

An in-depth case study of students' experiences of e-Learning – how is learning changing?

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This paper describes some of the findings which have emerged from an in-depth case study exploring students' experiences of e-learning. The main research theme of the project was to collect learner stories on their experiences with e-learning. Data was collected through an online survey, coupled with a series of in-depth case studies using student audio diaries and interviews. The study yielded both expected and unexpected findings in terms of students' use of technologies. The expected findings are useful in terms of providing valuable up-to-date empirical evidence of students' current learning environment. The unexpected findings give a hint of the student learning environment of tomorrow and have important implications for policy and practice.

Keywords: student experiences, student perceptions, e-learning, in-depth case studies, audio log, online survey

Introduction

A review by Sharpe, Benfield, Lessner & DeCicco (2005), showed that the learner perspective on e-learning had been largely overlooked, but that knowledge of how learners use and experience e-learning/technology in their learning activities was crucial for the development of tools, pedagogy and teaching practices. This paper reports on a project (The LXP project - students' experience of e-learning) which was funded by the Joint Information Systems Committee (JISC) in the UK and ran from January – August 2006. The main research questions addressed were: How do learners engage with and experience e-learning? (What is their perception of e-learning? What do e-learners do when they are learning with technology? What strategies do e-learners use and what is effective?), and How does e-learning relate to and contribute to the whole learning experience? (How do learners manage to fit e-learning around their traditional learning activities?)

The project was particularly interested in extrapolating out subject discipline differences in the use of technology and worked in conjunction with four of the UK's HE Academy subject centres: Medicine, Dentistry and Veterinary Medicine; Economics; Information and Computer Sciences; and Languages and Linguistics. These centres were chosen because they gave a good spread of subject areas and because they were centres who had a track record and interest in research on both the way in which students learn and the use of e-learning.

Sharpe et al. (2005) reviewed studies (post 2000) which purported to focus on students' experience of e-learning. They concluded that there was a scarcity of studies focusing on the learner voice (beyond that of simple course evaluations), far more emphasis appears to have been given to the practitioner perspective and on course design. They distilled out a number of overarching themes which emerge from their review of research studies on the students' experiences of e-learning. In terms of the student voice they highlight three aspects: *Emotionality* (students mixed views on the pros and cons of e-learning), *time management* (the contradiction between the tutor-centric view of the flexibility technologies afford and students' concerned about the additional time requirements), and *e-learning skills* (a wider range of skills than just

IT skills are needed for students to make most effective use of technologies to support their learning). In terms of the factors affecting the e-learning experience they highlight literature on the influence of the *tutor*, the influence of *pedagogy*, *learner differences* – gender, cultural, learner preferences, language, disability, etc, and *effectiveness as an e-learner*.

The ‘Learner Experience of e-learning’ or LEX project was carried out in parallel to LXP and was funded under the same JISC programme. Both LEX and LXP arose from the recommendations of the Sharpe et al. scoping study and were intended as initial pilot projects under the ‘understanding my learning’ strand of work. The focus of LEX was to ‘investigate learner’s current experiences and expectations of e-learning across the broad range of further, higher, adult, community and work-based learning (Creanor Trinder, Gowan, & Howells, 2006). The study focused on three main questions: characteristics of effective e-learners; beliefs and intentions; and strategies for effective e-learning. The findings led to the development of a conceptual framework which mapped five high level categories (life, formal learning, technology, people and time) against five influencing dimensions (control, identity, feelings, relationships and abilities). The SOLE project represented an important landmark project in terms of being one of the first to evaluate students’ experiences of Virtual Learning Environments (VLEs) (Timmis, O’Leary, Weedon, Harrison & Martin, 2004). Of particular interest is the discipline differences reported from the project. They noticed a marked difference between some subject areas in the roles of tutors and students.

Kirkwood and Price (2005) report on data spanning five years from evaluation data on students’ attitudes to and experiences of technologies. In terms of access to and use of ICT they suggest that there has been a fundamental shift in students’ access to ICT – arguing that this reflects not only attitudinal changes but the changing needs of society. Their meta-analysis shows that student access to, experience of and attitude towards technologies varies across subject disciplines and argue that: “Although students’ access to computers and to the internet is no longer considered an obstacle in some subject areas, there are still concerns in others (e.g. health and social welfare).” They also provide valuable insights into how students are using ICT in their studies, which mirror the findings reported here. For example they high use of generic software such as Word for preparing assignments and students habits in terms of using the internet to search for information and using a range of technology tools to communicate with peers and tutors.

