



Preparedness for flexible access to learning materials: How ready are university students and staff?

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Information and communication technologies (ICTs) provide new opportunities for learning and teaching. However, for students to benefit from these opportunities, they must have ready access to ICT and positive attitudes toward its usefulness for learning. This paper reports results from an analysis of data collected from students and staff at an Australian regional university with on campus and distance student cohorts in late 2009. The surveys were conducted as part of a larger project to identify ICT likely to be available and of most benefit for student learning, and to gain an understanding of lecturers' attitudes toward ICT use for teaching in relation to the perceived benefits to students. The survey data are being used to inform decisions about adoption of new digital technologies for learning and teaching and the provision of professional development to teaching staff. This paper focuses on the preparedness of students to access study aids such as lecture recordings via traditional and mobile devices. Outcomes of the study are important to inform responses to proposals to make recordings of all classes available online through establishing what types of content are most likely to be accessed by students and identifying priorities for professional development of teaching staff.

Keywords: flexible learning, lecture recording, mobile learning

Background

The characteristics of Australian higher education students have been changing. From 1989 to 2002 the proportion of 20 to 24 year old Australians enrolled in higher education almost doubled from 10% to 19% (DEST, 2005), signalling participation by a wider segment of the population than school leavers. However, many students need to balance their study with commitments to family or work, which affects participation in conventional classes. In 2006 the typical Australian university student was

engaged in significant paid employment during the university year (James, Bexley, Devlin, & Marginson, 2007), with 70% of full-time undergraduate students working approximately 15 hours per week, 15% working more than 20 hours per week, and about 5% working full-time. Not surprisingly, many such students find it difficult to attend scheduled classes and flexible learning can allow them to balance study, family and work commitments to meet individual needs. Consequently, some students who are enrolled on-campus are studying to some extent in a mode that resembles distance education. As a consequence on-campus learning and teaching is faced by challenges usually associated with providing distance learners with the interactions necessary for effective learning (Moore, 1989) and a need to consider how contemporary digital technologies might provide enhanced interaction with content, instructors, and peers (Albion & Ertmer, 2004).

Universities have responded by adopting technologies to increase flexibility for students. An example is recording lectures and making them available on the Web to increase flexibility for on-campus students and provide distance students with additional learning opportunities (Mula, 2010). One study reported that recorded lectures offer benefits for distance students by providing study support that is not otherwise available and an increased sense of belonging to the class (Woo, et al., 2008). Data suggested that distance and on-campus students used recordings similarly, listening more than once, but with some differences in purpose. On-campus students had their study pace set by scheduled classes and used recordings to review content they had missed in class but this was not generally applicable to distance students who were more likely to use recordings to set their own pace for study. Loch (2010) found that mathematics students, who had the choice to study on-campus or by distance, and intentionally enrolled in on-campus mode, continued to attend classes despite recordings being available as they appreciated the interaction and the opportunity to ask questions. Access to recordings provides both groups with additional opportunities to interact with course content.

For the past eight years the University of Southern Queensland (USQ) has enabled recording of lectures and other presentations. The original system (IPLD – Internet PowerPoint Lectures On Demand) was developed locally and deployed in selected lecture theatres using a PowerPoint add-in that linked to a server to schedule recordings and deliver them to a Web server where they could be accessed from a course index page. In general that system worked acceptably and was replaced only when it was not compatible with an updated version of PowerPoint. Breeze (from Macromedia and later Adobe) was deployed to develop and record presentations to be included on CD-ROM but was also used to prepare presentations for web delivery. Breeze and its successor, Adobe Presenter, worked well in offices but were not easily configured for convenient use in lecture spaces. In 2009 Camtasia Relay was adopted for lecture recording, partly because its screen capture supported demonstration of other software in addition to PowerPoint.

