, because is very very useful"*

Mid semester 2 - Diary 5

In this diary we took the opportunity to ask our students to give us their views about assessment and feedback, a subject that is constantly topical within universities for various reasons. We were interested in gaining an insight into their perception of assessment itself (e.g. reliability, validity, equity) and the actual and potential role of technology. The "other side of the coin" is feedback on assessments, and we asked our students for their views of the best sources of feedback (individual tutors, whole class sessions) and again about how technology does, or could, play a part. The diaries were mostly very dense, with clear signs of strong personal feelings about these questions. The cohort was perhaps more polarised about the role of technology in assessment than on any other topic we raised with them, and their strength of feeling was reflected in quite detailed commentaries.

Assessment – exams vs. coursework

The majority of comments on the overall composition of assessment were around the balance (or lack of balance) between what was being learned and the assessment of the skills and knowledge acquired. Written exams were the most common format – some respondents felt this was acceptable, others felt it was too limited or out-moded. However, there was clear evidence that in these courses students acknowledged a variety of assessment formats were in use, although their weighting with respect to final written exams was not satisfactory for some of our students.

> *"I think the best way for staff to test us is with traditional style exams but with much less weighting, due to the fact in the real world when we get a job or go into further study, we will be able to use books, other resources etc. So I think more coursework based assessment is more useful to us, as this will be how we will do work out of university."*

> *"I think that there should be a range of assessments that count towards your final mark and not simply 80% exams – ie ; essays and presentations/ worth more than 2.5%!)"*

> *"Considering we are studying a [..] degree we seem to have mostly 'old fashioned' examinations which is not allowing everybody to shine – ie, some people have different strengths & weaknesses"*

> *"For my last class exam, I had 2 parts that were not the usual written type…one was the …oral exam,… the second one was the 'spot' exam, where I had to label…"*

"In my opinion oral examinations are an efficient way of assessing one's skills. I find that I can describe things clearer when talking rather than in writing. Oral exams are particularly important in the...Degree as communication is a necessary skill for this occupation."

"I think that short answer and essay questions are the best way to demonstrate what I know on tests. Tests here normally consist of a multiple-choice section or a section of vocabulary terms, short answer questions that can be answered in 3-4 sentences, and an essay question or two."

"I don't think single, huge exams will change as a means of assessment in 10 years time…"

International students may not be accustomed to the same assessment formats as are taken for granted in the UK:

"I feel that we are not prepared in how to handle various exam questions here. ... I was baffled by some questions that came out for the exams as the questions was very general and I could possibly write a 4 page answer to what was supposed to be a short-answer question."

Technology & assessment

Quite strong views were expressed by our students about the role that is, or might be, played in assessment by technology, and their views diverged sharply. Most replies focussed on exams due to the form of the diary questions we asked, but some student made reference to coursework, making it clear that in the latter technology is normal (essays etc), whereas in formal exams the situation is very different.

Some suggestions about exams that we thought might emerge spontaneously did not do so. For example, no-one suggested doing exams in other formats than the traditional synchronous timed session, such as on-demand using computers. Despite the fact that almost all students have laptops, which they use for preparing essays and other coursework, no-one suggested a future in which they would take the exams on their own machines. (Some of our student were taking part in a pilot of use of laptops in exams, but did not really extrapolate from this to a wider use in future.) There was almost no prediction of much greater ease of use of ICT applications so that what is not easy now (e.g. drawing, equations) would become so later, or that physical examinations involving objects or evidencing skills might move into virtual spaces. There were hints that some realised that machine marking of text was a reasonable prediction.

For some of our students, "handwriting is still king" and will be around into the indefinite future due to its flexibility, speed, ease of annotation etc. For others it is already a handicap to clarity of expression, and technology helps them to avoid messy handwriting, and aligns with the rest of their study and life. Some can clearly see both sides of the question. Mostly comments revolved around our students' view of "an answer" being "a long essay".

"I think that exams will be mostly on computers in the near future."

"I think handwritten exams are fine and have no major problems with them."

"In handwritten exams I get a very achey hand and find it difficult to write after a certain amount of time, especially with essay questions. My writing gets less and less...However, I find it easier to concentrate on handwriting something than typing something. If I were to type an exam, at least it would be tidier and easier to lay an essay out, particularly if a mistake was made"

"I hate handwritten exams, I write slowly and it is very messy. This cause me to spend time correcting and writing, which means less time to think. I will definitely do faster and better at electronic exams either by MCQ or by typing."

