A 2010 Snapshot of Educational Technology use by Teaching Staff of Charles Sturt University

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This paper presents a snapshot of Charles Sturt University teaching staff attitudes towards and usage of technologies for teaching and learning, drawing on an institution wide online questionnaire completed in 2010 by 246 teaching staff. One of the most interesting findings from this study is the high usage figures for many teaching technologies, including technologies which most would assume would still be used only by early adopters. The study also highlights technologies with relatively low current usage but very high desired usage, including plagiarism checking software for student use, and online assignment marking and return. The study also indicates that teaching staff have genuine educational reasons for choosing to use technologies in their teaching. The findings of this study make it further very clear that assumptions about staff or students' technology preferences, usage or proficiency based on age would be highly misguided. A key finding from this study is that teaching staff at Charles Sturt University are highly diverse in their attitudes towards and usage of technology and consequently, university initiatives need to cater effectively for different stages of technology adoption.

Keywords: Technology adoption, eLearning, Educational Technology use, teaching staff

Introduction

The adoption of technologies for learning and teaching is of crucial importance to the transformation of university learning and teaching from face-to-face delivery models and distance education models to more student centred models that blend the advantages of different modes and media within a flexible learning framework.

Given the rapidly changing nature of educational technology, the survey was executed so that the University can more effectively provide educational technology to its staff. It was also hoped that the survey would provide a better understanding of the professional development and support needs of teaching staff. It aimed further to obtain information to help inform evidence-based educational technology developments and change management.

Educational technologies in this study include information and communication technologies (computers and networks), teaching and learning spaces, mobile devices, video conferencing and multi-media. Anecdotal evidence suggests that while early adopters have managed to use technology as a tool to facilitate transformational pedagogical change there are still many university teachers who have engaged only in a token way with educational technologies.

This paper, then, reports on results obtained from an anonymous survey of 246 teaching staff at CSU about their attitudes towards and practices with technology for teaching. The University sought feedback through this survey on the use of educational technology by teaching staff, their skill levels in using these and on how they might expect these technologies to help them with their teaching.

Background

The adoption of learning management systems and associated "new" technologies took hold in Australian Universities in the 1990s in part due to peer pressure amongst the Vice Chancellors (Pratt, 2010) after a move to a more competitive funding structure introduced in 1989 (Marginson, 1997). By 2001, 23 out of 40 Australian Universities had at least one award course that could be completed fully online with no face-to-face component (Bell, Bush, Nicholson, O'Brian & Tran 2002). As more and more institutions entered the online education market it became apparent that there was a great variation in need amongst staff in relation to the use of technology. Spicer (2003) stressed that platforms needed to not only be simple to use for design and management but also well integrated with other institutional systems. Pratt (2010) noted that such planned selection and implementation was severely lacking when it came to the adoption of such technologies by Australian Universities. Spicer (2003) also noted variation in staff competence with technology and online delivery which he suggested needs to be addressed by a diversity in levels and style of support, particularly "just in time". The variations in support styles is needed to address the range of academic users from the well discussed early adopters, who may just need help navigating the latest platform and tool, to the reluctant adopters who need technical support they can rely on to be available for every step in the process. Failure to address staff technical proficiency has meant that despite the much touted capacity for technology to enhance an academic's ability to engage with new pedagogies or expand their use beyond the classroom walls; the actual educational experience presented is a product of staff proficiency, especially in the early foray online, rather than design (Honey and North, 2010; Tynan & Barnes, 2011). Hannon (2008) also noted a gap between stated best practice and what is actually happening, which he attributed to a decline in technology and pedagogical support once the initial "roll out" of a platform is over. Lack of sustainability is often a result of the project centred model of IT/educational design support provided at most Australian universities through small centralised units (Tynan & Barnes, 2011). One survey of Australian academics found that staff felt that to be effective online teachers they needed training in pedagogy more than technology (Kim & Bonk, 2006). Australia is not the only country finding that the traditional modes of staff professional development aren't keeping up with either internal technological advances nor the ongoing developments and innovations available

publically to students and staff alike; these same issues have been noted in Europe and the USA (Schneckenberg, 2009). In reviewing the central value of adequate professional development to enable staff to develop enhanced pedagogies that meet the needs of the students and the discipline Gosper et al (2010, p. 261) stresses:

> Programs need to go beyond the provision of technical information and training to encompass the development of a deeper understanding of the capability of learning technologies based on sound teaching and learning principles.

Arguably, an institution first needs some concept of the technical proficiency of its academic staff so that limited resources can be effectively deployed. Further, the perceptions and attitudes of staff need to be considered so that more inclusive and effective training and technology selection strategies can be implemented; a user led approach rather than the top down approach historically evident in Australia. Gosper et al. (2010) took the first step in their analysis of the use of learning technologies as well as perceptions of technology value by staff and students at four Australian universities. While their work noted a significant difference between staff and students perceptions of the value or benefit of online technologies they did not relate this to potential variations in the different populations' general use, acceptance and values in regards to technology. Several authors have noted the technical divide between the current generation of students (Gen Y or Net Generation) and those of the academics, a mix of baby boomers and Generation X, perceived as being less IT literate, can cause the latter to be less optimistic with their evaluations of the benefits of technology (Prior, 2004).

