

Growing in Esteem: Positioning the University of Melbourne in the Global Knowledge Economy

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The emerging global higher education market, facilitated by advances in information and communication technologies, challenges all universities to reconsider their mission and direction. The University of Melbourne, one of Australia's leading research universities,¹ has undergone a fundamental reshaping to ensure its place in an evolving global knowledge economy.

The result is a strategy called "Growing Esteem,"² developed after extensive consultation. Growing Esteem signals the university's intention to remain a leading education provider in the 21st century. The metaphor of a triple helix defines the strategy's character and purpose. Setting three priorities for the university—research and research training, learning and teaching, and knowledge transfer—the helix captures the complex and shifting relations between three disparate spheres of activity that are tightly bound, each reinforcing the other.

Central to the Growing Esteem strategy is the "Melbourne model" (a term coined by Australian media), the most significant curriculum reform in the university's 154-year history. The Melbourne model is premised on creation of a small number of broad undergraduate programs, followed by intense professional training at a postgraduate level.

Integral to the achievement of the university's vision will be the way in which the university's information services, systems, and technologies come together to support the vision: to bind the strands of the helix to achieve strategic outcomes, 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.

This essay outlines the university's 2015 vision, the steps taken to "dream large,"³ and the way information services and technologies are working toward the realization of the 2015 vision.

The Context: A Rapidly Changing Higher Education Sector

The higher education sector worldwide is responding to a raft of global influences—an international market, the influence of the knowledge economy on education, the influence of technology on learning and teaching. Key drivers include the evolving needs of graduates and employers, the increasing importance of international rankings, a continued decline in public funding, and rapid technological change. When he visited the University of Melbourne late in 2006, Professor James Wilkinson, director of the Derek Bok Center for Teaching and Learning at Harvard University, advised: “I don’t think Australian higher education has any choice but to diversify and innovate now. There’s a long lead time in education. It is not smart just to think that what worked well in the past might work well in the future.”⁴

Expectations of University Graduates Are Changing

Australian students, like their international peers, are globally mobile. The career trajectories of graduates in the 21st century will likely include time spent overseas, working for international companies, or managing multicultural environments. Graduates expect to be global citizens, carefully attuned to cultural diversity and able to communicate across cultures.

In a global knowledge economy, what students learn today may be outdated before they complete their degrees. Career pathways can be expected to shift direction several times. Students expect transferable skills such as learning how to learn, problem solve, analyze, and communicate effectively across cultural and discipline boundaries. Discipline boundaries are shifting to accommodate new academic alliances in an effort to comprehend complex systems, such as global warming.

Universities Must Compete in a Global Education Market

Universities now compete for students—and quality staff—in a global market. International research rankings, especially those based on research indices, have become important. Just as good students prefer to study with other good students, the best researchers want to work with the most able and stimulating colleagues. Increasingly, international rankings are an important factor as students and faculty alike make choices about which university to select.

Melbourne has long been a leader in Australian indices of research performance but performs less well by international measures. In the *Times Higher Education* world rankings, Melbourne sits at 22 in the world, but in the more rigorous, research performance–based *Shanghai Jiao Tong* index, the university is number 79, one of only two Australian universities among the top 100. North American universities count for 8 of the top 10 universities in the *Shanghai Jiao Tong* index.

While global competition has yet to impose a single model of higher education, there are signs of convergence around the familiar North American model of broadly based undergraduate degrees followed by graduate entry professional degrees. While four-year undergraduate degrees tend to be distinctly North American, the Bologna approach adopted across Europe accepts the same architecture of foundation studies, followed by professional training, in an undergraduate–masters sequence. The Bologna model incorporates easily readable and comparable degrees, uniform degree structures, and increased student and staff mobility. Adoption of the Bologna model across Europe is influencing higher education worldwide as countries that follow neither North American nor European degree programs ponder how to compete globally.

A global market means not just some measure of standardization; it also means competition from institutions that set up campuses outside their home territory. In Australia, changes in the government protocols and loans scheme have fueled the growth of private higher education providers. In 2006, a campus of an American research university, Carnegie Mellon University, opened in Adelaide, supported by funding from the South Australian government. It may only be a matter of time until one of the big and successful universities from the United States employing online delivery with local tutorials—such as the University of Phoenix or Kaplan University—begins to operate in this nation. In addition, Australia can expect to experience increased competition for students, as English program delivery at European Union and Asian institutions makes these more attractive to students from the broader region.

