Understanding the reasons academics use – and don't use – endorsed and unendorsed learning technologies

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Educational researchers have a longstanding interest in the reasons why academic staff use technologies in their teaching. The investigation presented in this paper considered drivers and barriers to the use of technology in a higher education context where it is increasingly possible for academics to not only rely on endorsed, university-based systems and tools, but also on unendorsed tools available 'outside' the university. The findings from this study showed that most staff were using a relatively standard, endorsed technology tool-set and, in most cases, there was limited use of external or emerging technologies and tools in learning and teaching. Five clear profiles of academic staff were established that represented diverse motivations for using or not using technologies in teaching. The implications of the results of this study are discussed in terms of staff training, support and professional development.

Keywords: Technology Adoption, Drivers, Technology Use, Academic Development

Background

Drivers of Technology Use in Higher Education

While the type and range of technologies adopted by universities and their staff have changed over the years, there has been sustained interest in what drives both institutional and individual adoption and use of technologies in teaching and learning. As Snyder, Marginson and Lewis (2007) see it, the educational promise of information and communications technologies in University settings will only be realised if the 'planets align'. And given the number of planets, satellites and pieces of space junk orbiting within institutional solar systems, this can be a complex space to analyse and understand.

Regardless, researchers have investigated and developed frameworks to account for the drivers and constraints associated with technology use in higher education. For example, in 2003 Shannon and Doube conducted an investigation of staff use of the University of Adelaide's Learning Management System (LMS) (see Shannon & Doube, 2003a; 2003b; 2004). As part of this work, Shannon and Doube (2003a) provide a useful review of the reasons why technology is or is not used across different educational sectors. They summarise the key issues that impact on the uptake of technology as (paraphrased):

- workload and time
- knowledge and skills
- staff development and training
- tools and infrastructure
- recognition and rewards
- conceptions of teaching and learning, including concern about the value of technology, definitions of academic work in relation to teaching, and the quality of learning and other student outcomes; and
- institutional support.

Reporting from their own research study, Shannon and Doube (2004) identified a number of factors that constrained the use of technology or 'web-supported teaching' including, "time and workload pressures, concerns about knowledge and skills, conceptions of teaching and the value of web supported learning for improving student outcomes, and the perceived stability and integration of the University infrastructure and learning management system" (p. 114).

More recently, Birch and Burnett (2009) developed a framework for conceptualizing the factors that influence academics' adoption and integration of technology in the context of distance education environments. The framework proposes that an interplay between institutional, individual and pedagogical factors accounts for academics' adoption of technology in their courses. In their review they identify a range of factors, within each of these domains that correspond broadly to those of Shannon and Doube (2003a). For example, institutional constraints to technology adoption include lack of clear leadership and support and inadequate infrastructure; in the individual domain constraints include lack of time, negative attitudes from academics about the benefits of technology and the lack of reward for innovation. Finally in the pedagogical domain Birch and Burnett (2009) identified facilitators of technology use such as the perception that elearning environments can accommodate different learners' needs, and can make learning more student-centred and independent.

In the international context Blin and Munro (2008) undertook an analysis of lecturers' use of the *Moodle* learning management systems using an activity theory lens. Among their findings, Blin and Munro (2008) reported that dominant reasons why staff chose not to use features of *Moodle* in their teaching were perceived lack of relevance to their "course, subject or practice" (p. 487) and lack of familiarity or knowledge about the advanced features that were available to them. Lack of time was again raised as a concern for many staff – time to familiarise themselves with both the technical functionality of the system as well as how to best exploit it educationally.

