
‘Do we need to use a wiki, Miss?’ – Student choice and preference for using technologies to support learning

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Blogs, wikis, nings, Google, del.icio.us, YouTube, Skype, Facebook, Flickr, Twitter... the list is endless. Social networking technologies have become an integral part of life – supporting our work, learning and social activities on a daily basis. As new technologies emerge, we make decisions about adopting these as part of the suite of tools we prefer to use to complete information, communication and learning tasks. As social networking technologies are integrated across the curriculum in schools, how do students cope with the introduction of these new technologies, particularly with regard to the development and management of their own personal technology toolkit? What features of new technologies are valued by students in supporting their learning? What factors influence students’ decision making in terms of adopting or rejecting a new technology as part of their personal toolkit? These questions are explored based on findings of a doctoral study which examined the use of Web 2.0 technologies to support students’ completion of an inquiry-based assignment.

Introduction and background

School age children born in the 1990s have grown up surrounded by a world of high technological sophistication. The world of digital citizenship is the only world they have known. A recent UK report for the Committee of Inquiry into the Changing Learner Experience (2009) describes this generation as having “a strong sense of a community linked in its own virtual spaces of blogs and social networking and gaming sites; a similarly strong sense of group identity; and a disposition to share and to participate”, who are also impatient learners who have “a preference for instant answers; a downgrading of text in favour of image; and a casual approach to evaluating information and attributing it, and also to copyright and legal constraints” (p. 39). Social networking technologies have become an integral part of life – supporting our work, learning and social activities on a daily basis – and the role of school libraries needs to reflect this shift.

The school library shift from a Web 1.0 to Web 2.0 world

With the increasing number of students in Australia with Internet access at home, 24/7 access to a range of quality online resources and services through the school library is essential if school libraries are to remain central to students' informational and technological worlds (Hay, 2006a). While teachers and TLs can work with students during school hours to critically evaluate information and develop the skills and understandings required to detect misinformation from pertinent and authentic information, the school library needs to find ways of supporting students' information behaviour and knowledge construction when they are completing learning tasks out of normal class time, including when they are at home.

The body of research in the early 2000s examining the nature and development of school library websites and virtual libraries (Kuhlthau, 1997; Clyde, 2001; 2003), information skills instruction using Internet resources (Eisenberg & Berkowitz, 2000; Johnson, 2002, 2003; Herring, 2004) and instructional websites (Herring, 2005) did provide TLs with insights into the development of and nature of responsive online school library service. But this research did not extend beyond what we now refer to the 'Web 1.0' (O'Reilly, 2005), or 'Library 1.0' environment (Maness, 2006).

The introduction of Web 2.0 technologies provided teachers and TLs with an extensive range of new technology platforms and tools to transform online information services and information literacy and inquiry learning programs beyond a Web 1.0 paradigm. However, by the mid-2000s little research had been conducted on school libraries' use of Web 2.0 technologies to support student learning, with the exception of an initial study of school library blogs by Clyde (2005). This was in direct contrast to the increasing number of articles published in the professional literature of school librarianship in the mid-2000s, encouraging TLs to 'embrace' the potential of Web 2.0 technologies, or be left behind (Harris, 2006; Bradley, 2007; Hargardon, 2007; Hauser, 2007; Valenza, 2007). Hall and Davison (2007) made a similar conclusion in their review of the literature on the use of blogging in library and science education, arguing that "enthusiastic claims for blogging in educational settings are founded on a research base that is currently limited: little empirical work lies behind them" (p. 164), with "findings" based on anecdotal evidence, "such as stories of practice, rather than data derived from well-executed research" (p. 169).

In defining School Library 2.0, Naslund and Giustini (2008) provided a range of examples of how to use blogging, social networking and other Web 2.0 tools to engage learners in learning how to learn in digital contexts, predicting that the "future of School Library 2.0 will see social software applied to digital learning spaces in pedagogically innovative ways... [bringing] rich media together in an experimental but collaborative platform... where students can work with peers and interact globally" (p. 65). In the professional literature, school library consultants and practitioners recommended the use of blogs to promote school library programs and resources, and support literature and literacy programs in schools (Berger, 2005; Achterman, 2006; McPherson 2006a), as well as the use of wikis as collaborative web spaces to support student learning in groups and publish content online (Achterman 2006; McPherson

2006b). They argued that podcasting can help motivate students as learners as well as provide students with another format for publishing project reports (Lamb, & Johnson 2007a; 2007b; Hauser, 2007), and that social bookmarking services can provide students and teachers with opportunities for collaborative information discovery through the provision of a website where individuals can contribute to their group's collection of bookmarks of online resources, no matter what browser or computing device they are using (Alexander, 2006; O'Connell, 2006).

