# Exploring Students' use of ICT and Expectations of Learning Methods

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**Abstract:** This study investigates changing patterns in students' use of electronic tools over a four year period, mapping changes in social communications with expectations in formal learning. The data, collected from 2001 to 2004, reflect the views of 2215 university entrants, the majority of whom were aged between 17 and 20 years across a range of disciplines (Business, Science and Engineering) on their first day at university. Although the data was collected prior to the emergence of the contemporary social technologies, it tests an underlying assertion that students' expectations of learning are strongly influenced by their prior experiences. Results show no correlation between the extent of university entrants' use of Information and Communications Technologies (ICT) and their expectations of how they will learn. Despite a dramatic increase in students' use of ubiquitous technologies over a four-year period, their expectation of how they might learn at university remained relatively static over the same timeframe.

## 1. Introduction

Global, societal and technological changes are affecting the way we live, work and learn. There has been a transformation in daily communications, as electronic devices such as mobile phones, digital cameras, ipods, MP3 players and computer game consoles become ubiquitous. Social network sites (SNS) such as MySpace and Facebook are gaining rapid popularity, especially amongst groups of young people (Owyang, 2009). As the time spent communicating via technology tools increases rapidly, there is a sense in which young people wish to use them to support many aspects of their lives (Goldsmith, 2009).

Digital technologies and environments could have a significant potential to support learning in formal educational domains. However, their effective use requires students to move beyond using tools for social purposes and gain an understanding of how tools can be used to support learning (Beetham, McGill, Littlejohn, 2009). Students need to develop an insight into how tools can support a wide range of learning literacies, such as taking control of their own learning, engaging with discourses, constructing meaning and exploring identity (Sefton-Green, 2004).

Some educators consider that these literacies are inherent within school leavers entering university, sometimes referred to as the 'NetGen' (Net Generation) or 'digital natives' (Oblinger and Oblinger, 2005; Prensky, 2001). There is a belief that learners think and process information differently - that they are 'multi-taskers' who can 'parallel process' information more effectively than so-called 'digital immigrants' (Prensky, 2001). Recently these claims have been widely contested, since the underlying assumptions have not been explored and there is little evidence to draw upon.

There is conflicting evidence in the literature as to the ease with which digital literacies can be transferred across boundaries – see Beetham, McGill, Littlejohn (2009) for a review of this debate. Some studies conclude that students can acquire a range of literacies when they use digital tools for social purposes (Willett and Sefton-Green, 2003). Under certain circumstances, these literacies appear to be transferred to support learning in educational contexts (Conole, de Laat, Dillon, and Darby, 2006; Creanor, Trinder, Gowan, and Howells, 2006). However, other studies conclude that learners find it difficult to transfer literacies across boundaries (Carmichael, Miller, and Smith, 2007). An important factor inhibiting the transfer of literacies across boundaries appears to be learners' expectations of how they will learn. During transition to university students have ideas about how they will be taught in class, their own academic abilities and study skills, how they should study and how 'learning' will take place (Ipsos MORI, 2007). During their period of study these expectations constantly change, as they are revised in response to new experiences (Bamburg, 1994).

Nevertheless these expectations shape how students expect to learn and study on transition to higher education.

Educational psychology literature reveals that prior expectations exert powerful influences upon student behaviour, whether they are internal, self-expectations of students or arise from external agents, such as teachers (Kirsch, 1999; Merton, 1968; Rosenthal & Jacobson, 1992). To date, most studies in this area have been short term; they do not provide data that allow reliable and meaningful trend analyses. Also, these studies have not investigated students' expectations at the point of transition to higher education.

This article outlines an explorative study into students' expectations of approaches to learning at university, measured during the transition phase (i.e. students' their first day at university). The study investigates changing patterns in students' use of electronic tools over a four year period, mapping changes in social communication with expectations in formal learning. Although the data was collected during the time period 2001-2004, when there was limited use of SNS technologies, the underlying assertion, that students' expectations of learning is strongly influenced by their prior experiences, still holds true. The study is guided by the following research questions:

- What are students' expectations of approaches to learning at university?
- How did these students learn before they came to university?
- What are the trends in using the web and email over a four year time period?
- Is there a relationship between students' use of technology and their IT skills?
- Is there a difference between students' preferred ways of learning (i.e. with or without technology) and their IT skills?

