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ALL KNOWING: Creating the Knowledge Society from the Information Economy

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Introduction

Throughout this century the system of economic production and value creation has moved from machines and manpower to the use of information and brain power. Increasingly, economic value is being generated by knowledge and the skilful manipulation of information and symbols. The OECD, for instance, has estimated that more than one-half of the output of the world's advanced economies now relies on knowledge-based processes. Knowledge has joined capital and labour as a core factor of production. [Mark Latham (1998: xxi)]

As the term “knowledge management” slips easily into the vocabulary of librarians, we are in danger of underestimating the power and extent of the paradigm we invoke. It is not just that industries based on knowledge are developing. It is not just that information, like machinery, becomes essential to any business or enterprise. If we consider what infrastructure—networks, organisation, bodies of research, commentary, jobs, regulation, legislation—is in place to support the constructs of labour and capital in our society, we begin to glimpse what might be in store for the “knowledge” concept in an information society.

Knowledge management is not a neat box of tools that professionals can learn and apply in specific situations. Knowledge management is going to be a complex web of ideology, values, dependencies, power relationships, learning, manoeuvring, social and economic analysis, bodies of knowledge and techniques. Currently governments in Australia and elsewhere are formulating policies around the concept of information rather than knowledge, and around the economy rather than around society.

This paper looks at some of the challenges and opportunities that Australian educators (including librarians) face in this policy environment. Part 1 sets a context of information economy issues for our society. Part 2 looks specifically at these issues as they impact on educators, who, it is argued, should be preparing for the more dynamic “Knowledge Age”.

1 The Information Economy

1.1 Context

1.1.1 The Information Age

“Information”, “knowledge” and “digital” are all terms used to describe the age into which we are now inducted. The terms “Knowledge Age” and “Digital Age” capture nuances missing from the term “Information Age”. The advantage of “information” as a term is its stark simplicity. It is a foundation stone, one step removed from raw data. Governments appear to have settled on the term “information” to describe the new economy and the set of driving forces taking us into the new millennium. This tells us quite a lot about current governments and about the boundaries being created for education.

Information Age refers to a period in human history when economies, social organisation and demography are dominated and driven by information, in contrast to the last 200 years which were similarly driven by industrial development. Since the period of white settlement in Australia corresponds with and is a by-product of the Industrial Age, the Information Age has particular implications for Australia. It could, for example, provide an opportunity to render less significant the colonial scars we bear from the Industrial Age if in the Information Age Australia defines its own position, rejecting colonialism. If, on the other hand, we see the Information Age as an inevitable and simple development from the Industrial Age, it could render the colonial scars permanent.

The information society is the society created by the Information Age and contrasts with the industrial society created by the Industrial Age. The information society, therefore, is the kind of society produced by a reliance on information as the most significant factor in the means of production. The information society relies on the information economy to produce the goods, services, employment, wealth and lifestyle on which the community depends. The information economy relies on the information society to generate an environment of production and consumption.

Knowledge, as opposed to information, is dynamic and capable of creating energy in a similar way to capital and labour. Money, work and information are useful. Knowledge, capital and labour are concepts containing stored energy. Given the right incubation conditions they are capable of creating life. The Industrial Age applied ideas to the processes of production; it engineered production. The Information Age has found ways of manipulating information itself thereby opening up the possibility of extracting added value from knowledge.

It is important for educators to contemplate the implications and to shift the boundaries. Australian education has transmitted and exploited knowledge on behalf of society (Marginson 1997:34-40). Education is both a product of and a service to a society. Increasingly, economies have harnessed education to service the process of production. Coledrake and Stedman (1998: 35-42) argue that this pragmatic view has been more true in Australia than in the United States, Germany or the United Kingdom.

Schooling in Australia has served social and civil ends (Marginson 1997:5). The establishment and functioning of State and Territory education systems has been a key factor in creating and maintaining Australian egalitarian ideals (which is why teachers have served in less popular locations as a condition of employment at salaries fixed by State Awards), in creating a national identity, and in ensuring common experiences across a vast landmass.

The tension between education for broad social purposes, and for economic advantage has probably always been present. Certainly it was there in the establishment of technical and vocational schools in the '50s, in the development of “comprehensive” curricula and continued government priority for vocational education in schools. We at the end of the twentieth century have the advantage of observing our society entering the Information Age, of analysing as it happens. This opportunity was not available to those pioneering educators who developed the educational structures and policies for the Industrial Age. We can take stock of the kind of society likely to be produced by an information economy, and attempt to influence and shape it, moving it beyond information to where the energy of a knowledge society can effect greater change.