Despite occasional technical issues, distance students have responded positively to recorded materials (Mula, 2010). Students studying on-campus have also accepted them as supplementary material, though they are less accepting of recordings when they are used as a substitute for a live presentation. The apparent level of acceptance is such that some senior staff have suggested that recording and Web distribution should be mandated for all class presentations. However, little is known about the capacity of most students to access recordings or about the use to which they put them. Neither has there been any concerted effort to assist teaching staff with improving the quality of recorded presentations through such means as better design of slides, management of interaction with a live audience in ways that facilitate later use of the recording, and selective recording of key material rather than entire sessions that result in very large files to be served and downloaded. To become more sophisticated and selective in designing, editing and delivering recorded sessions, staff need a higher level of comfort, training and skills with available technologies. Similarly, students need to have access to, and be comfortable with using contemporary devices to take advantage of the rich media resources being developed.

USQ has a diverse and widely scattered student population that includes a high proportion from lower socioeconomic backgrounds. Hence access to, and experience with, new forms of ICT are likely to be variable and it is important to have accurate and current information about what forms of ICT students can access and their preparedness to use them for learning. With that knowledge it becomes possible to design learning activities that can be accessed by students and, where necessary, to provide teaching staff with appropriate professional development and support in the preparation of such activities. The data presented in this paper were obtained as part of a broader effort to identify ICT most likely to be

of interest for learning and teaching and to implement a cascading peer mentoring approach to developing relevant capabilities among academic staff.

The project commenced by administering university-wide surveys to students and staff to obtain data about access to ICT. The intent was to identify forms of ICT widely available to students and favoured by them for learning so that those forms of ICT could be prioritised for use in learning activities. Relevant staff development through the mentoring program was to be informed by the same data.

The focus of this paper is on forms of ICT that support flexible access to learning materials with substantial media content. The paper seeks to answer some key questions about the preparedness of students and staff at USQ for flexible access to such learning materials. The guiding questions are:

1. What forms of ICT are available to students for flexible access to learning materials?
2. What experiences do students and staff have of access to online media?
3. What are the preferences of students for access to media for study?
4. How useful are staff perceptions of student ICT use as a guide to priorities for adoption?

Methodology

This study adopted instruments derived from those originally developed and used in a large study of staff and first-year students conducted across three Australian universities in 2006 (Gray, et al., 2009). The instruments have been used for other studies (Newton & Ellis, 2009; Thinyane, 2010) and were selected for this study to facilitate comparison of results with those obtained in other studies. Most items were retained in their original form or as near as possible to it but changes were made to the demographic items to suit the structure of the university, and other items were updated to reflect changes in technology. A few items were added to obtain additional data relevant to the context. Examples include speed and volume of broadband access, which has assumed particular importance because the file sizes of learning materials have increased as teaching staff embrace the opportunities for recording presentations.

Administration of the questionnaires was on-line using LimeSurvey® (<http://www.limesurvey.org/>). This eliminated the requirement for data entry from printed forms and permitted data to be downloaded in a format suitable for import into SPSS 18 for analysis. Student participants were recruited in November-December 2009 using a short notice in the university student portal inviting students to visit a Web page for more information about the survey and the opportunity to win one of five iPod Shuffles or other prizes of equivalent value for completing the survey. Staff participants were recruited in January-February 2010 through a global email message inviting them to complete the survey in return for entry in a draw for one of several shopping vouchers.

Results

Completed responses with consent for research purposes were obtained from 623 students representing all faculties and campuses of the university, although not necessarily in proportion to enrolments which totalled 25 657 in 2009 (Tickell, 2010). Because the data were collected online in the period following the end of Semester 2 and at the beginning of Semester 3 it is likely that the responses over-represented students who are more comfortable with ICT, which is particularly important for access to Semester 3 courses that are mostly offered in online or external mode. Despite this limitation the responses were sufficient to provide useful insights into the access, capabilities and attitudes in relation to ICT for learning and teaching.

