Information management and emerging technologies: control or chaos?

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Abstract

Students of today are the 'natives' of a digital, hi-tech, virtual environment that entertains and informs. Personal Digital Entertainment Devices (PDEs), MP3 players (iPods), Personal Digital Assistants (PDAs), mobile phones, laptops, TabletPCs, USB memory sticks, gaming devices, digital cameras are, for some, a digital toolkit.

These devices allow them to access and/or create Blogs, Chat, email, MUDs, MOOs, MUVEs, Moblogs, Photoblogs, Podcasts, SMS, Wikis, Vlogs and VoIP.

The implementation and use of current and emerging technologies in schools will require a cultural change to teaching and learning practices and access to professional development opportunities for all educators. These new devices of information and content distribution will require the teacher-librarian to be involved in the development and management of information, policy, e-learning programs and e-portfolio environments.

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"Student: I've gotta research idea.
Librarian: Yes, that's a good place to start. What is it?
Student: (looking confused): That's it. I've gotta a research idea.
Librarian: (equally confused): Tell me what your idea is.
Student: Idea? I can't remember what it is. You could google it.
Librarian (doubtfully): Ummmm, OK. What should I google?
Student: Idea Act!
(Thank you, Google!   I.D.E.A. – Individuals with Disabilities Education Act of 2004.)" (Ewing 2006, p. 64)

Does Web 1.0 have a lot to answer for? Wait there is more – Web 2.0 is beckoning.

Australian Internet statistics

At the end of March 2005, the total Internet subscribers in Australia numbered 5.98 million (Australian Bureau of Statistics 2005). According to these statistics, connection to broadband access continues to rapidly outgrow dial-up access with the household subscriber being the highest growth area.

In January 2006 the Organisation for Economic Co-operation and Development (OECD) Programme for International Student Assessment (PISA) released its study, *Are students ready for a technology-rich world? What PISA studies tell us*. This second three-yearly survey of students at age 15, conducted in 2003, indicates that Australian students are among the world's leading users of computers in education both at school and in the home. Seventy per cent of Australian students indicated they had more than five years experience in using a computer (PISA 2005, p. 19). Ninety-four per cent of Australian students reported they had access to a computer at home for school work and 100 per cent of Australian students reported having access to a computer at school (PISA 2005, pp. 20-22). At least ninety per cent of students across the OECD countries of Australia, Canada, Iceland, Korea, New Zealand, Sweden and the United States reported being confident in performing Internet tasks and, with help from someone, could perform high-level tasks on a computer (PISA 2005, p. 48).

The Net Generation [N-gen]

Prensky (2001a, 2001b) argues that the students of today are not like us. They think, behave, and process information very differently. Prensky coined the phrase - "digital natives"- and clarified this by stating, "Our students today are all *native speakers* of the digital language of computers, video games and the Internet" (2001a, p. 1). These students have been exposed, for a very long period of time, to thousands of hours of computer and video games, television and commercials, mobile phone conversations and thousands of email and instant messages (IM).

Studies in neurobiology and social psychology indicate that regular and consistent stimulation changes the brain structures and influences the way people think and behave. "Several hours a day, five days a week, sharply focused attention - does that remind you of anything? Oh, yes - video games!" (Prensky 2001b, p.3). Since the mid 70's, when early computer games were available, the *digital native*s have been programming their brains to multi-tasking, interactivity, instant gratification, higher order thinking and problem solving, inductive learning and a host of other cognitive skills. The *configuration* of these skills is different to those of their predecessors.

The Boomers [Baby Boomers]

Given that the average age of teacher-librarians falls into the Boomer category, there is a gap of a generation or two between the *digital native*, our primary user, and the *digital immigrant*. Prensky defines the "digital immigrant" as "those of us who were not born into the digital

world but have, at some later point in our lives, become fascinated by and adopted many or most aspects of the new technology" (Prensky 2001a, pp. 1-2). He indicates that even though we engage in the new technology we still retain our *accent*, which is our familiar and comfortable style of thinking, behaving and processing information.

Can you identify with the confessions of a digital immigrant?

- Reading the manual for a program rather than assuming the program will teach me how to use it;
- Printing out my email;
- Printing out a document written on the computer in order to edit it;
- Bringing people into my office to show them a website rather than sending them the URL;
- Phoning someone to see if they got my email;
- Prefer receiving text before graphics on a website and then reading from left to right;
- Only having one application open at a time on my computer; or
- Having a mobile phone in case of emergency but never turn it on.

