Expectations and Reality: Exploring the use of learning technologies across the disciplines

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Abstract

This paper describes a study of the use of learning technologies by first-year students from a variety of different entry routes and across a variety of subject areas at the University of Edinburgh. The focus is on "critical moments"; more specifically, the involvement and impact of both institutional and personal IT-related technologies on learners' transition to university and how their use of learning technology changes as they progress through their first year.

The study includes the experiences of a heterogeneous group of first year students selected from a number of different disciplines, including Physics, Divinity and Veterinary Medicine. Early years courses in all these subject areas have a well-established presence online, marrying the best of the online and real environments, and have begun to gain experience and understanding of how to embed Web2.0 tools in support of the teaching. Hence, this is an ideal time to study the student perspective in parallel with these initiatives.

The work is ongoing and is presented here as a work in progress. In this paper we focus on the methodology, tools and techniques used for data collection. In addition, early and emerging themes are discussed.

Keywords

Elearning, learning technologies, student experience, first year experience, interdisciplinary

Introduction

In common with most Higher Education institutions in the UK, the University of Edinburgh has seen a significant increase in undergraduate student numbers during recent years; in Scotland over 50% of 18-19 year olds now continue to some form of further study (Universities UK, 2004). In addition, for a single institution the University has a diverse student intake, with approximately 47% of entrant undergraduates from Scotland, 36% from the rest of the UK and the remainder from Europe and overseas. Incoming students have a wide range of educational backgrounds and qualifications, including Scottish Highers and Advanced Highers, UK "A" levels, the International Baccalaureate, Irish Leaving Certificate and some with previous experience of higher education. There is an associated range in ages of students first entering the University; for example, over 10% of the undergraduate intake is under 18 at entry. Some students are returning to university after substantial work experience or time away for family commitments. Furthermore, the four-year honours degree programme offered by the University allows for a broad-based curriculum built on principles of flexibility and choice, especially in the early years, with students able to select options from an extensive range of elective courses. As an example, only about 50% of students taking first year Physics are registered for a physics-related degree. One consequence is that a wide range of abilities, aptitudes and aspirations are represented on most large courses, especially those in the early years, presenting a complex set of challenges for both students and staff. This is especially true for new undergraduates, who also have to manage the changes associated with living and learning within a university environment.

Since 1990 the University has been collecting information, through a survey conducted at enrolment, about newly arriving undergraduates' experience of, and attitudes towards, information and communication technologies and their use in teaching and learning. Initially these data were collected annually, and subsequently on a two or three year cycle. Interesting trends have been manifest over the years (Macleod et al., 2002, Haywood et al., 2004). The survey has provided relatively low-level evidence, although its conduct through the enrolment process has meant high return rates (in the order of 80% of the population) and thus a genuinely representative picture. In the early years of this survey, results showed the vast majority of our students to be arriving with far lesser degrees of IT experience than might popularly have been held to be the case. These findings demonstrated the need for institutional policy and action to support students in the cultivation of their IT fluency in preparation for university studies. In recent years however, students can be seen to be arriving with a rich repertoire of IT-related skills already formed, largely derived from their personal and social uses of the technologies. This is an exciting, though potentially disruptive, situation affording great opportunities, though also posing significant management challenges (Nicholson et al, 2005). It is this rich and complex situation that the present study seeks, in part, to explore.

Our aim is to shift attention away from an individual course-centric view of student activity and utilisation, towards one that aims to capture aspects of the whole learning experience, including the role played by technology, during their first year. To this end, in addition to the institution-wide survey of the population of first year undergraduates, we are exploring the first year experiences of a heterogeneous range of first-year undergraduates from a variety of different entry routes and across a variety of subject areas at the University of Edinburgh, including Physics, Divinity and Veterinary Medicine. Early years courses in all these disciplines have a well-established presence online, marrying the best of the online and real environments in a blended-learning approach to learning and teaching. Some have previously investigated the utilisation of online resources by student cohorts (Hardy et al., 2005, 2006). These findings illustrated a multiplicity of patterns of use by students in rich online environments. More recently, courses in all three subject areas have begun to gain experience and understanding of how to embed Web 2.0 tools such as weblogs and podcasts in support of more traditional teaching methods. These tools, and the courses in which they are being piloted, emphasise a shift away from the transmission of knowledge, published by a respected authority, towards a more bi-directional and collaborative approach.