A number of other researchers have considered barriers to and facilitators of technology adoption and use in higher education and, somewhat tangentially, why educational technology has failed to reach its transformational promise (see for example, Johnston & McCormack, 1996; Georgina & Olson, 2008; Giardina, 2010; Hannon, 2009; Selwyn, 2007; Nicolle & Lou, 2008; Goodyear, 1998; Kirkup & Kirkwood, 2005). From these reviews it can be seen that, regardless of the era, the technology, or the mode of learning under consideration, previous research has identified various institutional and individually-based factors that impact on why academic staff choose to, or not to, adopt technology in their teaching and learning. What is less as clear from the literature is how these various drivers or inhibitors of technology use are represented across the teaching staff of a particular university. That is, in any given context are the drivers and constraints equally weighted for individuals or do they vary, and if so, is this variation systematic. This is, in part, the focus of this paper.

Endorsed and Unendorsed Learning Technology Use

One of the shifts we have seen in the last five to ten years in higher education is the move to a shared model of learning technology provision. By this we mean that where once the provision of technology for the university's teaching, learning and assessment, and the management and administration of these activities, fell squarely within the domain of the university itself, in more recent times we have seen universities more prepared to explore alternative models for IT sourcing. This has included shifting a greater proportion of service provision from internally to externally hosted options (Goldstein, 2009; Katz, Goldstein & Yanosky, 2009), with an underlying business model of acquiring greater flexibility in purchasing IT capacity as it is required, and funding this from operational rather than capital budget allocations (Goldstein, 2010). For example, where once universities would provide staff and students with a dedicated university email service, internally hosted, to facilitate communication among and between staff and students, more recently we have seen a number of universities moving their email services to external providers such as Google Apps and Microsoft Live@edu (for overviews of the Australian, US and Canadian contexts see Bolt, Fitzgerald and Jessen (2010), Bristow, Dodds, Northam and Plugge (2010) and Pirani (2009)).

A similar movement or change has been seen in the provision of resources for teaching and learning. It was not so long ago that universities and their staff would largely create or source resources and tools that would be sanctioned for use in the classroom. The explosion of freely available content on the Internet and the ability of lecturers to make use of free or cheap web-based tools in their teaching has meant that, should they have the inclination and where-with-all, lecturers can now choose to by-pass the systems and services provided by the university (e.g. the centralised LMS). Lecturers can find online video and images to use in lectures, they can create wikis and blogs using services external to the university, and they can exploit existing social networking tools for teaching and learning purposes (see, for example, Kennedy, Dalgarno, Bennett, et al., 2009).

The interplay or even tension between centralized, endorsed, university-based resources and services and distributed, unsanctioned web-based resources and services parallels prevailing discussions about the use of Learning Management Systems versus the provision or creation of *Personal Learning Environments* for students at university. As Chatti, Agustiawan, Jarke and Specht (2010) argue "A common idea behind LMS-based technology enhanced learning solutions is that different tools are pushed by the educational institution and pre-packaged into a centralized system. A Personal Learning Environment (PLE), however, is a more natural and learner-centric model to learning that takes a small pieces, loosely joined approach, characterized by the freeform use of a set of learner-controlled tools and the bottom-up creation of knowledge ecologies" (p. 69). While it is somewhat unclear what a PLE actually *is* from this description, the notion that students (and lecturers) can use the services, tools, resources that *they* deem appropriate rather than ones that the institution controls and deems appropriate lies at the heart of the distinction we make between endorsed and unendorsed learning technologies.

Aim of This Paper

Given this background, the focus of this paper is two-fold; first, we sought to gather baseline evidence of the extent to which staff in a major research-intensive university were relying on university- and non-university-based technologies to support their teaching and learning. Second, we were keen to draw on previous research to consider the reasons why staff generally choose to use, and not to use, technologies in their teaching to support students' learning. Given that previous research has provided an indication of some of the drivers and inhibitors of learning technology use in institutions, our focus was on determining whether patterns or profiles of University staff could be established when it came to the barriers and facilitators of their technology use. If patterns, could be established, these may have implications for the way in which strategies, services and support could be provided in universities.