1.1.2 The information economy

The notion of an “information economy” is now well entrenched in government policy statements. The Clinton administration has produced significant documents relating to electronic commerce, as has the European Union. The United States Government has taken a strong non-regulatory approach, whereas European governments have been much more prepared to regulate to protect, for example, the privacy of citizens.

The Australian Government produced a number of reports in 1997 and early 1998 indicating Australia's direction in relation to electronic commerce (ATO 1997; Cutler 1997; ECEG 1998; ACCC 1997; Goldsworthy 1997; DFAT 1997:1; DFAT 1997:2; Mortimer 1997; NOIE 1998:1; NOIE 1998:2). The government has established the National Office for the Information Economy to support the work of the Ministerial Council for the Information Economy. One of this agency's discussion papers (NOIE 1998:1:4) records the Australian Government's commitment to guiding Australia rapidly but smoothly into the information economy.

The Australian Government has taken a position of supporting market based solutions and industry self-regulation rather than government intervention. Intervention should be in order to ensure that the Internet is a safe and secure place to do business and to ensure equitable access. It should treat paper-based and electronic, online and offline technologies consistently and favour national approaches that are consistent with agreed international positions (NOIE:1:8)

This is very consistent with the position advocated by the United States. Although early statements from the USA took a radical non-regulatory stance, it is already finding some difficulty in maintaining this position, with industry moving more slowly in such areas as content regulation and privacy than is acceptable to government. From the point-of-view of an information economy, the critical issues for regulation will be those governing commercial transactions and ownership: taxation, intellectual property, privacy, consumer protection and security. It is critical that transactions and ownership in an online environment are consistent with those in the offline world. The online world may have been created for purposes other than commercial transactions and ownership but it is now being colonised.

The information economy is being modelled on the industrial. While it is more efficient in the short term if the regulatory framework and legislation for online commerce is managed as an adaptation of that in the offline world, this evolution may not be the quickest way to reach the potential of an online economy. The extension, for example, of existing copyright legislation to the online environment imposes a set of agreements evolved to suit more fixed and limited media onto a fluid and potentially unlimited medium. Even if this imposition is achievable, it precludes a potential new way of managing human intellectual endeavour.

If Latham (1998) is right, and knowledge becomes a third reference point in the labour-capital tension, we are likely to find adaptations to the current regulatory and legislative framework inadequate to deal with a knowledge-based society. The current approach is underpinned by assumptions that knowledge is a commodity that can continue to be bought and developed as in the past; that knowledge workers, like industrial workers will engage their skills in return for wages. If knowledge becomes a factor analogous to labour and capital then knowledge becomes a market in its own right. It will, in an information economy, be traded, benchmarked, negotiated, organised, have its status reported in daily news bulletins, and trigger the fall of governments.

In this context knowledge management is quite a different activity from information consumption, information production or information work. We might “play the knowledge market” by speculating on knowledge creation. Governments may fund “knowledge market awareness programs” to assist small business. We could find ourselves with Knowledge Relations Courts and a political party named the Australian Knowledge Party.

In reality, we cannot imagine what might emerge from such a triangulation of knowledge, labour and capital, because the paradigms we currently have are largely anchored in Industrial Age conceptualisation. The choice of the term “Information Age” rather than “Knowledge Age” anchors us more firmly to Industrial Age thinking.

1.1.3 The information society

The free-trade philosophy of governments establishing information economies within existing regulatory and legislative frameworks will shape an information society. Had the Europeans who sought materials and markets in the New World been more sensitive to alternative cultures and societies they may have created quite a different industrialised world. It may have been possible to industrialise more cooperatively and respectfully. The attitudes of colonisation were both market and culture driven. Many of Australia’s current debates, notably Wik, the Constitution and multiculturalism result from the need to revisit attitudes inculcated in early Australian colonisation.

The information society will be similarly limited by the cultural values of governments and merchants who colonise cyberspace. The native populations of cyberspace—and they include universities—will need to be informed and strategic if they wish to retain power and influence rather than become the colonised. If the native populations of cyberspace succumb these limitations will be carried forward.

Australians can make choices which reflect what we have learned from our history. We can choose to uphold certain values over others. While the tide of economic change is unlikely to meet its Canute, we do not have to be passive accepters of its shipwrecks. We can at least, seek to shape, direct and influence changes by anticipating and contributing to the kind of society we want the economy to produce.

1.2 Issues for society

The new technologies have the capacity to alter social patterns or at least to reinforce changes that are occurring for other reasons.