The focus of this project is on "critical moments"; more specifically, the involvement and impact of learning technology on learners' transition to university, and how their use of learning technology changes as they progress through their first year. The key questions that the work aims to address include:

- What are learners' expectations regarding the availability and use of e-learning at university?
- How do learners adapt and change their approaches to e-learning during their first year at university?
- What are the key factors that influence learners' choices of e-learning strategies and how these are utilised?
- To what extent do learners use non-institutional / personal e-learning technologies to support their learning?

The paper is presented as a work-in-progress. It represents an early-stage snapshot of a study of first-year undergraduates that will extend over the whole of their first academic year. The main emphasis is on the methodology and the practical issues associated with implementing this type of study. The paper is organised as follows. By way of setting the context, a brief overview is given of the selected disciplines; general characteristics of their student cohorts, their courses and modes of delivery. The methodological approach and implementation details of the study are then considered, together with some early indicative results. We conclude with a look forward and a discussion of the lessons learned to date.

Setting the context: Subject-specific features

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 of Edinburgh. Organisationally, they sit within each of the three colleges that form the basis of the academic structure of the University: the Colleges of Humanities and Social Sciences; Science and Engineering; and Medicine and Veterinary

Medicine. Academic teaching staff in all three subjects have wide ranging experience in the innovative use of learning technology in their courses 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 atypical, however it is because of these initiatives that this is 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* Veterinary 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.

Methodology and practicalities: Tools and techniques for data collection

With such diverse student cohorts, we cannot represent the whole range of student experiences within this study. Instead, our aim was to obtain a representative cross-section of student views and opinions using a range of data collection techniques. The overall shape of the research approach was based on two underlying principles (advocated previously by Sharpe (2005) and Mayes (2006)). Firstly, that it is important to take a *learner-centred approach*, whereby the learners' own views and opinions are central to the study. Secondly, to adopt a *holistic approach* in which learners' use of e-learning is set within the context of their learning experiences as a whole. Most of the courses taken by the students in this study include a significant component of traditional face-to-face teaching supplemented and enhanced by the use of online resources. Hence, the extent to which students engage with online resources may be determined, at least in part, by the preferences of the individual learner rather than being imposed on them by the delivery media used for the course. A course-centric approach, may not, for example, take into account the use of non-institutional or personal technologies in support of learning

To capture the breadth and complexity of learners' experiences, rather than evaluating only their online behaviour, we used a mixed-mode approach (Aspden & Helm, 2004). This included an institution-wide survey, a series of reflective diaries recorded by students in the three target disciplines, and a number of focus groups. The underlying rationale for each of these approaches, together with some of the practicalities and pitfalls, are discussed below.

Institution-wide Survey

The institution-wide survey on students' use of IT was conducted at enrolment. The aims of the survey were twofold. Firstly, it formed part of a long-running longitudinal study by the University of Edinburgh on students' prior experience with, and expectations of, IT for teaching and learning (Macleod et al., 2002, Haywood et al., 2004). Secondly, it was used to gather baseline information for the current work. One beneficial side-effect was that it also provided a very effective vehicle for recruiting students to the project, particularly when it was administered in-person rather than online.

To facilitate comparison with data collected in previous years, the questions were based on previous surveys conducted at the University together with a small number of additional questions specific to the current study. An online version of the survey was made available to all new undergraduate students via a URL included in the joining pack, sent in paper form to all new students prior to registration. Students interested in participating could indicate this on the form. The number of students who completed the online survey was very low (only 17 replies were received by this route). This is consistent with the low online return rate obtained previously (Haywood et al., 2004). To compensate, the same survey on paper was distributed by hand during Fresher's week and the first two weeks of term. With only limited effort available, we could not hope to reach all new students in person, therefore a number of representative disciplines from across the University were targeted. Distributing (and collecting) the survey in person at induction talks or early lectures was particularly effective, but surveys were also distributed at IT support sessions and various induction and students' association events.