## 2. Methods

### 2.1 Data collection methodology and instrument

Data were collected using a paper-based questionnaire. The questionnaire was distributed to first-year students when they arrived at an induction session on their first day at university. The questionnaire was completed immediately and returned to the researchers during the session.

The questionnaire comprised seven questions exploring students' experience of learning prior to entering university and their expectations of how they will learn at university. To avoid jargon, the questions referring to learning methods were worded in such a way as to make it easier for students to understand them (ie did they expect to make use of books / handouts, web resources, videoconferencing, online or face-to-face discussions and so on). Other questions related to whether or not students thought that they required support in ICT skills or other learning skills that would help them to use ICT. They were also questioned on their frequency of use of a range of ICTs (web, e-mail, online discussion fora, text messaging, etc.). Preferred approaches to learning were assessed through multiple-choice questions. Questions relating to students' perception of their own IT skills' level were based on a dichotomous answer (yes or no). The frequency of use of various types of technologies was measured on a Likert scale ranging from 1('never') to 5 ('most days'). While the questionnaire as a whole was self-explanatory, all respondents were provided with verbal instructions and students were encouraged to ask questions if anything was unclear. The full questionnaire is included in the Appendix.

### 2.2 Respondents

Data were collected from a large sample of Business, Science and Engineering undergraduates on their first day at a single university (the University of Strathclyde in the UK) between 2001 and 2004 (n = 2215). Although the responses were collected at one institution, the data reflects the views of respondents who transferred to Strathclyde from a range of schools, colleges and workplaces. The majority of respondents were school-leavers in the age range of 17-20 years. The majority of participants had enrolled to study Science (n = 1492, 67%), approximately one third of the sample were Engineering students (n = 592, 27%) followed by a small number of Business students (n = 127, 6%).

## 3. Results

### 3.1 Background information

The first question related to students' reasons for entering higher education. Many respondents believed a degree would help them enter their desired career (n = 1152, 64.3%) or would increase their earning potential (n = 459, 25.6%) (table 1).

**Table 1:** Respondents' reasons for going to university

| Reason for going to university | 2001 | 2002 | 2003 | 2004 | Total 2002 - 2004 |
|---|---|---|---|---|---|
| | | **Year** | | | |
| It leads to your desired career | N= 410 students did not answer this question as it was not included in the 2001 survey | 232 (60.3%) | 494 (64.4%) | 426 (66.6%) | 1152 (64.3%) |
| Greater earning potential as a graduate | | 115 (29.9%) | 200 (26.1%) | 144 (22.5%) | 459 (25.6%) |
| It was expected of you | | 16 (4.2%) | 26 (3.4%) | 25 (3.9%) | 67 (3.7%) |
| Not quite sure | | 10 (2.6%) | 17 (2.2%) | 20 (3.1%) | 47 (2.6%) |
| It's better than a dead-end job | | 7 (1.8%) | 16 (2.1%) | 12 (1.9%) | 35 (2.0%) |
| You've heard the social life is fantastic | | 3 (0.7%) | 5 (0.7%) | 7 (1.1%) | 15 (0.8%) |
| It delays the problem of job seeking | | 2 (0.5%) | 6 (0.8%) | 4 (0.6%) | 12 (0.7%) |
| You couldn't get a job | | -- (0.0%) | 3 (0.4%) | 2 (0.3%) | 5 (0.3%) |

The second question aimed to clarify participants' perceptions of the difference between learning at their previous location (school, college or work) and at university. The majority of respondents (n = 1510, 84.4%) anticipated that learning at university would be different from their previous experience of learning (usually at school) (table 2).

**Table 2:** Respondents' understanding of the difference between school and university

| Difference between school and university | 2001 | 2002 | 2003 | 2004 | Total 2002 - 2004 |
|---|---|---|---|---|---|
| | | **Year** | | | |
| Very different | N= 410 students did not answer this question as it was not included in the 2001 survey | 311 (80.4%) | 648 (85.3%) | 551 (85.8%) | 1510 (84.4%) |
| A little different | | 37 (9.6%) | 60 (7.9%) | 55 (8.6%) | 152 (8.5%) |
| No opinion | | 39 (10.0%) | 49 (6.4%) | 35 (5.4%) | 123 (6.9%) |
| About the same | | -- (0.0%) | 3 (0.4%) | 1 (0.2%) | 4 (0.2%) |

Note: The original response options for this question included "haven't a clue" and "never thought about it" (see Appendix). For analysis, the responses in these two options were combined into a "no opinion" category.