1.2.1 Small group power

The Information Age, because it creates a knowledge market, provides opportunities for new power structures to form. Political activists are working out how to use the new communications infrastructure. Kathy Bail (1998), for example, argued in the 1998 Pamela Denoon Lecture:

Computer networks are making it possible for smaller groups of people outside institutional structures to network and be effective. On the Internet you can find people expressing their opinions, participating in debates and fighting for their political beliefs. Paradoxically, on this global network, we are witnessing the rise of community action groups. People are creating alliances online, putting themselves in a stronger position to challenge governments and businesses.

This is happening on both sides of the political divide in Australia, and on issues like the Constitutional Convention, across the political divide. New linkages and alliances are made possible across geographic boundaries, across age and issue boundaries. There is an advantage available for a while to those who can use the technology to communicate faster and more effectively than their opponents.

1.2.2 Mainstreaming marginal groups

The Internet has facilitated the move of marginalised social groups towards greater power and confidence. Steve Silberman claims in *Wired Magazine* that “the Internet has changed the way gay people grow up, come out, organise political actions and fall in love” (1998). Australia’s population is not too small to marginalise some groups. It is small enough for all members of a marginalised group to find each other on the Internet. If we can solve the telecommunications access problem and manage it appropriately we could reduce the tyranny of distance and turn our population size into a remarkable asset, harnessing the strength of our whole population in ways unachievable by more populous nations. We can exploit the knowledge that is created by the comprehensive interconnections possible in a small, diverse population.

If we do not solve the telecommunications access problem within a relatively short time, or if we fail to manage appropriately, the result is almost certainly social fragmentation and a resultant loss of economic position.

1.2.3 Exacerbating disadvantage

The new power being open to all those who can access and utilise the technology *ipso facto* denies it to those who can’t. This raises the most obvious of the social questions prompted by the concept of an Information Age. Web usage is growing disproportionately in some groups. Black Americans for example, have lower rates of access than white Americans (Katz 1998), rural Australians lower access rates than urban Australians (ABS 1998). The dominant paradigm of the Web is the marketplace and as Charles Handy points out (1997:229), capitalism thrives on inequality. The Web is therefore a vehicle of inequality by definition.

The corollary of the opportunities presented by the Web is the threat of a new underclass: those who cannot access the online world and are further and further alienated. At present we do not have the telecommunications structure in place that can deliver adequate online services in much of rural Australia. We do not have an infrastructure in place that ensures access to urban communities without the affluence necessary to have Internet access in their homes. Libraries have been in the forefront and school systems are trying to head in that direction. There is as yet no national infrastructure plan that addresses the need as a priority.

1.2.4 Role of the expert

The Information Age is challenging the role of the expert in society and therefore altering the relationship between expert and amateur (Handy 1997: 251). The Web creates new opportunities for “do-it-yourself” in a wide range of areas currently dominated by experts. Experts and professionals in all industries (not just education and information management) will need to think through the nature of their expertise. Where knowledge is the result of information acquisition melded with experience many amateurs will be as effective as experts. A search of the Internet using the name of any one of dozens of chronic or terminal diseases will indicate the wealth of knowledge being shared by sufferers and carers providing understanding well in excess of that provided by conventional health services and timed access to health experts. Internet support groups are able to access information and pool their experience. Medical experts will need to add considerable value to this if they are to maintain a privileged niche in the information society. Australia has lost many of its artists and intellectuals to Europe and the USA because Australian culture would not or could not provide the environment they needed. We will need to take care that the tendency to do-it-yourself expertise on the Web does not reinforce our tendency to destroy tall poppies. Being able to generate knowledge from shared experience does not eliminate the need for expert opinion. It should sharpen expertise and make it more widely accessible and accountable, thereby providing pressure for improved quality of advice.

1.2.5 Shifting work patterns

There is a move towards more self-employed and small cores of corporate workers, a move away from a 9am to 5pm, eight hours a day work pattern. This reduces certainty, increasing stress for some workers who have less control of their hours and less protection from the pressures of supply and demand. The global nature of the information society introduces patterns of international and regional work with a tendency for the elite knowledge workers to be employed internationally (Kanter 1995:123). This is a contrast to the traditional patterns of work in Australian cities, which have perhaps been the most regulated in the world.

Home and work are not then geographically bound as in the past. It is possible in the Information Age to choose to live in Adelaide because of its lifestyle and to work globally, travelling when and where required but working from a package of digital communications devices. At least since World War II Australia has sustained groups of workers who travel long distances for work, while their home was elsewhere—the Snowy, the Pilbara, Moomba. Knowledge workers, being skilled in thinking processes rather than labour processes, will not be geographically limited to working where resources are located. They may travel to home, rather than to work. Others may choose to reside and work in one place, thereby opening up many options for living. Good educational provision may be a deciding factor.