Shifts in the Way Universities Are Funded

Pressure on national public funding for higher education in the United Kingdom, Australia, and New Zealand has encouraged or forced most institutions in these countries to seek additional income from other sources. In Australia, universities have increased their revenue from full-fee-paying international students from 5.8 percent

of university income in 1995 to 14.5 percent in 2004⁵; federal funding as a proportion of total higher education revenue dropped from 57 percent in 1996 to 41 percent in 2005.⁶

Recent trends in international student markets have highlighted the unsustainability of continued dependence on revenue from international students. While Australia has been a preferred destination for those in the region seeking higher education, rapid growth in the overseas student numbers has stalled—a situation that leaves chronically underfunded Australian universities particularly vulnerable to global competition. In addition, these trends raise questions about the traditional responsibilities and roles of national governments in higher education. Simon Marginson and Marijk van der Wende suggest that terms such as “public” education and related notions of priority and accountability take on new meanings as universities go beyond national borders.⁷

In a Global Knowledge Economy, Universities Are Experiencing a Digital Revolution

Underlying these changes to the higher education sector has been a fundamental transformation in the process of creating, synthesizing, and disseminating knowledge through the advent of advanced information and communication technologies. Initially, the digital revolution began with dissemination of scholarly information and stand-alone e-learning tools. With the advent of the Internet and growth in digital multimedia capabilities, access to full-text scholarly information and more sophisticated e-learning opportunities, which rely on communication and collaboration tools, became a reality.

As the tools that generate research data increasingly provide digital output, the Internet has provided the catalyst for distributing access to research data and instruments, furthering research collaboration. No longer must a scientist be located with the instrument to access, analyze, manipulate, and interpret data. The capabilities for accessing research data and collections and collaborative capabilities are also being exploited by the social sciences and humanities.

A threshold was crossed some time recently into a world in which all academic pursuits now include at least some digital component. Indeed, many research and teaching and learning activities use predominantly digital information management and communication technologies. Hence, information and communication technologies are not simply “utilities,” like electricity or water, but a “rapidly evolving, mission critical resource.”⁸ This makes digital communication the backbone of a university’s knowledge management capability.

A Strategic Imperative: The Interface between Technology and Teaching and Learning

In the higher education sector, three key trends in the management and use of information and technologies are transforming the academic enterprise—the blurring of research, learning, and teaching boundaries; the proliferation of technologically fueled new ways of communicating; and recognition of an important trend toward standardization.

The Blurring of Research, Learning, and Teaching Boundaries

Chris Dede has written: “Our ways of thinking and knowing, teaching and learning are undergoing a sea change, and [that] what is emerging seems both rich and strange.”⁹ The ease with which people can now publish to the Internet allows anyone to contribute to the world’s store of knowledge—and others to build on the foundation using collaboration and social networking tools. Students can become creators of content in new ways, changing the relationship between teacher and student. And as research increasingly becomes a digital endeavor, everyone has the potential to become part of this research. Amateur astronomers now easily contribute to the world’s astronomical research. Students can become active participants in the research process in ways never thought possible, changing the boundaries between research, learning, and teaching.

New Ways of Communicating

Today’s “new-generation” undergraduate students have grown up with the Internet and use information and technology in ways quite different from previous generations. *The ECAR Study of Undergraduate Students and Information Technology, 2006* in the United States provides an excellent insight into students’ use of technology and their expectations. This study showed PC ownership among undergraduate students to be 97.8 percent, with three-quarters owning laptops and almost one in five owning a PDA. While the students were clearly enthusiastic users of technology, only just over half wanted information technology (IT) used in their courses. By far they saw convenience as the single most important benefit of IT in their university experience, but most also agreed that IT in courses improved their learning.¹⁰

Of course, such changes also have the potential to create a digital divide, significantly disadvantaging those students with limited access to, or experience of, the new technologies. Ways of defining and measuring educational disadvantage must now also take into account IT disadvantage.

In many cases, university administrations are making (incorrect) assumptions about how the new technologies influence communication using the outdated frameworks of “old-generation” teachers and administrators.