Method

Participants and Procedure

Participants targeted for this investigation were academic staff from a large, research-intensive, metropolitan university who were involved in teaching. An open invitation to complete an online questionnaire was sent to all university staff via a 'staff news' mailing list, and through Associate Deans in each Faculty and Graduate School. Staff were asked to complete a short questionnaire and an incentive of a chance to win one of five $100 vouchers was provided. The questionnaire was created in Survey Monkey and was available for three weeks during November and December 2010. A total of 286 completed questionnaires were received from academic staff, with more males (60.9%) than females (39.1%) responding to the survey.

Measures

A questionnaire was developed for this investigation that comprised six sections, with each section containing both closed- and open-response items. The content of the questionnaire was based on the particular technology environment at The University of Melbourne (i.e. the systems, tools and resources that were available to staff), as well as previous research on staff and students' use of technology (e.g. Kennedy et al., 2009) and the previously identified drivers of university staff uses of technology in teaching (see review above). The first section of the questionnaire asked about demographic information of the respondent, including number of years teaching and year levels taught; the second section focused on what university-based technologies were used in teaching; the third section focused on what non-university based technologies were used in teaching; the fourth section focused on reasons why technologies were used in teaching; the fifth section focused on reasons why technologies were not used in teaching. The final item on the questionnaire asked staff to comment on the one thing they would change about the use of technology in teaching at the university. For a copy of the questionnaire please contact the authors.

Only a subset of data from the questionnaire will be reported in this paper. We will primarily report on the quantitative data that considers those technologies staff were using and the reasons they indicated for using and not using technologies in their teaching. To determine technology use/non use, for a range of technologies (n=29; see below) staff were asked to indicate whether they had (i) ever used a particular technology in their teaching, (ii) whether they had used that technology in 2010, (iii) if they have never used that technology, or (iv) if they were not familiar with the technology. Separate questions were asked about university-based technologies (such as LMS-based tools and other centrally supported systems) and non-university based technologies (e.g., more generic tools and services available via the Internet). With regards to the reasons why staff choose to use or not use technology, 21 items were generated based on previous research and staff were asked to indicated how important each of these was in determining their technology use/non use using a scale from '1' (not at all important) to '7' (very important).

Results

Internal and External Technology Use

The first set of analyses considered the extent to which staff used particular university supported or endorsed technologies in their teaching. The pattern of responses from staff about whether they used a particular technology at all and whether they had used it in their teaching in 2010 were similar and so for simplicity the latter (2010 specific data) have been removed from the results. It can be see from Table 1 that two technologies enjoyed widespread use by staff: LMS subject sites (91.6%) and LMS announcements (83.3%). While not as widespread, two other technologies – lecture capture (58.4%) and assignment submission via the LMS (51.6%) – were used by the majority of staff. After these technologies there was a clear trailing off in the distribution for other university-based systems and tools included in the questionnaire. This is reflected by the majority of staff indicating that they had never used over half of the University-based technologies asked about. Even what may be considered rather mainstream tools, such as LMS Discussions, were only used by 36.7% of staff.

It was somewhat surprising that many university-based technologies were simply unknown to small but significant proportions of staff. *Respondus* (the tool that enhances quiz and assessment functionality in *BlackBoard*) *Sakai* (an LMS that provides a suite of resource sharing and collaboration tools), *Praze* (a peer-based assessment tool) and Readings Online (a tool and service that allows staff to make available and integrate electronic resources into their online learning environments via the library), all fell into this category.

Table 1: Staff Use of University-based Technologies

Technology	Percentage		
	Used at some time	Never used	Don't know
LMS Subject Sites	91.6	3.2	0.7
LMS Announcements	83.3	9.5	0.7
Lectopia	58.4	26.7	1.1
LMS Assignments Submission	51.6	37.5	2.0
LMS Grade Centre	43.8	41.7	5.0
Turnitin	38.0	46.0	4.8
LMS Discussion Board	36.7	48.6	0.8
Readings Online	22.4	58.5	10.4
LMS Group Tools	22.2	61.1	9.0
LMS Community Sites	20.9	64.9	7.5
LMS Wiki	15.2	75.8	5.6
LMS Blog	9.4	80.4	4.9
Praze	6.1	74.7	16.2
Sakai	5.3	74.0	18.9
Respondus	4.0	71.2	23.0

