

3.0 Investigating the Net Generation

3.1 Rationale and Method

This project focussed on use of new and emerging technology-based tools in three areas: communication, publishing and file sharing. Traditional digital communications technologies (mobile phones and email) have recently been supplemented by other web- and phone-based communications tools, including instant messaging (e.g. *Messenger*) and Web 2.0 technologies such as social networking and blogs (Alexander, 2006; Bryant, 2007). Accordingly, in addition to the more entrenched technologies this project focussed on emerging technology-based tools such as: web-based communications tools including instant messaging and social networking; text-based mobile phone communication; online publishing using blogs and wikis; digital file sharing using the web and mobile phones; the use of the web to access published material particularly via syndicated feeds (e.g. RSS) and the use of MP3 players for audio playback and podcasting.

The project was conducted in three stages: *Investigation*, *Implementation* and *Dissemination*. The Investigation stage documented how first-year Australian university students, and university staff, routinely use established and emerging technologies, both in their day-to-day activities and to support students' learning. This stage comprised two phases of data collection. In the initial phase, a questionnaire was circulated to first-year students in a range of disciplines across the three participating institutions. This questionnaire asked students about the degree to which they accessed and used technology-based tools, how they used technology to create and exchange information and knowledge, their perceived skill with these technologies, and their perceptions of how useful technologies were or how the use of technologies could be improved in their studies. A questionnaire asking broadly similar questions was circulated to teachers in the students' discipline areas. This asked teachers about their experience and skills with a range of technologies and technology-based tools and how they currently use technology to support student learning. The student and staff survey data were collected in the second half of 2006.¹

¹ Copies of the questionnaires used are available from www.netgen.unimelb.edu.au

In the second phase of the Implementation stage a series of interviews and focus group sessions were conducted with students to better understand their use of the most popular technologies. The focus group sessions enabled us to gather more detailed information about how students used specific technologies for particular purposes, what they like about popular technologies, and to explore ways in which they thought these technologies could be harnessed for educational purposes. A second series of focus group sessions were conducted with teaching staff and educational designers. Again, these focus group sessions asked how staff use popular technologies both in their everyday lives and to support their teaching activities. The staff focus group sessions also identified facilitators and barriers to the use of emerging technologies and technology-based tools in local learning contexts.

3.2 Demographic Data

3.2.1 Staff and student survey data

Table 3.1 gives the percentage of students and staff from each of the three universities that made up the sample.

| University | Students (n= 2588) | Staff (n=108) |
|--------------------------|--------------------|---------------|
| University of Melbourne | 45.4 % | 24.1 % |
| University of Wollongong | 27.5 % | 14.8 % |
| Charles Sturt University | 27.0 % | 61.1 % |

Table 3.1: Percentage of students and staff from each university in the sample.

Overall, there were more female respondents than male (Females: 68.9%; Males: 31.0%) although for the staff sample slightly more males than females responded (Males 53.3%; Females 46.7%). Table 3.2 shows the age ranges of the student and staff samples. The vast majority of student respondents (84.4%) were nominal members of the Net Generation, being 25 years of age or younger, while only a small number of staff (7.5%) could be put in this group (see McCrindle, 2006; Oblinger & Oblinger, 2005).

| Age | Students (n= 2588) | Staff (n=108) |
|---------------------|--------------------|---------------|
| 25 years or younger | 84.4% | 7.5% |
| 26-34 | 9.1% | 21.7% |
| 35 years or older | 6.5% | 70.8% |

Table 3.2: Age distribution of students and staff in the sample.

A key aspect of the Investigation stage was to consider how the students' experiences with technology may differ as a function of the discipline in which they were studying. Students were asked to nominate the course and subject in which they were responding to the questionnaire and these were used to classify students into the discipline categories of *Arts*, *Science*, *Professions*, and *Mixed* categories (based on the Australian Standard Classification of Education Codes (see Trewin, 2001)). The percentage of students in each of these categories is reported below (Table 3.3).

| Discipline | Students (N =2588) |
|-------------|--------------------|
| Arts | 23.2% |
| Science | 24.7% |
| Professions | 37.2% |
| Mixed | 13.0% |
| Missing | 1.9% |

Table 3.3: Proportion of students by discipline in the sample.

Other demographic data for the student sample that may be of particular interest are presented in Table 3.4.

| Demographic Characteristic | Proportion of Student Sample |
|--|------------------------------|
| Part-time students | 3.9% |
| Students studying in distance mode | 9.5% |
| Students from non-English speaking backgrounds | 21.5% |
| International students ² | 12.6% |
| Aboriginal or Torres Strait Islander students | 1.0% |
| Students with a disability | 2.1% |
| Students living in a 'Major City' ³ | 67.7% |
| Students living in an Outer Regional or Remote area ³ | 6.5% |
| Students who were of 'Low' socio-economic status ⁴ | 34.0% |

Table 3.4: Indicative demographic characteristics of the student sample.

² On-campus students from other nationalities visiting Australia on a student visa.