The online survey was built and deployed using the Bristol Online Survey (BOS) service[1]. Information was collected from the paper surveys by electronic scanning. Survey data were analysed using MS Excel and SPSS.

Reflective Diaries

Selected students were asked to record reflective diaries at key points through their first academic year. Video was chosen by the investigators as the preferred medium, primarily because it has the potential to provide a rich source of information that cannot be fully captured via audio or text diaries. It also builds on and extends the audio diaries approach used by Conole et al. (2006). The value of video over other media has been expressed by Noyes (2004), who, referring to the use of video diaries to explore school children's learning, states: "The first thing that struck me when watching the recording of their entries was the increased depth of their comments…their video responses were somehow far more compelling." However, although students were encouraged to record at least one diary entry as a video there was no compulsion. We believe that it was important not to exclude people who were uncomfortable with this approach, or who were not technically confident, as this would have the potential to bias the data. International students, at this stage, might find that their English was not sufficiently fluent to make a video, whereas a dyslexic student may respond well to the idea. For these reasons, participants were also free to use other methods such as audio diaries, blogs, email, text documents or simply pen and paper.

Each diary covered a time period of approximately 2 weeks and had a particular theme. The diaries were relatively freeform and unstructured. They were recorded by the students themselves with no-one from the research team present. To provide some guidance on the scope and content of the diaries (together with practical details on recording and uploading, key dates etc.) a "diary information sheet" was provided, but students were also encouraged to add other comments if they chose. Students used a webcam to record their diary (either their own or one provided by the project). Even people who did not consider themselves to be technically-minded found the webcams easy to set up and use. We also set up a "LEaD Diary Room"; regular drop-in sessions. Students who did not have access to a webcam could come along to record their diary in private, while one of the project team was on hand at these sessions to answer any questions or simply chat.

The original plan had been for students to upload their video diaries directly to a central repository such as a VLE or wiki. However, this proved to be problematic, due mainly to the large file sizes involved. For example, most of the University and departmental systems impose a file upload limit (typically between 2 and 10 MB). Even a short (3-5 min) talking head video may be considerably larger than this (on average between 10 and 20 MB, although some were significantly larger). A range of technical options were explored, for example compressing video files before upload or using an FTP service[2]. However, all of these approaches required a level of technical competence and confidence that some people may not possess – and it is clearly important that this group was not excluded from participating in the study. Video sharing sites such as YouTube were not considered to be suitable, both for data protection reasons and because they do not permit download of videos. Ultimately, a "low-tech" approach

[1] See http://www.survey.bris.ac.uk/

[2] File Transfer Protocol, a widely-used method of transferring data across a network

was chosen: students were provided with labelled CDs for their diaries together with pre-addressed envelopes for returning diary entries. This approach worked surprisingly well from the investigators perspective, and we will ask the students how well it worked for them.

Focus Groups

Focus groups were conducted with groups of students from several disciplines. We used elements of the "Interview Plus" methodology proposed by Sharpe (2005), Mayes (2006) and Creanor (2006) to stimulate and guide the discussion. Interview Plus advocates the use of in-depth interviews building on some activity or artefact to guide recall and aid thinking. Rather than exploring in detail individual students' experiences, our approach was to use more general themes identified from the learner diaries. These were presented either in the form of short scenarios or as short illustrative diary extracts.

Mayes (2006) and Creanor (2006) utilised Interview Plus in the context of an Interpretative Phenomenological Approach (IPA) (Reid, 2005), which starts from the premise that "the experts in learner experience are the learners" (LEX, 2006). We did not directly follow this approach. The first year at university is a time of significant adjustment in many students approaches to learning, which may include periods of confusion and self-doubt. Although we firmly believe that the "learners' voice" should take centre-stage, it is less clear that at this stage in their academic career students are indeed experts in their own learning.