The second set of analyses considered the extent to which staff used technologies that were external to the university; that is, those not endorsed by the university (see Table 2). The technology that showed most widespread use was presentation software (82.2%) such as PowerPoint or Keynote. (In fact, while the University does not officially endorse the use of presentation software or a particular software application, given these technologies are well supported through desktop support and through provisions in teaching spaces, this endorsement is strongly implied). A striking finding is the relatively high use by staff of online video in their teaching, with almost half saying they are using it (48.4%). Beyond these two technologies, however, there is a similar – although more rapid – pattern of decline in technology use when comparisons are made with university-based technologies in Table 1. What is also noticeable when Tables 1 and 2 are compared is that fewer staff are indicating they 'don't know' about external technologies compared with many university endorsed ones (the clear exceptions being clickers and social bookmarking). Many staff seem more aware of technologies that are 'out-there' in the world than they are of ones available within and endorsed by the University.

Finally, it is worth making note of the use of two common Web 2.0 tools: Blog and Wikis. These tools have captured the attention of educators recently as their functionality aligns well with contemporary social constructivist models of teaching and learning (e.g. collaborative learning, inquiry-based learning designs). Through using these tools students are able to individually and collectively create, publish and share material online with their peers and teachers. As the utility of these tools became apparent to commercial educational technology vendors, they were quickly incorporated into the suite of tools available via enterprise LMSs. Similar tools, of course, continued to be available outside the university after their incorporation in LMSs. So it is interesting to compare the extent to which staff are embracing the university-based or non-university-based blog and wiki tools. It can be seen from Tables 1 and 2 that usage of internal and external blogs is almost identical (9.4% and 10.0% respectively) while the proportion of staff who have used an external wikis (9.3%) is marginally less than those who have used the LMS-based wiki (15.2%).

Table 2: Staff Use of Non-University-based Technologies

Technology	Percentage		
	Used at some time	Never used	Don't know
Presentation Software (e.g. PowerPoint, Keynote)	82.2	7.1	0.4
Online Video (e.g. YouTube; TeacherTube)	48.4	39.4	0.0
Mobile Phones	17.7	78.2	0.8
Desktop Conferencing (e.g. Skype)	12.3	79.9	0.0
Survey Tools (e.g Survey Monkey)	11.3	77.0	4.4
Google Docs	10.6	80.1	3.7
External Blog (i.e. non LMS)	10.0	80.3	3.6
External Wiki (i.e non LMS)	9.3	81.0	3.2
Social Networking Service (e.g. Facebook)	8.5	88.3	0.0
Podcasting (i.e. not Lectopia)	6.9	85.8	2.0
File Sharing Software (e.g. Flickr)	5.3	86.2	4.5
Instant Messaging (e.g. MSN, Yahoo)	4.5	93.1	0.8
Clickers (e.g. Keepad)	4.1	80.8	9.4

| Social Bookmarking (e.g. Diigo; del.icio.us) | 1.6 | 85.3 | 11.0 |

Drivers of Technology Use

The third set of analyses considered the reasons why academic staff choose to use or elect not to use technology in their teaching. The 21 items that were used to determine the reasons why staff chose to use – or not use – technology were submitted to a principal components factor analysis with a varimax rotation (see Table 3). A five-factor solution fit the data well and explained 61.8% of the variance in the solution. However, the fifth factor contained only two items, which is not ideal, and as such these two items were excluded from further analysis. (It is worth noting that one of these items, "I do not use technology because my workload is too high" was the second most strongly endorsed reason staff cited for not using technology; 68.9% of staff felt this was important). The final four-factor solution (see Table 3) explained 60.8% of the variance, had factors which showed clear conceptual clarity, and scales developed from these factors recorded high internal reliability (between .77 and .83). The labels derived for each factor and a description of them is presented below:

i. <u>Innovation and Learning</u>: This factor reflects reasons for using technology in teaching that are associated with the desire to develop innovative, technology-based learning activities that will assist student learning and understanding.
ii. <u>Support and Skills</u>: This factor reflects reasons for not using technology in teaching that are associated with concerns about getting appropriate support, particularly if self-perceived skills are low.
iii. <u>Relevance and Value</u>: This factor reflects reasons for not using technology in teaching that are associated with concerns about how relevant and valuable it would be for both staff and students.
iv. <u>Convenience</u>: This factor reflects reasons for using technology in teaching that are associated with making things more convenient for both staff and students.

