SCHOLARLY INFORMATION IN A DIGITAL AGE – CHOICES FOR THE UNIVERSITY OF MELBOURNE

A consultation paper that invites involvement and response

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A CONSULTATION PAPER¹

“[T]he archetypal image of a university is a community of scholars clustered around a library, drawing on and adding to a growing archive of codified knowledge...”²

Melbourne’s future is defined through the metaphor of the triple helix: a public-spirited institution defined by tightly-bound strands of research, internationally recognised teaching and continuous knowledge transfer, each reinforcing the other. Binding these strands is the process of scholarly communication: the creation, evaluation, synthesis and dissemination of knowledge through scholarly information. It is therefore entirely appropriate that, following the work of the Curriculum Commission, we explore the place of scholarly information in realising our commitment to being one of the finest universities in the world.

Melbourne has rich collections of printed scholarly publications, cultural materials and archives befitting a university of its age and stature. Yet our ability to collect even a fraction of what is currently published is overwhelmed by the sheer volume of production, by escalating costs and by our ability to manage, make accessible and maintain such collections. And whilst the Internet has the potential to make knowledge more widely available, competitive pressures are encouraging greater protection of intellectual property and copyright. Digital content does not guarantee that access will be free. The vast amount of information becoming available in digital form creates the paradox of overload and challenges our capacity to locate and preserve relevant, high-quality information.

The fates of research libraries and universities are inter-twined. Disruptive technologies challenge the practice of scholarship — changing the ways in which knowledge is created, sparking opportunities for new forms of synthesis and dissemination and making possible new ways of learning. The boundaries of the helix are blurring.

In 2008 the Information Futures Commission will engage the University community in a critically important discussion — a consultation process that will shape a 10-year strategy to position the University as a leader in the application of scholarly information and technologies to underpin next-generation research, teaching, learning and knowledge transfer, binding the strands to achieve the Growing Esteem vision.

I look forward to your participation in this conversation.

Professor Glyn Davis
Vice-Chancellor
INTRODUCTION

If this Consultation Paper poses a single overarching question, it is this:

How should we develop our scholarly information and technologies, services and infrastructure to achieve our research, learning, teaching and knowledge transfer aspirations over the next decade?

Rapid and unpredictable changes in information technology mean that we will need to reconsider this question every few years. But a changing environment is not an excuse for inaction. Rather, it calls for deliberate choices to be made. By not making choices we risk a dilution of effort, we risk finding that poor planning forces us into continually trying to bridge the gap between our aspirations and our ability to deliver, we risk falling behind our competitors in attracting and retaining the best academics, the best students, the best professional staff.

Our initial consultations and research have identified a multitude of possible responses to the underlying trends and challenges we face. Yet we cannot do everything. The work of the Information Futures Commission is to engage the University community in making what will be difficult choices.

This Consultation Paper aims to stimulate a vigorous conversation among members of the University community and with relevant external stakeholders. For the purposes of this conversation we propose that ‘scholarly information’ has four dimensions:

1. **Published information and collections used by our scholars to inform their learning, teaching and research.** Published information and collections may be in many formats and may or may not be provided through the University. Of particular interest from a planning perspective are the information and collections the University (normally through the library but not always) negotiates access to or collects. These include books, refereed journals, maps, monographs, images, DVDs and videos, audio recordings and other physical materials. Increasingly information is produced in digital format and we are seeing a growing tension between free access and market-driven models of publishing. The term ‘scholarly information’ also refers to other primary sources typically collected by a library, museum or archive: for example letters, financial documents, mementoes and other contents of personal and business archives; or museum collections of instruments, samples or other objects.

2. **Materials created for learning and teaching purposes.** These could include, for example, course notes, presentation slides, customised ‘packs’ of selected readings for a particular subject, audio and video versions of lectures, and a range of digital objects that can be stored in a learning management system and reused in different ways and at different times.
3. **Information created in the course of research activities.** Examples of such information are numerical data collected from scientific instrumentation and laboratory work; information collected from surveys, interviews and other social studies; records of meetings and conversations between collaboration partners; models, plans or images created in the course of design, architectural or ethnographic research.

4. **Research outputs** such as papers, chapters, monographs, articles, letters, presentations, posters, demonstrations and speeches, processed research data, visualisations of large datasets, models, web sites and multimedia objects. Information produced for the purposes of community engagement can be considered a subset of this category.

We cannot separate a discussion of our plans for scholarly information from a discussion of the underlying information technologies, given the inter-connectedness between the information and the form in which it is used. Scholarly information technologies include the tools, systems, infrastructure and processes by which we create, identify, manipulate, classify, index, store, preserve, search, retrieve, deliver and use scholarly information. New technologies are evolving rapidly — not only in the online world but in the built environment, requiring reconceptualisation of learning and teaching spaces, libraries and social spaces. With new technologies and ideas come new expectations for physical spaces, for how we design, inhabit and reconfigure them to fit a variety of purposes.

Over the next few months, in consultation with the University community and stakeholders, the Information Futures Commission aims to:

- Understand how we create, use and communicate information in our individual scholarly activities
- Consider how we wish to make our scholarly output available to and usable by others
- Imagine our preferred future state and:
  - Identify the approach we wish to take to collecting or connecting to information
  - Determine what technologies, systems and infrastructure we must access or provide
  - Define the preferred characteristics of our physical spaces (teaching spaces, learning spaces, libraries)
  - Develop a strategy to build the capabilities of our staff and students to find, evaluate, create, share, present, use and manage scholarly information effectively in a digital environment

The release of this paper will be followed by a broad-ranging consultation process. In June 2008 the Commission will produce its final report proposing a 10-year strategy for our scholarly information and technologies, a strategy which will require the University to make some choices. Some of these choices will require courage and a willingness to leave behind some of our dearly held practices and assumptions so that we may embrace bold new opportunities in the future.
RESPONDING TO THIS DOCUMENT

This discussion paper is organised in three sections:

**The Changing Environment** considers how changes in society and technology, changes in scholarly practice, and the public mission of universities influence the place and use of scholarly information.
*Pages 5-14*

**Melbourne’s Place Today** outlines the history and current state of scholarly information at the University, and examines how other institutions compare and the changes they are undertaking.
*Pages 15-20*

**Summary Outlook and Strategic Choices** examines our aspirations and the questions they raise for the future of our scholarly information, infrastructures and spaces.
*Pages 21-28*

How you can be involved

During March, April and May 2008 the Information Futures Commission will seek input from the University community and other stakeholders.

Staff and students are invited to attend discussion forums, consultations and the Information Futures Forum series of lectures to be delivered by Australian and international experts.

The Information Futures weblog provides a venue for informal conversation. All interested individuals, both within and outside the University, are welcome to add their comments.

More information about the consultation process is available from the Information Futures web site [www.informationfutures.unimelb.edu.au](http://www.informationfutures.unimelb.edu.au)

In responding to this Consultation Paper, we encourage all staff and students to conduct their own discussions and concentrate on the issues most relevant to them. Colleagues should get together to work out their response and proposals, which need not be confined to the questions raised in this paper. Critical perspectives, creative ideas and robust solutions are most welcome.

Your response by Friday 9 May 2008 would be appreciated. Correspondence can be submitted via the Information Futures web site or emailed directly to info-futures@unimelb.edu.au
THE CHANGING ENVIRONMENT

“Collaboration, across time and space, is the fundamental method of scholarship, and without it we can do nothing of value.”

Repositories of human wisdom and knowledge

Universities and libraries have both been characterised as the gatekeepers of knowledge. The library, as the custodian of published knowledge, was both metaphorically and literally at the heart of its university, providing the fundamental infrastructure of scholarship. Publication of a scholar’s work was the essential foundation for the creation of new knowledge. If scholars did not publish their ideas others could not build upon them. The library organised, made available and preserved these ideas, as recorded in published works. Librarians provided the specialist skills to assist people to find and use information. Traditionally, scholarly information has been created and reviewed by experts, classified and catalogued by specialists, and delivered by teachers expert in their field. Often, scholarly information was accessible only to those who had been taught to use the tools of hierarchical and classified access.

The amount of information published each year continues to grow. More than 3000 books are published daily, with an estimated 3.1 billion books published in 2006, an increase of 0.5 per cent on 2005 figures. A new weblog is created every half-minute; 50 million blogs were created in the second quarter of 2006. Podcasts, videos, machinima and digital archives further expand our information sources, and 2.7 billion Google searches are performed each month.

What happens to the role of the university and the role of the library when we live in a digital world, a world where almost everyone can publish, almost everyone can access this published material, where the amount of information is growing exponentially? A world where there is an illusion that information is free, where public search engines, Open Access publishing and the increasing ubiquity of Internet-enabled computing have challenged the traditional sources of authority? A world where “The scarce commodity is no longer the information itself, which is often free, but the time and skills to use it well”?

A networked world: new ways of seeking, understanding and using information

The Net Generation is a term coined to refer to a social demographic that coincides with widespread access to Internet-related technologies. These technologies allow simple, fast access to vast amounts of online information, and the ability to communicate and collaborate easily and cheaply. Of most interest in the current discussion are some related social trends and changes in individual behaviour.

Members of the Net Generation have been described as being digitally literate; connected; attracted by the immediate and experiential; social, team-oriented; interested in structure,
engagement and experience; visual and kinaesthetic in their learning styles, and concerned with ‘things that matter’ \(^{12}\). Although originally these were seen as attributes only of those born after about 1992, more recently both general technology research organisations \(^{13}\) and more specific studies in the field of scholarly information \(^{14}\) posit that many of these assumptions are not in fact age-based. However, these and other studies \(^{15}\) have also determined that technology usage and expectations are influenced by a range of factors including social background, discipline, gender and role.

