The Student View of ICT in Education at the University of Edinburgh: skills, attitudes & expectations

Authors: Jeff Haywood
Hamish Macleod
Denise Haywood
Nora Mogey
Wilma Alexander

Address for correspondence: Jeff Haywood, MALTS, University of Edinburgh, 55 George Square, Edinburgh EH8 9JU, UK; jeff.haywood@ed.ac.uk

Hamish Macleod (h.a.macleod@ed.ac.uk), Denise Haywood (denise.haywood@ed.ac.uk), Higher & Community Education, School of Education, University of Edinburgh, Paterson’s Land, 37 Holyrood Road, Edinburgh EH8 8AQ, UK

Nora Mogey (nora.mogey@ed.ac.uk), Wilma Alexander (Wilma.alexander@ed.ac.uk), MALTS, University of Edinburgh, Paterson’s Land, 37 Holyrood Road, Edinburgh EH8 8AQ, UK

Abstract
Knowledge of the student view of ICT in education, and in particular their view of e-learning, is a vital ingredient in the Edinburgh University’s strategic planning process. In this paper we present data collected from new and established students over a 13 year period which gives us an insight into their experiences with ICT and their attitudes towards its use in higher education. Some of the implications of the students’ views for university actions are discussed.

Introduction
Why study student views?

We believe that collection of the views of students about the role of ICT in education is an important component of any university’s strategy for its educational development programme. The reasons for this are several: ‘consumer consultation’ is normal good working practice; rapidly changing technologies and differential uptakes of them may result in mismatches (and misunderstandings) between providers and users; student expectations of university use of ICT may not be aligned with those of the university, and assumptions about the thrust of strategic developments, such as increased use of e-learning, may differ between students and staff; and measuring change helps decision-making by enabling some prediction of the near future.
On a wider front, the UK government has adopted objectives that ensuring 'access to the Internet for everyone who wants it by 2005 and that not just a fraction, but all our young people can master 21st century skills' (Blair, A., 2003). In the European Union, universities are seen as playing a key role in achieving the strategic goal set at the Lisbon European Council, i.e. to make the EU the most competitive and dynamic knowledge-based economy in the world (European Commission, 2005) and to develop the Europe of Knowledge (European Commission, 2003). Within the EU, barriers to access such as distance and gender are seen as important targets for reduction. These various objectives become part of the drivers that act on individual universities to a greater or lesser extent. ICT is here to stay as a (costly) part of university education and we must gain the best value we can from it.

Some of these issues resolve at university-level into questions which can be stated as:

- do students hold a view of e-learning as transformative for their education or as supplementary to traditional methods?
- are student ICT skills improving with time and does this come from school training or from self-tuition in important social competences?
- at what rate is student ownership of PCs (desktop, laptop), PDAs and internet increasing, and what support services do universities need to put in place to gain maximum advantage from this?
- are female and male students broadly similar or different in their attitudes and expectations about ICT in education?

Some information about student views can be gleaned from public statements from student associations [e.g. The National Unions of Students in Europe (ESIB), http://www.esib.org/ and the National Union of Students (NUS) http://www.nusonline.co.uk] and Edinburgh University Student Association (EUSA), http://www.eusa.ed.ac.uk] or from published academic studies (Lundgren, T.D & Nantz, K.S, 2003; Beyth-Marom, R.E. et al, 2003; Hong, K-S, 2002) but given the variation between universities in both their recruitment patterns and their objectives with respect to graduate attributes, only direct sampling of the opinions of the university’s own student body offers the most accurate picture on which to base strategic choices.

Since 1990 we have been collecting information about newly-arriving and established students at the University of Edinburgh, some of which has previously been published (Macleod et al, 2002). Between 1999 and 2001 we led a European project that surveyed ICT skills, knowledge and attitudes of almost 13,000 students at seven universities (SEUSISS Project, 2002), and between 2001 and 2003 we were members of a related study that collected student views about e-learning at fourteen universities (SPOT-PLUS Project, 2004). More recently, within Edinburgh, we have been exploring the experiences and attitudes of Edinburgh students towards e-learning through their use of the university’s campus-wide virtual learning environment (VLE), WebCT. We have used, and continue to use, this research as the evidence-base to inform our development of ICT skills and e-learning strategies within the university.
In this paper we collect together a sample of these longitudinal data and explore the trends they expose and discuss the present situation with respect to Edinburgh students. Although the data we present here are mostly limited to a single university, Edinburgh, our European studies enable us to extrapolate more widely and also to look ahead to likely changes for a few years ahead.