These four scales were then used in a cluster analysis to determine whether distinct profiles or reasons for adopting technology in teaching and learning could be established across the sample. A clear five-cluster solution emerged from this analysis. Figure 1 provides a profile of the clusters across the four scales. The first cluster (n=41) displayed in Figure 1 reflects staff who tended towards the mid-point on the scale for all four reasons for using or not using technology. For want of a better term, these staff could be considered *Regular Citizens* in the academic community; there seem not to be strong drivers for technology use, nor particularly strong barriers to use. The profile of the second cluster (n =37) is dominated by convenience as a driver of technology use; we might like to call these staff *Convenience Driven* when it comes to their use of educational technology. While somewhat concerned about relevance and value, and certainly attuned to the true educational value of technology, they see most value in the ability of technology to make teaching and learning more convenient to them and their students.

The third cluster (n= 72) could be labeled *Perfect Citizens.* These staff are below the midpoint of the scale on reasons for not using technology – they are not that concerned about lack of relevance, value and support – but they are high on convenience, innovation and learning as drivers for technology use in teaching and learning. The fourth cluster represents a large proportion of the sample (n=95) and share a similar profile to the *Perfect Citizens* except <u>they are</u> concerned about lack of relevance, value and support. These *Dedicated Warriors* are motivated to use technology for the 'right' reasons (innovation, learning, convenience) but are, at the same time, not using some technologies and tools in their teaching and learning because of concerns about relevance and lack of support. Finally, there is a small group of *Disgruntled Pragmatists* (Cluster 5; n= 17). These staff, on the whole, are not driven to use technology for reasons of innovation and learning – they are well below the mid-point of this scale – and are mostly driven to use technology by convenience. But what characterizes staff in this cluster is the very high importance given to both reasons *not* to use technology.

In a final set of analyses we undertook a preliminary exploratory analysis of the association between the 'endorsed' and 'unendorsed' technology use of staff and the four 'drivers' of technology use (*Innovation and Learning*, *Convenience*, *Support and Skills*, *Relevance and Value*). For example, it may be that staff who are

particularly concerned about support are less inclined to use technologies that are unendorsed and external to the university, where support may be less reliable.

In order to undertake this analysis, we created a relatively simple metric of endorsed technology use based on the sum of university-based technologies a staff member indicated they had ever used. Similarly, a measure of unendorsed technology use was created by summing the number of non-university-based technologies a staff member indicated they had used. We then used each of these measures as dependent variables in a one-way MANOVA where the five staff 'profile' groups were used as the independent variable. A significant multivariate effect was recorded (F (8)=3.94; p < .001) and there were significant univariate effects for both endorsed (F (4) = 5.10; p = .001) and unendorsed (F (4) = 4.02; p = .004) technologies. This indicated that the five profiles of the reasons why staff use learning technologies discriminated the degree to which staff used both endorsed and unendorsed learning technologies (see Figure 2). Post-hoc comparison tests revealed the significant differences between groups for endorsed and unendorsed technology use. For endorsed technology use, *Perfect Citizens, Convenience Driven* users and *Dedicated Warriors* on the one hand used a greater number of endorsed technologies than *Disgruntled Pragmatists and Regular Citizens* on the other. While significant overall, there were few differences between groups for unendorsed technology use, with the only post-hoc difference occurring between *Perfect Citizens* and *Disgruntled Pragmatists*.