Recruitment and retention

It was very important to engage with students as early as possible so that they could record their initial thoughts and experiences while they were still fresh in their minds. To facilitate this, introductory presentations on the project were included as part of the Fresher's week induction sessions for Physics, Divinity and Veterinary Medicine. Interested students were invited to attend an informal follow-up session where the project was explained in detail. Students who signed up were provided with an information pack which included information sheets, blank CDs and return envelopes and, if necessary, a webcam. The diary room also provided additional support and encouragement for participating students.

Student retention over the whole of the academic year was vital to the success of the study and considerable time effort was expended in this area. Our approaches included:

- *Involvement of academic staff* Academic teaching staff were directly involved at all stages of the project, and their role was crucial. Together with significant expertise in deploying and utilising e-learning in their disciplines, they had a major "advocacy" role in encouraging student participant compliance, and were closely involved in all stages of the project.
- *Rewards and benefits* Direct rewards ranged from providing refreshments at information and focus group sessions etc., through to offering financial incentives paid on a per-semester basis to encourage ongoing participation. Less tangible than but equally significant benefits included providing opportunities for students to:
    - Think about the way they study: what works, what doesn't, how approaches develop over time.
    - Try out and use new technologies and practice skills useful for academic life and beyond.
    - Contribute to the research, and make a real difference to learning and teaching for themselves and future students
- *Being "part of something"* Various approaches were used to foster a sense of identity and community: The project officer was key in acting as a central point of contact for all participants; the diary room offered a concrete demonstration of the team's support and encouragement; and the project identity was reinforced by using the project logo on notices, information packs, website etc.
- *Flexibility of approach* This is exemplified by the fact that although students were encouraged to record a video diary, they were free to choose an alternative format if preferred – we were keen to emphasise to participants that the message was more important than the medium. The drop-in diary rooms provide another example, as by scheduling relatively long sessions (typically all afternoon plus occasional evenings) we could accommodate individual students' timetables.

Implementation

The themes and dates for the personal diaries were chosen to reflect significant study-related events during the semester. Students were asked to focus on the 2 weeks preceding each diary entry, so that they could record their thoughts and opinions "in the moment" rather than through the lens of hindsight. The themes for the diary entries, together with an outline of the various activities undertaken over the first semester of the study, are summarised in Table 1.

Table 1 Data collection: survey, reflective diaries and focus groups (Semester 1 2007/08)

Theme	Trigger	Approach	Participating groups	Number of participants
Prior experience & expectations	Welcome pack (before arrival)	Survey (online)	All new undergraduates	17
Prior experience & expectations	Arrival at university	Survey (paper)	All new undergraduates	1,345
First impressions	Arrival, start of taught courses	1st diary entry (video, audio, text or paper)	Target disciplines (Physics, Divinity and Vet Medicine)	24 (7–9 per discipline)
Assessment & feedback	First assessed assignment	2nd diary entry	Target disciplines	24 (7–9 per discipline)
Preparation for exams	End of courses, First exams	3rd diary entry	Target disciplines	24 (7–9 per discipline)
Sanity check: comparison between disciplines	End of taught courses	Focus group (face to face)	Inter-disciplinary (target disciplines + other subject areas)	30 (4 groups of 6–8 per group)

Early findings

As the study is continuing over the whole of the 2007/08 academic session, the findings presented here are necessarily only early indicators. Data from the enrolment survey shows that 96% of new students have found IT to be helpful or very helpful in their previous studies, while 81% and are confident or looking forward to using computers and the internet for their university studies (see Table 2 and Table 3). Furthermore, 94% of respondents have their own computer, over 90% of which are laptops. This high level of computer ownership and IT confidence is consistent with findings from previous surveys carried out at the University (Haywood, 2004). However, only 34% of those students who had laptops when they started University planned to carry them on-campus. This is consistent with findings from the first set of diaries: most participants stated that they studied mainly in their own room at home or their hall of residence. For some this was because of personal preference, while for others it was for convenience, for example, not having to carry books and equipment around on-campus. Divinity students in particular expressed a preference for working in the library, with ready access to set books and recommended texts that may not be available online. It is clear that students, at least at this stage in their academic careers, are far from being "mobile learners", accessing online resources anywhere and at any time using handheld or portable devices. Instead, there is still a strong reliance on university-provided systems in libraries and computer labs, with personal laptops generally found at home.