When examining technology use and preferences of academic staff it is worthwhile to keep the caution noted by Ragusa (2010) that with the selection of any new technology over another we need to consider the purpose behind the selection as well as at what expense and acknowledging the consequences of specific choices. It is also worth perhaps considering the willingness of staff to adopt technology for reasons other than competence. Lansdell (2010) noted that some of the staff at one Australian University were reluctant to transfer their legal course to an online delivery mode as they felt that the students would not be able to adequately develop professional interpersonal skills. The same study also noted concerns about loss of control over where the content, in this case personal legal experiences, may end up once online. This lack of perceived value or indeed reduction in capacity to teach students what they need to know via an online platform has been echoed by others across a range of disciplines (Gosper et al., 2010; Hanson, 2009). A third area of concern was a preference to not have all of their teaching activities able to be viewed by others, not wanting the university "watching over their shoulder" (Lansdell, 2010) nor the student body (Hardy, 2010).

While this paper focuses on staff use of educational technologies, it doesn't matter how staff or why staff select one technology over the other if they fail to consider the needs and preferences of the students who are supposedly the beneficiaries of these technologically enhanced experiences. Therefore, we need to contextualise the issue with studies of student technology use and preferences. It can be argued, in the absence of appropriate research, that institutional imperatives and resource prioritisation around technology used for teaching and learning is based on assumptions of the expectations and needs of contemporary students, often referred to as "Digital Natives" or the "Net Generation." (Prensky, 2001; Tapscott, 1998). A number of subsequent studies have found that assumptions about this "generation" of students are not especially accurate and in general, university students today use a fairly limited range of technologies such as the internet (for searching/'surfing'), email, mobile telephony, sms and office applications. They do not however, use newer Web 2.0 technologies such as blogs, wikis, and collaborative social media applications to the degree we might expect based on the assumptions made about the so call Net Generation. (Margaryan & Littlejohn, 2009; Kennedy, Dalgarno, Gray, Judd, Waycott, Bennett, Mason, Bishop, Chang, & Chuchwood, 2007; Kvavik, 2005). A number of studies would suggest that there are in fact not enough differences in the way these students learn to allow us to classify learners in this way without creating a number of significant misconceptions about what they may or may not expect from their educational experiences as a result. (Kennedy et al, 2007; Bennett, Maton, & Kervin, 2008; Selwyn, 2008). To then base the need for the teaching staff of higher education institutions to become more tech-savvy in their teaching and learning approaches solely on these assumptions maybe misguided. Margaryan and Littlejohn (2009) did find that assumptions about the tech-savvy nature of contemporary university students a common motivator amongst lecturers to use new technologies in their teaching.

In their study of undergraduate students in two British Universities, Marharyan and Littlejohn (2009) found that students use a limited range of social technologies for learning such as collaborative applications or virtual worlds as well as their institution's Virtual Learning Environment (VLE) and websites such as Google or Wikipedia. Notably, their study found that the attitudes of students to learning was more significantly influenced by their lecturers' approaches, and that students tended to expect what would be considered fairly traditional approaches to teaching and learning in the university environment. Students tended to use creative and social forms of technology such as Facebook, blogs and publishing sites, more for entertainment purposes, and used traditional and static forms of technology (such as VLEs to download lecture notes, office applications and content-based websites) for learning (JISC, 2007). Seeing the myriad technologies as an opportunity to improve teaching and learning for students, rather than as something students already know and expect to use, may be a more solid foundation on which to build the educational technology skills of teaching staff in universities.

The Study

CSU Context

Charles Sturt University is a multi-campus university with a large proportion of its students studying at a distance rather than on campus. Specifically, in 2010 23,367 students were enrolled in Distance mode, 9,568 in On Campus mode and 5,029 in a mixture of On Campus and Distance modes. In 2010 the University employed 673 full-time equivalent academic staff, in four faculties (Arts, Science, Business and Education), as well as adjunct staff in a number of partner institutions within Australia and offshore. The University has required all subjects to have an online presence containing at least the subject outline and a discussion forum since the late 1990s, with online assignment submission available in all distance subjects since the early 2000s. The Sakai based Learning Management System (named *Interact* within the University) was introduced in 2009, providing an announcements tool and a resource sharing tool in all subjects and tools such a blog, a wiki and a chat room at the discretion of the subject coordinator.