Table 3: Rotated Factor Structure for 'Reasons for Use' Items

| Item	Factor			
	1	2	3	4
It allowed me to innovate	.793			
It aligned well with the learning activities I had designed	.757			
I though it would help assist students learning in my discipline	.727			
I thought it would help students develop technology based skills	.646			
I wanted to try out new technologies	.637			
Concerns about getting technical support		.888		
Concerns about getting administrative support		.827		
Concerns about my technical skills		.781		
Just too hard		.667		
Concerns about the reliability of the technology		.532		
Not really needed or relevant			.758	
Concerns about whether it would work with students			.663	
Concerns about value for students			.658	
Concerns about the value for me			.653	
Not really sure how to make it educationally useful			.626	
Not a priority for me as an academic			.605	
It made things more convenient for me				.865

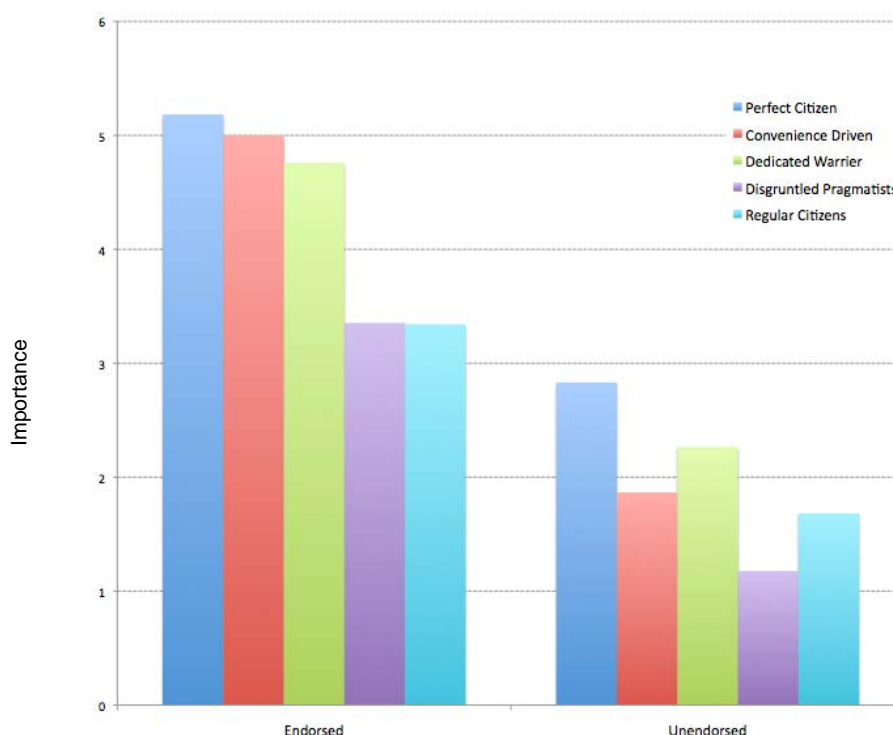| It made life easier administratively | .810 |
| It made things more convenient for my students | .659 |
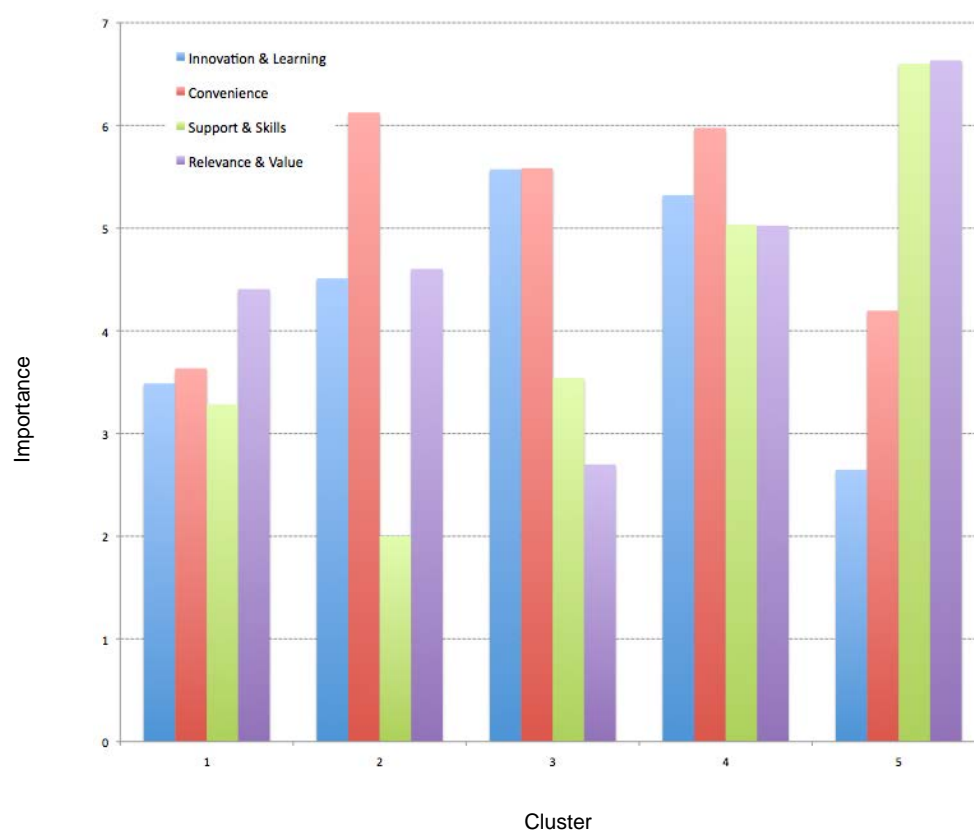
Figure 1: Staff 'profiles' reflecting reasons for using or not using technology in teaching