This response is at odds with answers to subsequent questions, indicating that the majority of respondents anticipated few differences in approaches to learning at university as compared with school, college or work (see 3.2). Subsequent studies revealed similar findings, reporting the main difference anticipated by students is increased personal responsibility for learning at university (Conole et al, 2006).

### 3.2 What are students' expectations of approaches to learning at university and how did students learn before they came to university?

Learners' preferred approaches to learning were grouped into two categories:

- Learning without technology support (books, printouts, library, face-to-face, TV/video/DVD),

- Technology-enhanced learning (email, internet, online discussion, CD ROM, videoconference)

The vast majority of respondents reported that, prior to entering university, their approaches to learning did not involve technology. They anticipated they would prefer similar learning methods during their university studies (table 3). When correlating preferred learning methods at school/college/work with learning methods expected at university, this pattern is confirmed ($r = .345$, $p < .001$, 2-tailed) meaning respondents' preferred methods of learning at school/college/work significantly reflected their preferred learning methods at university. Note that the correlation coefficient is small; there may be other factors that contribute to the variance in students' preferred approaches to learning at university.

**Table 3:** Number of students indicating their past and expected preferred method of learning per category *per year*

| Method of learning | Number of students indicating preference for method of learning | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | At school | | | | At university | | | |
| | 2001 | 2002 | 2003 | 2004 | 2001 | 2002 | 2003 | 2004 |
| Non-technology enhanced | 388 (94.6%) | 371 (95.6%) | 747 (96.8%) | 615 (95.6%) | 366 (89.3%) | 357 (92.0%) | 722 (93.5%) | 588 (91.6%) |
| ICT-supported | 12 (2.9%) | 15 (3.9%) | 19 (2.5%) | 21 (3.3%) | 21 (5.1%) | 21 (5.4%) | 39 (5.1%) | 44 (6.9%) |
| Both (no preference) | 10 (2.4%) | 2 (0.5%) | 6 (0.8%) | 7 (1.1%) | 23 (5.6%) | 10 (2.6%) | 11 (1.4%) | 10 (1.6%) |

### 3.3 What are the trends in using the web and email over a four year time period?

The overall trend in students' use of ICT technologies in their social life, (use of the internet, email, chatting online and text messaging, etc) was found to increase each year (table 4). Despite this increase in the use of ICT for social purposes, students' expectations of learning methods at university centred around learning without technology, supported by non-digital resources (books, handouts) as well as classroom based discussions (surfing the web: $r = -.77$, $p < .001$; emailing: $r = -.054$, $p < 0.5$; chatting online: $r = -.056$, $p < .01$). It is interesting to note that although correlation coefficients are small for email and chatting online, there is a strong association for surfing the web, explaining almost 60% of the variance.

**Table 4:** Number of students reporting use the web, email, online chatting and text messaging at least once a week

| Number of respondents reporting… | Year | | | |
|---|---|---|---|---|
| | 2001 | 2002 | 2003 | 2004 |
| To surf the web | 262 (34.3%) | 301 (79.0%) | 730 (82.3%) | 552 (86.1%) |
| To use email | 248 (60.9%) | 277 (72.3%) | 560 (73.1%) | 500 (77.7%) |
| To chat online | 24 (6.1%) | 140 (36.8%) | 378 (49.6%) | 353 (55.1%) |
| To use text messaging* | - | 350 (91.4%) | 712 (92.6%) | 607 (94.6%) |

*In 2001, the answer option of text messaging was not part of the survey, and thus no data are available.

### 3.4 Is there a difference between students' preferred ways of learning (i.e. with or without technology) and their IT skills? Is there a relationship between students' use of technology and their IT skills?

In line with previous research question (3.3), general trends in the reported competency in IT skills increased each year (table 5).