Questionnaire Design

The questionnaire was designed in close cooperation with staff from the University of Waikato, New Zealand in mid-2010. The questionnaire was based on the following surveys: University of Waikato, Staff and Student eLearning surveys 2008; ECAR Research study 6, 2007; Student Information and communications Technology project, University of Edinburgh; Association of College and Research Libraries, Informing Innovation survey 2009; VERSO, 2008; UNSW@ADFA, Students' ICT Experience, 2008; Victoria University, Student Questionnaire, 2009; Macquarie University, Student Experience of Technologies in Universities, 2010; University of Wollongong Survey, 2008; UTAS, Staff and Student experience with eLearning technology surveys 2010.

The questionnaire was thereafter customised to address key concerns about educational technology at CSU and had the following sections: Demographics – Personal; Demographics – Institutional; Technology Access; Use and awareness; Features currently used; Features they would like to use to support their learning; Views and Experience; University Services. A similar questionnaire was designed and administered among CSU students. This paper, however, reports on the survey among teaching staff only.

Administration and Sample Demographics

Ethics approval for this survey was obtained from the CSU Learning & Teaching Services Ethics Committee. The questionnaire was made available online in Survey Monkey between 13 July 2010 and 1 August 2010. It was widely promoted in CSU and its partner institutions through general communication channels and also through CSU's micro-blogging tool Yammer and a learning management system site called "About ICT integration" (which has just under 500 members).

The survey was conducted anonymously and it was made clear that even though Survey Monkey used the IP address of the computer to enable staff to continue if they exited the survey before the end, this would not be used to identify their contribution. It was also made clear that any publication as an outcome of this survey would not identify any individual or any particular subject in any way.

Teaching staff were encouraged to complete the full questionnaire, but could exit the survey at any time and return later to finalise it on the same computer or exit without completing. It was stated that participants had the right to withdraw from the research at any time, without penalty and they could also contact the first author of the paper if they wished to withdraw after having completed part of the survey. The survey took approximately between 30 and 45 minutes to complete. This paper reports summaries of the responses to a subset of the questions in the survey relating to general attitudes towards and usage of technology, attitudes and usage of selected educational technologies, and usage of the CSU Learning Management System. Generally items have been chosen for reporting where it was considered that their usage was sufficiently common across the sector to warrant wider interest.

The survey was completed by 246 teaching staff members, including 105 males, 137 females, and 4 not stating their gender. 208 respondents were employed directly by the university, while the remaining 38 respondents were teaching staff employed at one of 12 partner institutions. There were 63 respondents from the Faculty of Arts, 40 from Business, 70 from Education and 49 from Science, with 24 indicating that they were not in a faculty (some staff from the Divisions of Student Services, Library Services and Learning and Teaching Services completed the survey because they have some involvement in teaching. 21 respondents indicated that they were aged 55-60, 43 were 51-54, 32 were 45-50, 47 were 40-44, 34 were 35-39, 24 were 30-34, 21 were 26-29, 10 were 22-25, 11 were 18-21 and 3 indicated that they were less than 18.

Findings

General attitude towards technology

In order to get a sense for teaching staff respondents' attitudes towards new technologies, they were asked to choose which of a series of descriptors described themselves ranging from "I love new technologies and am among the first to experiment and use them" to "I am skeptical of new technologies and use them only when I have to". As shown in Figure 1, only 9% of respondents indicated that they loved technologies and were among the first to use them, while 31% of respondents indicated that they liked technologies and used them before most people they knew. The fact that the largest proportion of respondents (35%) indicated that they use technologies when other people start to use them, and 26% of respondents indicated that they used technologies after other people had started using them, indicates that there was a fairly even distribution of respondents ranging from those very positive about technology to those much less positive.
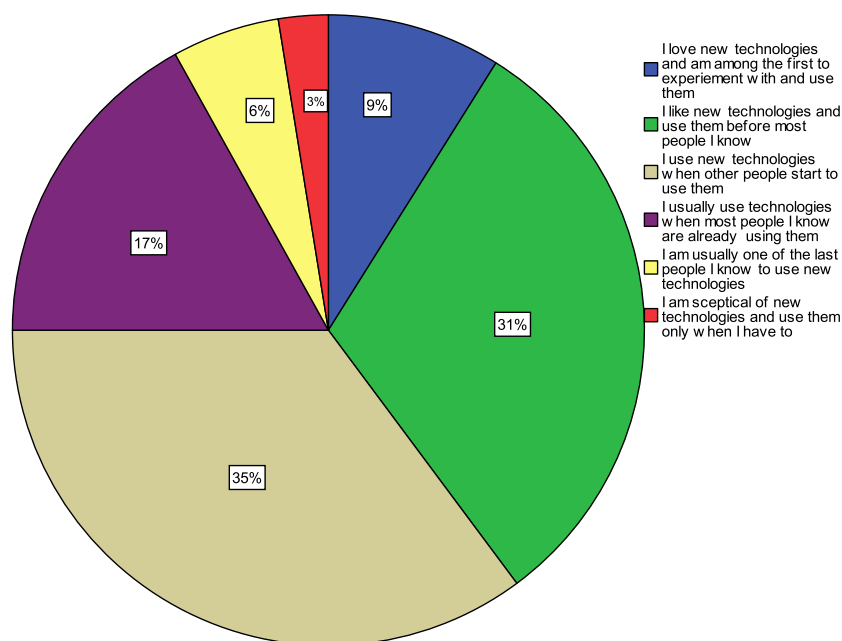
Figure 1: Attitudes towards new technologies