Figure 2: Mean scores for endorsed and unendorsed technology use for each staff profile

Discussion

The aims of this paper were to determine the degree to which academic staff at a university relied on university-based and non-university-based technologies in their subjects and courses, and to determine whether patterns or profiles of university staff could be established when it came to the drivers and inhibitors associated with their technology use. The findings from this investigation show that there was only widespread use – above 80% of staff reported using them – of three technologies: LMS subject sites, LMS announcements and Presentation Software. These represent very mainstream technologies that are most commonly associated with the one-way transmission or broadcast of information; and as such are closely aligned with more instructivist pedagogies. While we acknowledge that presentation software can be used in large and small group settings in a variety of ways, and that the software itself is agnostic when it comes to learning design, we still maintain that presentation software is typically associate with didactic presentation (see Bower, Hedberg & Kuswara (2009) for a perspective on this).

Beyond these core technologies, the next most obvious technology being employed by staff – and presumably consumed by students – was audio-visual material: university based lecture recordings and non-university based videos available from sites such as YouTube. Again it is not possible to make judgments about the learning design of the broader context in which these technologies are used, however, the value that students see in lecture capture technologies is well established as being associated with assisting them to revise, take notes and translate unfamiliar spoken words and phrases if their first language is not English (see Gosper, Green, McNeill, Phillips, Preston and Woo (2008)). And Bower et al (2009) suggests that video is "a particularly effective means of representing procedural information" (p. 1159). The point is that traditionally neither technology has been strongly associated with higher-order conceptual or metacognitive learning processes (see Bower et al, 2009), and both are more often associated with the transmission and transfer of information.

The next band of technologies used by staff – used by between 20% and 50% of staff – are all university-based technologies: LMS Assignment Submission, LMS Grade Centre, Turnitin, LMS Discussion Boards, Readings Online, LMS Group Tools and LMS Community Sites. Towards the top of this list are technologies that are broadly used for the management and administration of learning and teaching through electronic means: that is, tools that are used to support the management of assignment submission, the distribution of electronic resources, and the maintenance of academic integrity. Towards the bottom of the list are tools that often associated with social constructivist pedagogies that involve interaction, discussion and peer-based collaboration.