³ Remoteness index was based on national postcode (Australian Bureau of Statistics, 2006).

⁴ Socio-economic status was determined by the postcode of local students' permanent home address.

3.2.2 Staff and student interview data

In total 46 first-year students took part in the interviews or focus group sessions. Twelve student interviews and six focus group sessions were conducted, involving 11 students from the University of Melbourne, 19 students from the University of Wollongong, and 16 students from Charles Sturt University. Students were asked about the technologies they used in their everyday lives, the technologies they used to support their studies, and the technologies they would like to be able to use to support their studies.

A total of 31 staff were interviewed or participated in focus group sessions across the three universities. Participants included nine lecturers/tutors at the University of Melbourne, eleven lecturers and two educational designers at CSU, and six lecturers, and three educational designers at the University of Wollongong. Staff were asked about the technologies they used in their everyday lives, about how they design and teach their subjects, how they currently use technology to support their teaching, what technologies have been successful and unsuccessful, what technologies might be useful in the future, and what they saw as barriers and facilitators to the adoption of technology for teaching and learning.

3.3 Descriptive Findings

3.3.1 Students' access to hardware

Students were asked to indicate their level of access to types of technology, not including their access on campus. Figure 3.1 shows almost ubiquitous student access to mobile phones and high access to desktop computers, memory sticks, digital cameras and camera phones. Only nine students reported having no access to a computer (desktop or laptop) and while access to MP3 players is high, over one fifth of students (21.6%) reported having no access to an MP3 player.

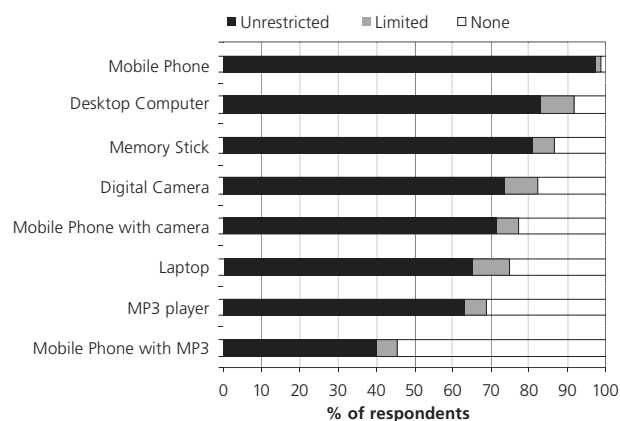


Figure 3.1: Students' access to hardware.

3.3.2 Students' access to the Internet

Separate to campus access, the vast majority of students said they had unlimited access to broadband internet connections (76.0%). Of the 24% who didn't have unlimited access to broadband, approximately half rely solely on dial up internet access (12.5%).

"At home I don't have the Internet; because dial-up's way too slow, we don't have broadband in the area."
(Chemistry student)

A small but significant number of students in the sample reported no access to the Internet at all (4.2%).

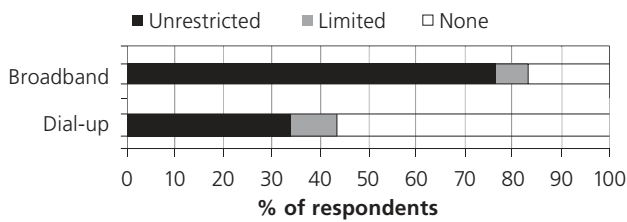


Figure 3.2: Students' access to the Internet.

3.3.3 Students' use of mobiles

Students showed a high reliance on mobile phones for texting and making calls, with the vast majority of them doing this on a daily or weekly basis. Among a subset of students, there was clearly a culture of regularly taking and sending pictures using mobile phones. The more advanced features of mobile phones – features associated with accessing the Internet for web services or checking email – were being used by only a few students.

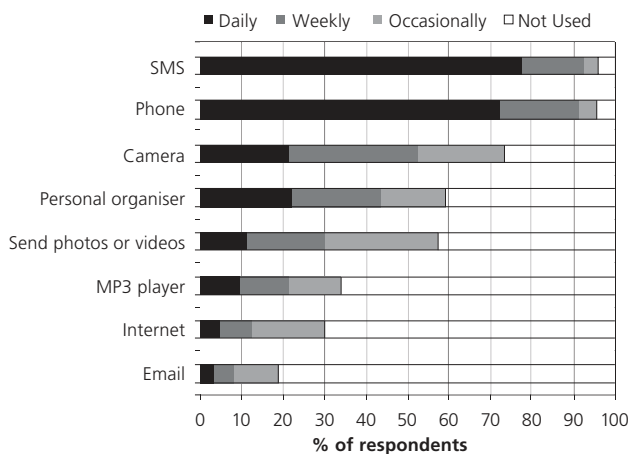


Figure 3.3: The frequency with which students use mobile phone-based technologies.