For the Net Generation, technology is both determinative and recursive: while it changes our routine work and study habits, we also expect to change the technology itself by adapting and repurposing it to do new things. Thus shared mobile telephones are used for e-commerce in Africa \(^{16}\) and web applications that are based on collective knowledge and popularity form the basis of successful 21st century businesses. \(^{17}\) These uses also highlight a cultural element to the digital shift — the Net Generation has come to expect a ‘beta test’ mentality, with rapid development of products and services, and trial and error learning — a different culture from that in most university libraries and IT areas which have traditionally focused on delivering more robust products and services, more slowly.

Perhaps most profoundly for universities, there is a move to more collectivist and democratic methods of creating and sharing information. This is exemplified by Wikipedia, a free online encyclopedia that is ‘built by the masses’ and yet rivals the centuries-old *Encyclopaedia Britannica* in accuracy and certainly exceeds it in circulation. \(^{18}\) The Internet has created an unprecedented ability to collaborate among friends or strangers, and among personas that are real or virtual.

Today’s ‘new generation’ undergraduate students have grown up with the Internet. Google and Wikipedia are their first choices for information seeking, ahead of the library’s collections. Arriving in a university environment, the Net Generation encounters academics and libraries that pay credence almost exclusively to scholarly sources of information. As a marker of change, Wilder (2005) notes that if a new student today “were to use her library’s website with its dozens of user interfaces, search protocols, and limitations, she might with some justification conclude that it is the library, not her, that needs help to understand the nature of electronic information retrieval.” \(^{19}\) From the institution’s perspective, “In a media-saturated age, how does a university help students navigate their way through oceans of information to islands of knowledge, and from there to the getting of wisdom?” \(^{20}\)

### Disruptive change: university engagement with the Netgen society

“Prediction is very difficult, especially if it’s about the future.” \(^{21}\)

In his presentation at the launch of the Information Futures Commission, Richard Katz outlined the very rapid pace of technological progress and its disruptive effects on society. \(^{22}\) He spoke of looking back 20 years and comparing the excitement some of us felt at playing “Pong” to the rich experience of immersive games available to today’s generation. Even looking back 10 years — the same time period as the scope of the Information Future Commission’s forward view — the changes in technologies and associated behaviours have been intense. In 1998 Google was
in beta testing and was only a search engine; collaboration using the Internet was in its infancy, although many were beginning to think about whether business could be transacted on the web. On the other hand, the complete replacement of printed books by electronic information was touted some time ago and has not yet eventuated. Today, the Internet is pervasive in the lives of many, providing the ability to obtain information at will, to transact business and to employ tools that lubricate an extended social network.

Katz began his presentation by outlining two opposing views of technologically-enabled change. One is the view that technology is a “raging torrent of water changing everything in its path” and the other is that technology is a tool we control and channel. Those who hold the former view may not feel any worth in gazing too far into the future because technology will change in unpredictable ways. Those holding the latter view might not feel the need to look too far into the future either, believing that organisations will be able to shape technology to support whatever strategic decisions they make. Perhaps, as Katz suggested, there is a unity in these views. The University of Melbourne is unlikely to influence most of the ways in which technology is created and interacts with society globally, but we are in a position to choose which of these changes require our response, either in advance or as they arise.

Should a great university take notice of technological or other trends as they emerge? What should it do about them and at what point? What level of resources should be committed in responding to predictions, some of which may never come to pass?

As a concrete illustration it is worth considering a few of the predictions made at a Gartner conference late in 2007.23

Gartner predicts that “by the end of 2011, eighty per cent of active Internet users (and Fortune 500 enterprises) will have a ‘second life’ — but not necessarily in ‘Second Life,’” the online role-playing world where users can create environments and avatars through which to interact with each other. Gartner touts these tools as potentially useful to organisations because they offer a range of online social networking features. Some universities have created campuses in Second Life as a marketing instrument, a few are teaching some classes in the Second Life environment, and many are not yet doing anything in virtual worlds. This is analogous to the World Wide Web’s early years when many were experimenting with how to get real value from it. Should a university invest in using virtual worlds and social networks for collaboration between researchers or as an aid to teaching and learning?

Gartner predicts that “by 2017, ‘extreme meritocracy’ based on publicly published performance ratings will be normal work practice.” An early example of this practice is the site RateMyTeachers.com. It is possible to imagine a similar model for university lecturers and researchers. What methods of disseminating scholarly information would be helpful to the ratings of our academics in such a world? Does this type of tool have the potential to instigate ‘extreme’ competition by academics to attract students into individual subjects within broad degrees?

Faced with a range of potentially disruptive technological and societal changes, what should an institution’s attitude be? To ignore predictions altogether and concentrate its resources on the present may seem foolish. To extrapolate current trends a few years forward and cautiously experiment with emergent technologies may still leave an institution behind. To gamble on long-term predictions may prove expensive with little return on investment. It seems reasonably certain that the increasing pace of change in our scholarly practices, support services and
business activities will demand in response a high degree of flexibility — in spaces, in services, in technology, in the structure and essence of information itself. It could be argued that a university’s role as an innovator entails the duty to experiment and innovate in its approach to research, learning, teaching and knowledge transfer.

The changing nature of scholarly practice

“Our ways of thinking and knowing, teaching and learning are undergoing a sea change, and what is emerging seems both rich and strange.”

Research practice is changing. Research problems increasingly require interdisciplinary and transdisciplinary approaches, and collaboration spanning organisational and national boundaries is becoming commonplace. E-research — large-scale, distributed, national or global collaboration in research facilitated through the capacity of information and communication technologies — allows the study of complex problems across the research landscape.

Australian publication and citation data confirms these trends, showing increasing collaboration (co-authorship), both domestic and international, and between research organisations, industry and the state. And this is not confined to the sciences. Within the humanities collaboration and wider collegial networks are increasingly important and all fields show rapid increases in their use of electronic tools and content. The Internet is seen as an important research tool, with a rapid increase in the use of data, databases and datasets as both an input to, and output from, research. Public web search engines have become an essential part of the research process for many scholars. In many disciplines, the preferred source of new and authoritative information remains the established scholarly journals, albeit now online.

Just as libraries have been regarded as essential research infrastructure, so now are high-bandwidth networks, large data stores and high performance computer infrastructure. The US National Research Council suggests that:

“The rapidly expanding availability of primary sources of data in digital form may be shifting the balance of research away from working with secondary sources such as scholarly publications… New automated systems, and perhaps new intermediary institutions for searching and authenticating information, will develop to provide these services, much as libraries and scholarly publications served these roles in the past.”

What of the disciplines where the library continues to be their ‘research laboratory’? Andrew Abbott contends that library research should be conceived as a particular kind of research system. Scholars of languages, literatures, history, musicology, art history, philosophy, and those from sociology, anthropology and political science — for these scholars the library is their primary data source. Even published material, which would be otherwise be regarded as secondary material, can be yet another form of primary data for these scholars. These are fields organised not around the pursuit of truth but in a “richness and plenitude of interpretations… a set of disciplines whose focus is less on the true than on the meaningful.”
The practice of library research Abbott describes as artisanal; standardisation and sequentiality do not matter. What matters is the unity the researcher brings, “since it is his mind that reads and interprets, his mind that browses, his is the mind that ultimately puts it all together.” Abbott values the randomness introduced by the physical nature of the artefacts, the classification, the physical shelving. “But library research, as any real adept knows, consists in the first instance in knowing, when you run across something suddenly interesting, that you ought to have wanted to look for it in the first place.” As described by Abbott, the practice of humanistic research is clearly associative in nature. Going down one path leads a curious mind to other associated paths. Abbott describes the physical library facilitating this in its dominant systems of classification and in the physical aspects of browsing. In virtual spaces, search and discovery are facilitated by a range of mechanisms including taxonomies, folksonomies (tagging), formal classification systems, visualisations and semantic analysis.

The world within which all forms of scholarship operate is increasingly digital. Two-thirds of the 23,500 active scholarly refereed journals available globally are now available online. Scholarly books are increasingly published in digital form and some people are even predicting that virtually all new titles will be digital within 10 years. Melbourne subscribes to approximately 53,188 current serial titles in both print and e-journal formats, 288,500 e-books and around 60 databases that contain records other than e-journals or e-books.

Existing scholarly works are being digitised. Project Gutenberg has produced digital text versions of thousands of books and other source documents. The Google Scholar and Google Books initiatives are making published works available and digitising significant library collections, starting with collections from Harvard, Michigan, Stanford and Oxford universities and from the New York Public Library. Under this scheme, by early 2008 the University of Michigan had digitised one million books. Other initiatives like the Yahoo-led Open Content Alliance are similarly drawing in the collections of scores of other institutions for eventual digitisation.

This has raised questions for universities about the need to retain out-of-copyright volumes that are duplicated in other institutional collections. What is the ongoing value of the original object to a university? For a massive digitisation effort, a university could partner with a well-funded commercial provider, a non-commercial organisation or a community group. In choosing a strategy the university would need to consider the degree of alignment with its own core mission and values. Digitisation projects are also starting to change the commercial models in the publishing industry. For example, Amazon.com has found that putting the full text of books online increases sales by 9 per cent relative to other titles: “We wondered about things like cookbooks and reference titles — would people just take the snippet they need and not buy the book? In fact, by letting people search inside, sales of these types of books have gone up more than average.” In a higher education context, the obvious effect is in terms of access by those outside an institution’s immediate audience of students and staff. Digital collections may have a greater reach and attract to a university a broader, more diverse audience of both scholars and the public.