A Trend toward Standardization

Within the university sector, digital leaders realize that business agility relies on standardization and integration of information systems and technologies. The corporate sector for some time has focused on automation of transactional processes, IT consolidation, shared-service initiatives, and process standards such as Information Technology Infrastructure Library (ITIL) to drive their IT effectiveness and efficiency. Research by authors such as Peter Weill, Jeanne W. Ross, and David C. Robertson clearly demonstrates that increased business success, greater agility, and innovation paradoxically require more standardized, automated core processes.¹¹ The foundations for business success are the IT infrastructure and digitized business processes, which automate an organization’s core capabilities. By standardizing and integrating these routine processes so that they are reliable and predictable, the organization’s human capability can be directed toward those activities that most add value.

Peter Weill and other colleagues found that “IT savvy” firms can convert investment in IT infrastructure into business value within the same year. IT savvy firms are those with committed senior management who champion IT initiatives, higher firm-wide skills in effective use of IT, more use of IT for internal and external communication, higher Internet use, and more digitized transactions.¹² Universities, given their propensity to localize and distribute organizational authority, have been slower to consider how to apply these concepts within their organizations. It seems likely that increasing student expectations for IT-enabled convenience, coupled with emerging opportunities for global collaborative research, will impel universities to embed IT standards and automate core processes.

New Directions in Learning and Teaching

So what does global transformation mean for research-intensive universities such as Melbourne?

Reforming the Curriculum, Reshaping Student Service Delivery

Lord Broers, an alumnus of Melbourne, vice-chancellor of Cambridge 1996–2003, and now president of the Royal British Academy

of Engineering, observed in a 2006 lecture to the Higher Education Policy Institute:

What we need first and foremost from our universities is the provision for young people of an adequately broad knowledge base, together with modern analytical and communication skills ... many of our undergraduate courses have become too narrow and overspecialized and do not equip the young with flexible intellects that will be able to adapt to changing circumstances.¹³

Under the direction of a 2006 Curriculum Commission chaired by the university's Deputy Vice Chancellor (Academic) Professor Peter McPhee, the University of Melbourne undertook the most significant reform since it was first established in 1853. The resulting Melbourne model reflects the global trend toward broader undergraduate programs followed by intense professional training at postgraduate level. In the Australian context this gives students more time to consider career choices. 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. Choices include a raft of new university breadth subjects such as Climate Change, The Internet: A Society Transformed, and Critical Thinking with Statistics and Data.

The "Melbourne Experience" (discussed in more detail later) aims to provide students with a cohort experience, building strong peer networks and encouraging close links with academic units. Students 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, along with opportunities for off-campus experience such as industry and community work placements and international study.

In parallel with curriculum reform, the university undertook a major review of its administrative and student services. The quality of the Melbourne student experience was a key focus of the reforms and has involved a significant reshaping of the university's services and administrative effort from a student-centric perspective. Under the Melbourne model, the individual needs of students come first, from their first contact with the university as prospective students to an ongoing relationship as alumni. The student hubs, which will be developed under the Melbourne model, will provide students with close links to their discipline areas. A "one-stop-shop" approach to administration and academic support should end 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 centers to colocate with new learning hubs—state-of-the-art information access located where students learn—within their faculty or graduate school. The design allows for 24×7 access to places where students want to congregate to learn with their peers.

A New Role for Information Services

A university is uniquely positioned to realize the emerging opportunities offered through information and communication technologies. Within one division at Melbourne, Information Services, the university brings together information professionals, librarians, archivists, multimedia specialists, specialist academics, and information and communication technologists. The different expertise of these professional groups can be combined and applied in ways that ensure that the university realizes the potential of information and technologies. As the Growing Esteem strategy notes: “Information technology is the backbone of the university’s knowledge management capability, critical to developing closer links between research and research training, learning and teaching, and knowledge transfer.”¹⁴

The three trends outlined above—the blurring of research, learning, and teaching boundaries, changing student expectations, and standardization and integration of processes—are evident in the University of Melbourne’s reshaping. The following section illustrates the tightly integrated way in which the university’s strategic aims shape, and are shaped by, its information and technology strategies.