General usage of technology

In order to get a general picture about teaching staff familiarity with a range of technologies, teaching staff were provided with a list of 60 technologies, tools and online information sources and asked to indicate whether they had never heard of it, heard the name but were not sure what it was, knew what it was but had not used it, used it occasionally, or used it regularly. Table 1 shows responses relating to 8 of these 60 technologies. Not surprisingly, tools such as Email (97%), Spreadsheets (76%) and Presentation Software (82%) that are central to the work of a teaching staff member were used regularly by the vast majority of respondents. Less used were Social Networking, Wikis and Podcasts with around 50% of respondents using them either regularly or occasionally. Interestingly, only a small proportion of respondents indicated that they had used Microblogging or Virtual Worlds, with 42% of respondents indicating that they had not heard of Virtual Worlds or were unsure what they were.

Table 1: Technology Use and Awareness

Technology or Tool	Never heard of it	I've heard the name but not really sure what it is	I know what it is but have never used it regularly	I use this occasionally	I use this regularly
Social Networking (eg. Facebook, LinkedIn, MySpace, Orkut, Ning)	0.4%	5%	36%	32%	26%
Email (Hotmail, gmail, Outlook)	0.8%	0.4%	0.8%	1.3%	97%
Wikis	3%	11%	39%	28%	19%

Electronic Simulations and Virtual Worlds (Second Life)	22%	20%	50%	5%	3%
Microblogging Services (Twitter, Tumblr, Yammer)	7%	19%	52%	14%	8%
Podcasts	3%	9%	34%	31%	23%
Spreadsheets (eg. MS Excel)	1%	0.4%	4%	18%	76%
Presentation Software (PowerPoint, Keynote)	1%	0.8%	4%	12%	82%

Attitude towards educational technologies

Participants were asked to nominate the "single most important benefit for me of using educational technology in my subjects", choosing from six options. The proportion of respondents choosing each option is shown in Figure 2. The largest proportion of respondents (46%) chose "improving the quality of my teaching", with 35% choosing "making it easier for my students to get access (where students would have been unable to attend some or all of the required on-campus classes e.g. due to distance, family commitment, work)". Only 2% chose "Personal management (Able to teach at times and in places convenient for me)" suggesting that student convenience is a much more important factor in technology use than teacher convenience. The high number of respondents using technologies because they see them as improving their teaching quality and the low number (4%) indicating that they could see no benefits in the use of technology is quite encouraging.

Use of the Learning Management System

Participants were asked three questions about whether they used the university Learning Management System (LMS), which goes by the tag "CSU Interact" and why or why not. The first question was "Do you use CSU Interact to support the delivery of some of your subjects" with 212 respondents (86%) choosing "Yes" and 34 respondents (14%) choosing "No". Respondents who chose "Yes" were provided with a list of fourteen possible reasons for using the LMS and asked to tick all that applied. Table 2 shows how many of the 212 respondents using the LMS indicated that the specified reasons applied to them. Understandably, the most common reason was that use was part of Faculty or School policy. Equally important, however, was to allow access to supplementary resources, followed closely by "to increase the opportunities for communication" and "to allow access to lecture notes, slides and handouts". Of lower importance were "for formative assessment (feedback only)" and "for summative assessment (count towards grades)".
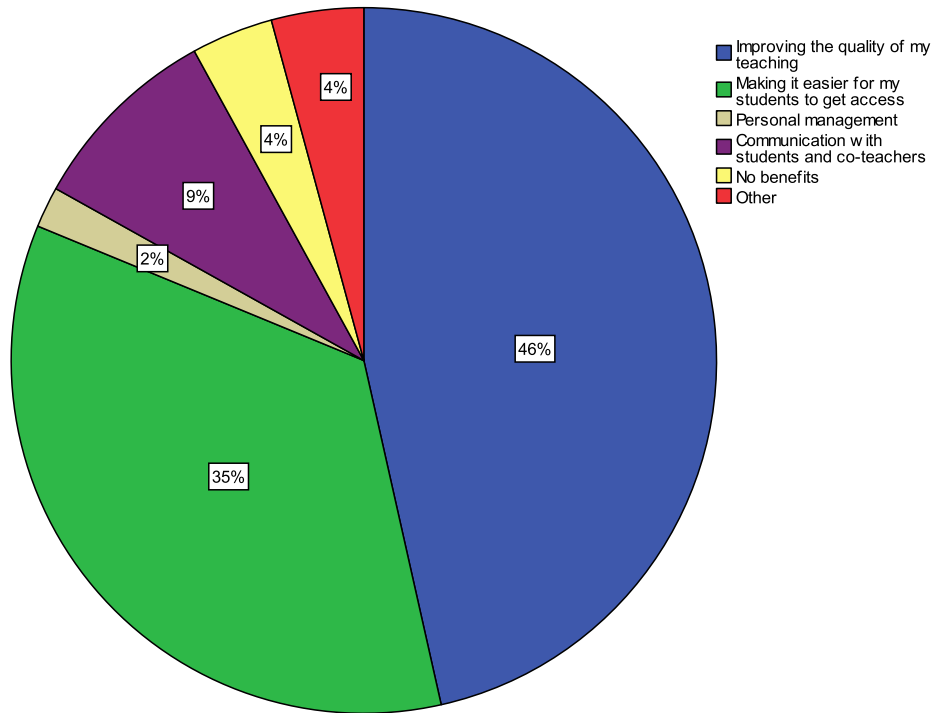
Figure 2: Attitudes towards educational technologies