The rise of substantial numbers of global workers calls into question the adequacy of the nation state as an organising unit. Goggin (1998:78-105) develops this concept in some detail in relation to telecommunications.

Those who find their work regionally rather than globally must mesh their knowledge of products and services to their knowledge of regional requirements. They are, however, increasingly dependent on decisions made internationally and are most successful when (as Kanter puts it) making the global economy work locally. (1995:201)

1.2.6 Multiple perspectives

The information society has multiple perspectives. As well as having more information, we see more points of view. Citizens of the information society can choose lifestyle and living space from a broader range of options. Their notion of “community” changes to include online communities, communities across geographic boundaries, and communities of the like-minded. They accept interdependence but have tools to tailor their own world to an unprecedented degree.

Steph Paternot, one of the founders of The Globe, a successful USA Online community business venture, believes that the dominant perspective of an online community is that of participant rather than spectator (Paternot and Krizelman 1997). This contributes to a trend being borne out in the introduction of interactive capacity to cable television in the UK, Europe and the USA. It may also be influencing the political dissatisfaction being expressed through the ballot box in Australia where governments are now routinely elected without a majority in the Upper House. Increasingly governments have to win over the vote of one or more of a handful of minority parties or independents to gain approval for their legislation. The effect is to create a breathing space between the framing of legislation and its passing. In this space the community has an opportunity to make its views known to an individual or a smaller, more responsive party or individual. The Internet makes it feasible for voters to directly influence their local member or an independent faced with the opportunity to reject or amend government legislation.

In the Information Age boundaries between real and not real are less clear, resulting in a further shift in perspective. Britons in the 1960s struggled to shift their perspective of “English” as British citizens of former colonies took up residence in the heart of London. The boundaries shifted. Perspectives adjusted. “English” no longer connotes what it did in 1959. Already “real” is making a similar shift.

1.3 Summary

As governments develop policies to build information economies and create an Information Age, some very significant social shifts are occurring. These contain the seeds for creating quite a different society from our present one and present some issues and opportunities for educators.

2 Creating the Knowledge Society

2.1 Issues for educators

2.1.1 Information Economy issues

2.1.1.1 Intellectual Property

An information economy engages governments in regulation and legislation relating to ownership and transactions: taxation, intellectual property, privacy, consumer protection, and security. In an information economy, the ownership and transaction of knowledge will be core issues for educational institutions. Educational systems and institutions own intellectual property. They have generated much innovation in the past by judicious application of knowledge. The academic tradition has been built on the free flow of information. In times when universities and schools were more fully government funded there was a “public good” argument for information generated by education bodies to be in the public domain, and for knowledge so generated to be public property. The emergence of an information economy coincides with a re-emphasis on marketplace economics, particularly in relation to the burgeoning online economy. In this atmosphere it is unlikely that education systems and institutions will be able to resist the pressure to exploit their own intellectual property to meet operational costs.

At a time when education is more integral than it has ever been to national economic advantage (operating as infrastructure) educational institutions have a competing demand to generate their own funding (operating in the marketplace). This creates a direct tension between the needs of educational institutions to protect their own intellectual property, and their need to protect the access of their scholars and students to the intellectual property of others. In an information economy within a free market regime it is likely to be increasingly difficult to protect Fair Use agreements. The scale and accessibility of the Internet militates against the control of content as intellectual property. On the one hand information is a commodity to be bought and sold—at a premium when the knowledge it generates is the edge of competitive advantage. On the other hand information is that which sustains all other economic and social possibilities and should not be monopolised or limited. The paradigm difference has some parallels with the Aboriginal community’s concept of land as spirit and the white community’s concept of land as property. It would be preferable do some reconceptualising of intellectual property to avoid exacerbating conceptual tensions as we enter an Information Age.

2.1.1.2 Privacy, freedom of expression and content control

The information economy raises significant ethical issues for Australia; in particular, the issues of a universal telecommunications service, privacy, freedom of information, freedom of expression and the environmental impact of globalisation. In the USA the current issue of most concern is privacy. The issue currently impacting most strongly in Australia appears to be universal provision of telecommunications, in particular what constitutes that universal base and how it can be ensured in a deregulated environment (ACA 1998). Online content control is also being raised in Australia (ABA 1998) without, to date, high levels of public concern.

2.1.1.3 Telecommunications access

The telecommunications issue has been well explored by the Centre for Philosophy and Public Issues at the University of Melbourne (Langtry 1998). Contributors take up the issue of what should constitute a Universal Service Obligation and whether access to data as well as access to telephone should be the minimum expected by citizens of the information society. The Review of the Standard Telephone Service (DoCA 1996:166) recommended that services such as fax, email, access to the Internet, electronic commerce and education platforms should be available to all Australians. In a deregulated environment it is as yet unclear how this could be enforced as part of a Universal Service Agreement.