The focus group findings supported these results. Several interviewees spoke about using the basic features of their mobile phones to maintain communication with family and friends. For example, one student said she used her mobile phone for:

"Mainly texting ... It's mainly for basic correspondence, like, to tell when I'm getting home or when we're meeting up, so basic things." (Psychology student)

3.3.4 Students' traditional use of the web

The majority of students were regularly using the Internet – daily or weekly – for looking up general information or information related to their study, email and instant messaging and other pastimes. The use of the Internet to access services (such as banking) and for buying and selling was less common, although a majority of students still reported doing this occasionally (at least once every few months).

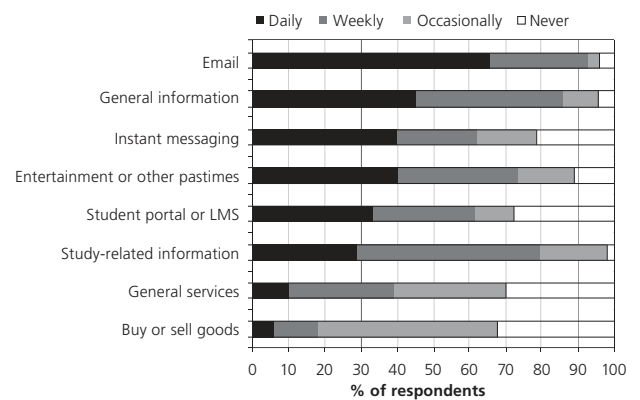


Figure 3.4: The frequency with which students use traditional web-based technologies.

"Well I do this other thing, I check up on it every now and then. It's like this website where people post sewing projects that they've done because I'm fairly heavily in to sewing." (Psychology student)

"My sister's overseas so I use it to talk to her as well and family – I'm from the country, so family back home."
(Education student)

3.3.5 Students' use of Web 2.0 technologies

Most students were very infrequent users of emerging technologies, such as Web 2.0 tools (see Figure 3.5). For example more than 80% of students surveyed had never produced a podcast and had never contributed to a wiki. More than 70% had never kept their own blog. More than 50% had never used a social networking site, read someone else's blog or downloaded a podcast.

Nevertheless there was a small but significant minority of students who were very frequent users of Web 2.0 technologies. For example, 16% of students indicated that they used social networking software once per day or several times per day, and nearly 18% of students said they commented on blogs at least once per week. Similarly, 15% of students said they produced and contributed to their own blog on a daily or weekly basis.

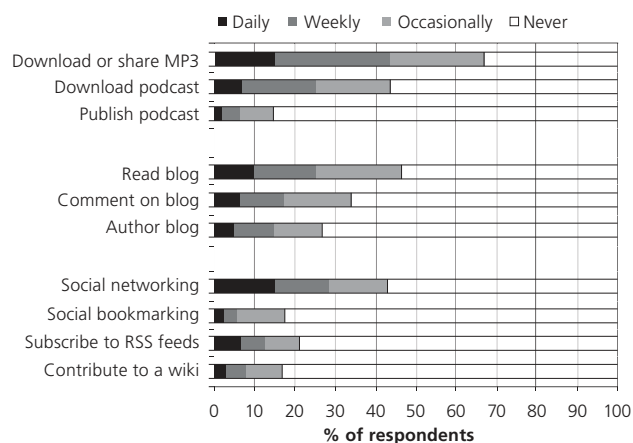


Figure 3.5: The frequency with which students use emerging web-based technologies.

In the focus groups, there were some students who had not heard of Web 2.0 technologies such as podcasting and blogs; for example: "What's a blog? I don't know what it is." (Chemistry student).

It is important to reiterate that the survey was carried out in the second half of 2006, and it could be expected that usage of some of the technologies in these categories would have increased in the ensuing years. For example, the social networking site *Facebook* clearly boomed during 2007 (McCarthy, 2008). These data can be seen in contrast with some more recent studies that have been carried out in Australia, the US and the UK (Salaway, Caruso & Nelson, 2008; Ipsos MORI, 2007; Oliver & Goerke, 2007). Oliver and Goerke (2007) found noticeable increases in the percentage of Australian university students using blogs and podcasts between 2005 and 2007. The most recent study from the Educause Centre for Applied Research showed that 85% of students in the United States were using social networking sites, over one-third were contributing content to blogs and wikis, and almost half were contributing content to photo or video websites, such as *Flickr* and *YouTube* (Salaway et al, 2008). A UK study has shown that 65% of the teenagers sampled were using social networking sites regularly, and a further 23% used them sometimes, while 62% said they regularly or sometimes used "wikis, blogs or online networks" (Ipsos MORI, 2007, p. 10). The study report did not clarify, however, the proportion of respondents

participating in each of these activities, nor whether they were contributing to, authoring, or simply reading blogs and wikis. Even taking the timing of our survey into account and the potential for cross-cultural differences, there remains strong evidence of low usage of emerging technologies.

3.3.6 Students' skills with technology

The skills items showed that students reported being very skilled at using the Internet for email and instant messaging, for fun and for finding information, while they reported not being skilled at social bookmarking and producing podcasts (but few students were engaging in these activities). When it came to mobile phones students reported being very skilled at using them to call, text, take photos and as a personal organizer.