"Obviously, certain subjects, such as Informatics, are examined via computers by definition, but enforcing ICT on all subjects is progress for progress's sake and will surely have the opposite of the intended effect. Handwritten work is far more natural and personal, and does not require any translation from the brain into which keys must be pressed, which often makes the student lose their train of thought."

"I think handwritten exams are a blast from the past. I can hardly believe that this is still how universities conduct final assessment. I think it may change in years to come and hope so. New technologies give opportunities, not just to review how exam answers are recorded, but to review the whole process of end assessment."

"Hopefully ICT can be used in the future to stimulate learning and provide formative feedback to students as well as to provide evidence that can take the place of the current examinations."

Several people commented on their perceptions of a possible lack of equity in typing as opposed to handwriting, and proposed teaching touch-typing as a key life skill in school:

"I don't mind handwriting exams, I think that way it's fair on everyone, whereas if an exam was to be typed it would be unfair on people who couldn't type as fast as others."

"If they are going to bring this in as a permanent move within universities they will have to do more to prepare school children for it. Maybe schools ... will have to teach touch-typing... so that pupils don't have an unfair advantage over each other."

"However, typed timed exams might be difficult for students who don't have proficient typing skills. Personally, I think that every high school student should be required to take a typing class. "

The simpler the types of questions used in exams, the more relevant technology was seen to be, especially for MCQ tests where computer-based testing is now commonplace.

"I think exams on the computer are ok if they are multiple choice,"

"I think for multiple choice tests, computer-based assessment is possibly better than handwritten assessment, and probably easier and safer to mark electronically."

"In ten years time there is the likelihood that many exams will be completed on computer, for instance multiple choice questions, labelling of diagrams etc."

Several students raised concerns over the usability of technology in exams, especially where answers were not purely textual but contained diagrams or equations. Presumably this reflects their personal experiences with trying to create such outputs on a computer. Questions were raised about the usability of online exams in terms of moving to and fro within the exam "paper" and being sure all questions were completed:

"I feel that it will take along time for exams to become ones where you sit in front of a computer and key in your answers. For subjects such as physics where a lot of equations are used, it is very difficult and time consuming to input answers to a computer."

"The advantage to writing exams is that there is space for creating rough drafts and/or outlines or bullet points before beginning the exam."

"The only problem that I had was that the questions were each on a separate page, and although you could go back to questions if you wanted to think about them or to change your answers I was very concerned that I would miss a question or accidentally key in a wrong answer."

"I personally hope ICT does not play a part in exams of the future, because proprietary academic computer systems have a history of being poorly designed and often contain showstopping bugs. It is not that we do not have the technology to implement this; the reality is that we are a long way past the days of this being infeasible. It is merely that in most cases it has not been implemented anywhere near satisfactorily."

Some students were worried about the reliability of machine marking as compared to human marking (this despite the known fallibility of the latter!):

"...particularly if they are marked electronically, because for certain questions, for example if a spelling error was made or something was not quite right but on the right lines, a person marking it could decide whether or not to give credit for the answer, whereas a computer marking it might mark it wrong categorically."

Questions about reliability and security of assessment data were also raised. Interestingly no-one at the same time recognised what they presumably all (unconsciously) know, that assessment data are currently moved into electronic format very soon after hand-marking has taken place:

"I expect that there would also be problems with data security, for example if online exam scripts were lost or the files were damaged. In the future I do see ICT being used in exams when the resources needed and security become available."

One student questioned whether the extent of use of computer-based exams could be expanded in future, due to lack of availability of the necessary hardware:

"In ten years time I think things won't have changed much because I don't think any university will have the resources to implement new technology instead of the traditional hand written exams."

A few students queried the reason for adopting technology, suggesting that it would not necessarily be to produce better exams but cheaper exams:

"However I think there's no pressing reason for moving to computer-based exams beyond saving paper."

"However I feel that technology will take over such things as the marking of exam papers. I think this will lower costs of exams..."

Alongside the speed and convenience of computers in assessment, a few saw a risk that it might encourage use for the "wrong reasons":

"I believe that if exams are computerized, there is a risk of a leniency toward multiple choice or one word answers in order to simplify marking."

Although our students were unsure about using computers for long text-based answers, many felt that ICT has value for short answer and MCQ tests, especially where it could maintain a higher quality test environment:

"I wouldn't be surprised if more and more exams switch to computer-based as time goes on. For spot exams and the like this has the advantage of providing specimens which will have not been disturbed by previous students, with missing labels or pins not being an issue, and also increasing the availability of potentially time-sensitive models which might decompose or be broken."