Research methodology

The project adopted a methodology developed during a scoping study carried out by Sharpe et al. (2005), to collect data on learner experiences with e-learning. In general the research procedure was aimed at describing the learner’s personal background and (learning) context in which they integrate technology into their learning. The selection of learners was done in close collaboration with the participating subject centres, via tutors who have taken specific approaches, or were working in specific contexts. Learners who have been effective in their participation with e-learning were approached to capture their experience with e-learning.

The methodological approach consisted of two phases – a wider contextual review of the use of technologies across a broad spectrum of students using an online survey and a more in-depth series of case studies of technology use gathered through student audio log diaries and interviews. The online survey was used to gain a wider understanding of learners’ experiences around particular artefacts, whereas the case studies of individual learners (via the audio logs and interviews) included describing the nature of the e-learning activities carried out by the learner and exploring the e-learner context and background.

After the data had been cleaned up a total of 427 valid entries were received from the online survey. The survey was sorted according to subject centre and divided into qualitative and quantitative responses. Quantitative responses were imported into SPSS for analysis. 85 distinct audio recordings were collected. Audio recordings were sorted by subject centre and individual and coded indicating the subject centre/institution, individuals and the number of the message dropped. Audio logs were ordered and anonymised and a separate look up coding table created. A total of fourteen interviews were collected. Background information and notes were collected during each interview and the sessions were audio recorded. A cross table matching original log and interview details was created. Table one gives the breakdown of the data collected.

Table 1: Summary of data collected

Phase one – context		Phase two – case studies			
Survey		Audio logs	Interviews		
Economics:	128	Economics:	3	Economics:	2
Languages:	92	Languages:	47	Languages:	3
Medicine:	31	Medicine:	16	Medicine:	5
Computing:	158	Computing:	19	Computing:	4
Other:	18				
Total:	427	Total:	85	Total:	14

The combination of methods allowed for rich empirical data, as well as for the triangulation of interpretations of the data that result from the different methods and different individuals and groups targeted. The sampling strategy was to a degree pragmatic, working specifically with the four subject centres to identify appropriate courses and student cohorts to target.

A version of the questionnaire (http://www.geodata.soton.ac.uk/eLRC/learner_survey/) is available online. The survey covered a broad spectrum of technologies and contained a series of matrices of technologies against types of learning activities. These matrices drew on media types table developed by Laurillard (2002) and the definition of learning activities developed in the DialogPlus taxonomy (Conole, 2007; Conole & Fill, 2005) of learning activities as a basis for categorising types of technology and their use. The survey was initially developed by the project team. It was then improved in light of discussions with the four HE Academy subjects centres and finally via exposure to the JISC e-pedagogy group at a meeting on 22nd February 2006. The survey was sent out by the participating subject centres to reach a maximum number of students within their institutions. The survey was designed to be a mixture of qualitative and quantitative questions.

The second phase focused on the actual learning experiences. Based on the sampling strategy and the results of the survey, a selection of learners from across the subject centres were selected for in-depth case studies on their e-learning activities and experiences. Students were given an initial briefing by a member of the research team to outline the purpose of the study and their involvement. They were then asked to provide regular audio log diaries to demonstrate the different ways in which they were using the technology. To conclude the same member of the research team met again with the students and carried out a semi-structured interview to help contextualise and extend the findings emerging from the audio logs. Each student received fifty pounds as a token of gratitude for participating in the study.

The audio-logs were used to collect diaries on the students' learning activities over a period of time, when the students were engaged in their HE course. The use of audio-logs allowed the students to inform us each time they used some kind of technology to support their learning activities by leaving a phone message on our answering machine. It provided a means of gathering 'in-situ' use of technology on a daily basis which could then be interrogated in more depth in the follow up interviews.

Audio logs were chosen because such diaries can provide rich data about day-to-day events, as they happen, and contain a realistic account of the activities undertaken by the learners. Furthermore the outcomes of these diaries were then used to feed into the subsequent interview with the learner to reflect on the technologies they have used and the learning strategies that they have developed as a result. Previous research suggested that working with written diaries was useful but that these written diaries are often incomplete and participants usually find keeping diaries time consuming (Timmis et al., 2004). To overcome this we set up a server which students were able to ring and leave a message. Participants are asked to make short recordings during their activities about what they are doing.

At the end of each case study a selection of learners were interviewed across the four subject centres, the focus was on eliciting their experiences with integrating technology into the learning as is expressed in the main research questions. The interviews were held at the universities where the students were studying. A total of fourteen interviews were recorded. During the interview participants were asked to reiterate what kinds of technology they used during the audio log period. From this a series of semi-structured questions guided the conversations.