USQ enrolls students 'on-campus', on any of the three major campuses or with a partner, and 'external or online', by traditional distance education and wholly online. The typical respondent was female (69%) aged between 18 and 30 (45%), in an undergraduate program (72%) and studying by distance or online (71%). By comparison, in 2009 students enrolled at the University were 53% female, 72% were undergraduate, about 80% were studying off campus and the median age was 29. Other than the potential to over-represent those more comfortable with ICT, the respondents to this study appear to be broadly representative of the student body at USQ. Previous studies (Gray, et al., 2009; Newton & Ellis, 2009; Thinyane, 2010) using related instruments focused on first year students and direct comparisons with the results of this study should be treated cautiously because of the substantial proportion of older students. The high proportion of distance students in this study, while typical of USQ, may limit generalisation to other institutions with more traditional on-campus enrolments.

The staff survey returned 69 completed responses with research consent. All faculties as well as the Learning and Teaching Support Unit (LTSU) and Library were represented in responses. Full-time equivalent academic and education support staff at the university in 2009 totalled 419. As for the student responses, the use of an online survey may have resulted in over-representation of staff more favourably disposed toward working with ICT. At 51.5% in the sample, female staff are over-represented relative to the university-wide proportion of 39% and at 46 years the mean age is a little lower than the university mean for academics which was 49 years in 2009 (Tickell, 2010). No comparable data were available for university teaching experience but the sample includes both new and experienced teaching and support staff and should be broadly representative of these groups at the university.

The basic requirement for students to access learning materials provided on the WWW is a networked computer. The university publishes specifications for recommended computer systems each year and students are advised in promotional material for programs and courses that they will require a computer with Internet access. The surveys did not seek details of hardware configurations used by students but used items equivalent to those in the original surveys (Gray, et al., 2009) to ask about convenience of access to desktop and laptop computers other than those provided by the university. Table 1 presents data from these items as a cross-tabulation of the percentages of all student responses reporting various levels of access. The shaded cells in the table mark the 2.3% of students who reported that they had ‘no access’ or only ‘limited or inconvenient access’ to either desktop or portable computers. Evidently these students, even those who reported ‘no access’, were able to access a networked computer, or equivalent device, to complete the online survey, most likely using computers provided in the university library or laboratory. At the other end of the spectrum, 61% reported that they had either shared or exclusive access to both desktop and portable computers. The potential for a high degree of mobile access is evident in the 80.7% reporting exclusive or shared access to portable computers. By comparison, an earlier study of first year students in three Australian universities reported that 83% and 65% of students had unrestricted access to desktop and laptop computers, respectively (Kennedy, et al., 2009). The higher proportion of students in this study reporting access to portables may represent a move toward increased mobility consistent with trends identified elsewhere (Johnson, Levine, Smith, & Stone, 2010).

Table 1: Percentages of students with access to desktop and portable computers (N = 621)

		Portable computer				
		No access	Limited or inconvenient access	Any time, shared with others	Exclusive for own use	Total
Desktop computer	No access	0.3	0.2	2.1	10.6	13.2
	Limited or inconvenient access	0.8	1.0	0.5	6.4	8.7
	Any time, shared with others	4.5	1.8	5.0	20.6	31.9
	Exclusive for own use	7.2	3.5	4.5	30.9	46.2
	Total	12.9	6.4	12.1	68.6	

Although some faculties at the university continue to provide course materials on CD-ROM or DVD discs that are posted to students, others have moved to Web-only provision (Mula, 2010) and, even where material is provided on disc, it will have been recorded several months in advance and there may be more recent material available online. Moreover, every course has an online space in the Moodle Learning Management System and most make some use of the discussion forums and other facilities. Hence, most courses advise students that Internet access is a requirement and, in those cases where media content is available in addition to forums, reasonable speed and data capacity is required. Some level of broadband Internet access is now a requirement for university study at a distance. Table 2 presents a cross-tabulation of responses to questions about dial-up and broadband Internet access. Of the 24 students that made up the 3.9% of responses in the shaded area, representing at best limited or inconvenient Internet access by any means, 17 were from on campus students who would have some access on the campus LAN. However, the remaining 7 were students studying at a distance who would be likely to find the lack of convenient Internet access a significant impediment to their studies. Two of those students reported no access and one responded ‘not sure’ which may mean that access was

available but the method was unknown. On the other hand, 97% of distance students reported having broadband access.