There were a few comments about the lack of willingness or interest of various academic units to adopt technology in assessment, and examples of where it could have sensibly been used but was not:

"In my opinion, the vet school is quite traditional in its way of teaching and examination and I would expect it to be quite the same even 10 years from now"

"The most high tech part was probably the video recording of a clock counting down and then sounding off every 5 minutes on the LCD displays in the room"

A few students commented on the use of ICT for the administrative aspects of assessment:

> *"We use turnitin.com when turning in papers in addition to handing in a hard copy."*

> *"I still use computers daily to log onto Blackboard...to find out what assignments I need to complete during the week. My [course] professor always posts worksheets online for us to print and complete and bring to class."*

Some of the students in the Divinity class had had experience of trialling the use of laptops in mock exams. It offered some of them the chance to test their assumptions about this form of assessment, although for those who felt technology was not sufficiently used in assessment, the downside was the continuation of the handwritten "real" exam:

> *"I am part of a class that is being used for research into use of computers for exams rather than written. We are sitting a mock exam at the end of the term in which we have the choice of whether to use a computer or do it handwritten. I chose to do it on a computer because I was interested in whether it would suit me or not."*

> *"I am taking part in a pilot of examination using laptops. However, the scope of the pilot seems to be fairly limited and the exam is to be conducted as a 'mock' exam only. The exam proper will be in the old pen and paper style. "*

Feedback – formats & delivery

Our students were quite critical of the feedback they had been given so far in their courses, with their strength of feeling ranging from strong to moderate. They were consistent in their view that feedback was only really valuable if scripts/papers etc were returned to them, including copies of online MCQ tests, and the practice of not returning work, or only returning it for a limited time, was very strongly deprecated:

> *"....however I cannot fully understand why exam papers are not more readily returned"*

> *"As far as I know, so far, we don't get anything back other than an overall course mark, so no way of knowing how we did either in the individual exam questions or in each exam overall. I believe that nothing is written on the exam paper by the marking tutor anyway, so getting them back wouldn't be particularly useful, except for the mark."*

> *"The [course] exam papers are available for viewing but you are not allowed to take them away. Without a worked solution I feel that seeing my exam paper would be of little benefit to me so haven't been to view it."*

Most respondents stated a preference for personalised feedback, on their own work and specific to its strengths and weaknesses. They preferred this to be provided by their tutor or lecturer, although they recognised that this is time consuming, and methods to increase efficiencies were needed.

Many also highly valued whole class feedback, commenting that this covers the questions they had not done as well as those that they had done, enabling the good answers and the errors of others to be seen by them and possibly avoided in future:

> *"The most helpful form of exam feedback would, for me, almost always be that which is individually tailored towards my exam answers I am not personally a fan of group-tailored feedback, and do not see it as a benefit unless individual exam scripts are returned also. I can understand why individual feedback is infeasible to produce for, say, a class of 300..."*

> *"I prefer personal comments that are specific to my exam answers....I liked that they gave comments for the course as a whole, but I wanted individual comments in addition to the overarching ones."*

"I think whole class feedback is a good way of general feedback. Most of what lecturers have to say in response to exams could be said to everyone. However, if someone has done badly (compared to how they should have) or extremely well, or if anyone has concerns over their results then I think they should have personal time with tutors or lecturers to discuss this."

"I feel that having feedback as a class would be more useful than individual feedback. This allows us to learn from mistakes made by others. Just because I didn't make that mistake this time doesn't mean I wouldn't do it in the future."

"I do prefer having the feedback in a written format, this way I can review it as many times as I want, and feel free to do it at the rhythm I want."

"For essays in particular think that the only useful form of feedback is individual notes or an annotation comparing what we have written to what was expected. However, I would not be unhappy with a generic rubric outlining what would have given us top marks and what information the examiner/lecturers think is the most important."

Technology & feedback

There was no consistent view amongst all students on how technology might be used in creating or delivering feedback, personal preferences predominated, and to some degree open-mindedness about the form of the feedback as long as it was available. Durable over ephemeral formats were preferred, and perhaps textual over aural.

"Feedback from an essay etc — written works for me, paper or e-mail."

"The feedback options from my exams have been poor, as you cannot access them easily.... Class feedback is good and this would suit me best if it was sent electronically."

"I cannot see myself using spoken annotations."

"Handwritten comments are nice, because they can write the comment in right next to whatever part of the answer it relates to. Emailed comments would be fine too though."

"The most helpful form of feedback from an exam or other assessment is from a tutorial, in which we can ask questions about the exam and try to improve, it will feel weird to listen it on podcast, and email will make the whole feedback thing not serious."