Table 2: Reasons for using the Learning Management System

Reason	Respondents (of 232 using the LMS)
It is Faculty/School policy	151
To allow access to supplementary resources	150
To increase the opportunities for communication	147
To allow access to lecture notes, slides and handouts	143
To increase the flexibility of teaching & learning	125
To provide blended subjects (where some core content, communication, readings or assessment is included online)	97
To allow access to audio or video resources	97
To selectively release online activities and content	69

To provide fully online subjects	63
For formative assessment (feedback only)	62
For summative assessment (count towards grades)	55
My students demand it	40
To use or link to simulations and virtual worlds online	28
Other (please specify)	11

Participants who indicated that they did not use the LMS were asked to indicate why not, by choosing one or more reasons from a list of eight provided. Table 3 shows the number of respondents out of the 34 not using the LMS who chose each provided reason. The most common reason (11 of 34 respondents) chosen was "there is no compelling reason to use it", followed by "other (please specify)" (10 of 39 respondents). Responses given for "other (please specify)" included, "It takes a long time to create resources", and "Do generic workshops as well as coordinate an online subject, don't use interact for these workshops".

Table 3: Reasons for not using the Learning Management System

Reason	Respondents (of 34 not using the LMS)
There is no compelling reason to use it	11
Other (Please specify)	10
Lack of awareness or professional development	7
It doesn't support my teaching style	6
It would be detrimental to my students' approach to the subject	5
It's too time consuming to use	5
I'm concerned about Intellectual Property issues	3
Other people manage my CSU Interact subjects for me	2

Table 4: Frequency of use and desired use for selected educational technologies

	Frequency of Current Use			Frequency of Desired Use		
	Weekly or more (1)	Less than weekly (2)	Never (3)	Weekly or more (1)	Less than weekly (2)	Never (3)

Announcements	59.5%	33.9%	6.5%	69.8%	24.3%	6.0%
Lecture recordings	16.3%	19.4%	64.3%	41.5%	29.0%	29.4%
Discussion forums	63.9%	21.8%	14.3%	65.2%	25.3%	9.6%
Chat room	23.3%	25.6%	51.1%	38.1%	30.3%	31.7%
Wikis	15.0%	32.6%	52.4%	32.4%	32.9%	34.7%
Blogs	14.2%	25.7%	60.2%	29.1%	32.7%	38.2%
ePortfolios	10.7%	16.9%	72.4%	25.2%	31.8%	43.0%
Assignments – students getting marked work back online	12.4%	37.6%	50.0%	19.0%	60.7%	20.4%
Plagiarism checking by students before submitting their assignments	5.8%	17.0%	77.2%	20.0%	62.8%	17.2%
Animation	8.9%	22.2%	68.9%	25.5%	35.7%	38.9%
Quizzes for learning / self review / assessment	13.2%	33.3%	53.5%	28.8%	52.1%	19.2%
Subject information on my students' mobile devices (handheld)	4.9%	4.0%	91.1%	22.2%	25.0%	52.8%
Digital object management system (Equella)	4.0%	2.2%	93.8%	14.8%	23.3%	61.9%

Usage of selected technologies in teaching

Respondents were asked to indicate the frequency with which they use each of 34 technologies in their teaching, and the frequency with which they "would like" to use each of these technologies. Table 4 shows the frequencies for 9 of these technologies. By far the most frequently used technologies were the discussion forum and the online announcements tool in the LMS. Supporting students using online forums or cohort wide announcements has been possible at CSU for more than 10 years. Such tools have commonly been used to supplement traditional print-based distance education pedagogies as well as traditional lecture and tutorial face-to-face teaching models. The fact that Web 2.0 tools such as Wikis, Blogs and ePortfolios are now being used by 25% to 45% of teaching staff suggests that many teaching staff have begun to evolve their online teaching strategies beyond those that simply support traditional distance or face-to-face approaches. The high number of teaching staff indicating that they desire to use online assignment feedback and plagiarism checking software, despite relatively low current use suggests that these tools which have become available at CSU more recently will gradually become much more popular. The very low current usage of the digital object management system and tools for providing subject information for mobile devices, is indicative of the fact that at the time of the survey such facilities were not widely available. The relatively low percentage of staff planning to use these tools may be indicative of a general lack of awareness of the possibilities in these areas.