A Triple Helix Strategy: Binding the Strands Together

The Melbourne vision of a fine university can be represented as a triple helix in which sharply focused, well-supported research, teaching, and knowledge transfer remain tightly bound, each shaping and reinforcing the other. The academic mission of the university “sets priorities, structures programs, designs enterprise systems, and deploys institutional resources” to realize the talents and contributions of staff, students, sponsors, and partners.¹⁵

To bind the strands of the helix through information services, the concept of “e-scholarship” has been used to frame the approach. While most universities have embraced e-learning and more recently many are engaged in discussion around e-research, Melbourne’s unique concept of the triple helix provides a framework for differentiation. By leveraging the capacity of information and communication technologies to provide

access to scholarly data and research instruments, regardless of location, and to the necessary know-how, collaborative tools, and infrastructure, we provide the opportunity for our students and staff to be engaged in learning, research, and knowledge transfer in an integrated way. Perhaps this is best illustrated by an example.

Currently, the university's Information Services division, through its newly formed E-scholarship Research Centre, in partnership with the Faculty of Arts, is imaging and generating XML transcripts of the convict records of the Archives Office of Tasmania. It is one of the world's most comprehensive sets of records of people placed under confinement. It is a collection of great complexity, comprising more than 30,000 records that relate to 75,000 men, women, and children transported to Australia during the first half of the 19th century. The vigilance invested in controlling the penal colony was collected on paper records covering all aspects of convict lives: behavior, character, work, health, family life, and death. It is a collection requiring a high level of historical skill to use without expert assistance, so the challenge for the electronic archivist is to make this complex collection accessible so that students, researchers, or genealogists can focus on an individual convict in a wide range of collectivities (birthplace, crime, religion, personality type, work, punishment, and so forth). This information needs to be not only connected internally but also connected to other data: genealogies, family, and criminal data in place of origin, and family and public records data in the place of refuge after sentence. The faculty will be using this collection as a rich 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 it creates a rich knowledge transfer tool of international value.

Such a case exemplifies the opportunities to link the triple helix of research, teaching and learning, and knowledge transfer through information services, systems, and technologies. They bind the three core activities of the university in ways that enrich each of these activities.

The Role of E-Learning in the Melbourne Experience

The Melbourne model fits well with the emergence of lifelong learning and multiple careers in the changing workplaces of the 21st century. Enhanced e-learning opportunities have a significant role to play

in the distinctive Melbourne Experience envisaged under the Melbourne model, given the principles underpinning the use of technologies in the new-generation curriculum. Thus, students will

- have a coordinated e-learning experience that increases in sophistication and complexity based on year level across the life of their program of study;
- develop an online portfolio to support personal and academic development;
- use e-learning environments to link to and be engaged in current research activities and programs;
- participate in e-learning experiences with diverse cohorts of students in online communities of practice, social, and learning networks; and
- use e-learning mechanisms to strategically complement, enhance, and extend their opportunities for internationalizing their learning experiences.

Enhancing the Cohort Experience

The cohort experience of students is strengthened through programs such as AIRport (Academic Interactive Resources Portal) and Postgraduate Essentials. Designed for undergraduate students, AIRport provides a plethora of interactive quizzes and activities. Importantly, though, it includes online language tutorials, designed either for specific groups within particular courses or for students whose second language is English. For many international students, online tutorial participation is much valued, for it allows time to formulate a response. As one second-year student commented, “In class, by the time I’ve worked out what to say and how to say it the tutor has moved on ... in online tutes I find I have much more to say.” In Postgraduate Essentials, research higher-degree students are able to ask questions of the online tutor and their peers in ways not always possible for students who spend long hours in labs or who may be based many kilometers from campus. The first-year online journal or blog also provides a forum for discussion for students new to university life.¹⁶

Managing Career Pathways

One key pedagogical driver of the Melbourne model was an understanding that for many students, direct entry from school to a professional degree may be problematic. Advice from well-meaning teachers, friends, and

parents “not to waste a high ENTER”¹⁷ has meant many bright students follow safe and prestigious, but personally unfulfilling, career choices. Under the Melbourne model, career choices can be delayed until the end of undergraduate education. On completing a new-generation bachelor degree, a student will have the maturity and self-knowledge to make an informed career choice. Some may go immediately to employment. Others will choose to enroll in one of Melbourne’s new graduate schools and pursue a professional qualification or undertake a research master’s or PhD.