"I feel that most of our lecturers are happy to help with any individual queries and it is comforting to know that I can always email them to ask a specific question or arrange a meeting to go over a certain topic."

"I think that verbal feedback from a tutor is the most suitable form. It also gives students the chance to ask any questions or address issues regarding the exams that concern them. A recording/ pod cast of this feedback would also be extremely helpful for future reference."

"Our results were posted online, along with an in-depth feedback PDF booklet for the Physics exam explaining how the class did for each question."

"I would rather have text comments than verbally-recorded ones since I'm a more visual person. I don't retain information well if I just listen to it, so I'd probably have to play recorded comments over and over. I wouldn't want verbal comments from a tutor because I have a bad memory and I'd probably forget what the tutor said as soon as I left the room."

"...so for me the most helpful feedback would be to be given my exam paper and for someone to go through the whole paper, showing the working to their answers, this could be done in a classroom environment or recorded and put on WebCt."

> *"Last semester there were some sample essays posted on-line, that had the highest marks, which was useful. Something similar for exam papers would be good"*

Some forms of assessment and feedback, such as self-assessment in lectures through use of personal response systems ("clickers") were not mentioned in response to these questions, suggesting that they are not perceived as being assessment or feedback. This is despite the fact that clickers are generally well-regarded. Perhaps "technology = computers and internet" and isn't generalised to other forms of technology. There was also no mention of handheld devices, other than iPods, being used in study activities, beyond the occasional mention of use of sms to arrange meetings.

Late semester 2 - second survey (online)

Two important transitions for our students focused around their changing IT skills and competences – the new skills that they had acquired through their studies and their pre-existing skills that had not been used and hence that may have degraded through lack of practice. Two-thirds of our students reported some new skills development (ranging between a few skills and many). The Divinity and Vet Medicine students had most new skill acquisition, for the former it was particularly associated with their academic use of blogs, and for the latter it concentrated on discussion forums and wikis, again because these are used formally in their courses. The Physics students did not offer much evidence of skill extension, except those involved in their use of personal response systems ("clickers"), of which their first year courses make substantial use.

A common IT tool used by all our students was the VLE, which forms the core of the e-learning in all their courses. The ubiquity of the VLE in their studies may have led them to underestimate their rising proficiency with it as a newly-acquired IT skill.

Our students also used the internet daily, especially Google (and Google Scholar), to gather information for their studies. This was true for students in all three subjects, and, of course, some of this would also be related to their general use of Google for personal reasons. Beyond this common activity, students in the three subjects differed in their main information sources, as shown in Table 9.

	Level of use		
Activity	Divinity	Physics	Vet Medicine
Google	F	F	F
Other search engines	N	N	N
Library catalogue	F + R	R	R
Online bibliographic db's	R + N	N	R
E-journals	R	N	R
Wikipedia	R + N	F + R	F + R
JSTOR	F + R	Nh	N + Nh
e-books	R + N	R + N	R + N
Textbooks	F	F + R	F + R

Legend: Majority of student responses are indicated by letter codes.
F = use frequently; R = use regularly; N = use rarely or never; Nh = never heard of this; + indicates approximately equal numbers of responses.

Table 9 Student reported use of information sources

An important skill for all students is assessing the quality of online materials they have discovered before using it in their studies, and perhaps particularly if they intend to reference them in submitted work. Students' were asked to rate their confidence in this area, see Table 10. Given the extent of their use of Google to find information this must be a frequently practised skill.

Very confident	Confident	Somewhat unconfident	Not at all confident
4/23	13/23	5/23	1/23

Table 10 Student confidence in assessing the quality of self-discovered online materials

As a group, albeit small in number, our graduate entry students in Vet Medicine were the most confident, with none reporting low confidence. There was no clear difference in confidence by subject studied for the other students. It is likely that students with confidence in their ability to assess the quality of online materials will be prepared to reference them in their assignments. All the Vet Medicine students, graduate and normal entry, referenced online sources "*always*" or "*sometimes*". The Divinity and Physics students were more evenly spread between "*always*" and "*never*" referencing such sources, and for both groups, 2/7 students reported never doing such referencing.

Their view of the acceptability of such a practice would be likely to influence their behaviour, but our students reported very little evidence of direct advice from lecturers about not using online sources, other than to take care in doing so, to avoid citing Wikipedia etc. Thus the students who did not reference online sources were doing so from personal choice.