The issue profoundly affects all sectors of education. Education as an activity that underpins our prosperity and democracy requires broadband access across the sector and into the community. Education is a high end consumer of telecommunications and cannot provide leadership for a knowledge society without broadband networks.

2.1.1.4 Globalisation

Given that the companies providing “universal service” are global companies, and the governments seeking to enforce the agreements are national, the concept of “citizenship” begins to seem tenuous. Nelson Mandela has called for global universal service in telephony and global access to the information highway (Mandela 1995-96:46). If an information economy is a global economy we increasingly become global citizens. Industrial economies have generated schooling systems linked very closely to citizenship. The information economy may in time see schooling linked to global citizenship rather than regional citizenship.

Eventually, all the current ethical issues relating to the information economy come up against the issue of whether a national framework is desirable and enforceable in a global economy. If we opt for a global solution we have the problem of negotiating matters of principle and policy in an arena where shared values are not necessarily pre-existing and have to be established.

Already we can observe the rise of the “international school”. Throughout Asia and South America non-government schools thrive as businesses operating for profit. These are not charitable foundations ploughing profit back into educational provision but businesses owned by families or corporations with no particular educational expertise. They buy educational leadership and expertise in the marketplace and attract paying customers according to their success in their chosen niche market. These schools are “global”, attracting students from diverse backgrounds, staff from many countries and buying quality control on the international market. They are the vanguard of the knowledge economy.

We need to rethink the approach of State education in Australia to the global economy. We sell students short if we don’t prepare them for the choices they are likely to face in order to know, understand and operate globally as well as locally. The State education systems have upheld Australian values of egalitarianism, seeking to include all Australian children in Australia’s opportunities. The extension of this into the Information Age will mean opening global services, experiences, knowledge and values to Australian children, or we will condemn them to a future limited by what the information economy washes on to Australia’s shores. State education systems may have to operate globally themselves, recruiting staff internationally and valuing international

experience in their local recruits, operating schools in other parts of the world, operating online schools or components of schools, forming alliances with international companies.

An information economy is a global economy. Schooling systems cannot operate independent of the economic models of the age. Our current model of State education belongs to the Industrial Age and must either transform itself or give way to a non-State-based model.

2.1.2 Information society issues

The issues outlined above have social as well as economic implications. The information society, however, raises many more issues for educators. Aside from significant pedagogical issues, and some specific cultural issues, there are five critical social issues emerging for educators from the information society.

2.1.2.1 New power structures

Industrial society gave power to national governments, industry, cities, mass groupings (majorities) and homogeneous geographic communities. Mass education is a product of this power structure. Industrial age workers (including teachers) are mass-produced. The information society shifts power to small groups and provides them with the tools to manage their knowledge resources. Individuals can find those of like-mind. Small groups can act as levers or catalysts. Educators are not therefore, preparing children to be part of a simple majority. Students need to learn to penetrate the new power structures, which are likely to be global and highly specialised. It seems likely in this environment that teacher preparation while it may have a mass-produced base, will also need to provide more niche options to meet particular community or client need. This is likely to include “para-educational” pathways as well as highly specialised professional ones.

2.1.2.2 New relationships between “expert” and “novice”

Students can now acquire much knowledge that was once the domain of experts. This raises the level of community awareness as well as skills of discrimination, research, risk-analysis and time management. Teachers must determine their professional core. It will not lie in the transmission of information. Communication technologies will do that better. This also affects librarians, some of whom have presided over collections that are superseded by the Internet. The expert with the capacity to learn (that is, adapt) will seek to apply his/her expertise further up the value chain. The expert is the one always leveraging future knowledge from present knowledge. This is the nature of knowledge.

2.1.2.3 The changing nature of work

This is a more confronting issue for teachers than many other workers because in addition to its impact on them as workers, it impacts immediately on the students of individual teachers. The new industries are knowledge and information industries. They rely on knowledge growth, experience, synergy and connectedness—to human and to telecommunications networks. Attitude is more important than skills. A career is more hyperlinked than logically sequenced.

Teachers’ work must change. In the Industrial Age Australian teachers were trained in mass programs, allocated to schools by mass distribution systems, governed by regulation, using in many cases, mass-produced resources. An Information Age is not an age of mass markets. It is an age of individualisation, of myriad choices, of options. Methods that were developed for mass education will not fit the Information Age.

Librarians' work has also changed. It has become increasingly clear in the last two years that the skills of librarianship are in demand. They must however, be matched to change management skills and reconceptualised in a framework of multiple choices, inter-operability and specific need.