Some attributes of 'digital natives'

a) Nomadic – used to receiving information really fast (*twitch-speed*) via multiple connections (e.g. mobile phone, Internet) from multiple locations.
b) Multi-tasker – capable of distributing attention across multiple applications (e.g. PMP, Internet, mobile phone, games) and working in integrated, parallel environments rather than step-by-step.
c) Agnostic – random access to information in a variety of formats (e.g. text, pdf, Blog, websites, chat threads, images, sound, streaming media).
d) Multi-media receptor – prefer images to text, prefer games, can build a mental map and use visual-spatial skills.
e) Collaborator – function best when networked with others.
f) Experiential – crave interactivity, immediate response to each and every action, and thrive on instant gratification and frequent rewards.
g) Direct – saying and behaving from their view point.

(Prensky 2001a, Abram & Luther 2004)

Web 2.0

The concept of *Web 2.0* emerged out of a conference brainstorming session between Tim O'Reilly and Dale Dougherty (O'Reilly 2005) as they explored the aftermath of the dot-com collapse and whether this was a turning point for the web and the companies, services and technologies that survived. Their basic principle is "the web as platform". What this means is the *web* provides the *platform* from which collaborative, interactive, dynamic, publishing tools and/or programs *jump off* so the end user is not only engaged in sourcing information but also contributing to the development of that information. For example, *Wikipedia*

(collaboration and publishing)*, School Library Association of Queensland Blog* (publishing, sharing and communicating) and *MySpace* (communicating, socialising and networking).

Web 2.0 opens up a new world for the information professional – social networking, collective intelligence, users as co-developer of content, multi-device oriented, shared authorship, pervasive interactivity…to name a few.

Digital devices

The toolkit for the *digital natives* and, increasingly so, the *digital immigrants* consist of numerous mobile devices that are capable of receiving and/or sending information. This section will define some of these devices and explore the educational benefits.

A. Mobile phones

"A mobile or cell(ular) (tele)phone is a long-range, portable electronic device for peer-to-peer telecommunications over long distances" (Mobile phone, *Wikipedia*).

Seventy-two per cent of Australian households had access to a mobile phone in 2002 (ABS 2004). A *CensusAtSchool* project conducted by the Australian Bureau of Statistics in 2006 included 110,000 Australian school students who indicated that seventy-five per cent of them had access to a mobile phone (ABS 2006).

Many mobile phones have additional features such as Internet connectivity as well as text, audio, photo and video storage. This makes them a suitable tool for transmission of information direct to the web for content facilities such as Moblogs. Multimedia Message Service (MMS) is the most common procedure used to transmit video clips, sound files and images. Barriers to educational use would be equity of access, limited capabilities and resulting compatibility of some mobile phones, network coverage in some areas and cost of usage for some services.

Even so, Short Message Service (SMS) is popular and *digital natives* are heavy users of SMS. It permits the user to send a short text message between mobile phones and other handheld devices. It is relatively cheap and able to integrate with email. Barriers to educational use can be linked to a ban on mobile phones at school, concerns about misuse, and limited message size. Some trials have been transacted using SMS to notify parents of student absence from class, but there is certainly some scope to extend the use of this service to communicate with the primary user.

B. Laptops

"A laptop computer or simply laptop (also notebook computer or notebook) is a small mobile personal computer, usually weighing from one to three kilograms, depending on size, materials and other factors" (Laptop, *Wikipedia).*

Most new laptops have wireless capability and the user is able to log in to a wireless network, therefore making computing more mobile and collaborative than previously experienced. The use of laptops in schools is not a new initiative, but equity of access is still of concern.

With a laptop connected to the Internet many of the Web 2.0 social and collaborative technologies become easily accessible. Rich, digital, multi-media, learning environments add variety to classroom activities.

C. Personal Digital Entertainment Device (PDE) and Portable Media Player (PMP)

PDEs and PMPs are devices that allow the user to download, store and play audio, photo and video files. Some also have the capacity to record audio. The most popular PMP is the Apple iPod. The *full-sized* model stores files on a built-in hard drive, whilst the *smaller* versions use flash memory cards. Many of the PMPs can also serve as an external data storage device when connected to a computer.

These are popular devices amongst the *digital natives* mainly for downloading, managing and listening to music. They have the scope to deliver information for educational purposes in audio or video format, to provide storage and portability of the students' digital work or collection of data, and to voice record. One popular Web 2.0 technology is the *podcast*, a term coined in 2004, which combines *iPod* and *broadcasting*.

C. Universal Serial Bus (USB) drives

A USB Memory Stick is a small, lightweight, removable and writable storage device that integrates with the USB port on a computer or through a USB hub. These highly portable devices vary in storage capacity (up to 4GB) are *wearable* and have tended to takeover from the CD and DVD storage methods.

The ease of use and portability of a USB stick mean students can have their personal work files with them 24/7.