SPSS was used to analyse the quantitative data. Qualitative analysis was divided up into appropriate sections and manipulated in Excel. First a broad descriptive analysis was carried out across all the available data to see if some general patterns emerge. These patterns were then further analysed to see if there are differences between the participating subject centres. The qualitative data was then organized and coded according to emerging patterns and the results ranked, proportioned or directly quoted to support the quantitative findings. After gathering data on the level of individual students, the research team used several analytical methods to analyse each case study individually followed by an overarching study across the cases (study of cases). The central purpose of analysing qualitative data was to extract, generalise and abstract from the complexity of the data, evidence concerning e-learning activities and experiences in order to answer the main research questions. Relevant extracts from the interviews were transcribed and used to complement and extend the survey and audio logs findings. Importantly these extracts were used to provide more in-depth information about the strategies that the students used and how the technologies influenced their approach to learning and the impact this had on their daily lives.

Overarching findings

There were a number of both expected and unexpected findings arising from the data. In terms of expected findings the survey and audio logs confirmed that students used a range of basic software to support their learning – in particular Word and PowerPoint. Particularly for students studying numerical subjects, use of technology for data manipulation was also important and both Excel and more specialised statistical software were cited. Search engines were used extensively to find information and the Internet was clearly used by the majority as their first port of call for information. What was not expected but which did come across clearly from the data was the fact that students were using technologies in a variety of often very sophisticated ways to communicate with their peers and communication tools emerged as an important element in their strategies for learning – examples cited included using mobile phones, Instant messaging and discussion forums, as well as the expected use of email. One surprising result was that many of the students showed a marked lack of enthusiasm for VLEs (Virtual Learning Environments). Only one person mentioned a VLE as one of the four technologies they like to use most, and ten listed a VLE as a dislike. This could be interpreted as the institutional VLE being just taken for granted, or that it is seen as having relatively little value. However it is more likely to be because in those instances the VLEs are being used primarily as repositories for materials rather than being used in more imaginative ways to support learning. A further factor is evident with the Computer Science students who have a preference for building their own environments rather than using off the shelf packages.

Table 2 lists examples of the ways in which students are using technologies taken from the audio logs. It gives an indication of the rich and varied ways in which they are using technologies; the second half of this paper distills out the key findings in terms of how students learning strategies and practices are changing as a result of their use of technologies.

Table 2: Emergent practice in use of technologies

<p>The internet as the first place to find information Internet sites to find meanings and glossary Mobile phone find out about course work MSN to send course work to friends Use of Google for keywords/phrase Use of Wikipedia for definitions and terms Listening to 'expert' lectures as podcasts Use of mobiles to communicate with other students – to share ideas or get missing information Course websites sometime deemed confusing Use of other students' homepages for information Development of e-portfolios and links to own professional practice Use of mobile to text class mates to get exam hints Blogs for personal reflection</p>
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From the quantitative data on the survey a number of key overarching findings emerged. E-learning was cited as an important part of their course across all four subject domains (64% - Econ; 62% - Lang, 78% - Med; and 67% - Comp, agree or strongly agree). The response to the question 'With e-learning I interact more with other students' was lower across the disciplines (26% - Econ; 34 % Lang; 17% - Med; and 35 % - Comp, agree or strongly agree), perhaps giving an indication of the degree to which e-learning is embedded into the course design. E-learning was seen as an important tool for learning and was perceived as helping to make learning easier (67% - Econ; 62% - Lang; 60 % Med; and 57 % - Comp).

Emergent trends

Analysis of the data reveal a number of interesting results which give us a valuable insight into students' current practice in using technologies and their experiences. These are discussed here under five main headings which emerged from the data:

- Students use of technology for information purposes;
- Students use of technology for communicative purposes;
- The nature of students' environment in which they learn;
- Students perceptions of e-learning;
- Changing nature of practice.

Information

The first issue in relation to the use of information is that it is evident that students' perception of the nature of content is changing.

The first thing I do when given any piece of word is type it into a search engine! This gives me the opportunity to see how different people interpret the title. From there I can focus on one main idea and use the electronic resources to support my initial findings or indeed rule them out. E-mail is always vital with communicating with different mediums. Teachers for support.