The clear trend in the data across all items was that students who reported using a particular technology generally also reported a medium to high level of skill with it. This is reflected in the mean correlation between frequency of technology use and skill with technology (.44). Or to put it another way, few students reported using their chosen technologies in unskilled ways. Typically less than 10% of the sample reported unskilled use (and, of course, this figure would be lower if it were calculated as a proportion of students who actually used the technology).

The clear exception was in the area of producing and editing new media. For activities like manipulating digital photos or images, creating media-rich presentations (e.g. PowerPoint) and for creating and editing audio and visual material, between 15 and 25% of students reported being 'not very skilled'. This is despite the majority of students reporting using these technologies and tools. One interviewee spoke about his lack of skills in using *PowerPoint*, reporting that he chose to use overhead transparencies for a presentation because he was unable to learn to use PowerPoint in time:

"I remember earlier this session I had to give a presentation for history and I thought it would be real good if I could do PowerPoint but I've never done it and I didn't have that much time to learn it all so I just did the overheads and that was fine." (Sociology student)

3.4 Use of Technology Comparisons

In order to more easily make comparisons between groups (e.g. staff and students, universities, male and female) a number of the technologies considered in the investigation were combined into five meaningful categories of technology-based activities as shown in Table 3.5.⁵

| Activity | Defined by ... |
|--------------------------|--|
| Advanced Mobile Use | Using a mobile phone as a personal organiser, to take and send pictures or movies, listen to MP3s, make video calls, access the Internet, or to send or receive email, |
| Media Sharing | Downloading or sharing MP3 files or podcasts, publishing podcasts, sharing photos or digital files on the Internet, using social bookmarking. |
| Web 2.0 Publishing | Creating or commenting on blogs or vlogs, contributing to a wiki, and using social networking software. |
| Creating and Using Media | Using a computer to create, manage or manipulate digital images, for creating presentations and for creating or editing audio and video files. |
| Traditional Web Use | Using the Internet to look up reference information for study purposes, to browse for general information, to send or receive email, and for other pastimes. |

Table 3.5. Definitions of categories of technology-based activities.

These categories were then used to make a number of comparisons between groups. Where appropriate we have chosen to also alert the reader to any additional noteworthy differences that occurred between groups.

3.4.1 Comparisons between the ‘natives’ and the ‘immigrants’

One of the enduring assumptions underpinning the notion of the Net Generation is that ‘digital natives’ (students now entering universities) far exceed ‘digital immigrants’ (educators within universities) with regards to their experiences with technology. In order to test this assumption we compared the degree to which staff and students engaged in the five technology-based activities described above. We also considered how those who were part of the Net Generation – as defined by age – may have differed to those who were not.

Perhaps surprisingly, there were no significant differences between staff and students with regards to their technology-based activities; but there were significant age-based differences (see Figure 3.6). Those under 25 years of age were significantly more likely to engage in *Advanced Mobile Use* and *Media Sharing* (and there was a tendency for them to engage in more *Web 2.0 Publishing*). However, it is worth pointing out that despite these differences, the technology-based activities falling within these two categories were only enjoying modest use: on average less than ‘every few months’.

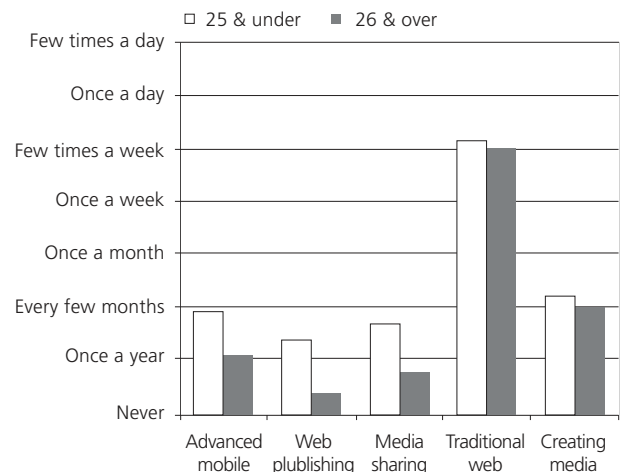


Figure 3.6: Comparisons of technology use by age.

⁵ The categories used in these analyses were formed conceptually rather than statistically (e.g. through a technique such as factor analysis). While this has resulted in clear and intuitive categories, it should be noted that this approach – and the categories derived from it – differs from a previous analysis of the same data (see Kennedy, Dalgarno, Bennett, Judd, Gray, & Chang, 2008).

3.4.2 Comparisons between universities and disciplines

A key component of this project was to determine whether there were systematic differences in students' experiences with technology across the sector or whether these experiences were largely uniform. We investigated whether the university that students were attending and their discipline area had any impact on the degree to which they engaged in the five technology-based activities.