2. Methodology
During our studies we have adopted several methods for capturing information from students, each suited to the type of student and the scale of data we wished to capture. All surveying has been carried out according to good ethical practice with respect to privacy and confidentiality, overseen by the relevant university committee. The majority of surveys have been short in length, completed anonymously and with the minimum of sensitive personal questions.

Paper-based surveys
These surveys have always been designed for machine-reading – originally by OMR scanner and software, without any or with very little written free-text input by students, and more recently by image analysis scanning and software with both tickbox and free-text inputs. In the SEUSISS project surveys were translated into each country language. The English version of these surveys can be found at [http://www.intermedia.urb.no/seusiss/D-Questionnaires.pdf](http://www.intermedia.urb.no/seusiss/D-Questionnaires.pdf). The SPOT-PLUS survey can be found at [http://www.spotplus.odl.org/questionnaire/](http://www.spotplus.odl.org/questionnaire/). When collecting data from new students we have issued and collected surveys as part of the enrolment process in the induction week before the start of the first term, whereas for established students this has been carried out in lectures or small groups in selected, representative classes.

On-line surveys
On-line surveys have been web-based, with students alerted to them by email. In recent surveys we have adopted an incentive scheme using library photocopy cards. On-line surveys have only been used with established students. The survey carried out through WebCT can be found at [www.flp.ed.ac.uk/webct/webctsurvey.pdf](http://www.flp.ed.ac.uk/webct/webctsurvey.pdf).

Face-to-face interviews, singly or group
Students have been contacted by word of mouth or through the student employment service. Interviews have been generally used to make ‘reality checks’ on survey data or to explore complex issues more deeply.

Scrutiny of server logs
Valuable information about patterns of student study behaviour can be gathered by analysis of network traffic and server logs. A virtual learning environment like WebCT is equipped with powerful means to monitor activity at the level of the individual student, but is less well able to deliver summaries at the level of class groups. Relatively crude measure however, such as the number of users connected to the server at any one time of day, can provide evidence valuable for planning purposes.

We believe that the data we have collected are broadly representative of the views of our students, being based upon large samples which were drawn taking care to ensure that we had inclusion of all categories of students with respect to variables such as gender, age, subject area, home/international etc. Clearly as with all sampling surveys
those who respond may be different in some degree from those who do not, and we have generally tried to reduce the impact of this by using paper rather than online surveys whenever possible. The consistency of the patterns of responses over time and over different samples suggest that we have achieved this objective.


**Findings**

When we began our collection of students’ ICT knowledge, skills and attitudes in 1990 we found that experience of educational uses of computers was mainly by males and was mostly about word-processing. The University of Edinburgh thought that it should assist students to ‘extend the range of entrant-students’ IT-related skills and tasks’ through a programme of IT Literacy (Anderson et al, 1993).

Over the intervening years we have observed a diminution of gender differences in skills and positive attitudes towards ICT (Macleod et al, 2002), increased ownership of PCs and internet access and of laptops, rising self-rated ICT skills (confirmed by experience in computer labs, digital assignment submissions etc), a reduction in the differentials between scientists and non-scientists, a growing expectation that computers will be used frequently at university and a general increase in ICT-confidence with less apprehension about using computers in their studies and careers.

When we combine the findings from all our sources collected over the past 2-3 years we can see some clear trends and also good consistency between the information obtained from new students as they arrive at the university and established students one or more years into their studies. We have brought these together below under a set of ‘statements’ about our students, with some data and explanatory text to expand on each one. We have made clear when data are from new students (within a few days of arrival at the university) and established students (2nd year and later), collected as part of EC-funded projects or independently, with the approximate number of respondents to the survey indicated.