In other words, there was an emerging plethora of professional literature espousing the merits of Web 2.0 technologies becoming part of school library programs, with little empirical evidence to support the nature of these merits or impact on improved student outcomes. The few studies that had been conducted focused on the school library's provision of Web 2.0 information services or use of Web 2.0 platforms to redesign the school library website, or examined the use of Web 2.0 technologies as teaching tools that had been selected by the teacher or TL. There was a lack of empirical evidence examining student choice of, or preferences for, Web 2.0 technologies and how these were utilised by students to support their own learning experiences through information and inquiry when completing an independent project-based assignment. Thus, the study presented in this paper was designed to explore some aspects within this gap of the research literature.

Purpose of the study

The key research question for this doctoral study was: How can Web 2.0 technologies be used to support student learning through the guided inquiry process? The purpose of the study was to explore the use of Web 2.0 technologies by a secondary TL and classroom teacher to support inquiry learning. In particular it aimed to examine how Web 2.0 technologies can be used to support students' completion of an inquiry-based assignment known as a Personal Interest Project (PIP). While students were given a choice to use a blog or wiki, and access to a social bookmarking tool to support the completion of their Personal Interest Project, individual students made decisions about which of these tools they would use or not use, and how they would utilise these tools to support the inquiry process. The findings specifically addressing students' choice of, and preferences for Web 2.0 technologies form the basis of this conference paper.

Research design and method

An interpretivist, qualitative research design was used to explore the research question. This approach was considered to be suited to the study for two reasons. First, the research needed to be undertaken in the students' classroom, the kind of natural setting appropriate to qualitative research (Bogdan & Biklen, 2007). Second, the different perspectives or "meanings" of students, teachers and teacher librarians

regarding the use of Web 2.0 technologies were crucial to the study. “Attempting to make sense of, or to interpret, phenomena in terms of the meaning people bring to them” is fundamental to interpretive research (Denzin & Lincoln, 2003, pp. 4-5).

Within the interpretive tradition, the constructivist paradigm was selected for the study. It was seen as suited in terms of both constructivist approaches to learning (e.g., Bruner, 1973; Dewey, 1944) and to research about learning using innovative technologies. In the research, students were viewed as actively involved in making sense of new information and new technological tools in relationship to what they already knew and had experienced, thus engaging in new learning and the construction of new knowledge. Because each student builds on different previous learning and experience, each student’s learning is unique. The focus of the study was therefore these individual learning experiences and the meanings resulting from them.

This ethnographic study adopted an interpretivist-constructivist approach where the experiences, understandings and meanings of all participants involved were the focus. The study drew upon Kelly’s (1963) personal construct theory, Berger and Luckmann’s (1967) social construction theory, and Vygotsky’s (1978) zone of proximal development, to inform the study’s theoretical framework.

The sample

The school selected for the project was a co-educational independent school in metropolitan Sydney in the state of New South Wales, Australia. The New South Wales school year consisted of 4 school terms of approximately 10-12 weeks per term. The selection of the school was based particularly on the availability of a teacher and a TL with the expertise and willingness to integrate Web 2.0 technologies as part of an existing assignment to be undertaken by students. The project-based assignment was to be undertaken by the students within a guided inquiry framework, selecting their own topic, developing a focus question-argument-hypothesis about their topic, then conducting their own research to address this focus and finally creating a report of their findings/conclusions. The class selected was a Year 10 Global Studies class.

Global Studies is an elective subject within the Year 9-10 (Stage 5) curriculum which has been endorsed by the Board of Studies New South Wales (NSW) as part of its School Developed Board Endorsed Course (SDBEC) program (Board of Studies NSW, 2011). Students are encouraged to explore the impact of events and issues at the global, national and local levels to help them develop skills for global citizenship.

The Global Studies class consisted of twelve Year 10 students and the school’s Global Studies teacher. The TL worked with this Global Studies class and teacher in Term 2 where the students worked in groups using a wiki to complete an issues-based inquiry project. In Term 3, the TL worked with this same class while students completed an individual inquiry-based project, called a ‘Personal Interest Project’ (PIP). The PIP unit required students to explore an international issue of their choice. They were asked to use either a wiki or a blog as their own personal online

project space for the completion of their PIP. The TL also introduced students to the social bookmarking tool, *Delicious* as a way of supporting the information gathering phase of their project. The TL's role as a teaching partner was principally one of Web 2.0 technology expert for both the teacher and her students, topic selection and resourcing support for students, and assessor of student bibliographies and learning logs. The teacher's role in the teaching team involved topic selection/approval, project design and research process support, writing up of project content, and assessor of project reports.

Data collection and analysis

The study employed a mixed methods approach to examine participant's information, technology and learning behaviours and experiences. Data collection techniques included student questionnaire, classroom observation, observation of students' Web 2.0 spaces, semi-structured interviews with the teacher, TL and students, and collection of student project documentation and project artefacts.

The findings presented in this paper draws upon the analysis of data collected from the questionnaire completed by students at the beginning of Term 3 (before the commencement of the PIP unit), classroom observation and observation of students' Web 2.0 spaces throughout Term 3, and semi-structured interviews with individual students upon completion of the PIP unit (conducted in early Term 4). This included the observation of students' decision making regarding the use of a range of technologies to support the completion of their PIP throughout the term.