End of semester 2 - Diary 6

Revision for end-of-year exams

At this point in the year, our students were approaching the end of their courses, and had generally developed stable study and social patterns including those that involved use of technology:

> *"Now that I am back at university I intend to work for at least two to four hours a day each day and as I get closer to exams I will push myself to work up to eight hours a day. I have used Microsoft Publisher to create a revision timetable which I am mostly sticking to and I am finding very useful. It allows me to easily see where I am making the most of my revision time and how much progress I am making."*

> *"I feel that I have used IT a lot, especially for the analysis and evaluation of data from my lab, and in writing my lab report. I also think that I have used the Internet a lot more recently, especially social networking sites (which are not work related!)."*

> *"I can't really think what could be better, IT sources are brilliant in this university, I feel very happy with it."*

> *"I work every evening except Friday evening."*

> *"In short, I work pretty much flat out but have to balance commitments to academic study alongside my practical training and other training from [vocational agency]. This training includes several week-long conferences and study tours throughout the year and a full-time Summer placement."*

Some student study situations highlighted their dependency on IT and the need for flexibility, adaptability and perseverance:

> *"I would advise new students to not get too one dimensional in their study habits and only use IT but use other forms of learning as well."*

> *"As I am going to do lambing this Easter, I will have no internet access for 3 weeks and I am planning to do my essay during this time. I have to bring one of the short loan books borrowed from the library to that place. However, without internet access it is impossible to renew the book during that period. Perhaps the library could look more into the situations during holidays to provide a more flexible service."*

> *"The instruction of finding resources from the library is kind of confusing, but those electronic journals are useful although I have to go through a lot of links before I can get the information."*

In this, their last diary, our students talked about **the advice about ICT they would offer to the University and to students following them through their first year**, basing this advice on their own experiences in their own first year. This was an opportunity for them to reflect on the key issues for them during this period, and decide which were the most important.

Advice to incoming students about using ICT at the University of Edinburgh

Purchase your own computer, ideally before you arrive at the University, and make sure you know how to use it:

> *"I would recommend having your own laptop, it makes everything a lot easier when it comes to writing reports, essays and the like if you can work on them at home without having to trek out to the library."*

> *"Get a windows based laptop instead of a mac, or risk spending nights in the School computer labs because some programs required do not support the mac platform."*

> *"Students arriving at the University of Edinburgh should take two things into consideration: 1) the importance of a computer (desktop or laptop) and 2) the need to understand the library and its IT services. A personal computer can save the student considerable time in projects, readings, essays, etc."*

> *"Things I have found useful: laptop, printer, pen-drive and a digital camera..."*

They did not wish incoming students to feel that they were essentially forced to invest in a PC, as the University provision was good:

> *"It is very useful to have one's own laptop for work and social purposes but it can also be very distracting from work and one should not feel that a computer is an absolute necessity."*

> *"I think that having my own laptop at uni is really useful; I can use the internet and word processing facilities at any time in my own room. However, I think it is important that new students don't feel pressured into buying a computer before they come to uni if it is not practical or possible to buy one and that there are plenty facilities available to use when necessary, even if they are not as convenient."*

Check that the PC you buy will be compatible with university networks and suitable for your studies before you buy:

"Register for Resnet well before you come (even though it does tell you to do this most students don't and pay for it by having no internet connection) it isn't particularly difficult as the instructions are helpful and concise."

Make sure you maintain your PC, taking advantage of the courses and support on offer:

"Get an antivirus program. This is essential with all the viruses going round the internet. There are courses run in Fresher's Week that offer free anti-virus and anti-spyware software for all attendees. These courses are free as well so make the most of them."

"Make sure to get Microsoft Office 2007 Student Edition - it's quite reasonably priced and will help you create all the documents you need. Open Office would be a bare minimum because it isn't 100% compatible with Microsoft, and that's what is on most PCs at university."

Make sure you know how to do some basic tasks with your PC, taking advantage of courses and support on offer:

"I would advise students if possible that they complete an ECDL course or even the core modules such as Word Processing, PowerPoint and Excel.

"When you get to university, look through the available short seminars and IT support WebPages, find any topics that look useful and either brush up on or learn about the desired topics. Things that have proven particularly useful for me are advanced excel classes and the university's instructions on how to set up a virtual private network so that you can access your university files from home (waiting until the seminar in November to find out about VPN isn't a good idea as it is incredibly useful)."

"Ensure they are fully aware of internet communication, re : email/ social networks so they can ask questions to course friends/ lecturers."

"If dyslexic or have a learning difficulty no matter how slight, go to the support services early, before the semester begins. You will get excellent support and assessments, and find staff ideas and equipment are helpful."

