

**Digital Nature and Digital Nurture:  
Libraries, learning and the digital native.**

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***Abstract***

*The so-called “digital native” – the first generation of students and learners who have been born and raised in a world of digital technologies – is now in our universities and, we hope, using our library services. While academic libraries have begun to recognize this phenomenon, have our services changed significantly in response to this “digital” generation of students and their approach to learning? What role should academic librarians have in equipping tertiary students to function in the digital information environment? Do academic librarians continue to have a role in this, or are we in fact lagging behind the students’ understanding of information technology, and their adoption of new technologies to acquire and use information? This paper will survey recent debate about the delivery of information services to the “digital native”, using Hong Kong academic libraries as a case study to reflect on the appropriateness of the services offered.*

## *The Net Generation*

So much has already been written and said about the Net Generation that – if nothing else happens – they are in danger of becoming the most labeled generation in history. Emerging principally from the work of Howe and Strauss (2000) and Marc Prensky (2001a, 2001b), compelling visions of “millennials” or “digital natives”, who process and manage information in fundamentally different ways to previous generations, have steadily permeated the thinking of many librarians and of library service provision to students at secondary and tertiary levels. (Long, 2001, Lippincott, 2005)

Prensky (2001a) has defined “digital natives” as “the first generations to grow up with...new technology. They have spent their entire lives surrounded by and using computers, videogames, digital music players, video cams, cell phones, and all the other tools and toys of the digital age...Computer games, email, the Internet, cell phones and instant messaging are integral parts of their lives.” He argues that rather than this being simply another generational change, the absorption of technology into the lives of this generation is so profound that it represents a discontinuity from previous generations, with changes in the way digital natives acquire information, think and learn. (Prensky, 2001b).

Prensky distinguishes this generation from its predecessors by referring to the rest of us as “digital immigrants”: - those who may have acquired some form of digital literacy to a greater or lesser degree, but nonetheless apply to the use of technology the mind-set, techniques and concepts with which our own generations were brought up. The Net Generation which has grown up with the digital revolution assumes the presence of some technologies which older generations recognize as “new”. Previous generations have grown up assuming that such things as telephones, televisions and VCRs are just an everyday part of their lives rather than “technology” as such. The same thing is happening to this generation, only it is occurring in a number of areas such as the omnipresence and interactivity of the internet, the availability of a range of portable communications devices, and the virtually immediate speed of communications. (Oblinger, 2005) While the temptation is to focus on the gadgets – ipods, MP3, mobile phones and so on – as the difference, the real difference is in how the net generation absorbs these technologies into their daily lives. (NetDay, 2004)

There have of course been challenges to this notion of a fundamentally

“different” generation, and sensible cautions against the adoption of a new stereotype being as misguided as retention of traditional ones (Hesel & May, 2007). For practical purposes, however, the literature points to broad characteristics that are attributable to the Net Generation which we as librarians and educators need to consider in our delivery of information services and resources.

### *Digital Natives as Information Seekers*

Digital natives in Prensky’s terms (2001a) can be characterized by a number of traits. They have been conditioned by the digital technological environment to expect immediate responses to information inquiries. They prefer random (or non-linear) access to information, have a preference for image over text based content, and are comfortable engaged in several tasks at once. They are impatient with slower and more structured means of acquiring information and knowledge, expecting instant response and instant satisfaction with the technologies they use, and are highly adaptive, able to utilize a range of technologies to network with their peers. The approach to learning that the digital student brings from secondary to tertiary education is also more collaborative, problem solving and task based.

It has been pointed out that while the previous generation of digital “immigrants” may find these approaches novel and inventive, it nonetheless does not necessarily mean that these behaviours are unfailingly positive or constructive. The instant availability of internet based information, for example, has raised a number of concerns about the Net Generation’s ability to retrieve and evaluate appropriate sources of information, to consider information sources other than the internet, and to apply information obtained over the internet in an appropriate way. Fundamentally different mindsets have emerged about the concepts of intellectual property and plagiarism. (Frاند, 2000) Students have expectations of a right to use, modify and pass on any information - regardless of source or ownership - with which they come into contact (Chad & Miller, 2005), and this is altering not only what they do with information but where they prefer to source it.

Several studies have focused on a key change occurring in library use in this generation of students. The OCLC report on ‘College Students’ Perceptions of Libraries and Information Resources’ (Rosa et al, 2006) found that 89% of its college student sample commenced a search for information with a search engine - higher than the general population sampled - and overwhelmingly preferred to all other forms of electronic access. Tellingly, only 2% of the students sampled listed the

Library website instead as the source used to commence an information search.