Analysis of data was iterative, using grounded theory techniques employed throughout the data collection and analysis phases of the study (Charmaz, 2002; 2003). For example, the analysis of questionnaire and observation data throughout Term 3 informed the design of the question in the schedule for the semi-structured student interviews. Data was coded for themes using an axial coding approach (Miles & Huberman, 1994), using the qualitative data analysis software package, NVivo 8 (QSR International, 2008). This allowed the researcher to identify themes, issues and relationships by clustering segments across data sets. These clusters were used to develop descriptions and provide examples of students' use of technologies, as well as drawing upon quotes from student interviews and Web 2.0 spaces to illustrate the inquiry experience "in their own words". This documenting of student 'stories' allowed the representation of 'student voice' to be presented as part of the reporting of this ethnographic study.

Findings and discussion

While the focus of the main research question was students' use of Web 2.0 technologies, grounded analysis of data identified a range of issues regarding the use of technologies by each of the participants which the researcher found could influence the students, teacher and TL's use of Web 2.0 technologies in supporting the inquiry learning process. The study found a number of factors influencing students' choice of, and preference for, technologies (whether Web 2.0 or other programs or tools) to

support their learning. A set of selection criteria (or reasons) were identified as informing students' decisions to use or not use a particular including accessibility, ease of use, familiarity, experience, utility, time pressures, and return on investment. An examination of these seven criteria forms the basis of the findings presented in this paper, followed by a short introduction to the concept of a student's 'personal technology toolkit'.

Criteria used by student to evaluate technologies

While students were given a choice to use a blog or wiki, and access to a social bookmarking tool to support the completion of their inquiry-based project, individual students made their own decisions about which of these tools they would use or not use, and how they would utilise these tools to support the inquiry process. A summary of the technologies used by each student during the completion of their PIP is presented in Table 1. This demonstrates the complex suite of technologies individual students can bring to the inquiry learning process, in addition to any technologies introduced to students as part of the design of the inquiry-based unit. Students identified a range of reasons why they elected to use specific technologies to complete particular tasks, as well as reasons why they decided not to use a particular technology. Students often identified more than one reason for their choice.

Accessibility

A student decided to use a specific technology, or not, based on the level of access they had to that technology. This included access to the technology at school, both during class time and out of class time, i.e., access via the library's computers, computer labs or while residing in the boarders' residence. Access via the school network in terms of slow network connections and blocked sites due to the school network's filtering system was identified as an issue. Students also identified the importance of being able to access a particular technology from their home computer, including the ability to access technologies hosted on a school server or intranet. The ability to access a particular technology while at school as well as at home was identified as an important factor in

trying to use, or continuing to use that technology, as articulated by this student who found using a wiki helped overcome his lack remote access to the school intranet:

I find at home, my computer blocks the school site so I can't get on to the [school] site. So the wiki was a really good idea, like I saved all my work onto the wiki, I never saved it to my school account because I could always access the wiki from home, and it was quicker to get onto... so I saved everything I did in class onto the wiki. (Student05)

Some students also identified the importance of being able to use a particular technology from other access points, including computer and Internet access at other family or friends' homes. Those students who were boarders at the school identified accessibility from multiple places as important, particularly during the school term when they might go to stay at friends' or relatives' homes on a weekend, with the ability

to “*be able to go back and constantly edit from lots of different computers*” (Student09).

Accessibility was also identified by some students in terms of multiple online tools requiring the management of multiple accounts and ‘log ins’ required to gain access to each technology. For example, Student02 explained how she began using her wiki to record the references to the websites and articles she found as part of the information gathering phase of her project. The effectiveness of this strategy led her to the decision not to create and maintain a *Delicious* site. As an alternative to *Delicious* or a wiki to record website locations, some students preferred to continue saving website details and URLs to a Word document to reduce their number of ‘log ins’.

Ease of use

The majority of students commented at some point in their interview about the decision to use a specific technology because they found it easy to use, or the decision not to use a particular technology because they found it difficult to use. In some cases, a student’s perception that a particular technology would not be as easy to use in comparison to a tool they were already using on a regular basis, determined their decision to not trial a new technology.

Ease of use was expressed in terms of the technical ease of using a particular technology for a specific task. The following comments illustrate the range of student responses with regard to technical ease of use as a prominent reason for choosing a particular technology:

Because we had been given the choice to use it [wiki], we had used it before on the project before, and I found it really easy to navigate and use. So you know, I thought it best to go with that. (Student05)

Well, the reason I chose it was because we’d previously done something with the wiki in History, and I knew how to use it, so I thought it would have been easier. ... Also, I think it would be easier to create than a blog, it’s – I think it’s easier to work and use. (Student01)

It [wiki] was pretty simple to use and, yeah it was also good for our reflections ‘cause I could just type it in, the date would come up. (Student09)