The statements are:

A. Students are ICT-skilled and hold positive views about ICT in education
B. Most students own PCs, increasingly laptops, with good internet access, much of which is broadband
C. Almost all students use ICT frequently in their social & recreational lives
D. The majority of students use ICT regularly in their studies and expect to be asked to do so
E. Students see ICT as a positive feature in teaching and learning
F. Most students have rather limited experience of ‘well-developed or sophisticated’ e-learning
G. Students generally want more of what they have already experienced
H. Mostly students currently see e-learning as a supplement to traditional teaching
I. Students worry about loss of quality & transfer to them of burdens/costs
J. Gender effects are small and generally declining

A. Students are ICT-skilled and hold positive views about ICT in education
Using a set of descriptions of simple tasks that can be carried out with different softwares (eg ‘create a CV with a word-processor’) to guide them to the appropriate level of skill we were interested in, students were asked to self-rate themselves as one of ‘able to do alone’, ‘would need some help’ or ‘never done this’. Table 1 shows the percentages of new students self-rating at the highest level levels for six software/task combinations.

Table 1: New students (October 2003) at University of Edinburgh self-rating of ICT skills (N=1200)

<table>
<thead>
<tr>
<th>Task</th>
<th>% respondents ‘can do this alone’</th>
</tr>
</thead>
<tbody>
<tr>
<td>word-processor eg to create a well formatted CV</td>
<td>88</td>
</tr>
<tr>
<td>email program eg to send an attached document or image</td>
<td>85</td>
</tr>
<tr>
<td>web authoring program eg to create a personal homepage</td>
<td>16</td>
</tr>
<tr>
<td>presentation manager eg Powerpoint to create a short talk with slides</td>
<td>46</td>
</tr>
<tr>
<td>web browser eg to look for weather or download music files</td>
<td>84</td>
</tr>
<tr>
<td>on-line bibliographic databases eg to search for a specific publication</td>
<td>60</td>
</tr>
</tbody>
</table>

Our experience in computer labs and teaching settings suggests that, for our students, these are not gross over- or under-estimates of their skills. The self-ratings are very consistent across the past 2-3 years, between new and established students and between subject areas of study. Most skill levels appear to remain rather constant except for those that are specifically developed as part of the academic process, use of on-line bibliographic databases and spreadsheets evidencing the largest increases in self-reported skill levels.

As might be expected given these relatively high self-rated skills, new students from the 2003-2004 intake are generally confident about using ICT in their coming academic studies (84%), compared to 76% in 2001-2002. Equally, most students nearing graduation have expressed confidence about using ICT in their coming careers (69%) in 2003-2004. Moreover we have seen considerable increase in respondents who report receiving some general introduction to IT at school or college with a steady and stable increase in confidence since 1990. However, this should not blind us to those students
who report lower confidence or even apprehension about using ICT in their studies. The gender issues in this group are discussed later.

B. Most students own PCs, increasingly laptops, with good internet access, much of which is broadband

In our sample of 1200 newly-arriving students in October 2003, 74% stated that their first choice machine for their studies would be their own PC, and for 64% of these students this would be a laptop (indicating that approximately 50% of new students were laptop owners). Distance from home was a clear factor in this choice, for only 40% of Scots (many of whom will be from Edinburgh) owned laptops as opposed to 79% of those from outside Scotland. The need for internet access if one owned a PC was apparent; 85% reported such connectivity. As recently as 1999, only 35% of new students who owned a PC actually had a laptop, and as only 40% of students owned a PC at all this translates to less than 15% of the new student population being laptop owners (respondents N=2500). Such data demonstrate the speed at which some student attributes can change.

Amongst a sample of 600 established students in February 2004, 62% reported that their own PC was their first choice for their studies as compared to 30% who stated that the university PC was their first choice, but of the owners 60% said that they used a university PC as second choice, emphasising the continuing importance of the university-provided PC to all students. Of these students, 57% owned laptops and 85% had internet connection, mostly broadband (Edinburgh has optic fibre under most central streets).

C. Almost all students use ICT frequently in their social & recreational lives

A very consistent finding over the past few years has been the high levels of social and recreational use of ICT amongst our new and established students, something that we have found across all our European partner universities (SEUSISS Report, 2002). Edinburgh new students’ experience of making use of ICT for recreational purposes varied greatly from application to application (Table 2), with electronic mail being, by a large margin, the application with which most students were familiar, but substantial numbers had also used other quite complex online activities such as media downloads, shopping and banking.