Abbott notes that a study of 5700 scholars at the University of Chicago showed a strong correlation between heavy users of print and heavy users of electronic sources: “scholarship advances on electronic and physical fronts at once... what this means for policy is very simple, if very expensive. If you are going to have a serious research library, you have to have both a physical library and a technological one.”
If a work is available in digital form, is it also needed in print? Do people seek both print and digital versions because the current user experience of the latter has limitations on ease, cost and convenience? How soon will those limitations become trivial, and will this encourage people to choose digital over print? How should millions of digital books be organised, presented and integrated to be of value? Some universities have already decided they don’t need a physical library at all. The University of Phoenix (USA) is a fully online university, with no physical campus or library, although it does deliver face-to-face tutorials in various locations. The Open University in the UK also maintains no library and yet scores well in national rankings of teaching quality, student satisfaction and research quality.

Teaching materials are also becoming available in digital form, in some cases free of charge. The Massachusetts Institute of Technology’s Open Course Ware is made available under a Creative Commons licence which allows anyone to copy, distribute, display and perform the work, and to make derivative works, subject to conditions that the work must be attributed, the use must not be for commercial purposes, and that derivative works must be licensed under similar conditions — a ‘share alike’ requirement.

Researchers can now download and use research data created by others, teachers can repurpose objects created by others for teaching purposes. Digital information can be copied, transmitted and manipulated, transformed and combined cheaply from almost anywhere in the world, and the price of transmission is usually independent of the destination. This, coupled with collaboration and social networking tools, allows scholars to become creators of new forms of content. Researchers, teachers and students can be co-creators of new and synthesised knowledge in ways not previously possible, raising interesting questions about the structure of academic work. A recent example is the discovery of a distant solar system believed to be like our own: the world-wide team of professional and amateur astronomers coordinated their observations over the Internet.

Reliance on digital systems for creating, preserving and releasing scholarly information carries some inherent risk. There have been many examples of digitised artefacts becoming inaccessible because of the rapid pace of change in information technology: file formats become obsolete, storage media decay or can no longer be read because the hardware is no longer produced. The long-term “fragility of digital systems and the resulting possibility of significant cultural loss are intrinsic features of the new landscape of scholarly communication.” Like the BBC’s laser-disc edition of the Domesday Book, today’s digital records — and the cultural and intellectual heritage they represent — could disappear if there is insufficient attention paid to preserving them, thus eroding the foundations of future scholarship.

Digital information is also more easily tampered with. While forensics in the digital world are constantly improving, a reader or investigator needs to be aware of and looking for signs of interference in digital sources, whereas these may be more obvious in the physical form. As we move toward a world where co-creation of content becomes a standard practice and where, perhaps, respect for a scholarly contribution’s provenance declines, what is the role of the library as a standard-bearer of authentic information?

Changes in scholarly practice, especially those arising from technological change, require a reconsideration of the physical spaces on university campuses. Teaching spaces can now enable more than a one-way lecture, and are equipped with multimedia equipment and furniture.
that encourages group work. Learning spaces and libraries are no longer reserved for solo endeavours: increasingly, students prefer and are encouraged to work collaboratively, requiring a mix of spaces that enable silent, quiet or loud study modes and that are flexible enough to adapt to different purposes as needed. What should campus-based universities look like in a digital age?

The university in society

“If nature has made any one thing less susceptible than all others of exclusive property, it is the action of the thinking power called an idea...”

The public mission of universities has evolved over time, ranging from character formation of elite citizens, to ‘critic and conscience’ of society, to supporting active citizenship in an emerging ‘knowledge society’. A common thread throughout is an engagement with society that involves exchanges based on information, the currency of scholarship. Some claim that information is well suited to such public missions: “Information is particularly suited to gift economics, as information can be copied and transmitted at practically no cost. It can be treated as a non-rival good: when you share information, you do not deprive yourself of the information (although you may deprive yourself of certain revenues that could be gained in the market economy from the intellectual property rights).”

Although information may be non-rivalrous, a property of what economists most often call public goods, it does not always come for free. The University of Melbourne spends in excess of $12 million per annum on purchasing scholarly publications and several million more dollars per year in licensing copyright materials. Significant additional costs are incurred and new skills required in stewardship of digital information and in data curation. In turn, our academics earn limited income from their intellectual property, they receive relatively small honorariums for their contributions to peer review and journal editing processes, and the University earns some income from licensing multimedia courseware to others.

While most in the academic community would aspire to further the public mission, research and teaching are the activities that a university and its scholars are most directly paid for and encouraged to engage in. Given limited time and resources, research and teaching are where most of an institution’s energies will be concentrated. As universities in Australia have moved inexorably away from their former reliance on government funding they have looked for other sources of income, including commercialisation of intellectual property. Such commercialisation, involving engagement with private corporations, is often seen to stand in contrast to public dissemination of scholarship.

Each of these three perspectives — the tradeoffs between the direct benefits of teaching and research and those of the public mission, resource conflicts, and commercial conflicts of principle — require some brief examination in terms of their applicability to scholarly information.
Although teaching and research are traditionally the core activities of universities, a range of direct and indirect benefits does accrue to a university and its scholars from wide dissemination of scholarly information.

First, universities and other cultural institutions are (amongst other things) stewards of resources provided at least partially through public funding. Scholars are beneficiaries of access to these resources. It is doubtful that a given level public funding would be maintained if universities were not to engage in the public mission of disseminating scholarship generated by them.

Second, public dissemination aids in increasing citations.48 While citations are valued primarily within the scholarly community rather than in the community at large, public interest in a piece of research can increase the need for other scholars to cite it — if only to refute something that is very public. In addition, measures of research impact beyond citations (for example, metrics) are gaining currency and these are typically more susceptible to influence by public action.

Third, public engagement can provide the building blocks for continuing research. Some academics are using means such as YouTube videos to make their research more broadly accessible, to trigger engagement with the wider community, and to stimulate input into a new cycle of scholarship.49

Fourth, when universities engage with and contribute positively to society, they enhance their brand and, without the need for expensive marketing, encourage the best scholars and students to aspire to join them.

A university’s role in beneficence sometimes sits awkwardly with a desire to reap the significant benefits that can accrue from a public service mission. Indeed, some contend that universities fulfil their public interest mission by virtue of engaging in the core activities of research and teaching.50

The public mission may also conflict with students’ perspective. In recent years students have become more demanding customers of a university as their individual contribution to the cost of courses has risen. This can be contrasted with their role as co-learners and researchers and therefore as a part of the university community of scholars contributing to society. As with many other aspects of the Net Generation society it is likely that these seemingly conflicting goals will continue to co-exist.

Regarding resource conflicts in distributing and curating information, the assumption that “information can be copied and transmitted at practically no cost”51 bears examination. It would be more accurate to say that the cost of copying and transmitting information has become very cheap in the Internet era, particularly in comparison to the past. The marginal cost of copying and disseminating information to any one recipient is close to zero, making it a non-rival good,52 but this does not mean the cost of the curation and dissemination mechanisms are equally minimal. In fact, they have a substantial fixed cost53 (which is perhaps why libraries and publishers continue to exist).

Who should bear these fixed costs: institutions, governments or society? In the past, the cost was nearly exclusively public — governments gave universities money to carry out activities such as buying books and making them available. Now, private companies digitise books and gain revenue from making them available, for example by charging third parties for the right to advertise beside the book’s content. This new funding model is rapidly increasing the size of the
overall investment in scholarly resources, and resulting in the witting or unwitting privatisation of a former public good—the digital copy, the one that will be most-used in the future, now belongs to a private entity. Perhaps the only sensible way for these costs to be met in future is through collective action by public institutions.

Potential conflicts between wide dissemination and commercialisation of scholarly information are a complex and emotive issue to which we cannot do complete justice here. It may be tempting to suggest that academics and universities should jealously guard the results of their scholarship as potential differentiators. Mitigating against this idea, it is clear that no single university or university system owns bodies of knowledge: rather, “collectively the (international) academy does control such a critical mass.”

What value does any individual piece of scholarship have for its creator or for a university? As mentioned earlier, there is the potential value of commercialisation, which is what intellectual property laws exist to guard.

The digital world has changed what we can do with information. Copyright and other intellectual property rights are about what we may do with information. Copyright is a form of property that exists only because the law says so. It exists to maximise good by balancing the incentive to create (owners’ or creators’ rights) with the public good of information being disseminated and used (users’ rights).

Ideas themselves are not subject to copyright. Expression of ideas in material form, for example in writing, is subject to copyright.

Copyright is a matter of balance in public policy, and part of that balance is a complex system of exceptions. Against the background of ‘all rights reserved’ there are significant movements intended to encourage and facilitate sharing of copyright material. Open Source licences for software allow programmers to build on the work of others, often on condition that they share their own work in a similar manner. Similarly, Creative Commons licences can be applied to literary and other works to make them available to others for free, subject to various restrictions at the discretion of the copyright owner.

Houghton, Steele and Sheehan (2006) suggest that adopting an Open Access approach to scholarly communication has potential economic benefits for Australian universities. These include: reducing the time and cost of the research and discovery process; reducing duplication of research; enabling better-informed research (and fewer chases down blind alleys); enhancing opportunities for multi-disciplinary collaborations; providing a ‘breadth’ dimension for researchers; and improving educational outcomes.

In the international arena universities are increasingly viewed through the lens of their position in rankings such as the Shanghai Jiao Tong Index where research performance is a significant factor, especially the number of individual publications and citations appearing in high-impact journals. To climb the rankings ladder universities encourage their researchers to publish in particular journals, and thus accrue prestige to the institution. By pursuing this course universities may inadvertently be creating an unwanted commercial dependency on the large transnational companies that produce those journals.
Some view the move to Open Access as inevitable: “It seems like a clash between the irresistible force of the open knowledge movement against the immovable object of intellectual property ownership.” Indeed, more and more significant institutions are moving towards open publishing. Great universities help to shape societies and are in turn shaped by them: Net Generation society is permeable at the boundaries between what is private and what is public. It is likely that this society will expect the same from its public-spirited institutions.

There is increasing pressure from funding agencies to ensure that research outputs and research data are made as widely available as possible through initiatives like Open Access repositories. The underlying argument is that the taxpayers, the students and the benefactors have already paid and should not have to pay twice.