Responses to the enrolment survey showed that the vast majority of students arrive expecting to have to take responsibility for their own learning, with more independent study and less formal "teaching". It was less clear how they expected this to translate into practice. The survey also indicated that most incoming students expect to make significant use of online resources to support their study. It was clear that at this stage students were still becoming oriented to university life and had not yet established patterns of study. It is perhaps not surprising, therefore, that the main online resources cited in the first reflective diaries were the University online portal ("MyEd") and the course VLE, for both administrative and study-related tasks. Most (although not all) students found online course material helpful, particularly when it

offered something that could not be obtained from a textbook or lecture notes. Examples here include formative self-tests, online animations, sharing of dissection photos and the "virtual farm". A range of non-university online resources (especially those recommended by tutors or by other students) were used to provide additional material or as study aids. For example, checking Greek translation against online texts, using online animations as an aid to understanding Physics concepts. Some Divinity students had been required to contribute to blogs as part of their tutorials; one mature student commented that, although they were aware of blogging they had never done it before and "quite enjoyed it".

Table 2 How helpful have you found computers and the internet to be for your previous studies?

Response	% respondents
very helpful	59
helpful	37
not helpful	3
hindrance	< 1

Table 3 How confident are you about using computers and the internet in your forthcoming University studies?

Response	% respondents
very confident	43
quite looking forward to the challenge	38
a little apprehensive	17
very apprehensive	2

It is evident from both the survey and diaries that students make extensive use of online services for recreational and social activities. However there is a very wide variation in the types of service that are used (see Table 4). For example, 69% of survey respondents said they frequently or regularly download music compared to 21% who download podcasts or other spoken word material; 86% use social networking sites such as FaceBook, while 31% keep a personal blog. There was little evidence in the diaries for the use of social sites for "informal" learning. At this stage in the study, most students reported a preference for keeping this aspect of their "online life" clearly separated from learning activities, citing that is provides too much of a distraction from study. However, we should re-iterate that this is a snapshot taken at or immediately after arrival at University. It will be interesting to compare this with students' responses later in the academic year.

Table 4 How frequently do you use Internet-based services?

Service	frequently / regularly (%)	never / don't know what this is (%)
download music	69	31
download spoken word material e.g. podcasts	21	79
use instant messaging system e.g. MSN messenger	80	20
use Internet phone system e.g. Skype	30	70
buy products or services online	78	22
use social network site e.g. FaceBook	86	14
use social recommendation service e.g. del.icio.us	21	79
use social sharing site e.g. flickr	32	68
make entries in a personal blog	31	69
use electronic or online diary	20	80

An interesting methodological point is that in the past, undergraduate students had almost no experience of university until the day they arrived. With the current trend, as at the University of Edinburgh, to give online access as soon as offers are "unconditional firm" or even earlier, the initiation into the digital life of the university has an uncertain date, but certainly precedes arrival. By the start of Fresher's week in 2007, 75% of all new students had already accessed the "MyEd" portal, compared to 60% by the same week in 2005 (the first year of the service).

Conclusions

In this paper we have discussed the methodology and implementation details of an ongoing study of the impact of both institutional and personal technologies in support of learning by first year students from widely different academic disciplines. A number of factors were key to successfully recruiting and

retaining student participants to the project: the involvement of academic teaching staff, flexibility of approach; providing both tangible and intangible rewards and benefits to participants.
Early findings have shown that most new students arrive with a high level of IT competence and confidence, regardless of the academic discipline that they have chosen. However, many are relatively conservative in their approach to study, preferring to work at home or in the library and to use books and lecture notes as the primary resource, supplemented by online sources "on demand". This may, of course, reflect their previous experiences of learning and teaching within a school environment. Many students, but by no means all, make extensive use of social networking sites for recreational use, but in their minds there appears to be a clear separation between online learning and online social activities.

The study is ongoing, and in the future we hope to be able to provide some pointers towards understanding how learners adapt their approaches to e-learning during their first year at university and to investigate differences between learners from different academic disciplines.

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