In the same survey of college students, it was found that 53% of the students sampled believed that information obtained via search engines was as trustworthy as information obtained from a library, and that 16% of the sample felt that the library was less trustworthy as a source of information when compared to a search engine. Consequently, not only were these students turning to search engines rather than library resources as the first point in their inquiry, over two thirds of the sample had as much if not more faith in the trustworthiness of the information they found there when compared to libraries.

### *The Digital Native and Libraries*

Lippincott (2005) refers to “an apparent disconnect between the culture of library organizations and that of Net Gen students”, arguing that while the information seeking behaviours of this generation have altered substantially, the information provision practices of libraries have not been keeping pace, in the way in which they provide information and in the systems and services which deliver it.

In the “2003 OCLC Environment Scan: Pattern Recognition.” study (De Rosa et al, 2003), the argument is put more succinctly, when the authors point to “the indisputable fact...that information and content on the open Web is far easier and more convenient to find and access than are information and content in physical or virtual libraries. The information consumer types a term into a search box, clicks a button and sees results immediately. The information consumer is satisfied.”

There is an entirely valid quality argument often put by librarians to defend and distinguish what they provide which internet access cannot. Algorithmic searches through engines such as Google instantaneously return massive amounts of information, but they do little to organize or rank this information in a meaningful manner, and less to determine the validity of literally where in the world it comes from. Libraries also of course provide material which is unavailable via the open Internet, such as copyrighted printed materials and commercially available databases, and one can argue that “libraries today routinely encompass the entire Internet – that is, they will customarily provide terminals allowing for the free access to all of the open portions of the Net – but that the Internet does not, and cannot, contain more than a small fraction of everything discoverable within library walls.” (Mann, 2006)

With their Internet usage preferences, students are demonstrating the inherent dilemma in information service provision today between convenience of access on the one hand and quality of content on the other. While there is no shortage of quality information resources held in a typical academic library, as Gaston (2006) points out, this is “a generation of students which has learned to seek out information on their own”, and as a consequence often prefer to source information through the Internet rather than through the intermediary of a physical or electronic library service. Most electronic databases, for example, now provide a wealth of content and sophistication of delivery which justly continues to amaze the digital immigrant raised on print sources and stand-alone products. Yet it also has to be said that many such products can be difficult for the uninitiated to use, require some prior knowledge of content, require until very recently multiple searches, can return mixed results according to the quality of the search, and may or may not ultimately deliver the actual information in the form desired by the user. Despite its potential, the digital native finds this approach cumbersome, unhelpful and ultimately unnecessary when the alternative is an Internet search that appears to retrieve everything on a subject, no matter what the search term. Convenience is rated more highly than the quality of the information, or perhaps put more accurately, it may be that the convenience is self-evident, while the superficiality or otherwise of the source is not properly considered.

What we are witnessing also is the development of credible information sources which are outside the “control” of libraries, insofar as it is not necessary to use a library service either physically or virtually to access them. With previous introductions of technology, such as online abstracts and indexes, bibliographic databases and finally full-text electronic resources, a focus remained on the role of the library and the librarian as an intermediary. While the role of the librarian in this process has since changed to one of facilitator – assisting students to acquire skills in information access rather than finding information on their behalf – the focus on the Library as the point of entry in some form has nonetheless remained unchanged.

The Internet, however, does not presuppose the presence of a librarian, nor require the intermediation of a library at all. While libraries are losing ground to alternative means of sourcing information, search engines – notably Google – have continued to position themselves more strongly as “library like” entities, by offering an improved range of content and links to both Internet and locally subscribed electronic material through services such as Google Scholar, and recreating the role of the librarian by offering tools and techniques to improve search results.

According to the OCLC survey (De Rosa et al, 2006), the students in the sample largely associated libraries with books first and foremost, or in other words differentiate the role of libraries from that of the Internet as an information provider. Perhaps not surprisingly, the annual statistical report of the Association of Research Libraries (ARL, 2006) has been recording a steady decline in book circulations and reference queries for several years, and in 2004-05 these indicators were both markedly less than at any time in the period since 1991. Consequently, it is appropriate for library services to be re-thinking their approach to bring the goals of convenience and quality closer together.

### ***The “Digital Nurture” Library***

Librarians have almost habitually asked themselves whether they and their services are relevant to the needs of their users, and indeed, have been demonstrably successful in adjusting throughout to changes in technology, product and service demand. The use of electronic databases is a case in point, as since their inception we have witnessed the immediate application by libraries of each successive improvement in content, networking capacity and search capability in an effort to improve convenience to the end user.

It must be remembered also that no academic library serves the needs of just one generation, but needs to mix their services and resources as appropriate to their range of users. Although it may be true that its largest constituency – undergraduate students – are all now rank and file “digital natives” who may bear some common characteristics, assuming that all students have an equal level of sophistication with technology is fraught with risk, and may marginalize sections of our user community. Of course, in most tertiary institutions another equally influential constituency – academic staff, research fellows and often post-graduate students – are from an entirely different generation and cannot be assumed to share the same interests or values in their information behaviour. Academic libraries have responsibilities for a diverse range of library users, and consequently should aim to provide flexibility and choice in the way in which their services are offered.