Comparison by Age, Gender and Faculty

To explore the possible differences in technology use between sub-groups of respondents, a series of Multivariate Analysis of Variance (MANOVA) procedures were carried out using age, gender and faculty as independent variables and, firstly, usage of the set of general purpose technologies listed in Table 1 as dependent variables, and secondly, usage of the set of educational technologies listed in Table 4 as dependent variables.

The analysis focusing on general purpose technologies indicated that there were no significant differences between male and female staff usage of any of the technologies. There were few age related differences in technology usage, with social networking being the only technology for which a significant main effect for age was found ($F(9,144)=2.863$, $p=0.004$). Post hoc analysis using Tukey's HSD test indicated that the mean response for the 22-25 age group was greater than for all of the older age groups ($p < 0.05$), that is, that the younger teaching staff members used social networking tools significantly more frequently. There were no significant faculty related differences for usage of general purpose technologies.

The analysis focusing on teaching technologies also found no significant main effect of gender, indicating that there is no difference in usage by male and female teaching staff. There were also no significant age related differences in frequency of use of these technologies. There were some faculty differences, with main effects found for announcements ($F4,135)=5.326$, $p=0.001$), blogs ($F(4,135)=3.487$, $p=0.010$) plagiarism checking software use by students ($F(4,135)=3.503$, $p=0.009$), and formative quizzes ($F(4,135)=3.316$, $p=0.012$). Post hoc analysis using Tukey's HSD test indicated that teaching staff who were not in a faculty (eg. Student Services, Learning and Teaching Services and Library Services staff) used announcements significantly less frequently than staff from the faculties. Similarly, staff from the Faculty of Education and non-faculty staff used Blogs significantly more frequently than staff from the Faculties of Science and Business. Staff from the Faculty of Business used plagiarism checking software significantly more frequently than staff from the Faculties of Education, Arts and Science, probably reflecting initiatives within the Faculty of Business to promote the use of such software when it was first made available. Finally, staff from the Faculty of Arts used formative quizzes significantly less frequently than staff from the Faculties of Business, Science and those not in a Faculty.

Relationship between general technology usage and usage of technology for teaching

In order to explore the relationship between teaching staff personal usage of technology, and their usage of technology for teaching, a mean technology usage score was calculated, from the usage responses for the eight technologies in Table 1. Pearson's correlation coefficient was then used to test for correlations between this mean technology usage score and usage as well as desired usage of each of the teaching technologies in Table 4. Significant correlations ($p< 0.05$) were found between the mean technology usage score and usage of eight of the thirteen teaching technologies in Table 4 (lecture recordings, discussion forums, chat room, wikis, blogs, online assignment marking, animation, and formative quizzes). Significant correlations ($p<0.05$) were found between the mean technology usage score and desired usage of all thirteen teaching technologies. This indicates, as would be expected, that personal usage and awareness of technologies is a strong driver of use of technology for teaching. The lack of correlation with some technologies is interesting. In the case of usage of ePortfolios and plagiarism checking software, it may be that the range of initiatives within the university to promote usage may have led to early adoption of these tools by people who were not naturally high users of technology. In the case of the provision of subject information for mobile devices and the use of the object management system, it may be that the very low usage of these technologies prevented meaningful correlation scores from being obtained.

Discussion and conclusion

One of the most interesting findings from this study is the high usage figures for many teaching technologies, including technologies which most would assume would still be used only by early adopters. Mainstream tools like the announcements tool (usage of close to 95%) and discussion forums (usage of close to 85%) have become almost ubiquitous at CSU, while 28% of respondents are using ePortfolios, 40% are using Blogs and 48% are using Wikis all of which would be seen by many as leading edge Web 2.0 technologies. These findings