We found no differences by discipline area; that is, students in Arts, Science and the Professions all reported around the same level of technology use in all five areas. However, clear differences between the three universities could be seen (see Figure 3.7) which showed that, with the exception of *Creating and Using Media*, students from the University of Melbourne were engaging in each of the technology-based activities significantly more frequently than students from either the University of Wollongong or Charles Sturt University. It was also evident that students from the University of Wollongong were engaging in two of the activities (*Web 2.0 Publishing* and *Media Sharing*) significantly more than students from Charles Sturt University.

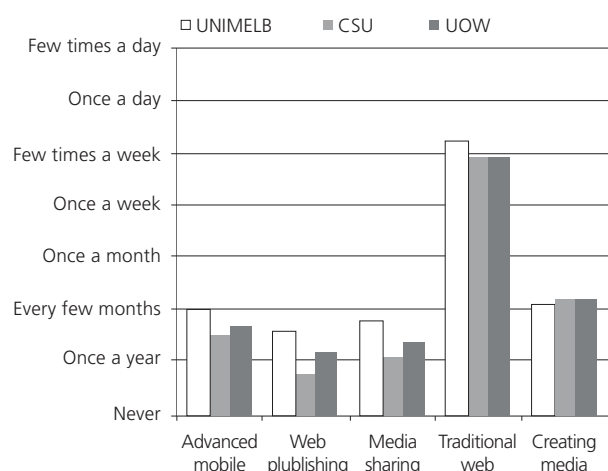


Figure 3.7: Comparisons of technology use by university.

3.4.3 Demographic comparisons

The final set of comparisons we considered were based on key demographic characteristics of the students sampled: gender, residency and socio-economic status⁶. These demographic variables went some way in accounting for differences in students' participation in the five technology-based activities.

The clearest findings were that males engaged in activities within the categories of *Media Sharing*, *Creating and Using Media*, and *Web 2.0 Publishing* to a greater extent than females (see Figure 3.8). A significant difference between males and females was recorded for *Advanced Mobile Use* despite the magnitude of this difference being only marginal. International students were more inclined to engage in *Advanced Mobile Use*, *Web 2.0 Publishing* and *Media Sharing* compared to their local counterparts (see Figure 3.9). When considering socio-economic status (SES), those of high SES tended to engage in *Advanced Mobile Use and Media Sharing* more often than those of either low or medium SES. Several two- and three-way interactions were recorded in these analyses, the reporting of which is beyond the scope of this report.

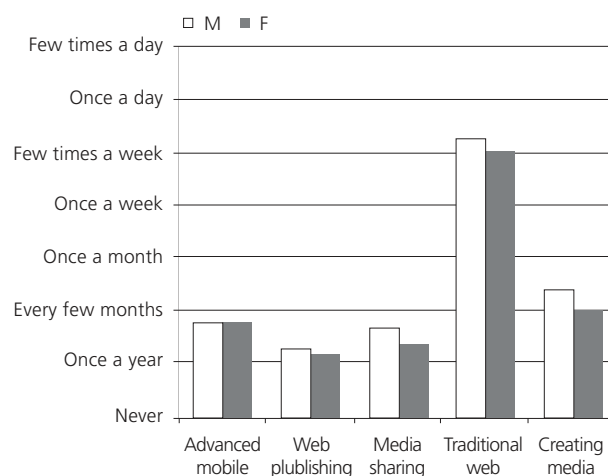


Figure 3.8: Comparisons of technology use by gender.

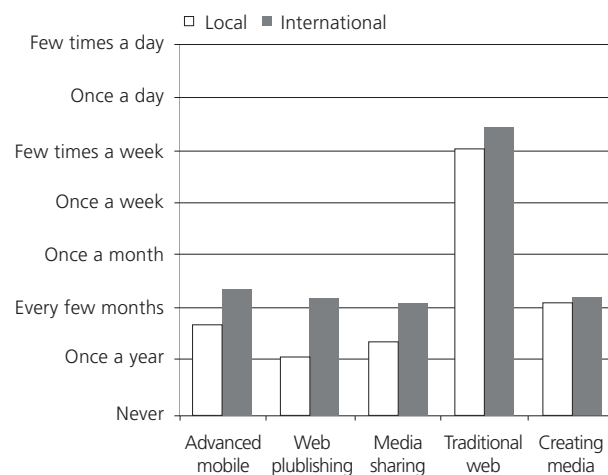


Figure 3.9: Comparisons between local and international students' use of technology.

⁶ Socio-economic status was determined by the postcode of local students' permanent home address.

3.5 Usefulness of Technology in Higher Education

3.5.1 Students' perceptions of the usefulness of technology

Students were asked to indicate how useful a series of technologies currently were or would be in their studies (see Figure 3.10). Students indicated a strong preference for using the web to access university services with 83.3% of students indicating this would be useful.