Under the Melbourne model, course advice takes on a much greater significance as students navigate pathways through to careers. Students will be supported to build e-portfolios recording their skills development and experience. A student may enroll in a bachelor of commerce degree program with the intention of following a career in international business. An internship with a human rights organization and success with breadth subjects in law (and the online global opportunities subject, which links students in classrooms across the world) may lead them to follow their new-generation BComm, either immediately or some years later, with a juris doctor, facilitating a pathway to a career as a lawyer specializing in human rights law.

The Melbourne model facilitates a career pathway many with old-generation degrees will recognize. Few graduates work in the jobs they anticipated when choosing subjects in year 10 with an eye to their chosen career. Under the Melbourne model, career pathways are managed and negotiated as students undertake a range of breadth studies and knowledge transfer experiences. The Melbourne model framework and its e-campus experience are made possible through the new information technologies.

The Need for Caution

Many undergraduate students have spent their entire lives surrounded by information technologies, including the Internet. This has shaped what students expect from universities, but it has also shaped assumptions we make about how our students wish to use technologies. In 2006, a study of more than 2,000 first-year students—students born after 1980—was undertaken at the University of Melbourne. Referred to as the *Kennedy study*, it examined students’ access to, use of, and proficiency with a wide range of information and communication technologies and tools.¹⁸ (It in part mirrored ECAR studies undertaken in the United States.) The Kennedy study found that students were overwhelmingly positive about the use of information and communication technologies to support their studies. More than 90 percent use computers for general study and to search for information, and more than 80 percent use the learning management system and use technology

for general course administration activities. Ninety percent of students had unrestricted access to a desktop computer and more than 70 percent had broadband Internet access.

Yet the Kennedy study also demonstrated distinct patterns of access based on gender, background (for example, international students used technologies more frequently), and discipline area. There was sufficient evidence to negate the argument of a one-size-fits-all approach. Kennedy notes that “we need to think carefully about how we can use particular ‘core’ and ‘emerging’ technologies to support learning in higher education, given the known diversity of experiences, attitudes, and expectations of students.”¹⁹

Information and communication technologies are already used extensively to enrich the on-campus student teaching and learning experience. The study undertaken by Kennedy underlines the need to consider carefully how best to enrich the teaching and learning experience through technologies.

These findings confirm those of the 2006 ECAR study that students overwhelmingly wish to use technology to increase convenience. Nearly 84 percent want to use the web for student services such as to enroll, sign up for classes, and pay fees, yet 80.9 percent also want to use the web to access a learning portal. Given the desire of students to use technology to increase convenience, the University of Melbourne, as part of its strategy to enhance the quality of the student experience, plans to automate all student transactional processes. Achieved over the next few years, such automation will ensure consistent, integrated, convenient, and cost-effective service delivery. The university will also seek to increase the use of information and technologies in student enrichment. This approach not only enriches the quality of the student experience but leads to standardization and automation of core business processes, thus increasing the university’s ability to innovate and be agile.

Ensuring We Have the IT Infrastructure to Support the Melbourne Model

Enhancing the expectations of the Melbourne Experience is a noble goal, but it also carries risks. To succeed, the Melbourne model requires an agile and responsive system. Standards and consistency in core processes are an imperative, not an option. As Craig Barrett, CEO of Intel, notes: “When you have common interfaces, common protocols, everyone can innovate and everyone can interoperate. Companies can build their businesses, consumers can expand their choices, the technology moves forward faster, and users get more benefit.”²⁰

Like many Australian higher education institutions, a long-established distribution of decision-making authority at the University of Melbourne