Table 2; new students’ experience of recreational applications of ICT

<table>
<thead>
<tr>
<th>Recreational uses of ICTs</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>making newsletter / website</td>
<td>6</td>
</tr>
<tr>
<td>editing digital media</td>
<td>15</td>
</tr>
<tr>
<td>chat</td>
<td>41</td>
</tr>
<tr>
<td>email</td>
<td>83</td>
</tr>
<tr>
<td>downloading media</td>
<td>55</td>
</tr>
<tr>
<td>online shopping</td>
<td>39</td>
</tr>
</tbody>
</table>
D. The majority of students use ICT regularly in their studies and expect to be asked to do so

Amongst the student sample using WebCT in February 2004, the distribution of hours of study using ICT in the form of WebCT is shown in Fig 1.

Fig 1 : 24 hour Pattern of usage of WebCT server

Fifty percent of our current students using WebCT report doing so 2-3 times per week on average in the current academic year, with a further 16% reporting daily use. It is clear that there is substantial, and rising, use beyond the scheduled university teaching day – a finding which did not cause us surprise but has significant implications for our maintenance of quality of service.

In our SEUSSIS survey of established students at Edinburgh in 2001, we found 60% of students reporting daily use of ICT in any form, with under 5% reporting less than weekly use. New students arriving at the university are already used to studying with ICT, for almost 80% said that they used it 2-3 times per week or more, and only 8% that they used it less than weekly. Clearly some of this use is inside school and hence using school equipment and demands, but much is outside school as 74% indicated that
they also studied at home with a PC. In contrast, in 1991/92, 60-70% of students reported ‘seldom or never’ using a PC for their studies, at school or at home. This lack of experience did not result from a lack of interest or willingness, for at that time 70% thought that computers were likely to be ‘important or vital to their studies’, and 60% were ‘looking forward to or were confident’ about this (see Table 5 below for 2003 student views on this last question).

Established students appeared mostly to use ICT in their studies as a blend of ‘free choice’ and ‘expected’ or ‘compelled’, with a slight bias towards use required by teachers or course requirements (Fig 2). As this sample was taken from students with at least one course in WebCT this is perhaps not a surprising finding as many of their course materials and for some communications will be presented through ICT. However, the distribution of activities done by choice and by expectation (Fig 3) shows clearly that some areas (research for assignments or more generally, use of digital library, email to classmates or staff) are as much voluntary as they are expected.
New students gave evidence of similar types of use of ICT for school studies, with researching information and preparing assignments being the dominant activities (79% and 85% respectively).

These same new students expected to be using ICT in their studies (90% predicted 2-3 times per week or more) which accords with the levels of use reported by students in second year and beyond. Thus there are not likely to be major dissonances between the expectation and the experience for most Edinburgh University recruits. This was not a universal finding, for at some of our European partners the level of actual ICT use in their universities was well below that anticipated by their entrants.

E. Students see ICT as a positive feature in teaching and learning
We asked both established students using WebCT and newly-arrived students about their views of the value of ICT to their studies. Their response was emphatically positive as shown in Table 3 (the phrasing of the questions to the two groups were slightly different and are shown in full for clarity).
Table 3: Views on ICT held by new and established students

<table>
<thead>
<tr>
<th>New students (N=1200)</th>
<th>% respondents</th>
<th>Established students (WebCT users)</th>
<th>% respondents (N=600)</th>
</tr>
</thead>
<tbody>
<tr>
<td>How helpful is ICT/internet in your studies?</td>
<td>How do you feel about the internet and computers in your studies?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very helpful</td>
<td>65</td>
<td>Very considerable benefit</td>
<td>79</td>
</tr>
<tr>
<td>Helpful</td>
<td>33</td>
<td>Something of a benefit</td>
<td>19</td>
</tr>
<tr>
<td>Not helpful</td>
<td>2</td>
<td>Something of a distraction</td>
<td>2</td>
</tr>
<tr>
<td>Hindrance</td>
<td>1</td>
<td>V considerable distraction</td>
<td>0</td>
</tr>
</tbody>
</table>

This positive view is backed up by more complex data from the SPOT-PLUS project (SPOT-PLUS Project, 2004) where a bank of 24 questions was used to tease out attitudes to ICT in education with respect to different opportunities that it may present (e.g., to share information with others, to work cooperatively with others at a distance). Students largely viewed ICT in a positive light when used for these purposes.