Table 2: Percentages of students with access to broadband and dial-up Internet (N = 623)

		Broadband Internet access					
		Not sure	No access	Limited or inconvenient access	Any time, shared with others	Exclusive for own use	Total
Dial-up Internet access	Not sure	0.5	0.0	0.0	1.1	2.1	3.7
	No access	0.0	1.0	1.9	25.7	50.4	79.0
	Limited or inconvenient access	0.0	0.3	0.2	0.5	2.2	3.2
	Any time, shared with others	0.0	0.5	0.0	3.5	1.4	5.5
	Exclusive for own use	0.0	1.0	0.3	0.2	7.2	8.7
	Total	0.5	2.7	2.4	31.0	63.4	

A course that provides audio recordings of weekly classes could easily require 50 MB of download capacity each week [for three to four hours of recording] and a student taking a standard 4-course load would require capacity of at least 1 GB per month. If the recordings include visual content, of slides or the speaker, then the data requirement may increase substantially and anything less than 5 GB per month is likely to be insufficient, especially if the Internet is used for purposes additional to study. For the slowest 'broadband' service at 256 kbps under optimal network conditions it would take about 30 minutes to download 50 MB. If such a file must be completely downloaded before playing, this is unlikely to be an acceptable wait time for a student accessing study material. Alternatively, if the file is streamed, there may be issues with buffering delays.

To gauge the suitability of the levels of Internet access available to students, those who indicated they had broadband access were presented with two additional items that asked them to select from alternatives for speed and data quota. Each item included alternatives that allowed for those who were unsure of the actual parameters to indicate that they did not know but that their perceptions of the service were that it was broadly satisfactory or unsatisfactory. Table 3 presents a cross-tabulation of nominal broadband speed against monthly data allocation. The 4.5% of responses in the shaded section correspond to students with connections that are, or are likely to be, perceived as too slow and with data allocations that are unlikely to support the requirements of study. However, 30.9% report data allocations less than 5 GB and a further 5.4% have data allocations greater than 5 GB but are on slow connections. The remaining 63.7% reported what should be adequate data allocations and acceptable connection speeds. The university staff need to be conscious when preparing materials that almost 40% of students may experience difficulty in accessing large files. Producing recordings in shorter chunks and selecting formats with good compression characteristics will improve the experience of students with poorer connectivity.

Table 3: Percentages of students reporting broadband access characteristics (N = 603)

		Nominal speed				
		Don't know, too slow	256-1500 kbps (ADSL1)	8000-20000 kbps (ADSL2)	Don't know, fast enough	Total
Monthly data allocation	Don't know, too little	1.2	0.5	0.2	0.5	2.3
	< 500 MB	1.2	2.0	0.0	0.7	3.8
	500 MB to < 1 GB	0.7	3.6	0.3	2.2	6.6
	1 GB to < 5 GB	1.8	8.8	0.8	6.8	18.2
	5 GB to < 10 GB	0.8	4.5	1.5	4.3	11.1
	10 GB or more	1.2	19.5	7.8	10.6	39.1
	Don't know, but enough	1.2	0.5	0.2	0.5	2.3
	Total	8.8	41.3	11.1	38.8	