This is a consequence of the fact that information is available readily and usually free; it is perceived as therefore having lower intrinsic value. Students are also used to high presentation standards and increasingly expect a high degree of interactivity of materials. This raises fundamental questions about the value of content in institutions and the appropriateness and nature of assessment processes. The second issue relates to the cost and value of content. The data consistently showed that students were accessing a rich variety of free material, and that the internet was their first port of call for information. Their perception of the value of materials therefore is different – if information on anything is available freely and easily what is its value? The third issue relates to presentation of content. Students expect good quality material, which is interactive and engaging; however there is a mismatch between this expectation and what the majority of students are being given in their institutions. The final issue relates to the new literacy skills that the students need and are demonstrating. These include skills of evaluation and an ability to critique and make critical decisions about a variety of sources and content.

Communication

Students are using tools in a variety of different ways to communicate with friends, family, peers and tutors.

I use email to communicate with everyone, especially lecturers; arranging meetings, asking questions about work and queries over assignments etc. I write all my assignments using Word and to sort through the information I find, make notes of what I still need to do, and spell check my emails that I'm sending to lecturers.

Search engines are used to find news articles. They also use the internet to access expert knowledge (which is an indirect form of communication) and have an expectation of being able to communicate with anyone, about anything, when they want to. New forms of collaboration are emerging both with peers and

via new 'smart' and adaptive technologies, suggesting a shift towards Salomon's (1992) notion of 'distributed cognition' and shared enterprise with tools.

Environment

The data revealed that the students are learning in a complex and changing environment, using a plethora of technological tools to support their learning: USB pens, ipods, mps players, integrated phones and specialized screen displays for reading were amongst the variety of tools cited.

I use my laptop to store data and type my course works. The MP3 player serves as a storage media used to save most of my assignments, electronic journals and articles, while I use MS word application to type most of my course works. The electronic library gives me access to books, journals and articles all of which are important for my study

The survey data confirmed that this really is the 'nintendo' gaming generation (Morice, 2000) and that the boundaries between students' use of technologies for learning and gaming are blurred. The rich, interactive and engaging environment of games however has lead to an increased expectation of similar levels of quality for learning materials. There is evidence that there is shift from passive to more interactive interactions across all aspects of their learning. Finally many now have their own PCs and wireless internet access and have become accustomed to being able to access information or contact people on demand, anywhere.

Perceptions

Students are evidently comfortable with using technology and see it as integral to their learning. They are generally sophisticated users, using technologies in a variety of different ways to support different aspects of their learning.

I use them to find out information for assignments, and also to help me clarify my notes on each subject area that I study. Instant messaging is used to discuss issues with friends if a topic is not understood.

I use the mobile phone and email to communicate with tutors and members of groups which I am in. The electronic library facilities to read online journals, reserve books and search for relevant texts and the word processing package to present my information.

They are critically aware of the pros and cons of the use of different technologies and 'vote with their feet' – i.e. they do not use technologies just for the sake of it – there needs to be a purpose and clear personal benefit.

I don't think I 'fit it around' other learning activities, I find to learn effectively I use them to complement each other i.e. searching elec. library to find a paper and then printing it off to read.

They don't see the technology as anything special. It is just another tool to support their learning. Finally they have an expectation of being able to access up to date and relevant information and resources and see this as vital.

Use it alongside traditional learning, sometimes do activities completely based on technology, but often use them together, i.e. research using books then write essay on laptop, or find an activity online, e.g. grammar exercise and print it off and do it as a hard copy.

Indeed a number of students found the whole idea of differentiating between 'learning' and 'e-learning' inappropriate.

This is a silly question. We've been brought up using new technologies, and introducing new ones to our way of working as new technologies appear. It's not a case of "fitting around" it's just the way I work, using multiple methods, some "traditional", some e-learning

But throughout the findings about views on e-learning, its' importance in comparison with other forms of learning is mixed, depending on a complex range of factors such as personal preferences, experiences of technologies, relevance and peer/tutor pressure.

One half of my course has really embraced e-learning and the other has not done so to the same extent; the side that has embraced it to a greater extent is a more organised school than the other.

Practice

The Web is unequivocally the first port of call for students – with extensive examples across the study of how students are using search engines, dedicated subject-specific sites, and e-journals to find information of relevance to their studies. What is surprising perhaps is the extent of this as a common practice amongst the students and the sophisticated ways in which they are finding and synthesising information and integrating across multiple sources of data. Similarly, technologies are used extensively by students to communicate with fellow peers and tutors, with students demonstrating use of a variety of tools (email, MSN chat, skype, mobile phones, etc.) to support a range of different communicative tools. Again, the level and type of communication is notable – there is strong evidence of peer support and peer community, reminiscence of the rhetoric inherent in the idea embedding in social networking and the world of Web 2.0 (O'Reilly, 2005). The key picture that emerges is that students are appropriating technologies to meet their own personal and individual needs – mixing use of general ICT tools and resources, with official course or institutional tools and resources.