2.1.2.4 Participation and democracy

The general belief holds that representative government is the only form of democracy that is feasible in today's sprawling, heterogeneous nation-states. However, interactive telecommunications now make it possible for tens of millions of widely dispersed citizens to receive the information they need to carry out the business of government themselves, gain admission to the political realm, and retrieve at least some of the power over their own lives and goods that many believe their elected leaders are squandering. (Grossman 1995: 6)

The unprecedented access of US and world citizens to the Starr report, unfiltered by the news media illustrates the interest and the potential.

It is evident that at the present time representative democracy in Australia is a little frayed at the edges. It may be resilient and flexible. On the other hand, the Internet and electronic mail together with high-speed data processing may provide a vehicle for moving closer to a participatory model of government. The schooling required by a citizenry that engaged directly in processes of government would be quite different to the present. Representational democracy is built on careful checks and balances. Citizens in a participatory democracy would need to negotiate checks and balances themselves. The sense of public good and the civil society would need to be internalised by citizens. This would need to be part of the education process. It is unlikely that our current educational institutions would prove to be appropriate for such an education.

There is no shortage of support for the notion that the Internet by its nature is uncontrollable and therefore a poor vehicle for civil society, however participatory.

While on the one hand distributing competence and political power to ever larger numbers of people, as a whole the technology has an inbuilt resistance to societal control of itself. (Ravetz 1996: 52)

2.1.2.5 Managing educational knowledge

Knowledge management includes data storage and retrieval systems, it means talking to users of services in order to improve services. It means planning for research, looking for those who don't agree with us because we learn more from them than from our sympathisers. It means nurturing a culture that links ideas to information, captures experience and turns it into growth. It means identifying and understanding patterns—and valuing always the deviation from the pattern because it leads us to the design. Educators must move beyond the concept of an Information Age to conceptualise and internalise the notion of a Knowledge Age

We need university courses on knowledge management for educators. Programs could look at pedagogical issues, such as the changes in conceptualisation occurring in young children as they experience multi-media. In addition, however, there are issues of knowledge and records management which are peculiar to education. We could examine the implications for schools of Lesk's (1998) calculation that by the middle of the year 2000 we will have more storage capacity than there is information in the world. We might examine how we could capture the knowledge of a grade 3 teacher to pass on to those who will subsequently teach that cohort, or how we capture the knowledge of parents to assist their child's learning. Or how a university can best utilise the knowledge that each

cohort brings, while identifying the gaps that require learning strategies. We could look at how an educator might benefit more easily from the stored knowledge of the system that employs him or her and vice versa. We need records management systems that are efficient, reliable, secure and transparent. Lifelong learning is going to be very tedious if the individual is the only authority; having to remember and redescribe his/her own learning history continuously for seven or eight decades.

2.1.3 Opportunities for educators

The education profession will choose the term “Knowledge Age” over “Information Age”. It is the profession that must create the knowledge society.

The most fundamental issues for educators relate to values. Cyberspace is being populated. The banking and finance industries are already information industries. A Knowledge Age is possible.

Education is a futures industry. It lays money and careers on estimates of what will mature in the future and then sets out to make it happen. Its core concern is the survival and the growth of civil society.

Educators can best ensure that the Knowledge Age in Australia transmits core Australian values by modelling those values in practice. There are no groups better placed in our society to provide leadership in knowledge management directed towards broad social goals. But it is not a task for the faint hearted. Educators forego opportunities by assumptions, habits and a tendency to respond to government rather than to pull governments forward.

There are four key areas of present opportunity.

2.1.3.1 Responsibility for employment pathways and professional knowledge

The information economy almost certainly brings with it more fluidity in employment. There will be a lot of work for educators, especially librarians, in the new economy. Most of this work will be outside libraries and outside the walls of educational institutions. To maintain maximum flexibility in this situation, and in order to be in demand as knowledge workers, we need to take charge of our own learning and employment, identifying and pursuing the experiences and knowledge that we need to solve problems, to develop our expertise. While employers may provide programs of training for specific situations we would be unwise to rely on particular employers to supply the experiences we require.

Librarians start with a bit of an advantage, since our association has always been active and assertive in relation to training for the profession. Teachers in State and Territory or religious education systems have been much more dependent on the employing authority for professional development support. The Knowledge Age will bring more power and options to those who take charge of their own learning, forming associations which can lobby on their behalf for frameworks for accreditation and pathways.

It may also be possible to win government support for some form of national “credit” system that facilitated negotiations with employers for payment of units of study or experience as part of employment packages. While voucher systems represent dangers to the provision of viable public education institutions, particularly schools, we should nevertheless be pro-actively thinking of some mechanisms that will allow workers to retain control of our own learning and negotiate with employers for some contribution to this process. We need both access to programs that meet our needs and a means of recording and keeping track of our learning and experience.