" learn at least basic stuff like using Word and a little bit of Internet (using Google properly, how to use the e-mail...). there are very good tutorials in the internet, or they can go to any course in it at the beginning of their course as well... and once they know the basics I think that the best thing to learn is play with it."

"Learn how to do a Boolean search, it comes in very useful for researching online."

If you do not have reasonable keyboard skills, practice to get better speed and accuracy, as this will save you time later:

"I would advise those doing essay subjects to become accustomed to typing and possibly learn to touch-type."

"One thing I would tell to any student before they enter university is that they should take a typing class. I took one in middle school (around age 12) and it is probably the most valuable and practical class I have ever taken."

Do not expect only to use a computer, even a laptop, as there are many occasions when you will use pen and paper, and keeping up with these is valuable. Exams are still mostly handwritten:

"Make sure you know how to write with a pen on a piece of paper as this is the main 'technology used."

Get into the habit of checking your email etc and logging in to systems daily, as much communication takes place online:

"Check email frequently, some very important information are dispensed via email which the school expects every student to check ever so frequently."

University is about self-reliance, and you should make sure you have acquired skills to support yourself in study and social life:

"When you get here be prepared for unreliable services and download stuff while you get the chance and it's still up & running."

Advice to the University regarding provision & use of ICT for learning and teaching

Our students' advice to the University was not overly challenging, and consisted of desirable actions that would not come as any surprise to their teachers or to the support services. Their concern was mainly about quality of facilities and services, which most students rated quite highly at present, rather than about innovation. The main items of advice were:

Improve access to IT, especially with respect to the various computer labs in the many academic buildings, most of which close at different times and days. Some are centrally provided and managed and others belong to individual Schools. Our students felt that it was important to maintain the number of PCs available and to improve their quality and availability because these facilities are important to all students, even those with laptops. This is because of access to printers and in particular access to software necessary for courses as this may only be accessible through specific microlabs:

"The Schools could consider combining all the log in details related to school under the EASE login, which was what EASE [University single sign-on system] was created for in the first place I suppose. However, right now I require 3 separate logins to access [names of services]."

"Also, I wonder about the cleanliness of computers available for students on the university campus. The keyboards and mice in [building] are quite dirty, which leads me to conclude that the computers are not cleaned frequently. With loads of people touching the keyboards and mice, I think it's quite a good way to spread germs."

"The one suggestion I have is to increase the amount of available computers, especially those that are available in 24- hour computer labs. Many of the programs are only available on university computers, but these are often full at the times when people are most likely to use them."

"I think the university should be careful that new students aren't feeling pressurized into buying their own laptops – it is extravagant, they can be broken or stolen and some people can't really afford it."

"Honestly, I don't think that University of Edinburgh needs to expand or improve its IT services much more. I think that there are sufficient learning aids through technology, plenty enough to busy yourself with. I think technology might cause students to do less hands-on learning, less textbook reading, and perhaps going to fewer lectures. I certainly don't think IT is bad, but until students start asking for more resources I don't think it needs to be expanded and I think we do have plenty of resources."

"I think they should put more colour printers at various places including the library, but the copying service is excellent"

"I think that having more self-test facilities online would help around exam time in particular."

"Ensure WebCT is up and running as courses rely on it eg exam questions if you have not bookmarked them. WebCT is clunky and inconsistent with user interface and accessibility problems."

"As laptops are often an essential item for many students, I think it would be ideal if University could offer students a special deal on laptops by ordering in bulk from companies"

Significantly improve the internet service in the student residences - a point made by several students, as it is a problem for many newly-arriving students. This was coupled to comments about the need for wider access to the wireless network:

"I think the most important resource provided by the university for me now would be the internet; I use it for research, study, revision, entertainment in between studies and communication. However, the standard of service provided by Resnet [Accommodation Services network] is appalling. During the most critical time where my friends from other courses and I were trying to complete our essays, there were prolonged internet downtimes at various locations and no explanation was given for them. Having a better internet service provider would be essential."

"I would also like to see the availability of wireless connections and the extent of campus covered by wireless to increase in the future."

Ensure there is good training and support available to new students, and make sure they know about it and how to get access to it:

"I think that students would benefit from compulsory classes introducing the IT facilities related to their course."

"I also think that classes in PowerPoint and other programmes should be more available for students."

"Instruction, or advice on Wikis would be good, since I had no idea what they were and had never used one before coming here and they are getting very popular now."

"Also, as I realise that it is possible to link your own computer to the network, and thus access information from the university I think it would be a benefit to the students and faculty if this was both better publicised and also better explained."