What is the value of a university’s information and who has moral ownership of it? On what principles does it decide when to give information away and when to license its material to others? When to license other people’s output? When to give away the source data and scholarly outputs of research, teaching and learning activities?

The future

In this networked world, some have gone so far as to predict the demise of the library and of the university. Others have suggested that “if the core competency of the university is the capacity to build collaborative spaces, then the changing nature of the library itself may be the paradigm for the changing nature of the university... Maybe the future of the library is not simply that of the university but of civilisation itself.”

Courant suggests that disruptive technologies will not change the defining characteristic of a good university — the creation of knowledge and understanding through careful scholarship — but they will, and have already, changed how scholarship is produced, made public, taught and learned.

Courant urges universities to be both conservative and revolutionary — conservative in terms of mission and revolutionary in attaining that mission.
MELBOURNE’S PLACE TODAY

“For the University of Melbourne, a century and a half has seen shifts in curriculum, the overlay of research as a key goal, and now the hope of knowledge transfer. The institution has been shaped by its founding ideas, by restless debate within, by the exigencies of government and budgets from without. It is not one place but many traditions overlaid, each on top of earlier ideals, to build something remarkable.”  

Collecting our heritage

In July 1854 Redmond Barry, a judge of the Supreme Court, and Charles Hotham, the new Lieutenant-Governor of Victoria, laid the foundation stones for both the University of Melbourne and the Melbourne Public Library. Each institution would be “a force for civilisation,” for “both the Library and the University existed to preserve and transmit knowledge.”

Several passionate, dedicated librarians, archivists and benefactors have helped build the rich collections which now position the University of Melbourne with one of the greatest library, cultural and archival collections in Australia.

The collections in our libraries, museums and archives contain objects and materials that are of national and international significance. The Ian Potter Museum of Art and the Percy Grainger Museum are obvious highlights. Other examples include:

- The Baillieu Library Print Collection, comprising 7000 individual prints and volumes, dating from the 16th to the early 20th centuries and based on a gift of 3000 prints from Dr John Orde Poynton in the 1950s
- The Earth Sciences Rare Book Collection: approximately 65 per cent of these items are the only known copy available in Australia, rendering this a collection of national significance; the collection’s origins were in the private collections and personal libraries of individuals such as Frederick McCoy and Ernest Skeats
- The 12,000 specimens and artifacts in the Harry Brookes Allen Museum of Anatomy and Pathology, where exhibits are rotated throughout the year so that they correspond with the various curricula of the students using the museum
- The Louise Hanson-Dyer Music Library’s Rare Collections, where some of the most significant items are from the personal collection amassed by the founder of Éditions de l’Oiseau-Lyre, after whom the Music Library as whole is named. The collection comprises 250 prints and manuscripts dating from the 15th to the early 19th centuries
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Consultation Paper
February 2008

- The Rare and Historic Maps Collection of 15,000 culturally significant maps, mostly of Melbourne, Victoria and Australia, and some of the earliest cartographic works by explorers of Australasia and the Pacific

- The Baillieu Library Special Collections of 200,000 volumes of books, journals, pamphlets and archival material. The Australiana Collection comprises books, serials, newspapers and pamphlets, mostly predating 1900. The McLaren, Meanjin Books and Grimwade collections originated from the private libraries of three donors. The Rare Books collection consists of non-Australian early printed books, periodicals, pamphlets and manuscripts, mostly pre-1880, and includes the Doves and Kelmscott Press collections. Some of the rare book holdings are based on the private libraries of individuals, primarily Dr Orde Poynton and Dr Pierre Gorman

- The University of Melbourne Archives were established in 1960 to collect and preserve records relating to the University, and to business and businesspeople, for the purposes of historical research. The business collections include the records of wholesalers and retailers, factories and foundries, solicitors and architects, along with the records of some of Australia’s largest mining companies. From 1973 the Archives began to collect trade union and other labour history material; and records of professional, community, women’s, peace and political organisations

The University’s cultural collections, special collections and archival collections are a rich resource. We are the steward of these collections on the nation’s behalf, and this precious heritage carries with it a serious obligation. Our Cultural Policy Statement proposes that:

“As a custodian and manager of cultural resources, the University is committed to the propositions that its cultural inventory should be documented and preserved, accessible to students and the general community, illuminated by research and teaching, and engaged with the community as widely as possible.”

In 2007 the physical collections of the University of Melbourne Library consisted of over 3.5 million volumes and we had 33 identified cultural collections. In 2006 our cultural collections were valued at more than $71 million.

In March 2007 a review of more than 30 archival, museum, gallery and other cultural collections at the University of Melbourne found that only six were fully catalogued. Others were partially catalogued, or had no inventory or catalogue of their contents. With no catalogue records to search or browse, potential researchers are unaware of the collections’ scale and content. Creating full, searchable records of these collections would require a substantial investment and collaboration across multiple departments. Many of our collections require conservation or preservation work. As well as reducing risk, investment in these activities would allow us to leverage the collections for their full potential value to scholars at the University and in the broader community.
Technology

In 1956 Australia’s first digital computer, called CSIRAC, was transferred from the CSIRO to the University of Melbourne. This was the year of the Melbourne Olympic Games. CSIRAC weighed 7 tonnes, used 30,000 Watts of electricity and operated at a speed of 0.001 MHz. (Today’s laptop computers weigh 3.1 kg, use 10 W of power and operate at over 2000 MHz.)

CSIRAC’s arrival marked the start of a long tradition of technological adoption and innovation at Melbourne. By the early 1980s there were about 400 computer terminals on campus, and probably fewer than 1000 computer users. Computing services were heavily centralised and supported word processing, administrative systems, academic users of applications such as SPSS and researchers who wrote and compiled their own software. In 1984 the University began to develop a campus-wide data network.

Like many other academic libraries ours was an early adopter of technology to improve access to scholarly data. In the 1980s computerised automation became possible for library management tasks: new IT systems were created for cataloguing, checking books in and out, indexing articles and linking to them. Also in the 1980s and early 1990s our librarians were searching international databases and using dialup connections to obtain bibliographic references for the University’s scholars. This was a slow and cumbersome process, but a huge advance on manually searching large sets of indices to locate relevant citations. These technologies required specialist training both in search techniques and in use of the software.

The first permanent connection of Australia to the greater Internet occurred in 1989 when the University of Melbourne established a 56 kb satellite link with the University of Hawaii. The University of Sydney and the Australian National University were also involved in creating and developing Australia’s Internet link to the world. The .au Internet domain was for many years administered by Melbourne’s computer science department, and the three universities were probably the first Australian organisations to create home pages using the new World Wide Web protocol in 1994.

By the late 1990s Australians were connecting to the Internet at home and in workplaces. Our scholars could begin to freely communicate with other scholars using email, access information by downloading files, and share their ideas and their scholarly output without the delays of international air and sea mail. In the classroom we were starting to use computers as a teaching tool. In libraries, not only bibliographic data but full text became available in digital form for purchase, or increasingly for license with access through the Internet. Library staff developed web pages to help our scholars navigate an ever increasing and complex array of scholarly sources. Following the recognition of the value of an integrated approach to the development of the University’s information infrastructure in a digital age, in 1999 the University became the first of the Group of Eight to form an Information Division comprising library, IT and multimedia education services.

Today almost all subjects taught at Melbourne have a presence in the online Learning Management System (LMS). Use of multimedia content and technologies in the classroom is commonplace, and licensing of our multimedia courseware is generating a healthy income stream for the University. By linking selected features of systems including the student portal, LMS, Digitool digital repository, SuperSearch meta-search engine and a custom-built application, the Readings Online service enables students to easily find and use full-text and digitised scholarly works that are directly relevant to their current studies.
Despite our early advances in computing the University now falls behind comparator Australian universities in the infrastructure it provides to its research community. Shared capability became the norm with the establishment of Australian Partnership for Advanced Computing (APAC) and the Victorian node (VPAC) in 2000. Whilst Melbourne has been a heavy user of these facilities it has not sought to build its own advanced computing capability, instead developing its capability in grid computing — something that requires minimal investment but good know-how. Today ANU benefits from being the home of APAC and having the skilled people and infrastructure to support advanced computing onsite. Similarly, the University of Queensland hosts its State's facility. As digital data becomes an increasingly important part of the scholarly process, many universities have set up large research data storage capabilities, a critical component of core scholarly research infrastructure. The University of Sydney, University of Queensland and Monash University provide in excess of 75 Terabytes to meet their research community’s needs. Melbourne does not provide any.

Provision and use of digital material and collections has not reduced the demand for physical library collections: in 2006 half of our library’s materials vote was spent on acquisition of or subscription to electronic resources. A survey conducted in August 2007 by the Society of College, National and University Libraries (SCONUL) indicated a long-term increase in the number of book loans, up by 11 per cent in the past 10 years. Melbourne’s data shows strong loan rates of 42 loans per EFTSU compared to 35 at Griffith and 36 at Monash in 2006.

**Space**

As boundaries between the university and the broader community become more blurred, we face questions about the physical spaces in which we provide access to scholarly information. Most Australian universities provide network access and computer laboratories on their own campuses. In the USA, universities and colleges typically provide network access to student dormitories. Some universities offer additional scholarly information services for affiliated organisations; the University of Queensland, for example, manages specialist libraries for the hospitals in its geographic region. Realising that many students and staff used the nearby Melbourne Central shopping centre and State Library of Victoria as alternative study and collaboration venues, RMIT University has extended its city campus’s wireless network to provide authenticated Internet access at these locations.