The use of technology to either access or receive course-related material and information was also seen as useful by many. Approximately three-quarters of the students sampled indicated web-based recordings of lectures would be useful, while 60% indicated that using RSS feeds to receive course information would be useful. While receiving course information such as timetable changes and grades via text message was seen as useful by many students (~40%), over a quarter of students felt this was not useful. In the focus groups, some students suggested that the immediacy of text messaging meant this form of communication would be preferable to checking for announcements on a learning management system or receiving emails:

"a lot of people won't check their email all the time, every day, whereas everyone, or usually everyone, always has their phone on them, so they'll get the message and pretty much read it straight away, whereas the email might sit there for a couple of days." (Chemistry student)

"Sometimes when they send us a message and say that the class is not on and then you get here because you didn't check SOLS [the learning management system]. It would be nice if you could like be SMS-ed because more people would check their texts rather than log on in the morning before they come to uni." (Education student)

Conversely, others felt the immediacy of the technology made it more disruptive than other forms of communication and did not want to be contacted by the university in this way:

"And also people tend to have their phone on them so you might be getting information you don't need at an inconvenient time." (Chemistry student)

"I don't like that because my phone is like my personal life and my education is separate" (Education student)

When it came to communication and collaboration, a number of students felt technologies such as instant messaging with peers (52.7%) and with staff (49.1%),

webconferencing (27.8%) and social networking (27.8%) would be useful. However, the perceived usefulness of these technologies was clearly not uniform, with a quarter of students indicating these forms of communications were not useful. Interview comments show that some students felt synchronous communication technologies such as online chats would be difficult to moderate in a group situation, for example:

"the thing I find with mass chats, with a whole group of people, sometimes it's really difficult to get in what you want to say because people type and everyone posts at the same time so you get a whole mass of questions and it just gets really complicated when the answers come in ... And so I don't think it'd be that effective." (Chemistry student)

Finally, there was low support for the usefulness of blogs and wikis in students' university studies with half the students sampled stating that these technologies would not be useful. One of the reasons for this could have been students' lack of familiarity with these technologies, which emerged in some of the focus group discussions.

3.5.2 Staff perceptions of the usefulness of technology

When staff were asked similar questions about the usefulness of particular technologies in supporting student learning in higher education their responses were more muted (see Figure 3.11). Downloading or accessing audio-video recordings of lectures (42.9%) and supplementary material (45.5%) were seen as useful by many staff, as was asking students to prepare multimedia presentations (46.3%), providing students with RSS-based alerts (31.4%) and asking students to share digital content about their course (29.1%).

A relatively high proportion of staff indicated that they did not know whether some technologies would be useful in supporting students' learning. This was particularly the case for the emerging technologies of social networking (37.9%), RSS feeds (33.7%) and wikis (35.6%).

It seems, therefore, that many staff are unconvinced, or at least unsure, about the academic usefulness of many technologies and technology-based tools that they were asked about, including the use of instant messaging, mobile phone-based texting for content provision or administrative support, creating or contributing to blogs, and asking students to create a web page as part of their course.