Figure 1: Technologies used by each student while completing their PIP

<p>Student01 Wiki Web browser and search engines Web browser bookmarks EBSCOhost full-text journal database Online survey tool (<i>SurveyMonkey</i>) Word processor <i>YouTube</i> (inserted <i>YouTube</i> video in his wiki)</p>	<p>Student02 Blog (created this but stopped using early in project) Wiki Web browser and search engines Proxy websites Web browser bookmarks Email Instant messaging Powerpoint Photosharing website (<i>Photobucket.com</i>)</p>
<p>Student03 Wiki Web browser and search engines Library catalogue Word processor</p>	<p>Student04 Wiki Web browser and search engines EBSCOhost full-text journal database Microsoft Word Email Instant messaging</p>
<p>Student05 Wiki Word processor Web browser and search engines Microsoft Photo Story to create a Windows Media™ Movie (9.5 mins)</p>	<p>Student06 Wiki Powerpoint slideshow (with audio of rap music embedded) Web browser and search engines Library catalogue EBSCOhost full-text journal database Microsoft Excel (to create tables/graphs for PPT slideshow)</p>
<p>Student07 Wiki <i>30boxes.com</i> (Web 2.0 calendaring tool used as a widget as part of pb.wiki platform) Web browser and search engines EBSCOhost full-text journal database Email Microsoft Word Microsoft Excel (to create tables/graphs for written report) Microsoft Photo Story (to create Windows Media Movie file inserted as an object in a Powerpoint file) Instant messaging</p>	<p>Student08 Blog Wiki Web browser and search engines Proxy websites Microsoft Word Microsoft Excel (to create tables/graphs for written report) Microsoft Powerpoint Social bookmarking (<i>Delicious</i>)</p>
<p>Student09 Wiki Web browser and search engines Online survey tool (<i>SurveyMonkey</i>) Email Microsoft Word Microsoft Excel (to create tables/graphs for written report) Microsoft Picture Manager Scanning software Social bookmarking (<i>Delicious</i>) Proxy websites</p>	<p>Student10 Wiki Web browser and search engines Microsoft Word Email Instant messaging</p>

<p>Student11 Wiki (created it but did not use it) Web browser and search engines Library catalogue EBSCOhost full-text journal database Microsoft Word</p>	<p>Student12 Wiki (created it but did not use it) Web browser and search engines <i>[This student left school for remainder of school term due to illness and did not complete PIP]</i></p>
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Students made comparisons between the ease of use of different tools in determining their preference to complete a particular task. They also discussed ease of use in terms of managing a number of technologies within a given project, where their decision was based on trying to simplify the technological or other elements to best achieve the learning outcomes.

Further to this desire to “*keep it simple*”, some students identified ease of use as the principal reason why they chose a technology so they could focus more of their time and energy on the requirements of the inquiry learning process. Some students also identified the ease of use of a tool as a principal consideration for future use:

Yeah, I might actually think about the wiki – it was really easy to use, like it was really interesting, and ... you could upload files onto it too, like it was just really easy to keep all your stuff together. (Student02)

Familiarity

The familiarity a student had with a technology contributed to their decision to use it again for a given task. Many students referred to being “*familiar*”, as one of the main reasons for choosing to use a particular technology, for example:

I chose wiki probably because I’ve, we used it once before, actually we used it, yeah, before in Global studies and in another subject, History... so I was fairly familiar with the technology that we were going to be using. ... You want to work with something that’s familiar. (Student03)

We’d used it before. I knew how to use it, so I was just like comfortable with it. (Student10)

Conversely, lack of familiarity with a particular technology contributed to their decision to a student’s decision not use it, or not even attempt to use it as a way of exploring its potential, as explained by Student09:

When we did the wiki before we had to spend a fair amount of time just learning how to use it. And so I didn’t really want to do that again with the blog, and I figured I knew how to use it and it worked.

Students articulated their preference for the ‘known’ over the ‘unknown’ when faced with a choice of using a range of technologies. In other words, when a student already had established another way of completing a specific task, the

requirement to invest more time into learning a new technology often outweighed the motivation to explore the potential of a new tool.

When talking about familiarity as one of the reasons why they chose to use or not use a particular technology, some students also made reference to the affective dimension as contributing to their familiarity. For example:

Because I'd used a wiki before, and it felt more comfortable using that than a blog. (Student04)

If there's a project that would use it, that I'm going to get given, I would definitely use it because I know how to use it now. Like once you're comfortable with a program, it's good. If it's a new program that you're having to learn and you have a choice of an old one, I'm the kind of lazy guy that won't bother. (Student10)

A number of students acknowledged that being formally 'taught' to use a wiki for a previous assignment contributed to their feeling familiar enough with it to use it again for their PIP. This also occurred with students' use of full-text databases to locate relevant journal articles (as per Table 1). These examples highlight the important contribution formal tuition of technologies can make to students' familiarity with tools, both in terms of technical, informational, and affective capacity building as technology users. Findings from the UK *Great Expectations of ICT* study (Ipsos MORI, 2008) also found that one's familiarity with, and "feeling comfortable" with a technology "makes a difference" to students' willingness to use technologies to support their learning.