*"I'm not too picky. I tend to just work with whatever system I've been given, so I'll manage whatever they have set up. I think I would like someone to talk to about my **portfolio**, since I'm not used to working with what is essentially a Wiki (I think- I don't know exactly the definition). Instruction, or advice on Wikis would be good, since I had no idea what they were and had never used one before coming here and they are getting very popular now."*

Reduce the inconsistency in the way lecturers on different courses use the IT systems available, especially the VLE, as this makes it hard for students to know what to expect:

> *"The use of WebCT could be much improved if lecturers would post slides, handouts etc before the lectures they relate to. The reliability of this whole process is very patchy and so students cannot rely on it."*

> *"Where I think the University should be focusing its efforts is by emphasising and standardising the availability of online and interactive material for each course. Ideally, I think this should include: freely-available and complete, interactive lecture notes and material; a large bank of short on-line questions designed to test your understanding of the notes as well as a separate, but similar, section involving coursework level questions (that at least give feedback regarding if you were correct, if the department is unwilling to provide sample solutions); group work –based activities or possibly even games, if the department is feeling particularly creative, designed to provoke discussion of material; a section that details all of the usual but important 'admin'-related information; a discussion forum to publicly ask lecturers questions; a section that makes recorded lectures available(preferably audio and video) and a section that gives a summary of what is happening next week (all of these things could be a nice start anyways ☺)."*

This last comment is an example of the occasional expression of a deeper reflection of the role of technology in university education, which was close to the views expressed by staff active in e-learning.

Postscript: Feedback survey

At the end of the year, we asked our students to reflect on what they had learned and gained from participation in the project. The majority said that they felt a greater sense of their ideas being valued and were confident that the project outcomes would be used to improve the student experience. They had also gained ideas for new study techniques through talking to other students, both from their own subject and from other disciplines. Eight students felt that they had more awareness of educational research, and five felt a greater sense of 'belonging' to the University. Finally, one especially gratifying outcome was that all of our students said that reflection had given them a better understanding of their own learning and development.

> *"I gained insights to help me improve and make changes"*

> *"I learned what techniques some of the others disciplines use for studying"*

> *"Websites and study tips from fellow students during discussion groups."*

> *"I found out how to operate a webcam and make a video diary."*

> *"Reflection and introspection are two powerful skills which have been significantly developed as a result of the project"*

> *"It was the first time I had to look back and reflect on the way I studied I had never really thought about this before and how effective my way of studying was."*

Summary and reflections on the student year

The key research questions addressed by the project were:

- *To look at "critical moments" for first year undergraduate students across a range of disciplines as they make the transition to university life;*

- *To identify students' expectations regarding the availability and use of learning technologies at university;*

- *To understand how their use of learning technology changes as they progress through their first year;*

- *To consider how students adapt and change their approaches to e-learning during their first year;*

- *To identify the key factors that influence students' choices of e-learning strategies and how these are utilised;*

- *To look at the extent to which students use non institutional online technologies to support their learning.*

It was clear from the outset that all our students anticipated extensive use of technology within their university studies. They had acquired this view from the university itself (website, Open Days, initial documentation offering access to the MyEd portal from acceptance of an offer of a place – the "fuzzy entry" mentioned above); from school, work, family and friends; from the general background information in the media, and probably from a view that "technology is everywhere" based on general experience of its ubiquity in modern life. They knew that they would use technology for their studies and also for social interactions, and so mostly came equipped with some of the tools they expected to use (laptops, USB sticks, mobile phones, printers etc), either purchased specially for their new student lives or else as part of the move of their personal belongings to a new location. Some left this decision to acquire hardware until after their arrival, but increasingly this is not the behaviour that we see with respect to major items.

They know from school, from work and as parents/siblings, that there are useful skills to have acquired, in particular the ability to search, retrieve and store information from the internet, and they have become users of Google and Wikipedia almost by reflex. They are aware of, and can use to some degree, more specific academic information retrieval systems such as online catalogues and databases. They can almost all use word-processors to a good-enough level for submission of work etc, many can use a wider range of productivity tools especially presentation managers such as PowerPoint. Our new students also report that many of them have reasonable technical skills to upkeep their equipment, and even if not capable of doing it themselves alone, are aware that this is necessary activity and search out help from the university or friends. Sharing of expertise was commonly reported.