Although an Internet connected computer is the minimum requirement for accessing course materials distributed on the Web, students may not wish to be bound to a computer while listening to and viewing course materials. Mobile learning has been identified as a rapidly emerging trend (Johnson, et

al., 2010). Some downloaded content can be transferred to other devices, such as iPods or other MP3 players, for use away from the computer. Other material may be accessed using highly portable, always online devices such as mobile phones. Hence it is important to know about the availability of such devices to students. Table 4 presents data about student access to mobile devices that, other than the standard mobile phone included for comparison, might be used for playing recorded presentations or similar material. The reported levels of access to MP3 players are lower than the 63% reported in a previous study of first year students (Kennedy, et al., 2009) but the difference is likely to be related to the ages of students in the groups with the older students in this group less likely to have adopted new technologies. However, at 66.2% the proportion of students with MP3 capable mobile phones is notably higher than the proportion (40%) reported by Kennedy et al. (2009), most likely due to the emergence of the iPhone and similar devices since the data for that study were collected in 2006. Further examination of the data revealed that 20.1% of students reported 'no access' to a mobile device capable of playing audio and a further 4.2% had limited or inconvenient access to such a device. For mobile video players, 24.2% reported 'no access' and a further 8.2% had limited or inconvenient access. Overall it appears that about three-quarters of these students have convenient access to devices, either MP3 players or mobile phones, that would enable them to access recorded audio away from their computer but just more than two-thirds have the capacity to play video on a portable device. The implication is that students are not universally prepared to access recorded material on mobile devices. However, these devices continue to become more common in households and utility for study may prompt earlier purchase of a device that would be eventually acquired in any case.

Table 4: Percentage of students with access to mobile devices (N = 623)

	Not sure	No access	Limited or inconvenient access	Any time, shared with others	Exclusive for own use
MP3 player	0.5	36.0	5.3	6.6	51.7
MP3 player – play video	1.3	55.5	5.0	6.9	31.3
Mobile phone	0.2	3.2	1.4	2.9	92.3
Mobile phone with MP3 player	3.0	34.5	3.2	3.0	66.2
Mobile phone – receive/play video	8.0	32.3	3.5	2.7	53.5

The survey did not include an item asking directly about access to a mobile phone or other mobile device with Web access. Such a question would be a useful addition to future iterations but, given the typical sets of features in mobile phones, the proportion able to access the Web on a mobile device is likely to be similar to that with access to mobile phones with audio or video capability. That is, about two-thirds, though many are likely to be restricted to older, small-screen formats that provide a less than satisfactory experience of the Web.

Although staff are not expected to be consumers of course materials on mobile devices their experience of accessing media on such devices is an important factor in their preparedness for producing materials suitable for such access. One of the challenges confronting educators at all levels in the application of ICT is that unless technology is integrated in daily life it is difficult to conceive of authentic educational applications (Lankshear, Snyder, & Green, 2000). Hence it is important that teaching staff experience the technologies they anticipate might be used by learners. Table 5 presents data about staff access to mobile devices comparable to the data in Table 6 for students. The proportion of staff without convenient access to devices is noticeably higher than for students, suggesting that many teaching academics are likely to lack understanding of how students might access content on mobile devices. The consequence of this is likely to be limited understanding of how such content might be designed to be most useful to students for learning.

Table 5: Percentage of staff with access to mobile devices (N = 68)

	Not sure	No access	Limited or inconvenient access	Any time, shared with others	Exclusive for own use
MP3 player	2.9	44.1	5.9	8.8	38.2
MP3 player – play video	4.4	58.8	4.4	10.3	22.1
Mobile phone	2.9	18.8	2.9	2.9	72.5
Mobile phone with MP3 player	4.4	48.5	0.0	4.4	42.6
Mobile phone – receive/play video	4.4	54.4	1.5	1.5	38.2

Even when students have access to media-enabled devices they may have little or no experience in the use of such devices for media access if their primary focus is on other affordances of these devices. Table 6 reports data for student and staff use of ICT to access media. Although a majority of students have used their computers to play digital music or to download audio and video content, just more than half have used podcasts, which involve download and transfer processes similar to what might be used for accessing course materials on mobile devices. Similar or smaller proportions have used their mobile phones for accessing media or Web content. Although students might reasonably be expected to value the opportunity for flexible and mobile access to course materials, for many of them there is no existing reservoir of skills that can be tapped to facilitate such access. Those skills would need to be developed as part of any effort to make content available using mobile technologies.