The above findings point to a profound shift in the way in which students are working and suggest a rich and complex interrelationship between the individuals and the tools. The follow eight factors emerge from the data in terms of the changing nature of the way students are working:

- 1 *Pervasive and integrated*: Students are using technologies extensively to find, manage and produce content. They use technologies to support all aspects of their study. Students are using tools in a combination of ways to suit individual needs. There is evidence of mixing and matching. They are comfortable with switching between media, sites, tools, content, etc. They said that technologies provide them with more flexibility in terms of being able to undertake learning anytime, anywhere.
- 2 *Personalised*: They appropriate the technologies to suit their own needs. They use the computer, the internet and books simultaneously. Their learning is interactive and multifaceted, and use strategies such as annotation and adaptation of materials to meet their learning needs.
- 3 *Social*: Students are part of a wider networked, community of peers. They are members of a range of communities of practice - to share resources, ask for help and peer assess.
- 4 *Interactive*: Students' perception of the nature and inherent worth of 'content' is changing. They have access to a rich variety of free material and are increasingly expecting high quality, interactive and engaging materials of the type encountered in gaming environments. Content is no longer 'fixed' and 'valued', it is a starting point, something to interact with, to cut and paste, to adapt and remix.
- 5 *Changing skills set*: Students need and are demonstrating new skills in terms of harnessing the potential of technologies for their learning. These include developing skills of evaluation and an ability to critique and make critical decisions about a variety of sources and content. Students are becoming sophisticated at finding and managing information (searching and structuring).
- 6 *Transferability*: They see the PC as their central learning tool. They are used to having easy access to information (for travel, entertainment etc.) and therefore have an expectation of the same for their courses. There is evidence of the transfer of practices of the use of technologies in other aspects of their lives to the learning context, for e.g. MSN chat, Amazon, ebay and Skype.
- 7 *Time*: The concept of 'time' is changing – both in terms of expectation of information and results on demand. There is evidence of a fragmentation of the learning timetable.
- 8 *Changing working patterns*: New working practices using an integrated range of tools are emerging. The use of these tools is changing the way they gather, use and create knowledge. There is a shift in

the nature of the basic skills with a shift from lower to higher levels of Blooms taxonomy, necessary to make sense of their complex technological enriched learning environment.

Students are evidently comfortable with using technology and see it as integral to their learning. They are generally sophisticated users, using technologies in a variety of different ways to support different aspects of their learning. They are critically aware of the pros and cons of the use of different technologies and ‘vote with their feet’ – i.e. they do not use technologies just for the sake of it – there needs to be a purpose and clear personal benefit. They have an expectation of being able to access up to date and relevant information and resources and see this as vital. They do not see the technology as anything special, but see it as just another tool to support their learning.

Conclusion

The project tried to capture the ways in which learners are using ICT - both in formal and informal learning - for educational purposes and other aspects of their lives. What is transpiring from the audio recordings and the survey is that many learners see technology as integral to all aspects of their lives. A similar study found the main tool used for learning in small and medium enterprises (SMEs) was Google (Atwell, 2005), and that people with a prior qualification were more likely to use ICT for learning, regardless of what the course was. This raises the question of how people are constructing or scaffolding knowledge. Knowledge in the past was generally acquired through formal learning and it was structured by academic and curricular concerns. But if people are now gaining knowledge informally through communities of practice then how do they build on and develop knowledge?

Clearly new and different skills are needed and a lot of research has shown that despite the fact that learners are now IT-literate (and have experience of using technologies in their daily lives, interaction with games etc.) they are not academically e-literate and still lack the necessary skills to make appropriate critical use of information. The results suggest that different learners use a combination of different tools in different ways to meet their own personalised and individual needs; some students keep tools for learning and tools for leisure separate, whilst for others the boundaries of the use of mp3 players, MSN chat etc. are more blurred. The tools appear to be used as appropriate for specific tasks, for example, some learners appear to separate their communication channels into work and leisure by having separate email accounts. Technology is constantly re-invented to support learning activities and there is a complex co-evolution of tools and their use. This has resulted in significant changes in the way that students are learning, which we need to take account of in the way we support learning and the institutional environments we provide.

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Acknowledgements

We would like to thank the Joint Information Systems Committee for providing the funding for this study and also members of the LEX project and Rhona Sharpe's team for valuable discussions and feedback on the project.

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