**Table 5:** Number of students reporting the thought competence of their IT skills

| Number of respondents reporting their IT level to be… | Year | | | |
|---|---|---|---|---|
| | 2001 | 2002 | 2003 | 2004 |
| Advanced | 11 (3.3%) | 13 (4.9%) | 56 (7.9%) | 51 (8.2%) |
| High (A-level) | 78 (23.7%) | 73 (27.7%) | 243 (34.3%) | 207 (32.6%) |
| Standard (GCSE) | 97 (29.5%) | 75 (28.4%) | 218 (30.7%) | 207 (32.6%) |
| Basic | 130 (39.5%) | 95 (36.0%) | 186 (26.3%) | 160 (25.2%) |
| Non-existent | 13 (4.0%) | 8 (3.0%) | 6 (0.8%) | 9 (1.4%) |

Frequency analysis indicates that those students who perceived their IT skills to be advanced were more likely to indicate that they would prefer to use technology-supported learning methods at university ($\chi^2 = 56.90$, df = 1, p < .000). Likewise, students who stated their IT skills were basic were also more likely to report that they expected to prefer learning without technology at university ($\chi^2 = 474.75$, df = 1, p < .000) (table 6).

**Table 6:** Number of students indicating expected preferred learning method at university compared with perceived level of IT skills

| | | Reported IT level | | | | |
|---|---|---|---|---|---|---|
| | | Advanced | High | Standard | Basic | Non-existent |
| **Expected preferred learning method** | Non-technology enhanced | 104 (5.8%)* | 550 (30.9%) | 555 (31.2%) | 540 (30.4%)* | 30 (1.7%) |
| | ICT supported | 20 (18.0%)* | 38 (34.2%) | 28 (25.2%) | 23 (20.7%)* | 2 (1.8%) |

Further analysis was conducted on students' IT skills and their use of IT technologies in their social time (table 7). Results indicate a significant positive relationship between respondents' use of technologies in social time and reported advanced IT skills. This is to say that the more advanced students perceived their IT skills the more likely they were to engage in technology-supported activities such as chatting online and surfing the web at an *increased* frequency. Note that correlation coefficients are small, explaining less than 10% of the variance.

**Table 7:** Correlation Coefficient and significance value indicating the relationship between students' use of technologies and their reported level of IT skills

| | Students reporting to… | | | |
|---|---|---|---|---|
| | surf the web | email | chat online | text message |
| **Reported level of IT skills** | r = .323<br>p < .000 | r = .257<br>p < .000 | r = .249<br>p < .000 | r = -.027<br>p > .05 |

## 4. Discussion and conclusion

The main aim of this study was to explore the relationship between new university entrants' expectations of learning methods, their past learning methods and their use of ICT in social situations (outside formal education). We were particularly interested in evidence of students transferring their ICT skills from social setting (e.g. using email for social communication or the internet for information gathering) to educational situations (e.g. for systematic access to information and to support knowledge sharing). Much of the debate in the educational technology literature assumes a correlation between students' routine use of ICT and their expectations of how they will learn at university. However, this assumption is largely anecdotal. Although there are some small–scale studies pointing to lack of correlation between students' use of technology in social situations and in formal educational settings, there are few investigations, like this one, with large number of students.

This study reveals a more complex picture than an assumed causal relationship. There are a number of inter-related factors that lead to this complexity:

A major finding of this study is that, despite a dramatic increase in students' use of ubiquitous technologies (in this case web, e-mail, online communication and text messaging) over a four-year period, their expectation of how they might learn at university remained relatively static over the same timeframe. Expectations of learning at university appear to be influenced more by prior experience of learning in formal situations than by use of technology outside educational settings. This is true even though the majority of students indicated they believed learning at university would be very different from learning at school/ college/work. While it is clear that students know how to use e-tools, they might not have a clear understanding of how to use these tools effectively *to support learning*, or indeed they may not be motivated to transfer their skills to different settings. According to the LEX study (2007) students perceive personal, face-to-face contact with tutors as the backbone of their learning. The authors suggest that students may not fully understand how ICT and formal learning can work together outside an educational context. In addition, this raises a number of questions about students' motivations for learning in university. If the educational system encourages students to focus on passing 'traditional' examinations focused on testing factual knowledge transmitted through lectures and textbooks, students may favour "traditional" approaches to learning even if outside institutions of higher education they learn and interact in a different way.

There is however a clear difference between students' expected learning method at university depending on their self-perceived level of ICT skills. Students who perceived they had better ICT skills were more likely to favour technology-supported learning (i.e., use of online communication, videoconferencing, etc.). This finding indicates that ICT skills may be an important variable, although it is not likely to be the only contributing factor to students' self-expected ability to use technology effectively in support of learning. A possible cause is higher digital literacy of students who have good ICT skills.