F. Most students have rather limited experience of ‘well-developed or sophisticated’ e-learning

In both our European studies and our explorations of what students do with ICT we have found that their experiences of advanced or more complex forms of e-learning are quite limited. This applied even where there was a full campus-wide VLE in operation. For instance in our 2001 SEUSISS study of established students at Edinburgh, although 45% had had a course website available to them, only 27% had ever experienced an online discussion, and in our SPOT-PLUS study one year later, although 42% of our student sample had several experiences of course websites with interactive features, 40% had no experience at all, and 67% reported no experience of online discussions. Our 2004 survey of WebCT students confirmed this view that students are using WebCT predominantly for access to information, as Table 4 shows.

Table 4: Activities students report using within WebCT (N=600)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture notes online</td>
<td>95</td>
</tr>
<tr>
<td>Past exam papers</td>
<td>76</td>
</tr>
<tr>
<td>Web links</td>
<td>74</td>
</tr>
<tr>
<td>PowerPoint presentations online</td>
<td>58</td>
</tr>
<tr>
<td>Collection &amp; submission of assignments</td>
<td>46</td>
</tr>
<tr>
<td>Activity</td>
<td>Percentage</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Signing up for tutorial groups or essays</td>
<td>44</td>
</tr>
<tr>
<td>Online discussions</td>
<td>42</td>
</tr>
<tr>
<td>Online tests &amp; quizzes</td>
<td>36</td>
</tr>
<tr>
<td>Online still images of useful materials</td>
<td>28</td>
</tr>
<tr>
<td>Digital readings (eReserve)</td>
<td>20</td>
</tr>
<tr>
<td>Online movies or audio clips</td>
<td>11</td>
</tr>
<tr>
<td>Online labs / simulations / role-play</td>
<td>6</td>
</tr>
</tbody>
</table>

Academic staff responses in early 2003 (N=150) to a request to inform us about what e-learning techniques they were using with their students agreed with the data from the students in WebCT – simple activities, information provision plus communication, dominated the scene.

Clearly these are rapidly changing experiences in all universities. In Edinburgh University in 2001 there was very little teaching in a centrally-provided VLE (although the Faculty of Medicine had a very well-established system for medical students), whereas in early 2004 WebCT was operating in Campus Edition with a ‘shell’ for all non-medical courses, all students with an ID and their courses automatically updated, and there were around 5000 different individuals making at least one login each month.

G. Students generally want more of what they have already experienced
Figure 4 shows the activities and facilities that students using WebCT reported that they would like to be given more of or less of.
The dominant theme is one of a desire for more information resources, both in the specific form of lecture notes and presentations and more generally for learning (eg digital readings) and revising for exams. The request for ‘more WebCT’ refers to a desire to have more courses with on-line presence. The highest request for more interactivity was for self-testing on-line, for rather few of these students were actually requesting on-line exams. Ironically, the on-line labs and subject-specific classes appeared to be amongst the most interactive on-line activities and were not well-liked.

Student understanding of the more advanced uses of ICT for learning was shown to be limited by the presence of many ‘don’t know’ answers to questions about this subject in the SPOT questionnaire (respondents N=1500). Statements such as ‘ICT allows for effective sharing of experiences’ and ‘I think that ICT can improve my learning’ elicited several times higher levels of ‘don’t know’ responses than did statements such as ‘I prefer reading from a printed text’ or ‘I like being taught in a classroom setting’, ‘…developing a more autonomous and learner-centred approach in university teaching’ indicating the need for greater general awareness-raising amongst students as to the potential of more complex on-line activities if these are to be accepted as part of the curriculum.
H. Mostly students currently see e-learning as a supplement to traditional teaching
Given the discussion above showing the views and experiences of students to be about use of ICT in education as predominantly providing information sources and simple communications, it is perhaps not surprising that their view of the role of ICT-based methods favours a supplementary place for them alongside, but not replacing, familiar traditional approaches. In both interviews and surveys during the SPOT project the student view substantially favoured use of ICT as a supplement to traditional teaching rather than a replacement for it.