This, it might be argued, is what academic libraries have been doing to a greater or lesser extent for many years, and they are now already beginning to respond to the types of “Net Generation” student trends and behaviours discussed above. Techniques and modes of engagement adopted from the more interactive and participatory internet environment of “Web 2.0” (O’Reilly, 2005) have begun to emerge in

so-called “Library 2.0” website applications such as library blogs, wiki based subject guides and content mash-ups. Libraries are also beginning to see major opportunities in using social networking software to work more intimately with the libraries customer base and to understand their requirements better. (Albanese, 2006)

While acknowledging that libraries have ceded ground to internet-based services, the internet developer and research organization Talis also points to possible ways in which the re-styling of libraries using Web 2.0 applications could be achieved. (Chad & Miller, 2005) The Talis “White Paper” summarizes the principles of “Library 2.0” as follows;

1. The library is everywhere, meaning essentially that the library “...is available at the point of need, visible on a wide range of devices, and integrated with services from beyond the library, such as portals, virtual learning environments...”
2. The library has no barriers: meaning that the resources which a library holds should be more widely exposed via the Web, “...visible to search engines such as Google, and harvestable into new applications and services built by the library and by third parties...”
3. The library invites participation: encouraging and enabling library users to participate and contribute to understanding of resources so that ultimately everyone benefits.
4. The library uses flexible best-of-breed systems: to achieve this situation requires new and different relationships with technology partners, relying less on proprietary systems and more on open, compatible and interoperable standards and modules.

Analysts have suggested a number of ways in which these principles might be articulated in the delivery of library services. One of the strongest ways in which this can be achieved is by offering students Internet search interfaces to library materials which are simpler and more flexible to use, and by attempting to aggregate or incorporate different (and not necessarily library owned or licensed) materials through the one point of entry. The collaboration between libraries, OCLC and Google to provide links to academic and scholarly material via Google Scholar is a positive initiative which realizes a model for future and mutually beneficial co-existence, and by using Google as the search interface, is “taking library resources to where students want to find them” (Lippincott, 2005) Another example of “Library 2.0” manifesting itself is in the practice of “tagging” or allowing library users to assign their own subject “tags” to provide additional perspectives and more meaningful points of

access to library materials. It has also been suggested (Maness, 2006) that in future the standard library web site may look and behave more like a social network interface (such as MySpace or Flickr), offering users opportunities to share views and personalize library services. A clear sign that this idea is gaining momentum is in the attempts that library management system vendors are now making to design in “2.0” features, such as faceted search, relevance rankings, federated search results and patron tagging into their next generation of systems.

Another major feature of 2.0 approaches to library services is in the concept of a “blended library”, or a library service which is available via multiple sources and devices. While this is often taken to mean no more than providing library website access via a PDA or mobile phone, the chief strength of the concept is more around “locating” library resources and tools such as search guides in course content management systems where and when students are most likely to need them. (Lippincott, 2005) However, the growing prevalence of PDA and phone ownership is also encouraging many to develop services tailored specifically for these devices. (McFarland & Mussell, 2006)

Information literacy is also changing in approach, as not only new means of accessing library information, but also different ways of manipulating information have become commonplace. For all the flexibility with technology suggested earlier in the paper, there are questions over how technology literate and information literate Net Generation students really are. (Lippincott, 2005) Programs are now being developed which combine technology and information literacy to genuinely equip students to function at a tertiary level, encompassing issues such as web literacy, “media literacy” and learning support in issues such as the evaluation of internet based resources. (Shih & Allen, 2007)

In terms of physical space in academic libraries, there has already been a distinct movement towards the development of study facilities which are more attractive to today’s students. This establishment of “information commons” in academic libraries is a reflection of this, bringing together in the one environment PC workstations, different software applications, support for information and IT needs, and adaptable spaces for individual and collaborative work. Libraries are also demonstrating greater flexibility in making their physical facilities more accessible to students at times when they need them, such as through the development of 7 x 24 facilities and more extensive opening hours.