The concept of the 'self-fulfilling prophecy model' may have some bearing on the effects observed in this study (Merton, 1968). It is possible that students who believe themselves to have basic IT skills (regardless of whether these students' assumption is correct) may intrinsically avoid using ICT supported learning methods. Bandura's (1977) self-efficacy theory, the belief in one's own capabilities and skills to manage a situation or reach a goal, along with motivational theories, may also be highly relevant in this context (Jernigan, 2004). While these theories have been examined in respect to *what* students expect to learn, they are yet to be linked to the question of *how* students expect to learn, and how their expectations may impact on their performance.

This study is explorative in nature, and findings presented require further research and investigation. While the research findings are statistically significant, correlation coefficients were small. For example the correlation between students' self-perception of their IT skills and their use of technology tools in their social time was low. This indicates that there are additional factors that may explain this relationship better.

Despite these limitations, the study adds to our understanding of changing patterns in students' use of electronic tools for learning, particularly since it draws upon a large data sample over several years at a mainstream, UK university. Given the data collection period, the sample obtained will be largely representative of the population under study. A limitation may be that the data obtained stems from 2001 to 2004, however, of importance here is the study of ICT trends and developments over a four year timeframe. This observation can be applied to current ICT trends and usage. Another positive outcome of this study is that the data collected captures new entrants' expectations at this particular point of transgression from school to university. . The findings presented here imply that students' prior experiences of learning may be an important factor in shaping their approaches to learning at university. Students' expectations and preferences are a positive (though not the sole) contributor to their preferred approaches to learning

Many universities are already integrating a range of digital literacies into their curricula. These literacies extend beyond ICT skills, critical information literacy skills (Elmborg, 2006; Johnston and Webber, 2003) or social networking literacies (Boyd and Ellison, 2007) in isolation towards the integration of such literacies (Holt et al, 2006). While individual sets of literacies are well researched, very little work has been carried out on their integration and embedding within the curriculum

(Beetham, McGill, and Littlejohn, 2009). Learners' development of these sort o digital literacies is likely to be an essential aspect in dealing with the societal and technological changes occurring in the world.

## 5. Appendix: questionnaire-

**Student Survey Science Faculty 2004**

Welcome to the University of Strathclyde! You are about to participate in a Student Induction session which aims to help you make the most of your time at Strathclyde. Before the session begins, please fill in this form. It is important that you hand the survey in with your name and degree course written in black capitals.

| **What was your reason for coming to university? (tick one option)** | |
|---|---|
| | It was expected of you |
| | It leads to your desired career |
| | You couldn't get a job |
| | You've heard the social life is fantastic |
| | It's better than a dead-end job |
| | It delays the problem of job seeking |
| | Greater earning potential as a graduate |
| | Not quite sure |
| **The difference between university and school is? (tick one option)** | |
| | Very different |
| | A little different |
| | About the same |
| | Haven't a clue |
| | Never thought about it |
| **What were your preferred ways of learning before coming to university (tick three options)** | |
| | Books |
| | Printed handouts |
| | Email |
| | World wide web |
| | Library |
| | TV/video/DVD |
| | CD ROM |
| | Online discussions (eg. Chatrooms, bulletin boards) |
| | Face-to-face discussions |
| | Videoconferencing |
| **What will be your preferred ways of learning at university (tick three options)** | |
| | Books |
| | Printed handouts |
| | Email |
| | World wide web |
| | Library |
| | TV/video/DVD |
| | CD ROM |
| | Online discussions (eg. Chatrooms, bulletin boards) |
| | Face-to-face discussions |
| | Videoconferencing |

**Please tick the appropriate box for the following questions:**

| | advanced | Higher/ A-level | GCSE/ Standard level | basic | Non-existent |
|---|---|---|---|---|---|
| | | | | | |

| At what level are your IT skills | | | | | |
|---|---|---|---|---|---|
| | Most days | Once per week | Once per month | Less than once per month | never |
| How often do you surf the web? | | | | | |
| How often do you use e-mail? | | | | | |
| How often do you chat online? | | | | | |
| How often do you use text messaging? | | | | | |

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