This view is also reflected in recent statements from the student body through their association, EUSA. In a discussion paper on the future of services and facilities for students they emphasise that ‘e-learning should not replace face-to-face interaction’ [internal University of Edinburgh paper for C&IT Committee, February 2004]. This is clearly not targeted at all provision, for distance education would be impossible under such guidance, but a concern that use of ICT should not distance students from good quality staff input, which is seen at present as being best delivered in person.

I. Students worry about loss of quality & transfer to them of burdens/costs
While students consistently request more and more materials to be provided online (‘lecture notes and presentations’ plus ‘information learning’ - Fig 4) this brings a danger that costs, notably printing, will simultaneously transfer from the course budget to the student pocket. Students resent being forced to print core resources themselves, when previously they would have been provided, and their negative feelings can then be compounded by pragmatic barriers such as access to fast high quality printers (‘want less of printing out docs’ and ‘want less of online lecture notes and presentations’ represent these concerns in Fig 4).

It is also critical that facilities promised and provided work efficiently and reliably. Students need to be confident that systems will be available when they wish to use them – in addition to the hourly usage pattern shown in Figure 1 we know that the demand on the WebCT server on Sundays is still significant - approximately half that on a weekday. Scheduled downtime for core services must be communicated efficiently to students otherwise a feeling develops that the system is unreliable.

The student association, EUSA, is keen to encourage the provision of more wireless networking round the campus, but at the same time warns about the possibility that increasing use of laptops in lectures could be very distracting. They care very much about the quality of their educational experience. A clear worry in the minds of a substantial minority of students is that moves to greater use of ICT in education, whether this is e-learning in the full sense of the word or is rather more what might be called ‘e-teaching’, is that they will find the quality of their educational experience declining.
J. Gender effects are small and generally declining

Many studies of attitudes towards, and voluntary use of, information and communications technologies have identified a powerful influence of gender (Lander and Adam, 1997). In the survey data which we gathered in the early 1990s, student gender was a reliable predictor of anticipated frequency of use of ICT for study-related purposes, perceived value of ICT in support of learning, the ICT experience which a student would bring to the University, and the likelihood that a student would have access to a personal computer of their own. Gender differences were large and statistically significant in any technology-related questions posed in our surveys.

Findings of this sort, and the anecdotal observations which parallel them, have lead to a persisting view that technology is a “male domain” and that women who enter that domain will find themselves at a disadvantage. Such views, and the stereotypes they support, have been termed “geek mythology” by Margolis and Fisher (2002). In the educational context, the differential experience, confidence, or preparedness to participate, of any group must be considered as a potential source of discrimination and inequity. One has to ask therefore whether increased deployment of online and computer-based approaches in teaching and learning will differentially disadvantage female students (Gunn et al., 2002). The trends which we have seen in our data over time, and the present pattern, encourage us to believe that this will not be the case.

Since the early 1990s we have seen overall attitudes towards ICT in study become more positive, and the reported attitudes of men and women to be converging to the point where no significant differences exist (Macleod et al., 2002). That is, men have become more positive, but the women’s attitudes have changed more rapidly. Other gender differences have progressively decayed over the course of the decade, some now to the point of vanishing. We have noticed that gender differences in self-reported attitudes or experience have been quickest to disappear in those areas in which the skills have come most obviously to be academically relevant.

In the 2003 survey questions in which students were asked to indicate, for a range of specified ICT tasks, whether they believed ‘they could perform this task alone’, ‘would need some help’, or ‘had never performed the task’ (see Table 1 for examples), gender differences were well nigh absent from the more routine or “domesticated” skill areas (like word processing or email – both genders in 80-90% range for ‘can do this alone’) but were still present in the less routinely used areas such as web authoring (females 8% vs males 26% for ‘can do this alone’)

Differences in computer ownership between men and women have ceased to be statistically significant; 73% of women and 76% of men have their own machine for use during term time. (Equivalent figures in the October 1999 survey were 37% of women and 44% of men). Interestingly, it was found that the women in October 2003 were more likely to be owners of laptop computers (67% vs 56%).