### *The Hong Kong Digital Native*

Much of the discussion concerning library services to the Net Generation originates and is focused in North America, and it is worth questioning whether this stereotype translates as easily in a so-called “Confucian-heritage” culture and learning environment, such as in Hong Kong. (Watkins & Biggs, 2001) The Hong Kong government is vocal in encouraging the use of information technology and the development of a knowledge-based society through its “Digital 21” strategy. Broadband internet penetration rates are amongst the highest in the world, with 1.68 million people (24% of the total population) as broadband customers as of the end of 2006. (HKSARG, 2006a). Over 70% of all domestic households had a PC at home in 2006, with 67% of households also having some form of internet connection. (HKSARG, 2006b) And – staggeringly – mobile phone and PDA ownership is equally high, with mobile phone penetration rates now given at 127%, or more than one phone per person. (HKSARG, 2006a)

Perhaps more revealing of the state of Hong Kong internet culture are studies which have been conducted on use of specific internet products. Jones (2001), in a study of Hong Kong teenager use of the social networking site ICQ, reported that approximately half of the surveyed 14-15 year olds are on ICQ for at least three hours a week, and over a third of this group accessed the site for over thirty hours per week. Cheuk and Chan (2007), in another study of the effects of ICQ usage and “internet addiction”, noted that the highest number of ICQ users in Asia is found in Hong Kong. Of specific interest in Hong Kong also is the study by Lin (2005) which looked at the communication practices in mobile phone text messaging amongst Hong Kong students, and concluded that a “hybridized bilingualism” of English and Chinese – effectively a unique text language - was emerging through this medium. In surveying the available literature on internet usage in mainland China, Mi and Nesta (2006) concluded that information seeking and internet usage practices were also consistent with usage studies in other countries.

To date, studies of internet culture amongst Hong Kong youth have been limited, and studies of how the internet impacts on local information seeking practices and use of academic libraries virtually non-existent. However, the studies that have been undertaken at a broader level suggest that rather than being different from their peers overseas, the Hong Kong “Net Generation” share and may even excel in some characteristics of technology adoption.

The academic libraries of Hong Kong have taken their first steps to “Library 2.0” services, using services such as Library blogs, RSS feeds and instant messaging as a means of connecting with users. In addition, new services have been developed which offer streamed multi-media content alongside print and electronic offerings, and most of the academic libraries have invested in revamping their physical facilities to offer more flexible study environments. However, the declines in usage of key public services in North American ARL libraries are not reflected in recent statistics of Hong Kong academic libraries, which have been experiencing continued growth in access and borrowing. Expenditures vary between libraries on investment in print as compared with electronic resources, with some libraries continuing to commit a higher proportion of their budgets to print information. Information literacy programs continue to focus on bibliographic instruction, and hover on the margins of the curriculum, in some cases embedded into a credit bearing programs while in others remaining as an optional plug-in. While some libraries have developed “information commons” to reflect perceived changes in students needs, the libraries overall are still typically positioned as part of the institution’s academic support or administration rather than central to its teaching and learning processes.

### ***Take It Up With My Avatar***

Traditionally, the physical and virtual academic library has been the primary provider of information for staff and students of a tertiary institution. Libraries have been to a greater or lesser degree the intermediaries between the user and the information they seek, using rigid bibliographic systems to manage information sources, providing access to these sources through structured IT systems, and supporting this access through reference and training programs.

Now, however, academic libraries are competing with ever more sophisticated search engines such as Google and Yahoo for attention from their primary user group of undergraduate students. The realization is dawning that these students now have access to an enormously powerful, convenient, easily accessible alternative for finding their information, so that the library - if not entirely irrelevant - may nonetheless diminish in importance for them.

Arguments may continue about the quality of Internet based information and the ability of today’s student to evaluate and apply that information in an appropriate way, but it is difficult to imagine that this will affect the trend towards greater and greater internet reliance. The current generation of digitally aware students show a facility

with, and a passion for, internet based social and interactive softwares, the implications of which library managers from an earlier generation are only beginning to fully comprehend. While much of the above discussion has focused on the Net Generation as the locus of change for academic libraries, the issue that is foregrounded by this discussion is that library services altogether are being challenged to become more flexible and responsive in the way that they meet the needs of their users. While librarians have talked about user-centric services for many years – and have in general delivered them as far as technology would permit – today’s use of the Internet demonstrates to us what user-centric really means: simple to use, minimal obstacles between the user and information, aggregation rather than segmentation of information, no differentiation in format and source, interactive, personalized and participatory.

While there may be a temptation to find all the answers in Web 2.0 applications, libraries will be better served in the long run if they consider in what particular ways they appeal to students, and to focus on developing services which are aligned with student preferences in their access to and use of information. Rather than competing with search engines, libraries can learn from the way in which they design their services, and through link resolving softwares can combine the convenience of the web with the quality of their own resources. Identifying reasons for using the library which are not satisfied by the Internet, and promoting these through improved virtual and physical access – such as more flexible library spaces and opening hours, and more interactive and user driven ways of locating information - help to define the niche that academic libraries serve and how they can build a better affinity with their student community. Rather than becoming irrelevant, in this and other initiatives academic libraries now have opportunities to nurture a digital environment which offers the type of service which the Net Generation student values.

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