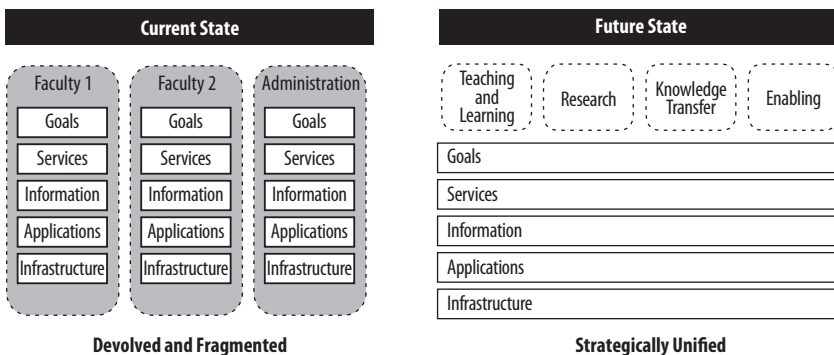
reflects presumptions of academic autonomy and is reinforced by budget practices. As a result, faculties and departments have adopted different and sometimes incompatible systems and technologies for their research and teaching. Such devolution of decision making and expenditure contributes to inconsistency in quality and offerings of IT services to students and staff, duplication and increased risk, poor value for the money invested, and an inability to prioritize investment in IT to achieve the best outcomes. Despite some significant local investment, the objective quality of user support remains low. There had been a growing recognition of the importance of investing in university core systems and infrastructure. Over the last five years the university has replaced all of its core enterprise systems, with the final system, the student management system project, due to be completed in mid-2008.

In recognition of benefits to be gained from a common IT infrastructure and digitized business processes, the university embarked on an IT shared-services project in 2006. This initiative acknowledged the importance of taking a university-wide view of IT in order to balance quality, cost, and risk for the university as a whole and balance the trade-off between local agility and the consistency required for high-quality, reasonable-cost services and to facilitate collaboration. Figure 1 illustrates the thinking underpinning this approach.

Some progress has been made toward implementing common systems and processes, largely through investment in common enterprise systems on a project-by-project basis, coupled with implementation of appropriate methodologies such as the ITIL and Prince2. However, only limited progress has been made on business process integration and standardization. In a highly devolved organization, technologies that imply organizational change are particularly challenging.

As Indiana University CIO Brad Wheeler notes: “For many institu-

Figure 1. Toward a Strategically Unified Information Future



tions, this [shared services] is a chicken-and-egg situation where the money to provide shared services is in the research projects and schools who may prefer the use of university infrastructure, but can't trust it until it exists. It can't exist if the money isn't aggregated to fund it."²¹

Over the coming years, the University of Melbourne will use the concepts developed around the new student services model to continue its journey toward being an IT savvy organization. By focusing on enhancing the quality of the student experience, automating core processes, and enhancing enrichment services through targeted use of information technologies, the university will build critical IT foundations and business capability. Over time, this approach will be applied to all university core processes, with the aim of being an exemplar in interlocking its business and IT practices and competencies.

Summary

In many ways, the history of higher education in Australia has been shaped by isolation from the rest of the world. Australia's first universities were staffed by academics wooed from the mother country with promises of opportunity—fueled by the discovery of gold. In architecture (the “sandstones” of Australia's Group of Eight) and curricula, the first Australian universities followed the models of Oxford and Cambridge.

Thanks to IT, Australia is isolated no longer, and U.K. universities no longer dominate world higher education rankings. If Melbourne is to fulfill its aim to be one of the world's finest universities, it must respond to global educational challenges. Through its Growing Esteem strategy, the University of Melbourne signals an intention to remain a leading education provider in the 21st century. The Melbourne model brings closer alignment to global changes in the sector while establishing a pioneering higher education model for Australia. The strategy has received bipartisan political support, with government and opposition alike recognizing the need for domestic diversity if the sector is to compete globally.

Growing Esteem posits a university understood as three intertwined activities—research and research training, teaching and learning, and knowledge transfer. Each relies on IT, and the overall strategy requires enterprise systems to bind together the strands. Like other universities, Melbourne is part of an academic world with blurred boundaries around the development of new knowledge, proliferation of technologically fueled, new ways of communicating, and recognition that an agile institution paradoxically needs standardized systems to enable collaboration. The vision presented in Growing Esteem embraces information technologies as the essential platform for a successful contemporary university.