One area where gender differences persist is in self-reported confidence in the ability to handle the demands of using ICT in study-related settings (Table 5). Male new students report themselves to be more confident about their readiness to use ICT in their studies than do the females (chi-squared = 41.944; p < 0.001) and over 20% of the women report some degree of apprehension.
Table 5: expressed confidence with ICT for future study as a function of gender in new students, October 2003 (N=1200)

<table>
<thead>
<tr>
<th></th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>female</td>
</tr>
<tr>
<td>very confident</td>
<td>35%</td>
</tr>
<tr>
<td>quite looking forward to the challenge</td>
<td>45%</td>
</tr>
<tr>
<td>a little apprehensive</td>
<td>18%</td>
</tr>
<tr>
<td>very apprehensive</td>
<td>2%</td>
</tr>
</tbody>
</table>

Information gathered from established students already experienced in the use of WebCT is particularly encouraging with respect to gender patterns of participation. Men and women report spending equivalent amounts of time online for study purposes and equivalent frequency of use (43% females spent 6hr or more online studying as compared to 34% males). Although not statistically significant, the women are more likely than the men to report particularly high levels of online working (10hr or more per week). There is no sign here of female reluctance to engage with the technology.

**Conclusions**

We can draw many conclusions from our studies over the past 13 years of students and their experiences, skills and attitudes to ICT in education and more widely, some of which have been reported elsewhere (SEUSISS Report, 2002, SPOT-PLUS Report, 2004, Macleod et al, 2002). Here we will focus on what we see as the implications for our own university, and, to varying degrees, for all UK universities.

Our new and established students mostly take ICT ‘for granted’ – they are digital natives rather than immigrants to use Prensky’s terminology (Prensky, M., 2001). Many use ICT daily and seamlessly for both studies and recreation and social interactions like many, if not most, of the academic and administrative staff in the university. Their skills with common applications is self-rated as high, as is their confidence about use of these, and they appear to take up new applications and increase their skills and confidence as the application is ‘domesticated’, as can be seen with web browsers, email and now web authoring. Females appear to do this a little more slowly than males, and their uptake of new tools may be related to its proven utility in their context.

The options for mobile learning are increasing rapidly as student ownership of laptops expands as the majority of modern laptops have wireless networking built in or optional with much cheaper PCMCIA or USB cards. The presence of such high levels of PC ownership also make more problematic the decisions as to the student:PC ratio that is sufficient for effective study. The Dearing Report (Dearing Report, 1997) proposed 5:1, twice the level of the earlier proposals, but when the ratio is approaching 1:1 for
own PC and many of these are mobile the provision of wireless and other network access plus study locations with power outlets may become more critical.

Students all view use of ICT as a beneficial ingredient in modern university education but mainly as a source of information and research materials on-demand rather than as a direct and structured learning option. This may stem from their quite limited exposure to such e-learning opportunities and wider experience of high quality e-learning activities could alter this view. At least at present, students and their association do not regard e-learning as an appropriate substitute for traditional face-to-face methods but rather as a supplement, a situation that may become problematic if the university wishes to avoid an expensive duplicative approach to teaching and learning.

Although most of the data presented here are drawn from our work with University of Edinburgh students, we have found very similar results in surveys carried out at several European universities whose students were also young adults mainly straight from school. It may be that the social and societal drivers on young people in Europe result in substantial homogeneity of views and experiences. One cannot extrapolate these findings to other groups such as older or less academically qualified students. The limited evidence we have about older students suggests that they are significantly different to the young adults in many respects and so universities with different intake profiles would need to survey their own students to identify the similarities and differences from our Edinburgh data presented here.

In our conference presentation we shall present further data and analyses and discuss the implications of these for university strategies for effective use of ICT in education.

Acknowledgements
We should like to thank the many respondents to our surveys and interviews, without whose input none of the information presented in this paper would have existed. We are grateful to the University of Edinburgh for funding for all our studies and to the Directorate General for Education and Culture, European Commission, for financial support to the SEUSISS and SPOT-PLUS projects.

References


http://webhome.idirect.com/~stelex/tony_blair.htm