A first step in the process of asserting the responsibility for our own learning is to rethink our own expertise and sharpen our cognitive skills. We have for some time acknowledged the processes of learning. We have not however, been meticulous in developing our skills of manipulating symbols, nor have we demonstrated clearly the importance of cognition and meta-cognition in our teaching and learning. We need to be very specific about what we add to the cumulative knowledge (or more importantly, wisdom) of our communities that could not be added by a diligent education or information handyperson.

An emphasis on the process of learning must not imply “content-free”, unmeasured or less than rigorous. As more members of the general public develop good practices to manipulate information effectively, we need to maintain our contribution to society by pushing the boundaries, developing more efficient and effective practices in creating, storing and manipulating knowledge.

2.1.3.2 A broad-based infrastructure for knowledge management

As they seek to develop an information economy, governments recognise the marketplace need for infrastructure. The extent of the infrastructure required by educational institutions and libraries if they are to provide the basis of public capacity to participate in the knowledge society is not well recognised.

There is, moreover, an educational, or knowledge management infrastructure that is required (Broadbent 1997). To date we have only seen this acknowledged in relation to specific skills for the IT industries or in relation to content regulation. Even here, we may well require an infrastructure of content rating or metadata at source if we are to manage information to produce knowledge without compromising much fought for principles of freedom of information. However, as Heim has pointed out (1998:265), the citizen manages knowledge in more ways than does the employee. Consequently the educational infrastructure supports more than corporate need.

As a profession, we need to be examining the notion of educational entitlement as part of the infrastructure of the Knowledge Age. The availability of information does not result in lifelong learning. A society committed to a knowledge-based economy must surely consider less than adequate the current educational infrastructure of ten years of compulsory (largely) institutional education followed by either unemployment, optional schooling for 2-3 more years, then competitive, partially funded vocational courses or the vagaries of the employment market. A Knowledge Age is likely to require a more flexible and sophisticated infrastructure of access to formal education programs that can be customised to the needs of the individual, industry and communities. It is not too much to postulate that the information society would demand that 20 years of a citizen’s life be spent in formal learning situations.

To accompany some sense of entitlement, we need flexible educational delivery. Not only do we need more access to online components to courses, but also we need more modularised courses and programs to achieve a high degree of customisation (Baldwin and Clark 1997). This requires us to do more than package skills acquisition. The critical need is for higher level thinking skills. We need to find ways of constructing courses and pathways that ensure students can develop their creative and conceptual talents in contexts that meet their needs.

Further we must build community education networks and points of information access. The British government’s “New Library” (LIC 1997) proposal goes some way towards this. We need to examine whether the current integration, for example, of a university and its library is the only or best way to

provide a service to students. Perhaps in a knowledge society access points to stored knowledge will need to be more independent of the institutions of formal learning, creating more flexible access to learners regardless of where they may be formally enrolled. Our current infrastructure of school, TAFE, university, public and State libraries may not be the best we can devise.

At least for the first decades of the Knowledge Age, we may need to be more proactive in bridging generation gaps. We could devise networks of community access that assisted, for example, parents and grandparents to learn about information manipulation in contexts of relevance to their children's education. We might take the trouble, particularly in communities where work has been traditionally industrial rather than information centred, to bridge adults into the world into which their children are growing, so they are not so alienated, and so their children have the support of confident families.

Finally, we might be bold enough to experiment with some national lifelong learning institutions. These might be virtual institutions. They might comprise existing institutions in some form of network. They might cross State boundaries. They might aim for Australian education in a global context. Without some bold thinking and risk we are unlikely to produce the educational infrastructure we need for the Information Age. We don't have to wait for government. Leadership should be coming from educators. Such institutions might allow us to learn how to customise learning for students across a lifetime rather than an age group. They might teach us how to develop the truly flexible, Australian world citizen. They might assist us to understand what supports a lifelong learning habit that is useful to our society. They might accelerate our freedom from the limitations of State and Territory resources and economies.

2.1.3.3 Sharing, linking, recycling and collaborating

The Knowledge Age is a digital age. We need to be able to unpack, reassemble and repack knowledge to create new knowledge. This requires partnerships at all levels—corporations, nations, organisations, individuals. We can expect to see the same mergers, partnerships and sell-offs occurring in relation to knowledge as has occurred in relation to capital. Already in our federal system we see governments coming together to form alliances (between, for example, different State governments) to leverage from each other's resources or ideas.