Table 6: Percentage of students and staff using ICT for media access ICT

	Not used	Once or twice a year	Every few months	Once or twice a month	Once a week	Several times a week	Once a day	Several times a day
Students (N = 623)								
Use a computer to play digital music	16.1	5.8	7.1	11.4	11.9	20.2	7.5	20.1
Use the Web to subscribe to and download podcasts	47.7	8.5	10.8	15.1	7.1	7.2	1.3	2.4
Use the Web to download and/or share digital audio and video	38.0	6.4	8.2	17.3	11.7	12.5	3.0	2.7
Use a mobile phone as an MP3 player	47.7	9.1	6.3	10.3	5.9	7.1	3.5	10.1
Use a mobile phone to access information/services on the Web	53.8	6.6	5.6	7.9	4.8	7.4	4.2	9.8
Use a mobile phone to access university study material	87.6	2.1	1.4	2.1	1.3	1.4	1.1	2.9
Staff (N = 69)								
Use a computer to play digital music	15.9	10.1	15.9	13.0	8.7	17.4	8.7	10.1
Use the Web to subscribe to and download podcasts	53.6	8.7	11.6	10.1	5.8	5.8	0.0	4.3
Use the Web to download and/or share digital audio and video	47.8	10.1	17.4	4.3	14.5	4.3	1.4	0.0
Use a mobile phone as an MP3 player	55.1	15.9	7.2	4.3	4.3	5.8	1.4	5.8
Use a mobile phone to access information/services on the Web	53.6	2.9	7.2	4.3	8.7	10.1	2.9	10.1
Use a mobile phone to access university study material	82.6	7.2	1.4	1.4	2.9	1.4	0.0	2.9

Broadly similar patterns are apparent for staff, with most having some experience of using digital media on the computer but a minority having experience of access to content on mobile devices. As for the students, any move toward making course content available for access on mobile devices would require concerted efforts to develop staff understanding of how such content is accessed and how to prepare materials in ways that would be suitable for such distribution.

Even access to relevant ICT and some experience in their use for personal purposes may not be sufficient to persuade students of their value for learning. Hence it is important to know something about students' preferences for access to learning materials. Table 7 reports responses, according to mode of enrolment, to selected items rating the usefulness of various modes of access to study materials. Regardless of enrolment mode, 90% or more of students regard recordings of lectures and supplementary materials as moderately or very useful. Somewhat surprisingly students studying externally or online recorded a strong positive response for accessing recordings of lectures already attended despite their being unlikely to be able to attend any classes. Students appear to see value in information pushed to mobile phones by SMS but are less enthusiastic about accessing course materials or university services using mobile phones. That difference may reflect lack of experience with more

recent mobile phones that make access to Web-based services more satisfactory than with older systems. The implication is that most students are not yet prepared for access to course materials or other university services from mobile phones except by older and simpler formats such as SMS.

Table 7: Percentage distribution of student responses about usefulness of access modes

	On campus (N = 183)				External or online (N = 440)			
	Don't know	Not at all useful	Moderately useful	Very useful	Don't know	Not at all useful	Moderately useful	Very useful
Access audio/video recordings of lectures NOT attended	1.6	2.2	8.7	87.5	3.4	2.7	13.0	80.9
Access audio/video recordings of lectures already attended	2.2	2.7	14.8	80.3	3.9	5.5	13.6	77.0
Access audio/video recordings of supplementary material	1.6	2.7	16.4	79.2	2.5	2.5	14.8	80.2
Use Web to access university services	2.7	1.6	10.4	85.2	1.8	0.9	6.4	90.9
Use mobile phone to access Web-based university services	13.7	28.4	25.7	32.2	10.9	30.7	29.3	29.1
Access Web course material on mobile phone	12.6	31.7	29.0	26.7	9.3	36.4	29.1	25.2
Receive marks/grades via SMS	8.7	25.1	22.4	43.7	5.5	23.4	26.6	44.5
Receive pre-class discussion questions by SMS	9.3	27.9	25.1	37.7	5.7	26.4	30.0	37.9
Receive administrative information by SMS	8.7	24.6	21.3	45.4	5.2	22.5	27.7	44.5