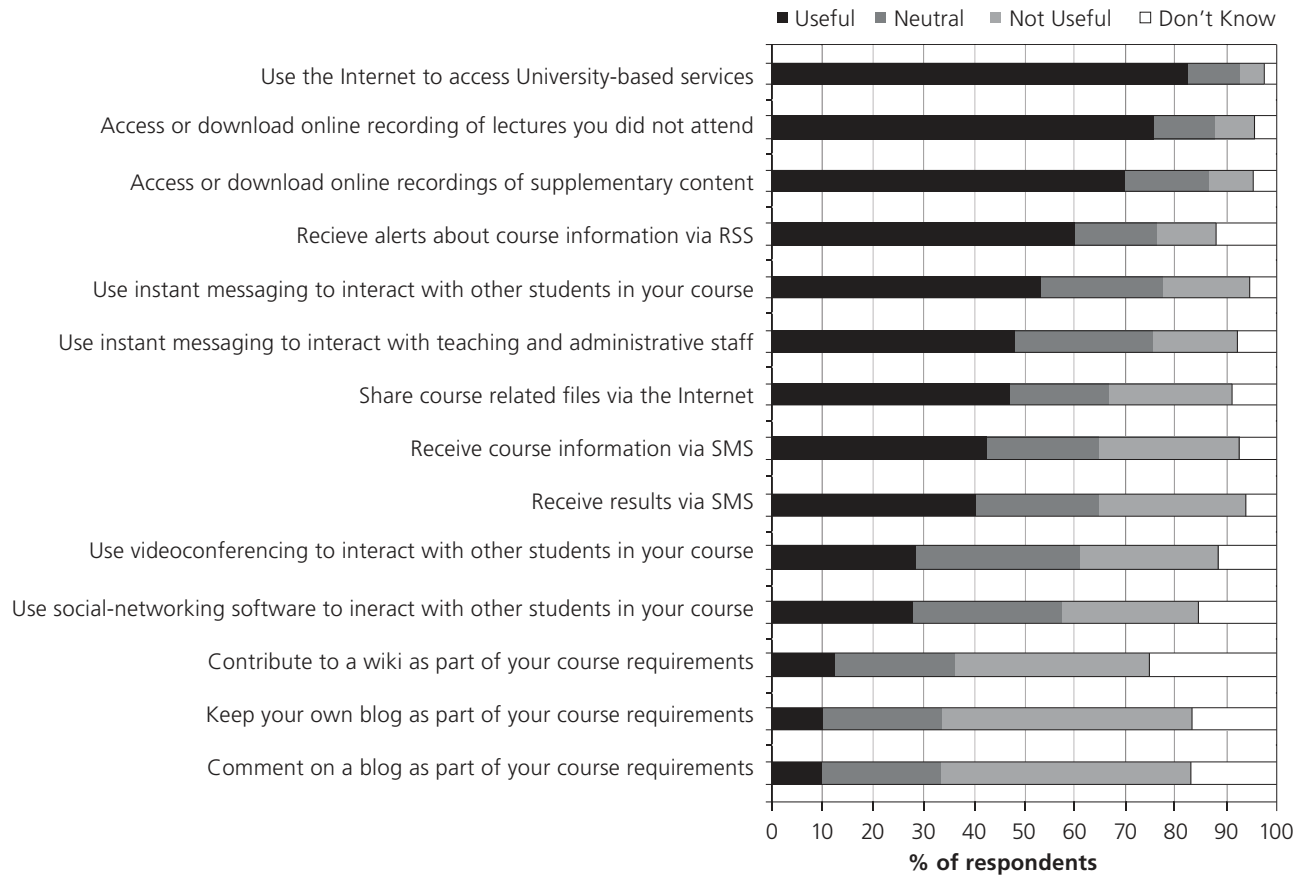


Figure 3.10: Students' perceptions of the usefulness of technology in their studies at university.

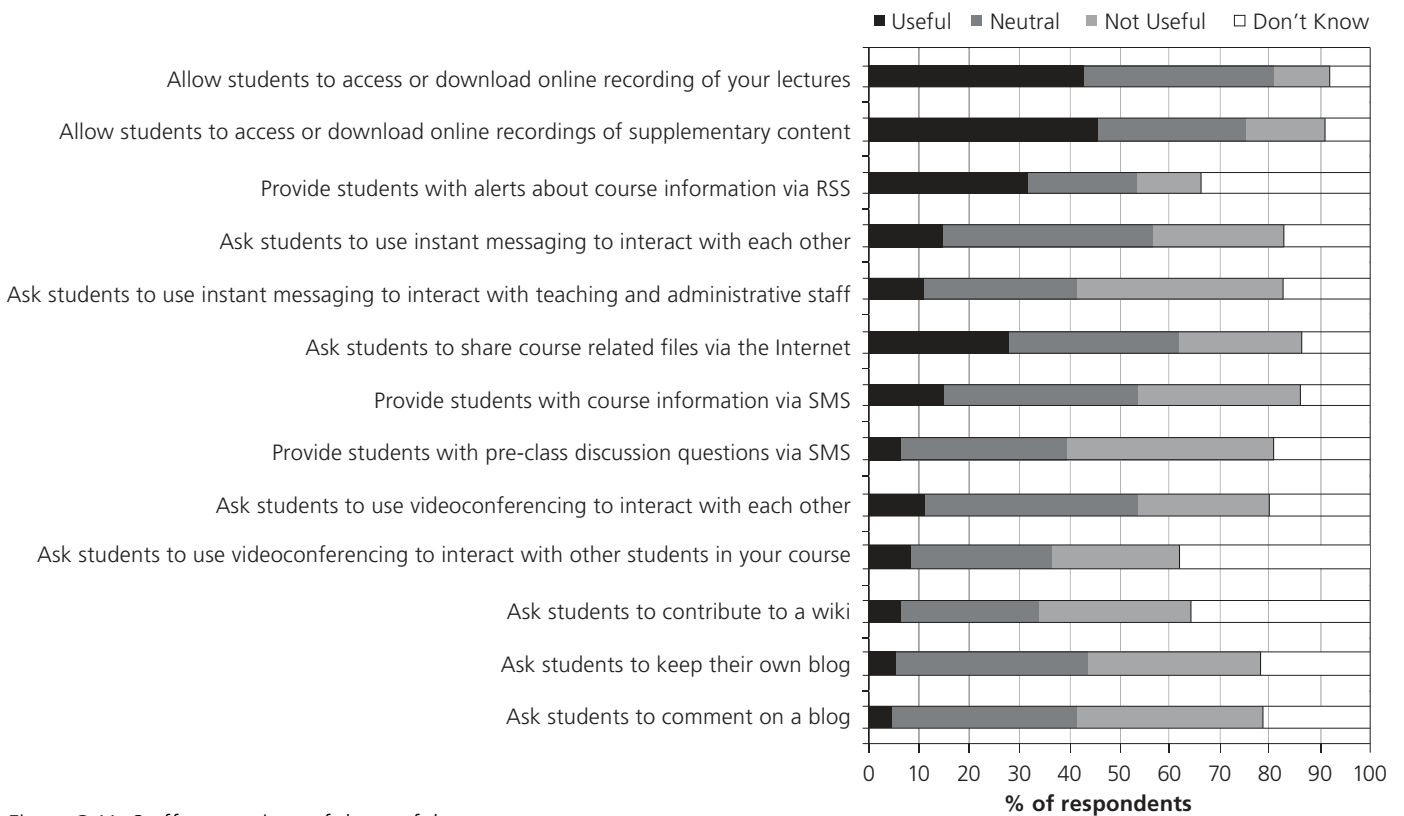


Figure 3.11: Staff perceptions of the usefulness of technology in students' learning at university.