Education Network Australia (EdNA) is an example of this. It is a service and a network that collects information, adds value to it through quality control and services, repackaging several ways to suit the needs of stakeholder governments (all Education and Training Ministers in Australia—Commonwealth and State/Territory are "owners" of EdNA). Stakeholders also work collaboratively to think through policy issues—particularly where existing policy frameworks do not fit emerging educational need.

EdNA has worked because it met a number of key conditions that are likely to be repeated in other contexts in the Knowledge Age. First, EdNA met an immediate need of education authorities for a handle on the emerging digital technologies. While some industries can introduce new technologies very quickly because market pressure gives competitive edge to early adopters, the predominant pressures on education authorities are social, industrial and budgetary. The dispersed nature of the education industry, particularly schooling, its large educated employment base, its public accountability and its fixed budget costs make it very difficult to mobilise expertise and introduce radical changes in technology. Education authorities learned from one another very rapidly through the EdNA forums, enabling a much faster development of strategic plans for technology.

Secondly, the conceptualisation of EdNA was timely. Originating in the Commonwealth Department of Employment, Education, Training and Youth Affairs, the idea was floated just at the moment of the

World Wide Web impacting on Australia. It therefore rode the wave of interest as educators needed to know what this was and how it might be harnessed.

Thirdly, EdNA harnessed the goodwill of educators towards each other, the existence of a Ministerial Council, the vehicle of a corporation established by Ministers for a somewhat different purpose, and the need of governments to harness technology for economic reasons. EdNA, what is more, harnessed these across sectors in education, an achievement not before observable. Had the structures not been there to use quickly, the idea may have lapsed.

Fourthly, EdNA worked quickly to establish some very base level standards and to ensure that the initial needs of the three education sectors were met. Content standards, metadata standards, protocols for administration were all argued out and agreed within the first 18 months and then revisited. The agreement that standardisation is efficient was quickly evident.

Fifthly, the initiative aggregated the efforts of the participating authorities to produce something greater than the sum of its parts. In this sense, EdNA (<http://www.edna.edu.au/>) is an outward and visible sign of a Knowledge Age; how to produce added value from knowledge. It continues to find ways of recycling and reusing information in different contexts, discarding the superseded but replenishing and repackaging continuously.

Such networked partnerships, ways of gaining value for everyone by balancing the needs of a group of powerful players are likely to be commonplace in the Knowledge Age. They require a great deal of skilled work in collaboration, finding solutions that meet diverse needs, delivering services, balancing resources and linking networks within networks. As a profession we need to work hard at such partnerships and networks. The policy task, as Colebatch (1998: 84) points out is:

To induce the participants to adhere to a common course when the possibility of compelling them to do so is quite small.

2.1.3.4 Developing an internationalised Australian perspective

Developing and safeguarding our Australian identity while thinking and participating globally is a key success factor. Just as the rise of the nation-state created the need for universal suffrage, the Knowledge Age will create a global citizen need, and will call into question the assumptions we have made about participation in society. Our profession must exemplify fairness, tolerance, respect and empathy. We need to expose ourselves to the pressures of needing to learn languages other than English and living in non-English speaking countries. There is a danger as well as an advantage in living in a country that speaks the current language of the Internet. Adaptability is an essential quality in a global economy. Adaptability is learned through struggle. The struggle to learn a new language and to communicate under duress pays dividends. Our neighbours learn it. About 25% of our current population learned it through their migration experience. We need to ensure we continue to renew it. We need to expect to spend periods of time in neighbouring countries listening and learning.

We need to emphasise and develop skills of participation so we can participate fully in our own society and a global one. We will only do this as we understand the cultures within our own community including Aboriginal culture. We need a context of self-understanding. It is only when we understand our own capacity for racism and cultural domination that we can be free of them. Denial precludes improvement.

The development of Australian curriculum for a global society is a major challenge (*Singh and Henry 1998; Marginson, 1997:251-258*). The associated challenge is to create the lifelong educational

delivery structure that will draw in and develop the groups currently marginalised in our society. Egalitarianism is a fundamental component of our view of ourselves as Australian. It is only in respecting and including all the talent and perspectives in our own society that we will think well enough of ourselves to participate unfettered in a global society.

The marketplace may well be the prime determinant of the Information Age. There are many ways in which education can and should contribute in that marketplace. From those to whom more is given, however, more is expected. We know as a profession that this is not sufficient. A Knowledge Age requires more effort to nurture and grow the society that sustains the economy, more choices about the means to the end, more attention to the learning infrastructure that will draw diverse talent from the broadest possible base and sustain the creative and intellectual life of the community.

We must find the voice in the next five years to speak with authority on these issues. Otherwise we abrogate the responsibility which is ours by virtue of the living we make from learning.

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