D. Digital cameras

"A digital camera is an electronic device used to capture and store photographs electronically instead of using photographic film like conventional cameras. Modern compact digital cameras are typically multifunctional, with some devices capable of recording sound and/or video as well as photographs" (Digital Camera, *Wikipedia*).

This electronic device allows the user to capture images related to learning activities, which can be used to enhance multi-media presentations, develop digital portfolios of their work, and to share with other students.

E. Gaming devices

Gaming devices are usually handheld game consoles and can also be accessed via mobile phones, Personal Digital Assistants (PDAs) and the Internet.

Teachers Evaluating Educational Multimedia (TEEM) investigated the habits of 700 children aged seven to sixteen. Their research indicated games support the development of a range of skills which are essential to the autonomous learner. These were "problem-solving, sequencing, deductive reasoning and memorization….negotiating skills and group decision-making as well as respect for peers" (McFarlane, Sparrowhawk & Heald 2002, p.13).

Many of our *digital natives* are familiar with these tools and can play against the computer program on a console or against other users on a network or the Internet. Well designed games are able to encourage the development of a wide range of skills, accommodate a range of learning styles, engage the user in active participation and challenge the learner.

A Multi-User Domain (MUD) computer game involves multiple users interacting with each other and the rooms, objects, events and characters within the program. Exploring fantasy or science fiction worlds, completing a quest, taking an adventure, creating story, role-playing and/or developing the characters or events are usual objects of the game.

A MUD Object Oriented (MOO) is a text-based online virtual reality environment involving multiple users. MOOs have attracted the attention of teacher-librarians either through coursework for completion of their studies or in bringing together students in literature circle programs (Bales 2002, Bales 2005).

Web 2.0 content synergy with digital devices

A. Instant Messaging (IM) and Chat

"Instant Messaging or IM is a form of real-time communication between two or more people based on typed text. The text is conveyed via computers connected over a network such as the Internet" (Instant messaging, *Wikipedia*).

IM requires the use of a *client program* that links to an instant messaging service and provides *real time* connection with other users. Most services provide a feature whereby you know when someone from your contact list is online and currently available for a chat. A number of programs that provide additional features such as data or video with voice connection also include an IM facility. For example, *AOL Instant Messenger, Google Talk* and *Skype*.

It provides immediate connection with other uses of like mind and has been used in one-to-one and one-to-many real-time interactions.

B. Blogs

"A weblog, which is usually shortened to blog, is a type of website where entries are made (such as in a journal or diary), displayed in a reverse chronological order. Blogs often provide commentary or news and information on a particular subject, such as food, politics, or local news; some function as more personal online diaries. A typical blog combines text, images, and links to other blogs, web pages, and other media related to its topic. Most blogs are primarily textual although some focus on photographs (photoblog), videos (vlog), or audio (podcasting), and are part of wider network of social media" (Blog, *Wikipedia*).

Blogging has become extremely popular with literally millions of blogs being available. In the educational context some blogs have been used to encourage student reading and discussion, whilst others have been used as professional spaces for sharing information, exchanging views and opinions. When used with the other technologies, as listed above, a blog can become a rich multi-media learning environment; a place for reading about what interests you, for contributing to the *dialogue* through reflection, questioning and responding, for collaborating on the development of ideas and thoughts, and for being a community.

With Really Simple Syndication (RSS) the content of the Blog can be made available to any user who subscribes to the Blog and who has an RSS reader. This means the user does not have to remember the URL for the Blog to be able to revisit the content development. (See *School Library Association of Queensland Blog* 2006).

C. Really Simple Syndication (RSS)

Most content syndication uses RSS, a *web feed*, which means this information can be used in multiple ways in multiple locations, but is only created once. For example, content is placed on a website or a Blog and the creator publishes a *feed link* on their site. The user subscribes to the *feed link* through an RSS reader, often available free, which reads and updates the content in their reader. The user is notified of new content without having to regularly check the website or Blog and it is delivered to their desktop. The user can then manage the information within their space.

The user can keep up-to-date on the things that are of interest to them without having to navigate through complex web pages. They can share this information or use it to enrich their own content.

D. Podcasting

Podcasting is the method of distributing audio files, over the Internet, usually using syndication feeds, for playback on mobile devices, such as an iPod or MP3 Player, and personal computer.

Podcasting has been very successful for the mass media providers, particularly radio stations, and it has potential, in the education sector, for delivering quality audio content to students, meeting the needs of auditory learners and allowing the user to revisit the content in their own time and space.

Vodcasting or *Vlogging* is a similar concept to podcasting except it delivers video files rather than audio files. These formats are likely to be viewed on a computer or portable digital player as many of the current players do not have a screen sufficiently large enough to enjoy the viewing.