can be contrasted with those of an earlier study by Shannon and Doube (2004), who in 2003 found that 55% of their University of Adelaide respondents used web teaching tools 'less than a moderate amount'. The data from this survey would suggest that there has been a substantial increase in the adoption of online teaching tools in recent years. It is interesting to also contrast these findings with those of Kennedy et. al. (2011) who report on a questionnaire completed in 2010 by teaching staff at the University of Melbourne, an institution with a predominately face-to-face teaching profile. A key difference is the proportion of staff making use of a discussion forum (94% at CSU compared to 37% at the University of Melbourne). Similarly, Web 2.0 social networking tools like Wikis (48%), Blogs (40%) and ePortfolios (28%) are becoming mainstream parts of university learning and teaching at CSU, while their usage is more moderate at the University of Melbourne (15% for Wikis and 9% for Blogs). It is likely that due to a lack of opportunity for face-to-face communication in many CSU subjects, teaching staff at CSU have explored the capabilities of online communication tools to a much greater extent than their counterparts at the University of Melbourne. The even higher desired usage figures for these technologies suggest that their usage will continue to increase in the coming years to the point where the majority of CSU teachers will be making use of them. Interestingly the use of lecture recording is much higher at the University of Melbourne (58% compared to CSU 36%) reflecting the value of such technologies in a face-to-face context.

The study also highlights technologies with relatively low current usage but very high desired usage, including plagiarism checking software for student use, and online assignment marking and return. At the time that the survey was completed both of these tools had only recently been made available, and so it is possible that many teaching staff had not yet had the chance to make use of them but had plans for doing so. It is likely that future surveys will pick up substantially increased usage of these tools. The survey also highlights two technologies with very low current use and relatively low desired use, namely tools for the provision of subject information on mobile devices and the object management tools. The low current usage is reflective of the fact that these tools were not yet widely available at the time that the survey was completed. The low desired usage has implications for the university in terms of the professional development required if the adoption of such tools is seen as desirable. It is likely that many teaching staff are not aware of the capabilities of such tools and so, without substantial promotion, will not use them even once they are made widely available.

The responses to the question about attitude towards educational technology and to the question asking for reasons for use of the LMS suggest that, even though usage of the LMS is required by university policy, teaching staff have genuine educational reasons for choosing to use technologies in their teaching. The fact that many teaching staff are making decisions to use online tools within their subjects that are not mandatory, such as Wikis, Blogs and ePortfolios, suggests that these staff are making decisions based on perceived pedagogical benefits. All of this said, the responses to questions about attitude towards technology in general (indicating that more than half of the teaching staff use technology when or after others start using them) and questions about awareness of and usage of technologies in general, indicate that there is still a large proportion of staff who have little experience with emerging technologies like virtual worlds, podcasts, social networking tools and micro-blogging tools. This suggests that as Spicer (2003) points out, support for teaching staff needs to cater for staff at a wide range of levels of technology awareness and experience.

Responses to the questions about general usage of technology suggest that a sizable minority of teaching staff use social networking tools, wikis and podcasts regularly. This runs counter to the notion suggested by Prensky (2001) of a Digital Immigrant teaching population teaching a 'Digital Native' population of students. Even though some teaching staff would fit into the age bracket characterised as Generation Y, and so might on this basis be assumed to be 'Digital Natives', the lack of age effects for usage of most technologies indicates that it is not in fact the younger staff who make up the group of frequent users of emerging technologies. Furthermore,

earlier studies (see Kennedy et al., 2007; Kennedy et al., 2008) suggest that many students are not regular users of Web 2.0 technologies and that age is not a good predictor of student and staff use of technologies in general. , Consequently, assumptions about staff or students' technology preferences, usage or proficiency based on age would be highly misguided. Our study would perhaps suggest that the main assumption that could be made in relation to teaching staff and educational technology use, is that as their technology proficiency increases so will their preference for a choice of tools that fit their diverse pedagogical needs.

To conclude, the most important finding from this study is that teaching staff at Charles Sturt University are highly diverse in their attitudes towards and usage of technology, including general technologies and learning and teaching technologies. Consequently, any initiatives designed to facilitate wider use of technologies for learning and teaching need to cater effectively for teaching staff at different stages of technology adoption.

References

Bell, M., Bush, D., Nicholson, P., O'Brien, D & Tran, T. (2002). Universities Online: A survey of online education and services in Australia. *Occasional Paper Series, Higher Education Group.* Canberra: Commonwealth Department of Education, Science and Training.

Bennett, S., Maton, K. & Kervin, L. (2008). The 'digital natives' debate: A critical review of the evidence. *British Journal of Educational Technology,* 39(5), 775-786.

Gosper, M., McNeill, M., Phillips, R., Preston, G., Woo, K. & Green, D. (2010). Web-based lecture technologies and learning and teaching: a study of change in four Australian universities. *ALT-J research in learning technology,* 18(3), 251-263.

Hannon, J. (2008). Doing staff development: practices, dilemmas and technologies. *Australasian Journal of Educational Technologies*, 24(1), 15-29.

Hanson, J. (2009). Displaced but not replaced: the impact of e-learning on academic identities in higher education. *Teaching in Higher Education,* 14(5), 533-564.

Hardy, I. (2010). Academic architectures: academic perceptions of teaching conditions in an Australian University. *Studies in Higher Education*, 34(4), 391-404.