Experience

From the interview data, three 'levels of use' emerged as potentially contributing to a student's decision to choose a particular technology to complete a specific task or tasks. These included previous use, successful use, and regular use. The study found students' previous use of a technology (whether successful or not) could be a major determinant for a student's future use of that technology. Nine of the eleven students interviewed gave examples of how their previous experiences with a particular technology influenced their decision to use the technology again.

Previous experience, including both successful and unsuccessful experiences, could have an impact on future use of technology, as was made clear by Student05: "*We had used... [a wiki] on the project before and I found it really easy to navigate and use.*" This is in contrast to the impact of previous, unsuccessful use on technology adoption, as expressed by Student11, "*It just kind of – it didn't add anything to it, apart from the fact that it was a place to store stuff.... So I wasn't a fan of the wiki thing.*"

Regular use was also identified as an aspect of this dimension of a student's technology experience. Examples of regular use provided by some students demonstrated a preference for using an existing technology along with well-practised

techniques, rather than adopting a new Web 2.0 tool to complete a particular task. Some of these included students' decisions:

- to save web resource titles and URLs using the bookmarking function of a web browser rather than using a social bookmarking tool like *Delicious*;
- to collect 'chunks of information' from web resources and paste these into a Word document rather than using a wiki to do this;
- to present sections of a PIP report as an essay in a Word document rather than presenting each section as a separate webpage within a wiki; or
- to record learning log entries into a Word document rather than record them as posts on a blog, or entries within a wiki, or calendaring tool.

Student preference to use standard software programs to support their learning such as Microsoft Word and PowerPoint has been confirmed in other studies (Conole, de Laat, Dillon & Darby, 2006). This supports the desire of some students in this study to 'keep it simple', especially when faced with a complex inquiry-based learning project.

Utility

The concept of utility was identified by students as a contributing factor in the decision to use a specific technology. Utility was described in terms of a technology being the 'best' tool to meet an immediate need, where they viewed a specific technology as being the most effective and/or efficient tool "*to get the job done*". Utility involved the technological capacity of a tool to assist in completing a specific task, which in turn contributed to the 'value' of this tool for future use. For example, Student02 explained how she liked the utility of wiki as a single storage space for her project content and documentation, "*It was very useful. ... Every time I went on a site, I'd add it to my...bibliography*". This student stated that using the wiki had actually helped her improve the way she would normally approach the information gathering phase of a project, and it helped her to be more diligent in terms of tracking and documenting the sources she used for her PIP. She concluded, "*I had all my sites there.*"

Other students commented on utility playing a part in their decision to use a wiki over another technology, as articulated by Student03:

I recognised that it would be useful for what I was going to be doing in that I wanted to make lots of edits, be able to just put it out in a nice clear format, basically just type it up, almost as a word document online and be able to go back and constantly edit from lots of different computers. And that's what I ended up using it as.

In this example, accessibility was also seen as contributing to the wiki's utility. Other students made similar comments. The above comments highlight students' capacity to think critically and creatively about the selection of the most appropriate technology to meet a particular need.

Alternatively, a student's perception of a particular technology can act as a barrier to exploring the potential application of a tool, i.e., lead to the 'utility' of the technology not being recognised. This was evident in a number of students' decision not to create a *Delicious* account. Furthermore, Student11 decided not to use a wiki to complete his PIP but rather to use a Word document as his principal project 'space' instead because *"I kind of don't like having the whole fiddly technology for the sake of technology stuff. ... It didn't add anything to it, apart from the fact that it was a place to store stuff."*

This was in contrast to the majority of students, who upon completion of their projects acknowledged the wiki (at a minimum) as a useful repository for their documents and writing, with access from multiple computers and locations an additional factor contributing to the wiki's utility. Later in Student11's interview he confessed that he *"probably needed some help"* with setting up his wiki to explore its potential. This is an example of an opportunity for instructional intervention that had been missed, with the student, teacher and teacher librarian, all unaware of this potential point of intervention.

Time pressures

Students also identified time pressures as impacting on their decision to use, or not use, a particular technology. The investment of time related mainly to those technologies that were new to the students. The following is an example of weighing up the time required to learn how to use a blog which was new to Student09, versus selecting the wiki which she had used before: *"I knew how to use it. ... When we did the wiki before we had to spend a fair amount of time just learning how to use it. And so I didn't really want to do that again with the blog."*

Time pressures were particularly a problem where there were delays in the decision on a final PIP topic or in beginning the project itself. For example, when asked why he had not created a *Delicious* account to record any websites found, Student03 responded:

I hadn't used it a lot before, and I was starting slightly later than some of the other people. Like, I was really working hard to try and hammer down a topic, get information, really start that information process. ... Because I hadn't used it before, I wasn't familiar with it. ... I really needed to get into the actual project.

Thus, the decision not to use a specific technology was sometimes made because students felt they had little or no time to invest in exploring its functionality and utilising its features, i.e., getting to know a new technology. In comparison, some students viewed the wiki as a time-saving technology which contributed to their efficiency in terms of keeping all of their project ideas and documents in the one place, and being able to access it from school, home or other locations.