E. Wiki

"A wiki is a type of website that allows visitors to easily add, remove, or otherwise edit and change some available content, sometimes without the need for registration. This ease of

interaction and operation make a wiki an effective tool for collaborative authoring" (Wiki, *Wikipedia*).

The *Wikipedia* is the most prominent example of the wiki collaborative authoring environment.

As a web-based publishing system a wiki would support collaborative learning activities which allow students to develop the content in a group environment. One has to understand that the content is ever-changing and is never really authoritative as it can be changed and edited. Having access to the edited versions of a page may be helpful when reflecting on the thinking that has been transacted throughout the learning activity.

F. Voice over Internet Protocol (VoIP)

VoIP, also called *Internet telephony*, is the transmission of voice conversations over the Internet or through Internet Protocol-based networks. This can be used either as one-on-one or in a group (the number involved is dependent of the service used). An example of this is *Skye*, a free VoIP software package. Some programs can combine text (e.g. PowerPoint) and video.

VoIP technology supports greater interaction between users and being able to access a guest or expert from another geographical area without having to bring them to the set location.

G. Web communities

This type of community is similar to a virtual community with the major difference being that it is by invitation-only or by registration-only. With Web 2.0 a number of social networking communities have emerged such as *MySpace*. This is an interactive web-based community attracting millions of Australian users. Users are sharing everything from photos, to favourite music and movies, to video clips, to blogs and journals. This type of community is home to the *digital natives* who gather online to meet their friends.

Brooks states, "But this is about more than simply socializing or getting and staying connected. It's a means of forging a sense of self, of creating a distinct identity and promoting a "me" outside the usual strictures of family, peers and colleagues" (2006, p. 53).

As teacher-librarians we might embrace a similar virtual community called *MyEdNA* (EdNA Online 2006).

Information management implications

The Web 2.0 certainly opens up a *Pandora's Box* for the information professional. There will be a need to be innovative and imaginative, and to not be afraid to merge some of the traditional elements of libraries.

Working with the basic principle of Web 2.0 – Web as platform – then a corresponding School Library 2.0 could be – School Library as platform. The school library is the jumping off point for the integration of Web 2.0 tools and programs making it a socially and mentally

engaging place/space for experiencing and learning. The teacher-librarian is the strategist for pointing users in the right direction to find information (in multiple formats), gather their thoughts and knowledge, and to create the content.

They will also need to be the strategist when considering the following -

1. **Policy and procedures** should not be created to impede the users' access but to protect and guide. Web 2.0 will challenge, for example,:
    a. Copyright / Intellectual Property
    b. Internet Acceptable Use
    c. Web Publishing
    d. Intranet / Personal Space/Place
    e. Privacy
    f. Email / Chat
    g. Plagiarism
    h. ICT Integration
    i. Filtering / Disputed Material
    j. Netiquette
    k. Collection Development

    Web 2.0 will test the notions of what is reliable and authoritative. It would be encouraging to include the user in the review and revision of policy and procedures using some of the Web2.0 tools that allow document sharing and discussion.

2. Explore how some existing **services** might be enhanced by Web 2.0 tools and how new services may be created in a climate of collaboration. For example, IM (chat reference service), Blogs (literature and reading), Wikis (study groups with a difference), and RSS (new services, new resources, assignment tips, pathfinders).

3. Explore **professional development** through virtual communities (Blogs, *MyEdNA*) to access and evaluate information that can be incorporated in the continuing development of your own content. Engage in **professional development** opportunities online using VoIP and data or media streaming.

4. Review **collection development** to include a variety of multi-media formats (podcasts, wikis, blogs).

5. Join *MySpace* to **understand the user** and how they access, consume and create content and encourage **user participation** in the creation of content and services.

6. Develop an understanding of **metadata creation** to increase the exposure of online information provided by your library.

Conclusion

It is unlikely the *digital natives* will reverse their technology DNA. They will continue to evolve with the technology tools of Web 2.0 and beyond. A challenge for information

professionals is to not try and keep up, but to harness the array of skills, capabilities and understandings their primary users, the *digital natives*, possess to develop the school library as a collaborative and dynamic learning place/space.

> Our young people have a much better idea of what the future is bringing than we do. They're already busy adopting new systems for communicating (instant messaging), sharing (blogs), buying and selling (eBay), exchanging (peer-to-peer technology), creating (Flash), meeting (3D worlds), collecting (downloads), coordinating (wikis), evaluating (reputation systems), searching (Google), analyzing (SETI), reporting (camera phones), programming (modding), socializing (chat rooms), and even learning (Web surfing).
> (Prensky 2005, para. 8).

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