What is clear when the data in Table 2 and 3 are compared is that staff in this institution are relying more heavily on learning technologies endorsed by the University as opposed those external to it. The trend highlighted in the introduction to this paper for universities to use external sources and resources for supporting the use of learning technologies does not seem to be particularly manifest in the data presented in this paper. Put simply, in a context where there was not particularly high use of either university- *or* non-university-based technologies, there was clearly less use of external unendorsed technologies. The interesting caveat to this is in the area of Blogs and Wikis. There was commensurate (low) use of these tools through university based system and external providers. This finding may be a harbinger of things to come as staff seek tools, resources, systems, functionality and support that may not be necessarily supported by their institutional systems. This, of course, raises questions for institutional policy makers about service delivery and costs associated with providing university-based learning technology systems and solutions.

What is also clear is that the promise of emerging Web 2.0 – wikis, blogs, podcasting, social networking, file-sharing, social bookmarking – is still yet to be realized on a wide scale in this institution. This is perhaps not surprising given recent research that has tempered the commentaries and hype associated with the introduction of Web 2.0 technologies. The data from this investigation suggest innovative learning designs that harness emerging technologies are being used by a small subset of staff: between 5% and 15%. This result, coupled with the other findings of this investigation reported above, are consistent with recent reviews that have noted the lack of transformation brought about by the introduction of technology in higher education (see Selwyn, 2007; Blin & Munro, 2008; Conole, 2004). For example, Blin and Munro (2008) argue "Although technology is now common place in most higher education institutions – most institutions have invested in a virtual learning environment (VLE) and employ staff dedicated to supporting e-learning – there is little evidence of significant impact on teaching practices and current implementations are accused of being focused on improving administration and replicating behaviourist, content-driven models." (p. 475).

It is important to reflect on the findings of this investigation, and the discussions of them presented above, and acknowledge that to a great extent an individual academic's use of learning technologies is driven by the needs and demands of his or her local curriculum context and broader university policies. For example, at the university in which this investigation was conducted there is a requirement that all subjects have a 'web presence', as defined by the existence of an LMS subject site. This requirement would clearly influence and account for the high use of subject sites by staff. Discussion boards, on the other hand, are not mandatory or actively encouraged as they are at other universities (e.g. Charles Sturt University) and this policy difference is likely to reflect differences in the degree to which these technologies are used in these institutions (see Uys, Dalgarno, Carlson, Tinkler & Crampton, under review).

A cluster analysis of the reasons why staff choose to use or not to use technology in their teaching and learning revealed five distinct profiles of academic staff. These profiles are interesting in and of themselves, but importantly they show that different members of the academic community can be differentially characterized using the reasons they cite for engaging or not engaging with learning technologies. As such, the profiles have clear implications for universities in the area of technology training, academic support and professional development. The kind of support and professional development opportunities that *Perfect Citizens* might find beneficial would likely be different from the types of support and professional development that *Dedicated Warriors* or *Disgruntled Pragmatists* would find useful. Moreover, by using the type of profiling explored in

this paper, academic developers could identify groups of academic staff who are concerned about their own learning technology skills, or the degree of support they feel is available when they use learning technologies, and tailor professional development programs for these individuals accordingly. Similarly, conversations could be started with academic staff who are concerned about the relevance of learning technologies in their disciplines or for their students.

In our final exploratory analysis we established a significant relationship between the five academic staff profiles and the degree to which staff used both endorsed and unendorsed technologies. The most interesting aspect of this finding was the similarity between *Disgruntled Pragmatists* and *Regular Citizens* when it came to using endorsed learning technologies; both used these technologies significantly less than the other three groups. It would seem that if higher education institutions were interested in fostering the adoption of learning technologies, attending to the drivers and facilitators as perceived by these two groups – which are quite different – would be a good place to start. A fruitful line of future research would be to consider whether the 'reason for use' profiles established in this study vary systematically with additional variables such as discipline area or years of teaching.

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