In addition, students used other technologies to help them deal with time pressures while working on their project during the school holidays and/or out-of-class

times. For example, email was used to share and proof drafts of students' work to each other, while instant messaging (IM) was used by four students to keep in contact with each other, provide feedback on drafts and generally provide 'moral support' leading up to the PIP submission date.

Return on investment (ROI)

In students' discussions about the utility of different technologies, the concept of 'value' emerged. While the utility of a tool relates to a student's belief that a particular tool is 'the best tool for the job' due to its technological, informational and/or technical capabilities, the productivity and rewards components regarding a tool's utility also emerged from the data. As previously mentioned, students 'weighed up' the pros and cons of using, versus not using, a particular technology, and the impact their decision would make on the inquiry learning experience and the successful completion of their project. This can best be described as their desire to gain a 'return' on their 'investment'. In the interviews, students outlined their thinking behind decisions to use or not use particular technologies to support their project work, and some students argued they had selected a particular technology because they believed it would provide the best value for them in terms of a 'return on investment' (ROI), i.e., with regard to the investment of time, energy and cognitive load involved in using this tool to complete a specific task.

This was evident for those students who identified themselves as particularly 'time pressured'. Students were quite astute in their capacity to assess possible ROI, especially in deciding when not to use a technology where they estimated receiving no or little return as a result of investing the necessary time and energy to gain maximum value or utility from a technology. For example, "*When we did the wiki before we had to spend a fair amount of time just learning how to use it. And so I didn't really want to do that again with the blog*" (Student09), and "[I] had to kind of prioritise so the wiki just kind of went out the door" (Student11). This was also reflected in earlier comments made by Student09 who decided to use *Survey Monkey* to manage the survey component of her project. She considered the time it would take for her to conduct a print-based survey, and she concluded the use of an online survey tool would provide her with a good ROI, even though she had to invest some time in learning how to use this new tool as part of this inquiry learning experience.

Summary of students' evaluation of technologies

In the study, familiarity, ease of use and regular use were articulated as three main determinants for technology adoption. This finding supports that of the UK *Great Expectations* study (Ipsos MORI, 2008) that concluded students' "perceived level of usefulness of different kinds of ICT increases with frequency of use" (p.7). Some students demonstrated strong critical abilities in evaluating technologies before making a decision about their use. The concept of utility was raised by all participants as an

essential factor in technology use. The UK study by Ipsos MORI (2007) of 6th form students' expectations of technology use concluded that young people "are not constantly looking for new technology to incorporate into their everyday life. They [only] appreciate and endorse it when they can see a palpable social or academic benefit" (p. 31).

However, in this study perceived value in terms of gaining a return on one's investment was an indication of whether one would adopt a new technology and continue using it. In contrast, time pressure was identified as an inhibitor to trialing a new technology. Due to time pressures, students either reverted to another technology that they already knew, i.e., familiarity and ease of use, or moved to another 'new' technology that looked like it had potential in meeting their needs in terms of utility and ROI, or they employed a non-technology method to complete the task.

Students' personal technology toolkit

As presented above, students can use a range of criteria to evaluate the potential application of technologies for a particular task, with a combination of these often underpinning a student's decision to adopt a particular technology. This 'adoption' of particular technologies results in a student developing their own personal suite of tools which they can then draw upon to complete future informational, communication or learning tasks. Adoption occurs when one makes a conscious decision to add a particular technology to one's existing suite of tools, i.e., it involves 'taking on' something new as one's own, and for future use. A number of students commented in the interviews about their decision to 'take on' or adopt a particular tool for future use, with the wiki being one of these. The emergence of students' decision-making and adoption processes with regard to technology use in this study suggest that these processes contribute to the development of a students' 'personal technology toolkit' (PTT). Conversely, the nature of a student's PPT influences their use and adoption of new and emerging technologies.

A student's PTT is defined as that suite of information and communication technologies an individual uses on a regular basis to complete specific tasks, whether for personal or school use. The toolkit consists of an individual's own personal collection of 'preferred' technology tools, where each of the technologies in this collection have been trialed, evaluated and then selected as the preferred tool over other tools available to complete the same task. In other words, these technologies have been 'adopted' by individuals to help them function effectively as digital citizens in today's complex informational and technological world.

In Table 1 it was also important to note the range in the breadth of tools used by students with some student using up to ten tools compared to the smaller sets of tools used by some students. This demonstrates that there is no 'one size fits all' approach to the development of students' PTTs and how these may be utilised to complete particular tasks. It should also be noted that a student is not going to draw upon all tools within their toolkit for each learning task. The simplicity or complexity of a task will determine which 'mix' of tools and techniques have the best 'utility' in terms of completing a task, efficiently and effectively,

In a student's PTT, some of the tools and techniques were used frequently, while others less frequently. However, no matter what the frequency, each tool or technique in a student's toolkit was used as regularly as a new task required in terms of functionality. When a student was faced with a task that required functionality that no tool or technique in his or her toolkit could accomplish, it was only then that they sought out a potential new tool. Alternatively, if a student diagnosed that he or she needed to find a different tool to meet their needs because their toolkit did not contain a tool with the required functionality, they were willing to receive advice or recommendations from others, be that a teacher, teacher librarian, peer, or other person within their sphere of influence such as a family member or friend. This was also reflected in the Ipsos MORI (2008) study that concluded "students are often reluctant to use technologies that are forced on them" (p.12). In other words, students will exhibit a 'readiness' to accept instruction from others with regard to trialing new technologies, and teachers and TLs need to be able to be mindful of this when initiating an instructional intervention. That said, students' exposure to the Web 2.0 tools in this doctoral study did influence the composition of all students' PTT in some way.