Table 8: Percentage distribution of staff responses about usefulness to students of access modes

	Staff responses (N = 68)			
	Don't know	Not at all useful	Moderately useful	Very useful
Access audio/video recordings of lectures NOT attended	2.9	2.9	11.8	82.4
Access audio/video recordings of lectures already attended	2.9	2.9	17.6	76.5
Access audio/video recordings of supplementary material	2.9	1.5	17.6	77.9
Use Web to access university services	2.9	0.0	11.6	85.5
Use mobile phone to access Web-based university services	11.8	1.5	39.7	47.1
Access Web course material on mobile phone	5.8	8.7	49.3	36.2
Receive marks/grades via SMS	11.6	31.9	29.0	27.5
Receive pre-class discussion questions by SMS	7.2	26.1	34.8	31.9
Receive administrative information by SMS	5.8	11.6	34.8	47.8

For comparison, Table 8 reports staff perceptions of usefulness to students of the same services represented in Table 7. Like students, staff consider access to recordings of lectures and supplementary materials to be moderately or very useful to students. This may reflect positive feedback that staff have received from students who have accessed recordings and found them useful. Somewhat paradoxically in light of the staff reporting lower levels of access than students to mobile devices (Tables 4 and 5) and less experience in media access (Table 6), the staff responses of moderately or very useful were

stronger than the corresponding responses from students to items about accessing Web-based university services (staff = 86.8%, students = 58.3%) and course materials using mobile phones (staff = 85.5%, students = 54.8%). Differences between staff and student responses to the items about receiving content by SMS are not so marked. Given the proportions of staff who reported no experience of using a mobile phone to access services (53.6%) or course material (82.6%) on the Web, staff expectations about the usefulness of Web access via mobile phone cannot be based on experience. Instead those expectations may be based on impressions gleaned from news media reports about smart phones and other devices that appear to make mobile access to the Web more convenient.

In addition to the items reported in the tables above, the surveys included items to gauge students' attitudes toward ICT and its use for learning. Items about reasons for wanting to use ICT for study were drawn from the source survey (Gray, et al., 2009) and additional items about attitudes using ICT for learning and confidence with ICT were based on items from a previous study (Jamieson-Proctor, Finger, & Albion, in press). On a 5-point scale from strongly disagree to strongly agree, students agreed with statements that ICT would help them achieve better results (mean = 3.92), lead to deeper understanding (3.84), make study more convenient (4.34), improve IT skills (4.14), improve employment prospects (4.08), and provide essential career skills (4.14). Students also agreed that they were comfortable using a variety of ICT (4.11), learned about new ICT easily (3.97), knew enough to solve their own technical problems (3.40), and had the skills needed to use ICT for study (4.05). The proportions of students responding with disagree or strongly disagree on these items was less than 10% for all but the item about solving technical problems where it was 26.9% with a further 48.5% recording a neutral response.

These data provide a basis upon which to answer the specific research questions articulated above.

What forms of ICT are available to students for flexible access to learning materials?

Students appear to have convenient access to computers and most have acceptable levels of Internet connectivity but up to 40% may experience difficulty with speed or data allocation if they need to access a large number of multimedia files for their study. Access to mobile devices capable of playing audio and video is less universal with about 75% of students having access to a mobile audio player and about 67% having access to a mobile video player. Although it is not known what proportion of students have access to mobile devices that can access the Web, the fact that more than half report not having accessed the Web using such a device suggests that most do not yet have convenient access to such devices and there is little motivation for such access. Overall students appear to be adequately equipped for access to materials on the Internet but many have not yet acquired devices that would support the anticipated trend toward more mobile access (Johnson, et al., 2010).