Physical space for libraries and collections has always been a challenge for the University of Melbourne. In the mid-1920s the library, then in the North Quadrangle, was overcrowded with students queuing to get a seat during ‘swot vac’.\(^7^6\) When the new Baillieu Library opened in 1959 its 1000 seats were almost immediately swamped by 8000 readers.\(^7^7\)

In 2006 more than 3 million visitors physically entered the 19 libraries at the University of Melbourne; in the same year there were slightly more than 1.5 million visitors to the library web site.\(^7^8\) The University of Sydney’s 17 libraries had almost 3.2 million visitors in 2006. Other Australian universities with a similar campus population have opted to run fewer branch libraries: Monash’s eight libraries saw 3.4 million visits and at the University of New South Wales three libraries saw 2.4 million visits in 2006.\(^7^9\) According to their annual reports for 2005-06, the National Gallery of Victoria recorded 1.6 million visitors, Museum Victoria 1.5 million and the State Library of Victoria 900,000 visitors.
For the past two decades the Melbourne University library has been facing a space shortage as print collections have continued to grow and space for them has competed with the need to provide space for people. Student numbers have also grown significantly in that time.

In 2006 the universities of Sydney and Melbourne had roughly similar numbers of library branches (17 and 19 respectively), with similar total floor space (around 33,000 m²) and numbers of seats for readers (3500). They also had a similarly-sized population of students and academics using their libraries (around 50,000). In the same year the Monash University library served a larger scholarly population of 61,000 at just eight locations and provided 1000 more seats in its 36,000 m² of floor space.

Fisher (2005) points to a range of factors influencing viability of a central library or a distributed network of branch libraries or ‘learning hubs’. These factors include the size of the campus, student population, the relative wealth of the university and historical antecedents. Fisher noted that Cornell University had approximately 7 million collection items spread over 20 libraries, the smallest of which held 58,000 items. Several branches of the University of Melbourne library have significantly smaller holdings. Fisher asks: “what is an appropriate critical mass to sustain a workable research oriented library in a leading university?”

In terms of size, quantity and usage our libraries are roughly comparable with those of peer institutions. Comparative statistics cannot describe the qualitative aspects of the spaces available for student and staff use. It is the unique blend of services, facilities and quality of experience that distinguish a university from its competitors.

In recent years Monash, Griffith, Macquarie and other Australian universities have renovated or redesigned their libraries to create flexible spaces that can be used for a variety of purposes. Advances in wireless networking and building technologies are enabling the creation of spaces that can be reconfigured at minimal cost as users’ requirements and expectations change over time.

Allocation of space for different purposes within a library is, in part, a trade-off between traditional open (or browsable) shelf space for collections and fixtures or furniture designed to enable collaboration, quiet study or other activities. As more space is used for people, less is available for storing books and other items.

Melbourne’s physical collections are expanding by more than 60,000 volumes each year, with around 2 million volumes available on shelves for browsing and a further 1.5 million volumes in storage.

Universities in Victoria have addressed their space limitations partly by creating a shared storage facility called CARM. This facility in Bundoora is operated by CAVAL, a consortium owned by a number of Australian universities. Some of Melbourne University’s low-usage collections are stored in CARM. We also operate a small off-campus storage facility in Brunswick for selected low-usage collections. Students and academic staff can request CARM items to be delivered to their library branch via the inter-library loans service; items from the Brunswick holdings are delivered within 24 hours.

Comparing Chicago University’s Regenstein Library with those of other top US universities, Abbott notes “considerable uniformity” in their operational policies regarding the space trade-off: “Most of our peer institutions have moved substantial portions of their collections offsite,
usually into some kind of high-density storage." Among these academic libraries Harvard has over 5 million volumes (about one-third of its total collection) offsite, Duke 1.3 million volumes offsite, Columbia 2 million volumes and Yale 2 million. These offsite storages are located between 5 and 50 miles from the main university campus. Removing the books from open shelving enables the universities to refit central library buildings as student study centres. “Given that the more esoteric sections of the collection are used only by a portion of the faculty and their graduate students, and given that overall use of physical materials seems to be declining, the temptation to repurpose these massive central buildings has proved irresistible.”

In designing its new library building, Macquarie University is taking a different approach. Floor space equivalent to about one-seventh of the existing library will be allocated to a warehouse-style storage facility with automated retrieval of books on demand. The warehouse facility will store approximately 80 per cent of the current collection and allows for projected growth over 10 years. The remaining 20 per cent of the collection — the books most frequently used by students and staff — will remain on open shelving. Most of the floor space in the new library building will be used for flexible multimedia and collaborative study spaces.

“In universities dominated by undergraduate concerns and by increasingly numerical concepts of accountability,” remarks Abbott, “library buildings promise to become stunning undergraduate study spaces of varying degrees of quiet, sociability, and amenity... The price is simply removing the ‘underutilised’ portions of the book collection (ie, the portions used only by scholars and by them relatively rarely) and paying to reconfigure the buildings. This policy is in many ways simply the logical continuation of an earlier policy in many universities... of having separate undergraduate and research libraries.” In this light, Chicago’s decision to site a new automated storage and retrieval system (ASRS) adjacent to its existing research library “embodies a decision against the general trend of academic libraries.”

Creating that general trend, campus libraries are increasingly seen as centres for student self-learning, spaces for collaborative team work as well as for individual study and research. RMIT and Griffith universities have “implemented interpretations of flexible learning centres, though the inherent component fabric of each prevails: an open ‘think-tank’ environment stimulating collaborative and cross-disciplinary exchange supported and surrounded by quiet study spaces, ICT facilities with service resources, seminar rooms, lounges and instructional staff... The Media Union at the University of Michigan integrates advanced ICT facilities, traditional academic library facilities, digital design and visualisation studios, virtual reality spaces, recording and electronic music studios and stages and several gallery/exhibition spaces.”

At the University of Auckland, recognising that learning hubs are also social spaces, the Student Commons and associated Kate Edgar Information Commons are located in a specially designed building “adjacent the main academic library and student piazza... [The building] successfully integrates student resource, ICT workstations and individual/collaborative study space in one wing and a central circulation and retail ‘shop-front’ atrium and student services [associations, lounges, offices] in an associated wing.”

At the University of British Columbia, the Chapman Learning Commons emphasises the delivery of support services for learning and research. A program of workshops, lectures and community events is designed to enhance learning opportunities and skills, and students are employed as ‘peer assistants’ to help new students with library resources, on-campus student services and IT support.
SUMMARY OUTLOOK AND STRATEGIC CHOICES

The year 2006 saw the release of Growing Esteem, a strategy which seeks to ensure the University’s place in an evolving global knowledge economy. This approach “embraces the notion of a triple helix: a public spirited institution, defined by tightly-bound strands of research, teaching and knowledge transfer, offering its students, staff and community one of the finest universities in the world.”92 The helix is an apt metaphor for the complex and shifting relations between three spheres of activity which are tightly bound, each reinforcing the others.

Integral to achieving the Growing Esteem vision will be the way in which our information services, systems, technologies and spaces come together to underpin the educational model, to enhance the quality of the student experience and to provide the foundation for strategic agility in a changing global environment.

The following sections, modelled on the concept of the triple helix, outline Melbourne’s aspirations and pose questions for the University given the changing environment in which we operate.

Research

“Research is the first strand, embracing the systematic generation of new knowledge, development of new ideas and experiment with new techniques. These activities inform student learning and provide an intellectual platform for engaging in knowledge transfer.”93

The Research and Research Training Quality Taskforce report of January 2007 sets the blueprint for research at Melbourne over the coming years.94 It found that 90 per cent of our departments are ranked in the top three in Australia based on research performance, with more than 47 per cent ranked first in Australia. Our international rankings confirm the strong research performance expected from a leading research-intensive university. Whilst the University is committed to improving our overall performance, there is recognition of the need to focus our research investment in targeted areas if we are to continue to be internationally competitive. There is a strong commitment to focusing on crossdisciplinary, inter-institutional and international research. In 2008, as a year in which the University will focus its attention more strongly on research, we will see targeted investment in key research areas such as the Doherty Institute for Immunology and a new centre related to resilient society.

As a world-class university how can we meet the scholarly information needs of outstanding researchers across a broad discipline base? Should areas of research priority be reflected in
how funds are allocated to library materials, whether those we collect or those we subscribe to or license as a digital resource? How should our scholarly infrastructure support collaboration across disciplines? Across institutions? Across national boundaries? Between scholars and students?

Integral to maintaining and improving our position in international rankings is our competitiveness in high impact and highly cited research. Recent research shows that citation impact can be increased by publishing scholarly output in digital forms that are searchable through the Internet. This achieves both a material and social end: the opportunity to increase impact whilst also making our research outcomes freely available to the broader community. The final recommendation of the Taskforce was a continued commitment to using online repositories to give greater access and profile to the University's scholarship. The emerging requirements from research granting bodies, to make available not only the outputs of publicly funded research but the research data itself, pose new opportunities and challenges for the University.

How committed are we as a University to making the outcomes of our research freely available? What level of rigor, if any, do we wish to exert in verifying the quality of what is published on University equipment? What is our commitment to making the underlying research data available to support our research? Our teaching? Our knowledge transfer obligations? Where public access is a mandatory requirement of a research grant, who should take responsibility for meeting this requirement? If the research data is of national or international significance, who will ensure its long-term access and preservation? How will this be funded?

The Taskforce found that many of our researchers do not perceive Melbourne as a major player in the nation's research and research training infrastructure initiatives. At a time when research is increasingly collaborative, requiring access to high quality information and communication infrastructure, large datasets, advanced compute capability and high bandwidth networks, Melbourne’s devolved approach arguably works against developing a sense of priority and the pre-requisite core infrastructure and capabilities.

What information infrastructure must we put in place to meet the needs of our researchers across different disciplines for the next decade? For access to, or ownership of, deep collections? For data mining? For access to advanced compute capability and high bandwidth networks?