Conclusions

These findings demonstrate the complex nature of the suite of technology tools and techniques that each student brings to the classroom, and to inquiry-based curriculum units, if the learning environment of the school is networked and connecting students and teachers to the online world of information, communication and learning beyond the walls of the school. Therefore, in a learning environment such as the one described here, it is important for teachers and TLs to understand what technologies students bring with them to a new learning experience such as an inquiry unit, as this can influence their preference for technology tools to complete certain tasks.

Teachers and teacher librarians need to acknowledge the existence of a student's 'personal technology toolkit' as part of the learning process, and also work out ways they can accommodate the development and refinement of students' PTTs when designing curriculum units. It is only then that we can fully understand what Web 2.0 technologies (or other tools for that matter) they use, when and how they use them, and why they use them to support the inquiry learning process. The study presented in this paper is significant in that it presents an exploration of the potential of school libraries to initiate and support guided inquiry units using cloud-based technologies, involving customisation and personalisation of teaching methods by both teachers and TLs.

The *NMC Horizon Report: 2011 K-12 Edition* highlights the demand for personalised learning which is seen as not being "adequately supported by current technology and practices" (Johnson, Adams, & Haywood, 2011, p. 5). The availability of new technologies, enabling greater "learner choice and control", means that "one-size-fits-all teaching methods are neither effective nor acceptable for today's diverse students" (p. 5). The findings of the research presented in this paper is particularly pertinent to this point. It examines how students use Web 2.0 technologies in their

learning, what technologies already exist in their PTT, and what factors influence students' choice and use of specific technologies to complete specific tasks. These findings have implications for teachers and teacher librarians in how they may personalise and customise teaching approaches to support the technology and learning needs of individual students.

When a student in your class asks the question, “Do we need to use a wiki, Miss?”, how will you respond?

References

- Achterman, D. (2006). Making connections with blogs and wikis. *CSLA Journal*, 30(1), 29-31.
- Alexander, B. (2006). Web 2.0: A new wave of innovation for teaching and learning? *EDUCAUSE Review*, 41(2), 33-44.
- Berger, P. (2005). Blogging to build a learning community. *Information Searcher*, 15(3), 2.
- Board of Studies NSW. (2011). *School Developed Board Endorsed Courses (non-VET): Guidelines for course proposals*. Sydney: Board of Studies NSW. Retrieved from http://www.boardofstudies.nsw.edu.au/manuals/pdf_doc/guidelines-2012-SDBECs-course-proposals.pdf
- Bogdan, R. C., & Biklen, S. K. (2007). *Qualitative research for education: An introduction to theory and methods* (5th ed.). Boston: Pearson Education.
- Bradley, P. (2007). *How to use Web 2.0 in your library*. London: Facet.
- Bruner, J. (1973). *Beyond the information given: Studies in the psychology of knowing*. New York: W.W. Norton & Co.
- Charmaz, K. (2003). Grounded theory: Objectivist and constructivist methods. In N. K. Denzin & Y. S. Lincoln (Eds.), *Strategies of qualitative inquiry* (2nd ed., pp. 249-291). Thousand Oaks, CA: Sage.
- Charmaz, K. (2002). Qualitative interviewing and grounded theory analysis. In J. F. Gubrium & J. A. Holstein (Eds.), *Handbook of interview research: Context & method* (pp. 675-694). Thousand Oaks, CA.: Sage Publications.
- Church, A.P. (2005). Virtual school libraries – the time is now! *MultiMedia & Internet@Schools*, 12, 8-12.
- Clyde, L.A. (2001). School library websites: The state of the art. In L. Hay, K. Hanson & J. Henri (Eds.), *New millennium, new horizons: Information services in schools. 2000 Online Conference Proceedings* (pp. 243-255). Wagga Wagga, NSW: Centre for Studies in Teacher Librarianship, Charles Sturt University.
- Clyde, L.A. (2003). School library websites: Current status and ongoing trends. *Scan*, 22(3), 31-37.
- Clyde, L. A. (2005). School libraries and blogs. *Synergy*, 3(1), 39-49.
- Committee of Inquiry into the Changing Learner Experience. (2009). *Higher education in a Web 2.0 world: Report of an independent Committee of Inquiry into the impact on higher education of students' widespread use of Web 2.0 technologies*. Available from <http://www.jisc.ac.uk/media/documents/publications/heweb20rptv1.pdf>
- Conole, G., de Laat, M., Dillon, T., & Darby, J. (2006). *An in-depth case study of students' experiences of e-Learning – how is learning changing?* Paper presented at the Proceedings of the 23rd Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education (ASCILITE): 'Who's learning? Whose technology?'. Available from http://www.ascilite.org.au/conferences/sydney06/proceeding/pdf_papers/p127.pdf