Endnotes

1. The University of Melbourne is ranked number 1 in Australia for research income (Australian Department of Education, Science and Training 2007) and is one of only two Australian universities ranked in the top 100 in the international *Shanghai Jiao Tong* index: University of Melbourne is ranked 79th, Australian National University is ranked 57th. (The Department of Education, Science and Training is now the Department of Education, Employment and Workplace Relations.)
2. The name *Growing Esteem* comes from the University's motto, *postera crescam laude*, from Horace's famous ode. A common translation is "I shall grow in the esteem of future generations."
3. "Dreamlarge" is the campaign theme chosen to promote the university's vision.
4. "HEd diversity offers choice—Harvard expert," *UniNews* 15, no. 13 (2007), http://uninews.unimelb.edu.au/articleid_3536.html.
5. Simon Marginson and Marijk van der Wende, *Globalization and Higher Education* (Paris: Organisation for Economic Co-operation and Development, 2007), http://www.cshe.unimelb.edu.au/people/staff_pages/Marginson/OECD-Globalisation&HigherEd.pdf.
6. Simon Marginson, "Global Setting, National Policy and Higher Education in 2007" (paper presented at Education, Science and the Future of Australia, a CSHE seminar series on policy, at the University of Melbourne, July 9, 2007).
7. Marginson and van der Wende, op. cit.
8. Brian L. Hawkins and Diana Oblinger, "IT Myths: The Myth about IT as a Utility," *EDUCAUSE Review* (July/August 2007): 11.
9. Chris Dede, "Introduction: A Sea Change in Thinking, Knowing, Learning, and Teaching," in *The ECAR Study of Undergraduate Students and Information Technology, 2007* (Research Study, Vol. 6), Gail Salaway and Judith Borreson Caruso, with Mark R. Nelson (Boulder, CO: EDUCAUSE Center for Applied Research, 2007), 25, available from <http://www.educause.edu/ir/library/pdf/ers0706/rs/ers07062.pdf>.
10. Gail Salaway, Richard N. Katz, and Judith Borreson Caruso, with Robert B. Kvakik and Mark R. Nelson, *The ECAR Study of Undergraduate Students and Information Technology, 2006* (Research Study, Vol. 7) (Boulder, CO: EDUCAUSE Center for Applied Research, 2006), available from <http://connect.educause.edu/Library/ECAR/TheECARStudyofUndergradua/41172>.
11. Jeanne W. Ross, Peter Weill, and David C. Robertson, *Enterprise Architecture as Strategy* (Cambridge: Harvard Business School Press, 2006).
12. Peter Weill, Stephanie Woerner, Sinan Aral, and Anne Johnson, *Becoming More IT Savvy and Why It Matters* (Research Briefing, No. VII-1D)

(Cambridge, MA: Center for Information Systems Research, MIT Sloan School of Management, 2007).

13. Quoted in *Growing Esteem: The 2007 University Plan* (Victoria, Australia: The University of Melbourne, 2007), 15, <http://growingesteem.unimelb.edu.au/2007universityplan/index.html>.

14. *Ibid.*, 23.

15. University of Melbourne, *The University of Melbourne Plan: A Strategic Overview* (Victoria, Australia: The University of Melbourne, 2007), http://www.unimelb.edu.au/publications/docs/2007UniPlan_StrategicOverview.pdf.

16. For more information about these programs, see <https://airport.unimelb.edu.au/> for AIRport; http://www.sgs.unimelb.edu.au/prog_services/programs/pge/ for Postgraduate Essentials; and <http://www.services.unimelb.edu.au/transition/starting/blog.html> for the first-year online journal or blog.

17. The Equivalent National Tertiary (Higher) Education Entrance Rank, or ENTER, is the percentage score out of 100 awarded to students completing high school study.

18. Gregor Kennedy, “Digital Natives + Others = First Year Student Experience” (paper presented at EDUCAUSE Australasia 2007, Melbourne, Australia, April 29–May 2, 2007), http://www.caudit.edu.au/educauseaustralasia07/authors_papers/Kennedy.ppt.

19. *Ibid.*, slide 24.

20. Quoted in *An E-Research Strategic Framework: Interim Report of the e-Research Coordinating Committee* (Canberra, Australia: Australian Government, 2005), 20. For the original interview, see <http://www.intel.com/standards/execqa/qa0904.htm>.

21. Brad Wheeler, “Leading Beyond the ICT Conundrums for Scholarship 2.0” (paper presented at EDUCAUSE Australasia 2007, Melbourne, Australia, April 29–May 2, 2007), 4, http://www.caudit.edu.au/educasueaustralasia07/authors_papers/Wheeler.ppt.

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