Honey, M.L.L. & North (2010). Using virtual learning to teach postgraduate nurses: an educators' perspective. In Ragusa, A. T. (Eds.) *Interactions in communication technologies and virtual learning environments: Human Factors.* Hershey, PA: IGI.

JISC. (2007). Student expectations study, July 2007.

http://www.jisc.ac.uk/media/documents/publications/studentexpectations.pdf

Kennedy, G., Dalgarno, B., Gray, K., Judd, T., Waycott, J., Bennett, S., Mason, K., Bishop, A., Chang, R. & Chuchwood, A. (2007). The net-generation are not big users of Web 2.0 technologies: Preliminary findings from a large cross-institutional study. In *ICT: Providing choices for learners and learning. Proceedings ascilite Singapore 2007*. http://www.ascilite.org.au/conferences/singapore07/procs/kennedy.pdf

Kennedy, G., Dalgarno, B., Bennett, S., Judd, T., Gray, K. & Chang, R. (2008). Immigrants and Natives: Investigating differences between staff and students' use of technology. In R. Atkinson and C, McBeath (Eds.). *'Hello! Where are you in the landscape of educational technology?', 25th annual conference of the*

Australasian Society for Computers in Learning in Tertiary Education (ASCILITE), Deakin University, Melbourne, Australia.

Kennedy, G., Jones, D., Chambers, D. & Peacock, J. (2011). Understanding the reasons academics use – and don't use – endorsed and unendorsed learning technologies. In G. Williams, N. Brown, M. Pittard, B. Cleland (Eds.). *Changing Demands, Changing Directions. Proceedings ascilite Hobart 2011* (pp. XXX-XXX). Kim, K.J. & Bonk C.J. (2006). The future of online teaching and learning in higher education: The survey says. *Educause quarterly,* 29(4) 22-30.

Kvavik, R. (2005). Convenience, communications, and control: How students use technology. In Oblinger, D., & Oblinger, J. (Eds.). Educating the Net Generation (Chapter 7) [e-book]. Retrieved June 21, 2011 from http://www.educause.edu/Resources/EducatingtheNetGeneration/ConvenienceCommunicationsandCo/6070

Lansdell, G. (2010). Have we forsaken quality and professionalism for technological convenience in the training of lawyers? In Ragusa, A. T. (Eds.). *Interactions in communication technologies and virtual learning environments: Human Factors.* Hershey, PA: IGI.

Margaryan, A. & Littlejohn, A. (2009). Are digital natives a myth or reality?: Students' use of technologies for learning. http://www.academy.gcal.ac.uk/anoush/documents/DigitalNativesMythOrReality-MargaryanAndLittlejohn-draft-111208.pdf

Marginson, S. (1997). *Markets in Education.* St Leonards, Australia: Allen and Unwin Pty Ltd.

Pratt, J.G.M. (2010). The antecedents and consequences of adopting learning management systems in selected Australian Universities. In Ragusa, A. T. (Eds.). *Interactions in communication technologies and virtual learning environments: Human Factors.* Hershey, PA: IGI.

Prenksy, M. (2001). Digital natives, digital immigrants. *On the Horizon*, 9(5), 1–6.

Prior, J. (2004). Computer aided learning: panacea or Pandora's box. In. Preston, D.S. & Nguyen, T.H. (Eds.).*Virtuality and education: A reader*. Oxford, UK: Inter-Disciplinary Press.

Ragusa, A. T. (2010). Communications and social interactions in a technology-mediated world. In Ragusa, A. T. (Eds.). *Interactions in communication technologies and virtual learning environments: Human Factors.* Hershey, PA: IGI.

Schneckenberg, D. (2009). Understanding the real barriers to technology-enhanced innovation in higher education. *Educational Research*, 51(4), 411-424.

Selwyn, N. (2008). An investigation of differences in undergraduates' academic use of the Internet. *Active Learning in Higher Education*, 9(1), 11–22.

Shannon, S. & Doube, L. (2004). Valuing and using web supported teaching: A staff development role in closing the gaps. *Australasian Journal of Educational Technology,* 20(1), 114-136.

Spicer D, (2003). *Where the rubber meets the road: an on-campus perspective of a CIO.* In Levine, A., Irvine, M., Cappelli, G., Twigg, C.A., Spicer, D. & Postman, N. (Eds.). *The Wired Tower: Perspectives on the impact of the internet on Higher Education.* New Jersey, USA: Prentice Hall.

Tapscott, D. (1998). *Growing up digital: The rise of the Net generation*. New York: McGraw-Hill.

Tynan, B. & Barnes, C. (2011). Web 2.0 and professional development of academic staff. In Lee, M.J.W. & McLoughlin C. (Eds.) *Web 2.0-based E-learning.* Hershey, PA: IGI.

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http://www.ascilite.org.au/conferences/hobart11/procs/Uys-full.pdf