- Denzin, N. K., & Lincoln, Y. S. (2003). Introduction: The discipline and practice of qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Strategies of qualitative inquiry* (2nd ed., pp. 1-45). Thousand Oaks, CA: Sage.
- Dewey, J. (1944). *Democracy and education*. New York: MacMillan Publishing Co.
- Eisenberg, M. B., & Berkowitz, R. E. (2000). *Teaching information & technology skills: The Big6 in secondary schools*. Worthington, Ohio: Linworth Publishing.
- Hall, H., & Davison, B. (2007). Social software as support in hybrid learning environments: The value of the blog as a tool for reflective learning and peer support. *Library & Information Science Research, 29*, 163-187.
- Hargardon, S. (2007). A little help from my friends. *School Library Journal, 53*(10), 44-48.
- Harris, C. (2006). School library 2.0. *School Library Journal, 52*(5), 50-53.
- Hauser, J. (2007). Media specialists can learn Web 2.0 tools to make schools more cool. *Computers in Libraries, 27*(2), 6-8, 47-48.
- Hay, L. (2006a). Are Internet-savvy kids@home the new information poor? Rethinking the digital divide. In K. Bonanno & P. Nibbs (Eds.), *Visions of Learning: ASLA Online II Conference Proceedings - May 2006*. Zillmere, Qld: Australian School Library Association Inc.
- Herring, J.E. (2004). *The Internet and information skills: A guide for teachers and school librarians*. London: Facet Publishing.
- Herring, J.E. (2005). The instructional website as a focus for teacher librarian and teacher collaboration: A research study. *Synergy, 3*(1), 29-38.
- Ipsos MORI. (2007). Student expectations study: Key findings from online research and discussion evenings held in June 2007 for the Joint Information Systems Committee (JISC). London: Ipsos MORI. Retrieved from <http://www.jisc.ac.uk/media/documents/publications/studentexpectations.pdf>
- Ipsos MORI. (2008). *Great expectations of ICT: How higher education institutions are measuring up. Research Study Conducted for the Joint Information Systems Committee (JISC)*. London: Ipsos MORI. Retrieved from <http://www.jisc.ac.uk/media/documents/publications/jiscgreatexpectationsfinalreportjune08.pdf>
- Johnson, D. (2002). *The indispensable teacher's guide to computer skills* (2nd ed.). Worthington, OH: Linworth Publishing.
- Johnson, D. (2003). *Learning right from wrong in the digital age: An ethics guide for parents, teachers, librarians, and others who care about computer-using young people*. Worthington, Ohio: Linworth Publishing.
- Johnson, L., Adams, S., & Haywood, K. (2011). *The NMC Horizon Report: 2011 K-12 Edition*. Austin, TX: The New Media Consortium. Retrieved from <http://www.nmc.org/pdf/2011-Horizon-Report-K12.pdf>
- Kelly, G. A. (1963). *A theory of personality: The psychology of personal constructs*. New York: Norton.
- Kuhlthau, C.C. (1997). Learning in digital libraries: An information search process approach. *Library Trends, 45*(4), 708-724.

- Lamb, A., & Johnson, L. (2007). Podcasting in the school library. Part 1: Integrating podcasts and vodcasts into teaching and learning. *Teacher Librarian*, 34(3), 54-57.
- Luckin, R., Logan, K., Clark, W., Graber, R., Oliver, M., & Mee, A. (2008). *Learners' use of Web 2.0 technologies in and out of school in Key Stages 3 and 4*. London: British Educational Communications and Technology Agency (BECTA). Retrieved from http://dera.ioe.ac.uk/1476/1/becta_2008_web2_learnersuse_report.pdf
- Maness, J. (2006). Library 2.0 theory: Web 2.0 and its implications for libraries. *Webology*, 3, article 25. Retrieved from <http://www.webology.ir/2006/v3n2/a25.html>.
- McPherson, K. (2006a). School library blogging. *Teacher Librarian*, 33(5), 67-69.
- McPherson, K. (2006b). Wikis and literacy development. *Teacher Librarian*, 34(1), 67-69.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Thousand Oaks, CA: Sage Publications.
- O'Connell, J. (2006). Engaging the Google generation through Web2.0: Part 1. *Scan*, 25(3), 46-50.
- O'Reilly, T. (2005). What is Web 2.0: Design patterns and business models for the next generation of software, 30 September. Retrieved from <http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html>.
- QSR International. (2008). *NVivo 8*. Doncaster, Vic.: QSR International Pty Ltd.
- Valenza, J. K. (2007). Web 2.0 meets information literacy: Make new friends and keep the old. *Access*, 13(2), 22-27.

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