Our commitment to enhancing the quality of research training remains strong. The Curriculum Commission focused explicitly on pathways into research higher degree programs and the distinctive PhD experience we seek for our students. “The distinctive PhD is premised on the need to provide our doctoral candidates with broader, interdisciplinary knowledge and skills in addition to those highly valued attributes developed by intensive and focused research programs.” The changing environment, requiring superior data mining and information literacy skills, and for most disciplines an understanding of e-research and the skills to operate in an increasingly collaborative, global, digital information environment, presents new challenges for the University. Increasingly diverse ways of publishing, types of publication and changing patterns of peer review make for a complex and rapidly shifting environment.

How do we ensure that our research higher degree students have the skills required to operate in the global information economy? How do we ensure our researchers are aware of new possibilities? New scholarly information sources? New tools? New techniques?
Learning and teaching

“The second strand is learning and teaching. It explicates a body of ideas, is informed by available research, and instils habits of inquiry that reflect the provisional nature of knowledge.”

Under the direction of a Curriculum Commission chaired by the Deputy Vice-Chancellor (Academic), Professor Peter McPhee, in 2007 the University of Melbourne undertook the most significant reform since it was first established in 1853. The resulting Melbourne Model reflects the global trend towards broader undergraduate programs followed by intense professional training at postgraduate level. In the Australian context it gives students more time to consider career choices. Starting in 2008, the ‘new generation’ degrees provide a multidisciplinary curriculum with a strong international focus. Students will experience discipline breadth as well as depth, with one-quarter of their study coming from outside their core discipline, including a suite of new University breadth subjects. Students will be exposed to, and learn about, alternative domains of knowledge, different methods of inquiry and different ‘ways of knowing’. Our graduates will be equipped for lives and careers in which knowledge boundaries are more permeable, the issues of professional practice often require interdisciplinary understanding and knowledge is rapidly renewed.

What does the changed curriculum model mean for the shape of our libraries? Their location? Their scope? The balance between discipline-based libraries and libraries which expose students to a breadth of scholarship? How will our professional postgraduate coursework students’ needs differ from those of our undergraduates? How will we develop in students the information literacy skills required to be adept at learning in a range of ways, including through information and communication technology?

Students will be introduced to the ethics and methodologies of research as part of their undergraduate experience. They will have opportunities to build interdisciplinary, cross-cultural and technological awareness and skills, with direct exposure to leading research and knowledge transfer projects on campus, as well as opportunities for off-campus experience such as industry and community work placements and international study. Many universities have moved to provide some courses or, in the case of the University of Phoenix, all courses fully online. In contrast the University of Melbourne remains committed to the on-campus experience, enriched through the use of emerging technologies to support individual and group-based learning. Through the “Nine Principles Guiding Teaching and Learning” the University has reaffirmed its commitment to encourage and support innovative approaches to learning and teaching, including through the application of information and communication technology. It has also reaffirmed its commitment to develop and maintain high-quality teaching and learning spaces and resources. The aim is to create an effective learning environment, whether virtual or physical, noting that the quality of learning technologies and resources of all kinds is a prominent indicator of the quality of a higher education learning environment.
How might scholarly information and technologies be used to facilitate research and knowledge transfer opportunities within the curriculum? What types of learning environments are required for next-generation courses and students? What technologies must we make available to students in our learning spaces? In our teaching spaces? How do we support a diverse student body with different skills and differing levels of access to emerging technologies? Who has the responsibility to protect and preserve the intellectual property of students?

If our role in the information age is to encourage the understanding of how to learn and how to expand scholarship, then the information itself is of less significance. What argument then for adopting the Massachusetts Institute of Technology (MIT) Open Course Ware model and Open Access more generally? Why do people come to Melbourne — what is special about the way we deliver on our mission?

In addition to curriculum reform, the University has undertaken a major review of its administrative and student services. The quality of the Melbourne student experience was a key focus of the reforms. It has involved a significant reshaping of the University’s services and administrative effort from a student-centric perspective. The Melbourne Experience aims to provide students with a strong cohort experience, building strong peer networks and encouraging close links with academic units. Under the Melbourne Model students’ individual needs come first, from their initial contact with the University as prospective students through to an ongoing relationship as alumni. A recent study has shown that our students overwhelmingly wish to use technology to increase convenience with 83.9 per cent wanting to use the web for student services such as enrolment, signing up for classes and paying fees, and 80.9 per cent also wanting to use the web to access a learning portal. Our commitment to the Melbourne on-campus experience has seen the creation of Student Centres to provide students with close links to their discipline areas. A ‘one stop shop’ approach to administration and academic support will mean the end of students being sent from one corner of the University to another for student cards, course information, language support or career advice. There are plans for the Student Centres to co-locate with refurbished libraries and learning spaces which provide state of the art information access located in spaces for collaborative and individual study.

How might our virtual environments, our learning spaces, our libraries, our campuses foster a cohort experience for students? How do we encourage a sense of the University as a learning community? Improve the quality of the student experience? What priority do we place on the virtual, as compared to the physical, student experience?
Knowledge transfer

“The final strand is knowledge transfer. It encompasses many dimensions of interaction between academia and wider society...” 102

It “involves conceiving the University as a two-way exchange of knowledge and skills with the wider community, to the mutual benefit of both.” 103

Melbourne aspires to be known locally and globally as a university deeply embedded in its communities. Through knowledge transfer activities we seek to enrich the Melbourne Experience for students. As a public-spirited institution Melbourne seeks to engage communities in collective experiences, providing opportunities for reflection and conversation, for co-production in which academic forms of knowledge and expertise find new applications, purposes and platforms beyond the typical reach of scholarship.

As a public-spirited institution Melbourne declares its intention to make research, student learning and external engagement serve public ends. 104 The University is therefore an owner, patron and agent in cultural life, as well as being an educational institution. 105

The Growing Esteem strategy discusses a number of forms of knowledge transfer including public debate, cultural collections and activities, commercialisation and the work of alumni. Information and communication tools have greatly increased and streamlined the possibilities for information dissemination and collaborative creation. As ever, streamlining does not mean that it takes no time, attention or resources. What is the resource balance between this and other missions of the University?

It is not clear that everything scholarship produces is relevant to knowledge transfer activity. The University was well aware of this when developing Growing Esteem: “As a public-spirited university Melbourne will serve local and international communities best by selective engagement, when it has distinctive contributions to make and when the benefits are compelling.” 106

As a public-spirited university seeking to serve public ends, should we adopt a Harvard-style mandate to make our scholarly output open to the world? 107 Our teaching materials? Our research outputs? How will this be funded?

The University’s special, cultural and archival collections are a valued and potentially valuable resource for the nation, but it would be costly to complete the work that would allow this value to be realised.

We currently provide access for the public to our library collections and facilities where possible and for a subscription fee we also permit borrowing. 108 While open access to library facilities comes at a near zero cost per single visitor, overall it adds to the pressures on space, IT and staff.
What role should our information and cultural collections, physical and virtual, play in bringing the community into the University and reaching out from the University to the broader community?

What obligation do we have in preserving existing collections and our emerging scholarly output where it is of national or international significance? Who should take responsibility for this? How might this be funded and sustained?

What obligation do we have to make our rare collections available beyond our immediate scholarly community? How might this be sustainably funded?

Should we continue to facilitate free public access to our libraries and, if so, how do we seek to fund this?

**Linking the strands**

“As a university with a strong sense of place, Melbourne reaffirms the unique virtues of its campus locale, where face to face teaching remains the norm, where scholars gather from across the globe, and where learning communities embrace evolving technologies.”

The University library has always embodied the linking of the strands: providing the collections and specialist staff to support our research, teaching and learning and opening our doors to the broader community. Our collections underpin scholarship in all its forms. Our very successful Friends of the Baillieu program demonstrates how the library is embedded in the broader community.

What is the university’s commitment to widespread dissemination of its scholarship? Its research data? Its learning materials? Its scholarly publications?

What is the university’s commitment to the stewardship of its scholarship? Its cultural and special collections?

Melbourne’s concept of the triple helix provides a framework for even greater differentiation. At a time when changes in scholarly practice are blurring the boundaries between the strands we are poised to leverage these benefits through the Melbourne Model and our approach to research. The places we create for scholarship to flourish — our libraries, our collections, our information systems and infrastructures, our learning and teaching spaces — form a critical part of realising this vision.

What should be the balance between investing in physical and virtual infrastructure?

How best can virtual infrastructure support the Growing Esteem vision?
How best can our physical space support the Growing Esteem vision? Do we wish to progress a precincts-based approach to libraries, Student Centres and other student services? What is the right balance between small specialist libraries located close to the relevant academic unit as compared with larger libraries which provide greater breadth of collections and deeper services during longer opening hours?

What is the right balance between browsable collections, collaborative spaces and individual spaces in the Melbourne library of the future? What will scholars and students be prepared to access by connecting to electronic sources rather than viewing physical collections? To access by recalling the physical object from a non-browsable source?

By leveraging the capacity of information and the underpinning technologies to provide access to scholarly data and research instruments regardless of location — and to provide access to the necessary know-how, collaborative tools and infrastructure — we enable our students and staff to be engaged in learning, research and knowledge transfer in an integrated way.

For example, in partnership with the Faculty of Arts, Information Services is currently imaging the convict records of the Archives Office of Tasmania. It is a collection of great complexity, comprising over 30,000 records that relate to 75,000 men, women and children transported to Australia during the first half of the 19th century. This complex collection will be publicly available and linked to other sources so that students, researchers or genealogists can focus on an individual convict, look at their birthplace, crime, religion, personality type, work, punishment etc, and move seamlessly across to other relevant Internet resources. The Faculty of Arts will use this collection as a research tool, often working in partnership with other disciplines such as population health to mine the data. The collection will serve as a teaching tool which provides potential opportunities for students to undertake their own research. At the same time, the project creates a knowledge transfer tool of international value.