What experiences do students and staff have of access to online media?

High proportions of students and staff reported at least some experience of playing music on a computer (83.9% and 84.1%) and many reported having downloaded or shared digital media from the Web (62.0% and 52.2%). However, considerably fewer had subscribed to and downloaded podcasts (52.3% and 46.4%) and very few had experience of using a mobile phone to access Web-based services (46.2% and 46.4%) or study material (12.4% and 17.4%). The general picture is of users familiar with accessing content using an Internet connected computer but mostly unfamiliar with accessing content on mobile devices, either transferred from a computer or accessed directly from a device that connects to the Web.

What are the preferences of students for access to media for study?

Almost universally students responded that access to recorded lectures and supplementary material is moderately or very useful. When responses in those categories were combined the proportions agreeing were 90% or more for those items. A majority of students also agreed that simple information provided by SMS would be moderately or very useful (66.5% to 70.6%). However, there was less enthusiasm for the use of mobile phones to access Web-based university services and course material. Students rating those as moderately or very useful applications amounted to only 58.3% and 54.8%, respectively. In general students appear to favour learning materials and information that are conveniently accessed using familiar ICT such as an Internet connected computer for recordings or simple mobile phone for SMS and to be less enthusiastic about newer, less familiar ICT such as mobile Internet access. This is

consistent with limited experience of newer ICT as reported in Table 6 and with fewer than 25% agreeing that they knew enough to solve their own technical problems, which they probably perceive as more likely to occur with unfamiliar ICT.

How useful are staff perceptions of students' ICT use as a guide to priorities for adoption?

As shown in Tables 4 and 5, the proportions of staff without convenient access to mobile devices are higher than for students. Moreover, in Table 6 higher proportions of staff than students reported not having used specific forms of ICT for media access, except for playing digital music and using a mobile phone to access Web-based services or study material. For the first two of these, the proportions lacking experience are similar and for access to study material the proportions of staff and students reporting use at any level are both less than 20%. In other words, the experiences upon which staff could base any perception about student use of these forms of ICT are, at most, not greater than the experiences of students or, at least, limited. As shown in Tables 7 and 8, staff responses to items about recorded lectures are similar to those from students and may be based on knowledge of student reaction to availability of recordings. However, staff perceived mobile access to Web materials more positively than students despite their limited experience of such ICT. Thus staff perceptions of student ICT use are unlikely to be a useful guide to setting priorities.

Conclusion

The data presented in this paper confirm that students are attitudinally prepared for the use of ICT in their studies. They regard ICT as having potential to make study more convenient and improve their results while developing skills that enhance their career prospects. They are generally confident that they have the skills necessary for routine access to familiar forms of ICT but their lack of confidence in their abilities to solve their own technical problems is likely to contribute to a preference for staying with familiar ICT rather than exploring new opportunities.

It is also apparent that most students are prepared to access learning materials from the Web and have convenient access to Internet connected computer systems that are adequate for the purposes of study. However, many students have limited or no access to devices that would support mobile access to study materials such as recorded lectures or websites and many have little or no experience of such ICT. Given their general lack of confidence about solving technical problems, more widespread use of mobile devices to access study materials will require careful attention to ensuring that systems are as user-friendly as possible and are accompanied by support materials that promote the advantages and assist students with avoiding the pitfalls that may be associated with new ICT.

Data from the staff survey indicate that staff experiences of new ICT are limited and probably not a good guide to how ICT will be received by students. However, the positive responses from staff suggest a willingness to work with new ICT. In order for the university to gain the greatest benefit from this staff goodwill in its quest for leadership in flexible learning, care will need to be taken to ensure that systems for preparing and delivering new forms of content are user-friendly and well-supported.

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