Thus in terms of the basics of learning *with* technology, our new students, from all backgrounds, appear to be well prepared for the tasks ahead of them, and indeed, few reported any serious difficulties in this respect. It is of course possible that they are a particularly capable and anticipatory subset of the general first year student population, although general experience within the academic and support services of the university does not confirm this concern. Clearly, students who need more help than others do exist, but if a large proportion were not prepared and/or could not perform these basic tasks for learning with technology, services would be swamped.

Our students also arrive with, and maintain, a very positive view of the role of technology in their education – they do not need persuading of its value. If anything, over the year they acquire a more critical view of the lack of use of technology in their university courses, and see opportunities missed for better, deeper and more consistent use that would make their studies easier.

However, to all of them this just appears to be how they see learning, and to some degree teaching, in the first decade of the 21st century. We did not present this as "e-learning" to them in our interactions with them, and they did not use the term spontaneously. Most adopted into their daily study lives the institutional learning technologies ("e-learning") on offer through the VLEs, online quizzes and assessments, use of Web 2.0 tools such as the wiki, web-based submission of assignments, personal response systems, email etc without overtly querying their value, appropriateness or effectiveness (as tools as opposed to the quality of their application). During their first year they progressively became regular users of the university's extensive digital library, accessing primary and secondary literatures online to use alongside the more traditional media formats, mostly books. Most of these e-learning resources were new to them, the e-journals, bibliographic databases and e-books owned by universities being little available to schools or the general public. Alongside these institutional technologies, and interwoven with them, they used their own technologies - mobile phones, laptops and accessories, Facebook, blogs, forums etc – as methods to communicate with each other, with staff and with family/friends, and with which to study and learn. Laptops and Instant Messaging (IM) are two good examples of "student-provided technologies" to explore.

No classes taken by our students *required* them to own laptops or to bring to them campus but all their courses *did require* that they carry out a substantial proportion of their studying using the internet and IT. Our students "moved" their studying from machine to machine as was most convenient to them, making heavy use of the university desktop PCs in the microlabs and making heavy use of their own laptops in their residences or on campus as appropriate. The steady progression since the 1990s of learning materials from standalone, CD-ROM based etc, to the web has enabled this fluid transition from place to place, machine to machine. The exceptions that our students found most problematic were those few materials that were still location-specific and software that could not be placed upon their own laptops. What our students did not appear to do, was use their handheld devices (almost entirely cell phones) as tools for *learning*, for example accessing the digital library or the VLE, with the exception of podcasts on small MP3 players.

Again, the courses taken by these students do not make formal use of IM. (A small number of courses in the university do use this for academic purposes but its use is not widespread. There is a university IM client on the microlab PCs.) However, courses do require students to work in groups, but often do not schedule this activity for them or offer specific time-allocated spaces. Equally, group study is generally favoured by the university as beneficial to learning. Some of our students adopted IM as a mechanism to support this activity, using this as an alternative to email and sms on mobile phones. They could do this wherever they were, making use of their own or the university equipment.

Thus our students adopted the institutional technologies that were necessary for them to use to gain access to learning materials and tasks (e.g. the VLE) and adapted their own technologies to support their learning and execution of academically-required activities (e.g. mobile phones, Google). They were generally fairly tolerant of system deficiencies (this may change with exposure in subsequent years when pressure on them is greater), although older students from efficient and well-resourced workplaces may feel differently, and perhaps may view university systems as less professionally polished than the commercial systems they have experienced.

These reflections reinforce the commentary offered in US studies of technology in higher education published by ECAR in which they observed that students value convenience and control [Kvavik et al, 2004].

Few of our students offered reflections on learning with technologies at the university that pushed the boundaries of what the university is offering in terms of innovation in e-learning in these courses. This may be partly due to the university's general student intake, which is clearly self-selecting in coming to a university which does not strongly *emphasise* substantial use of technology in most of its degree programmes (Medicine is perhaps an exception), but rather has a traditional university education uppermost in its public-facing information. It may also stem from the intrinsic cautiousness of students who wish to succeed in their studies and do not generally see risk-taking by the university as a "good thing". This is perhaps most evident in our students reactions to technology and

examinations where introduction of laptops into essay exams was not viewed with universal acclaim, despite the fact that almost all of them used laptops regularly for their studies and, on the face of it, this is hardly a revolutionary educational innovation. When the stakes are high, safety and the known was a dominant feature of thinking. We have seen similar concerns voiced in other research studies, when we have presented scenarios for the future use of technology in university education to student focus groups, and with student reactions to e-portfolio pilots [Tosh et al, 2005]. This suggests that universities that wish to expand their use of technology into more innovative and non-elective activities need to do so with suitable advance preparation of student attitudes, despite the rhetoric of a few Net Gen proponents.

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