Such a case exemplifies the opportunities to link the triple helix through information services, systems and technologies. They bind the three core activities of the University in ways that enrich each of those activities. This case also illustrates the exciting emergent possibilities in collaboration and the blurring of boundaries between the roles of academics, librarians, students and technologists.

Do we wish to invest in mining our collections, in using our capabilities in scholarly information and technologies, to link the strands of the helix to create learning communities? If so, which areas should take priority?

What roles do we need within the University to support the creation, validation, dissemination, use and curation of scholarly information? What types of information professionals will we need? With what capabilities?

The University faces a range of potentially disruptive future technological and societal changes. It is clear that the consequences of many of these have yet to play out and that a high degree of flexibility will be required. What is the University’s level of commitment to building flexible infrastructure? What is its role in experimenting with emerging trends, business models and tools in the creation, dissemination, access, collection and preservation of scholarly information?
The University has historically invested in some infrastructure and collections largely on its own and sometimes in collaboration with other institutions. Examples of collective action include the Australian Partnership for Advanced Computing (APAC) and CARM, the shared storage facility for Victorian university libraries. Of the myriad challenges and opportunities we face, which do we need to tackle collectively? As an individual institution?

The University of Melbourne is a significant producer and owner of copyright material and other intellectual property. As an owner, it is exposed to the risk of infringement by other parties — in the digital world, infringement is easy and inexpensive. The University spends several million dollars per year in licensing copyright materials for its own use and in turn earns income from licensing multimedia courseware to others. We can reasonably expect these costs to continue rising. Inevitably the University’s interests as an owner conflict with its interest as a user of copyright material.

To the extent that we enter public policy debate on intellectual property, do we speak as an owner or user? We face an inescapable dilemma in developing policy and procedures that facilitate, encourage and stimulate both commercial and non-commercial exploitation of the University’s intellectual capital.

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Do we embrace the Open Access movement and similar movements like Open Source and Creative Commons, with a sense of public-spirited sharing and collaboration amongst the not-for-profit education and research community? MIT’s Open Course Ware initiative has made a difference, as have other universities’ initiatives: Melbourne could do so too, if it chooses. If that is where we want to go, what are the appropriate policies, procedures and incentives?

Alternatively, do we seek a future in which universities actively license intellectual property for profit to each other and to wider communities?

Can we have it both ways?
CONCLUSION

In exploring the landscape of Information Futures, we started with a review of significant changes in the environment: changes that are creating an always-connected, visual society; scholarly practice that is increasingly cross-disciplinary and collaborative, blurring the boundaries between a researcher and a learner; the disruptive nature of much technology-enabled change and possible institutional reactions; and the expected contributions of universities to local, national and global society.

Next we touched on the history and current state of scholarly information at this institution, understanding both the highs of our aspirations and some of the limitations that space and resources have always imposed. We also compared ourselves to other institutions and looked at some of the diversity of approaches to common challenges.

Finally we examined our aspirations as a university and the questions they raise for the future of our scholarly information, infrastructures and spaces. We explored the tensions of supporting focused research priorities in a university which seeks to be comprehensive; the extent of our commitment to making our underlying research data available; the balance between discipline-based libraries for postgraduate study and libraries which expose students to a breadth of scholarship; the tension between opening up our collections to the world and preserving exclusivity of access as a distinctive aspect of the Melbourne campus experience.

Where to from here?

Staff and students are encouraged to participate in the Information Futures discussion forums, listen to the visiting experts, raise their own topics and discussions via the web site and explore topics of interest amongst themselves. Responses are welcome via informal and formal submissions. As a university we value the diversity of opinions that will enrich and inform the debate.

We know the conversation will be fun and engaging for many, but eventually it must reach a conclusion. As the Vice-Chancellor said at the recent Heads and Deans Conference a good strategy will also close the door on some things.

We have asked many questions, and for the most part there is no obvious answer. Some of the choices we face are difficult or uncomfortable. By engaging with them candidly and constructively we will collectively shape a 10-year strategy for the University’s scholarly information and technologies, a strategy that will position the University as a leader in the application of scholarly information and technologies to underpin next-generation research, teaching, learning and knowledge transfer, binding the strands to achieve the Growing Esteem vision.
NOTES

1 This consultation paper was jointly prepared by Linda O’Brien, Mark Brodsky, Margaret Ruwoldt and Sally Newton. It has benefited from earlier reports and consultation processes, including the Sheehan report, the Fisher report and the Library of the Future consultation process; advice from the Expert Advisory Panel, many members of staff, and from comments and contributions from Lynda Gilbert, Belinda Nemec and Stephen Young. Our thanks to Richard Katz and Dame Lynne Brindley for their comments on a draft version.

2 Davis, G and Sharrock, G (2005) p.10

3 See for example Macintyre, S and Selleck, R (2003) p.67 and p.109: “Long overdue, the tragedy of Melbourne’s Library was that it was built too soon.”

4 Courant, P (2006)

5 See for example Doherty, P (2004) describing the librarian as “both the guardian of the record and key figures among the keepers of the gates of knowledge.” See also Davis, G (2007) on “The end of the gatekeeper: when knowledge is free and available to all, universities have to rethink everything they do.”

6 It also serves other functions. James, P and McQueen Thomson, D (2002) p.193: “Academic appointments, promotions and funding allocations are all highly dependent upon the codified system of publishing new research in refereed academic journals, and to a lesser extent scholarly books. In days gone by this was a simple process of submitting articles to any of a small group of journals within an established field of study. Manuscripts would be peer reviewed, either published or not, and then journal issues would be distributed to university libraries and researchers at a price that reasonably reflected the costs of publication. The process was collegial, good-willed and commercially unambitious. Researchers were generally happy to give away their findings in order to encourage wide distribution and to enhance scholarship. Subsidised, not-for-profit university presses... were vital facilitators of this enterprise, with commercial presses playing an increasing role...”

7 Oblinger, D and Oblinger, J (Eds) (2005) p.1

8 Davis, G (2007)

9 Tapscott, D (1998). Other terms used are the Google Generation, Generation Y, and Millennials.

10 While the technology has been with us for a number of years, we have only recently seen a rapid maturing in the availability and take-up of a range of tools.

11 Katz, R (2008): there is a debate as to whether the technology cuts its own channels or we control it, but either way at a macro level these changes will affect the University.

12 Oblinger, D and Oblinger, J (Eds) (2005) Ch 2

13 Gartner Inc. have recently talked about the V generation.
Amazon.com uses automated analysis of customer behaviour to make recommendations about products you may wish to purchase. Google’s AdWords advertising service analyses the text displayed on your computer screen to target relevant advertising placements. Flickr.com encourages people to ‘tag’ their own and other people’s photographs, and to contribute to ‘photo pools’ and online discussions about photography.

Judd, T and Kennedy, G (2007)

Wilder, S (2005) p813

Davis, G and Sharrock, G (2005) p.11

Usually attributed to Niels Bohr, physicist (1885-1962)

Katz, R (2008)

Gartner Inc. is a commercial organisation that researches trends in Information Technology and delivers these to subscription members. The reference is to a presentation by Brian Prentice from Gartner Inc. at the Gartner Symposium in November 2007.

Dede, C (2007)

See for example Australian Research Council (2005) p.2

Houghton, J, Steele, C and Sheehan, P (2006)

Houghton, J, Steele, C and Sheehan, P (2006) p.6

Based on a study of 43 academics, Kingsley, D (2008) identified typical information-seeking behaviours for three academic disciplines. For general ‘keeping up,’ researchers in chemistry tended to subscribe to alert services and to scan indices and newsletters in a structured, systematic manner. Computer scientists preferred to attend specific conferences, while sociologists relied on serendipity and personal subscriptions to journals. For directed searching (aimed at finding the answer to a specific question), chemistry researchers turned first to bibliographic databases of scientific journals; computer scientists used web search engines; and sociologists accumulated a ‘snowball’ mixture of texts and academic papers.

Office of Special Projects, National Research Council (2001) p.5


Brindley, L (2006): “Most people are aware that a national switch to digital broadcasting is expected by the end of this decade. Less well known is the fact that a similar trend is underway in the world of publishing: by the year 2020, 40 per cent of UK research monographs will be available in electronic format only, while a further 50 per cent will be produced in both print and digital. A mere 10 per cent of new titles will be available in print alone by 2020.”

Quoted in Détraz, M (2008)

The Open Content Alliance was created by the Internet Archive and Yahoo! in early 2005. Contributors include university libraries, public libraries and museums from the USA, Europe and Australia. Corporate contributors include Adobe, HP Labs, MSN, O’Reilly Media and Xerox Corporation. The alliance aims to create a permanent, web-accessible collection of multilingual digitised text and multimedia content, offering broad public access to “a rich panorama of world culture... representing the creative output of humankind.”

Anderson, C (2005)


Higher Education and Research Opportunities in the UK (2001): Open University achieved rankings of 3a or higher in its 26 units of assessment. Its overall average of 3a places it in the third-highest band overall, demonstrating research quality that equates to attainable levels of national excellence in over two-thirds of the research activity submitted, possibly showing evidence of international excellence.

Kerr, R (2008)
Fyffe, R (2002)

Often cited as an example of digital obsolescence. For a summary, see Wikipedia (2008c).

Errami, M and Garner, H (2008) propose that “Given the pressure to publish, it is important to be aware of the ways in which community standards can be subverted. Our concern here is with the three major sins of modern publishing: duplication, co-submission and plagiarism... Two important contributing factors are the level of confusion over acceptable publishing behaviour and the perception that there is a high likelihood of escaping detection. The lack of clear standards for what level of text and figure re-use is appropriate (for example in the introduction and methods) is a well known problem; but the belief that one can get away with re-use is probably the single most important factor.” From a sample of 7 million abstracts, Errami and Garner estimated that at least 50,000 Medline records — and potentially 200,000 records — refer to duplicated papers.