3.5.3 Comparisons of student and staff perceptions of the usefulness of technology

When student and staff perceptions about the usefulness of technology in higher education were compared statistically, the clearest pattern of results was that staff were more sceptical and more unsure about the potential of technologies for supporting teaching and learning.

For many technologies, staff were less inclined than students to indicate that a particular technology was useful in supporting learning. This pattern of results was evident for the use of instant messaging for collaboration between either students themselves or between staff and students, using MP3 recordings of lectures, using social networking to communicate or collaborate, file sharing on the web, using RSS feeds, and contacting students via text message for either study or administrative purposes. Interestingly, this pattern was not evident with regards to course-related blogging and wikis.

For many of the technologies surveyed, staff were also more unsure, compared to students, as to whether a particular technology would be useful. This was the case for using downloadable audio recordings as supplementary course material, using instant messaging for student and staff collaboration, contacting students via text message for study, and using social networking, web-conferencing, RSS feeds and wikis.

The focus group data provides some insight into the reasons behind staff scepticism regarding the potential usefulness of new technologies for teaching and learning. Interviewees identified a number of perceived limitations associated with using technologies to support their teaching. These included: increased workload; interface or usability issues; functional limitations of the technology (that is, the technology did not do what staff had wanted it to do); inappropriate use of communication tools (by students); and loss of face-to-face interaction, for example:

"You've got more flexibility for the students but you've got more work for the lecturers." (Psychology lecturer)

"I've had a few instances where ... coming up to exams people were getting a bit stressed, a few comments, you think 'well, that's not on'. You sort of say 'look, be professional' and you take that comment off so it's not there for people to read it, so it disappears." (Chemistry lecturer)

"Certainly I would say that I'm very nervous that you would think that listening to this later [MP3 recording] is a replacement for coming in here and thinking and being active and discussing with people around you." (Education lecturer)

Despite these comments, it is worth noting that a number of interviewees also identified clear benefits associated with using technologies to support their teaching. For instance, some felt technologies improved communication, provided presentation or lecturing benefits, provided greater flexibility for students, increased immediacy of information access, enabled greater access to resources, and encouraged student engagement.

3.6 Summary

The data collected in the Implementation stage of this project paint a complex picture about the experiences first-year students and university staff have with technology. While there is a faint trace of the 'digital native' student so often talked about by some educational commentators, the data more strikingly provide strong evidence of the great diversity within both staff and student cohorts. While students reported high levels of access to and use of established technologies (such as personal computers, mobile phones, the Internet and email), emerging Web 2.0 technologies (such as blogs and wikis) were used by a relatively small proportion of students. While there was evidence that social networking and digital file sharing were popular among a small minority of students, few students were regularly using social bookmarking or creating and publishing podcasts.

Students and staff are clearly relying on core technologies for the fairly traditional purposes of communicating and information gathering, while other technologies are clearly on the fringe, used by a few but nowhere near the majority. The evidence from this investigation does not support the notion that a homogenous group of students, broadly adept with the latest technology, is now entering our universities.

The data show that students are more positive than staff about how useful technologies could be in supporting university-based learning and teaching. The most useful activities from the students' perspective were accessing university-based services and audio-visual content material via the web, while from the staff perspective, asking students to create media presentations (such as PowerPoint) and providing audio-visual content material via the web to support learning were seen as most useful. A key finding was that staff were generally more sceptical and more unsure about the potential of technologies for supporting teaching and learning. Despite these differences, it was also clear that none of the technologies surveyed was universally accepted as being useful in learning and teaching. Many students and staff – and in some cases the majority – seemed unconvinced about the relevance and usefulness of the application of particular technologies to support learning and teaching.

There was little evidence that technology usage patterns can be explained primarily on the basis of broad generational differences – the digital natives compared to the digital immigrants – although age did account for variation in two of the five technology categories considered. Comparisons between students based on their discipline areas also showed no clear differences. It seems that some of the variation in technology usage documented in this investigation can be explained by which university the students were attending and key demographic variables such as age, gender, whether the student is domestic or international, and socio-economic status. It is worth noting, however, that the magnitude of the differences between the groups being compared was small when considered alongside the overall diversity in usage patterns across the sample.

This section of the handbook was prepared by Gregor Kennedy, Barney Dalgarno, Terry Judd, and Jenny Waycott.

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