Jefferson, T (1813) put the argument for free access to ideas: “If nature has made any one thing less susceptible than all others of exclusive property, it is the action of the thinking power called an idea, which an individual may exclusively possess as long as he keeps it to himself; but the moment it is divulged, it forces itself into the possession of every one, and the receiver cannot dispossess himself of it. Its peculiar character, too, is that no one possesses the less, because every other possesses the whole of it. He who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me. That ideas should freely spread from one to another over the globe, for the moral and mutual instruction of man, and
improvement of his condition, seems to have been peculiarly and benevolently designed by nature, when she made them, like fire, expansible over all space, without lessening their density in any point, and like the air in which we breathe, move, and have our physical being, incapable of confinement or exclusive appropriation. Inventions then cannot, in nature, be a subject of property. Society may give an exclusive right to the profits arising from them, as an encouragement to men to pursue ideas which may produce utility, but this may or may not be done, according to the will and convenience of the society, without claim or complaint from anybody.”

45 Davis, G and Sharrock, D (2005) p.5
46 Wikipedia (2008b)
47 Samuelson, P (1954) used the term “collective consumption good”.
49 See notes and links at Brodsky, M (2008)
50 Courant, P (2006)
51 Wikipedia (2008b)
52 Courant, P (2006): “The technical property that matters most is that the cost of adding another consumer is zero (or approximately so). The good is non-rival. It then follows, as a matter of economic efficiency that the market price ought to be zero. Why? Because if I charge you something for an item that costs nothing to produce at the margin, I am passing up possible value. I could make you better off while doing no harm. This notion of efficiency underlies what economists love about market economies with respect to private goods. But when there are public goods, charging invariably reduces social welfare relative to what is technically possible.”
53 See Lynch, C (2008) “These programs represent substantial investments, and while extramural funding has helped with some of the early efforts, there’s great concern about ‘sustainability’ of these efforts — they either have to move to some kind of recharge basis, most likely, which will add a great deal of overhead, impede access, and consequently, reduce the contribution of the programs to the university’s mission goals, or they simply have to be funded out of core institutional budgets as part of the essential mission-critical activities of the institution. The choice of an aggressive interpretation of institutional mission to disseminate scholarship will not be without substantial ongoing cost.”
54 Brindley, L (2005)
55 Courant, P (2006): “Unfortunately, although public goods can be extended to more users at zero cost, they can still be costly to produce in the first place. The case of digitally produced scholarship is of course an excellent example. What the theory tells us is that we ought to charge nothing for it at the margin — give it away. It tells nothing about how to pay for its production or how to determine how much to produce. What it tells us is that markets will under—produce. It also tells us that as a general matter, the solution of public goods problems requires collective action.”
56 Lynch, C (2008) says “No one university ‘owns’ or ‘creates’ the body of knowledge that comprises any significant field of intellectual inquiry for any length of time; these are built up out of the contributions of multiple scholars, at multiple universities (and sometimes
at institutions beyond the academy). Further, the body of knowledge in any discipline is constantly being re-interpreted, re-integrated, and re-organized by the continuing efforts of scholars, and thus lives, evolves and grows. Collectively, the faculty of our colleges and universities represent very deep reservoirs of knowledge and scholarship across a tremendous range of disciplines and fields of inquiry. It is this full body of knowledge and scholarship, as expressed in the scholarly work of these faculty and their students that I am concerned with here, not simply the ‘new knowledge’ being created at a given time. And I want to stress that no single university or university system, even one as large and prestigious as the University of California system, controls a critical mass within this body of scholarship, but that collectively the (international) academy does control such a critical mass in many — perhaps most — disciplines, at least prospectively. (They have allowed copyright for the vast majority of the retrospective literature representing scholarly work over the past century to enter private hands.)”


58 Errami, M and Garner, H (2008) observe that, as measured by scholarly publication rates, scientific productivity world-wide is at an all-time high. At the same time, duplication, co-submission and plagiarism appear to be becoming more widespread. “Rising duplicate publication rates...[are] a global phenomenon. Potential factors contributing to this trend are the explosion in the number of journals with online content (increasing opportunities for unethical copying), and a body of literature growing so fast that the risk of being detected seems to diminish.”

59 James, P and McQueen Thomson, D (2002) pp.193-4: “Over the past few decades, most journals were subsumed into large commercial enterprises, such as Sage, Routledge, Blackwell and Elsevier, or sought the distribution-publishing strength of globalising university presses such as Cambridge and Oxford. Moreover, mergers and takeovers concentrated the commodification-effect. In recent years, a small number of transnational conglomerates — Reed Elsevier, Thomson, Wolters Kluwer, Springer Verlag and Wiley — have been cornering the journal market, precipitating enormous change for researchers, universities and libraries. For instance, in 2000 Reed Elsevier purchased major science journal publisher Harcourt for US$4.5 billion, giving this conglomerate control over 1700 journals and 42 per cent of average university spending in this field. During the same period, universities made themselves doubly dependent upon journal and commercial monograph publishing, for it became the evidentiary basis used to determine distribution of resources. For example, one key indicator of purchasing directions is the statistical knowledge of citations provided by the institute for Scientific Information, but the index itself is owned by Thomson, a transnational publisher.”

60 Duderstadt, J (2006): “The more I look at this new world we are in, the more it seems to me that we are observing a classic case of the irresistible force and the immovable object. The irresistible force is the ease of working and playing online, the billions of people who start and stop there, who expect to have access to all that matters there (meaning, again, that if it isn’t there it isn’t going to matter). Some of them are even the children of members of Congress. The immovable object is the rights environment and the effort to save old business models, with copyright law aiming for infinity less a day as being the ideal term of protection. I think that the force wins; I know that it should.”
Harvard has decided that arts and science research is to be made publicly available free on-line (with a waiver possible) — see Cohen, P (2008).

Geist, M (2008): “If it’s public funding that’s paying for this research the public ought to have access to these works and not have to be asked to pay for them multiple times as is currently the case.”

See for example Davidson, L (2005) who notes “we also face the sure demise of the academic library, an event that has been predicted for years but that only just know is finally coming to pass” (p.26) and questions whether universities will also disappear.

Duderstadt, J (2006)
Courant, P (2007)
Davis, G (2006)
Davis, G (2005) p.3
Davis, G (2006)
The University of Melbourne (2007) p.5
Bridgland, A, et al (2007) estimate that we have invested over $300 million in our library collections.
Nemec, B (2008)

Data about conservation, preservation and cataloguing costs were supplied by Dr Belinda Nemec in correspondence to the authors. The 2006 review of Baillieu Library collections identified more than 33,000 items (13 per cent of the collections) as requiring conservation or preservation work. Of these, around 7000 items required immediate attention. The total cost of conservation and preservation work was estimated at up to $17 million. Similarly, the cost of bringing the University of Melbourne Archives up to standard was estimated at around $11 million in 2000. Works would include preservation, conservation, rehousing and improvements to storage facilities.

Nemec, B (2008)

Tony Barry is quoted in Clarke, R (2004) as saying “There were three classes of people who made the net successful. The technicians... the content providers... and the enthusiasts/promoters. [These included] the library community as they were into networks way back in the mid 80’s both via [the Australian Bibliographic Network] ABN but also accessing Dialog and Orbit in the US via MIDAS (OTC). They did a lot to promote the internet from 1992 onwards... The Campus-Wide Information Systems (CWIS) movement, driven by university librarians, provided a model for intranets and information sharing, which started with gopher in late 1992.” Melbourne University’s CWIS team underwent an organisational restructure in 2006 and no longer exists by that name.

Macintyre, S and Selleck R (2003) p.67: “In the mid 1920s the library moved to the Quadrangle’s North Wing from the first floor of the North Extension where for fifty years it grew steadily and scandalously over-crowded. The new accommodation was immediately revealed as inadequate and, especially in the ‘swot vac’ before the final examinations, students queued outside waiting their turn to pursue their studies.”
Macintyre, S and Selleck, R (2003): p.109 “After repeated false starts, a library was completed in 1959. The Baillieu family had been donating funds for this sorely needed amenity since 1944, yet the library collection remained pitifully inadequate and the library staff were treated as menial functionaries. The new Baillieu Library provided for 1000 reading places and a doubling of the current collection of 150,000 volumes. It was almost immediately swamped by 8000 daily readers and rapidly exhausted the storage capacity. Sydney University was already planning for double the reading places and three times as many books. Long overdue, the tragedy of Melbourne’s Library was that it was built too soon.”

The number of web site visitors is based on data available at www.unimelb.edu.au/stats/ www.lib.unimelb.edu.au/ and excludes usage of catalogue search engines and other online applications provided by the library.

Analysis by the authors of statistics collected annually by the Council of Australian University Librarians (CAUL). Raw data are available at www.caul.edu.au/stats/


It costs $76.40 to store a volume on open access in our libraries, $38.20 to store a volume in high density store and $6.57 to store a volume in a purpose-built, high density facility such as CARM.


See for example articles by Steve Lawrence at citeseer.ist.psu.edu/online-nature01/ and www.nature.com/nature/debates/e-access/Articles/lawrence.html. This mirrors the Amazon.com experience which shows that making the full text of a book available online can increase sales of the work.
For example Melbourne distributes its Research Infrastructure Block Grant funds based on faculty and department performance. Other universities use these funds to build their library resources, network and compute infrastructure to support research and research training needs.

97 Curriculum Commission (2006) p.15
98 Davis, G (2005) p.8
100 James, R and Baldwin, G (2002) p.14
102 Davis, G (2005) p.8
103 The University of Melbourne (2007) p.2
104 Davis, G (2005) p.7
105 The University of Melbourne (2007) p.2
106 Davis, G (2005) p.8
107 Cohen, P (2008)


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