

# **The Enabling Pillars**

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**Learning, Technology, Community, Partnership**

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**A Report on Australian Policies for Information  
and Communication Technologies in Education and Training**

**Peter Kearns and John Grant**

Global Learning Services  
10 Fisker Crescent  
KAMBAH ACT 2902

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## EXECUTIVE SUMMARY

This study of policies for information and communication technologies (ICT) in education and training in Australian education systems and agencies is the initial component in a project undertaken for the Australian Department of Education, Science and Training (DEST).

The project comprises three components:

- the development of a searchable online data base where policies, both Australian and international, are summarised, and which can be accessed through EdNA Online (<http://www.edna.edu.au>);
- this report on Australian developments;
- an international report covering ten countries in Europe, North America and Asia, as well as Australian systems.

The Australian report provides the platform for the comparative analysis of the international report.

The data base of policy summaries has been structured around the five goal areas built into the Australian Education and Training Action Plan for the Information Economy prepared by the former Department of Education, Training and Youth Affairs (DETYA). This structure has been carried over into the chapters of this report with the addition of a further chapter on overarching strategies and frameworks for action.

### Phases of Development

The report shows that Australian education systems, like those included in the international study, progressed through several phases of development in their policy for ICT in education. These phases, in general, have been:

1. an initial rolling out phase with a focus on getting computers into institutions, accompanied by some professional development of teachers and software development;
2. a mainstreaming phase concerned with integrating ICT into the work of schools and vocational education and training (VET) based on the overall strategic directions for these institutions, and with a deepened concern for learning outcomes.

While considerable attention is now given to ensuring that policy for ICT in education is integrated with overall educational policy, the available evidence suggests that practice in education institutions remains a mosaic of the old and the new, and there has not yet been a transformation in the way learning occurs in these institutions and in society.

## **Partnership Development**

A feature of the Australian scene has been a strengthening of partnership development of various kinds in addressing the challenge of ICT. This has included a strengthening of collaboration between the States, Territories, and Commonwealth which is exemplified in the development of a national action plan for ICT in education covering all sectors of education.

This action plan titled *Learning for the Knowledge Society* was developed as a collaborative national response to the challenge of the information and knowledge society. There is active follow up on the sectoral plans with reporting to the Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) through its advisory committee, the Australian Information and Communication Technology in Education Committee (AICTEC)

A major collaborative project for schools, *The Le@rning Federation*, further illustrates the strengthening of partnership and collaboration between the Commonwealth and the States and Territories. In the case of the VET sector, annual strategic plans are being developed and funded by the Australian National Training Authority (ANTA) in consultation with the States and Territories.

## **Strategic Framework for the Information Economy**

At a national level, a *Strategic Framework for the Information Economy* has been developed to provide a whole-of-government perspective in national responses to the requirements of the information economy. Similar strategic frameworks exist in most States and Territories so that education systems are being brought into a closer relationship with State, Territory, and national objectives.

While allowing for a general lack of consistency in the use of the terms “information economy”, “information society”, “knowledge economy” and “knowledge society”, it could be argued that there is an economic emphasis in the Australian national strategic framework in contrast to the broader social vision which has emerged in the European Union and its member countries, and in other countries such as Canada. This question is discussed further in the international report.

## **ICT and Lifelong Learning**

In a number of Australian States/Territories the development of policy for ICT in education and training and more generally for orientating education systems to the requirements of the information economy has included a strong commitment to the principles of lifelong learning. The same commitment is not evident in any comprehensive way at the national level in Australia, although the *National Goals for Schooling in the 21<sup>st</sup> Century* charge schools with the responsibility to assist young people to develop a disposition towards learning throughout their lives and lifelong learning is promoted by ANTA as central to the mission of the VET sector. Whether this situation acts as a barrier to achieving the full potential of the role of ICT in education, and in society, is an issue that requires further consideration in the development of policy for ICT in education.

## **Access and Equity**

While programs such as Networking the Nation have supported the extension of telecentres and community technology centres across Australia, the focus of Australian policy for ICT in education has been on the sectors of the formal education system, and more could be done on a national level to address the needs of adults lacking ICT skills and digital literacy. Some States, however, have implemented programs directed at this need.

## **General Comment**

Considerable progress has been made in developing policy frameworks and partnership arrangements to further the use of ICT in the sectors of the formal education system, and mainstreaming of policy for ICT in education has become general across Australian education systems. There has been a strengthening of Commonwealth and State collaboration in addressing the challenge of the information era. However, access to affordable bandwidth remains a problem in the school and VET sectors, and less priority has been given until recently to the needs of adults lacking ICT skills.

There is a key issue as to whether a more comprehensive and systemic approach is required that links policy for the formal education system and for the adult community in synergistic ways so that outcomes are value added. Such an integrated and holistic approach would require further progress towards whole-of-government collaboration across the levels of the Australian federal system, and innovation in developing arrangements to bring about these outcomes. Achieving the full potential of ICT in education and in society, so as to transform the way people learn in the digital era, is likely to require policies that stimulate cultural change in education institutions, and in the communities they serve, in building a culture that supports enterprise, learning, innovation, and creativity.

# 1. INTRODUCTION

This study of policies for information and communication technologies (ICT) in education and training has been undertaken for the Australian Department of Education, Science and Training (DEST) at a time of major development in policies associated with the impact of the information society. For this reason, there is substantial value in a stocktake of policies adopted in Australian jurisdictions, and in a selection of other countries.

The stocktake of policies will lead to a searchable online database where policies will be summarised which will be accessed through EdNA Online ([www.edna.edu.au](http://www.edna.edu.au))

In addition to the database, two overview reports are being prepared for the Department:

- a report on Australian developments
- an international report covering a selection of OECD and other countries, as well as Australian developments.<sup>1</sup>

The report which follows is on Australian developments. The companion international report will be available later in 2002.

The data base of policies is being structured around five goal areas built into the Education and Training Action Plan for the Information Economy prepared by the former Department of Education, Training and Youth Affairs, the predecessor of DEST, with the addition of a further category for Overarching Strategies which covers strategic plans for the use of ICT in education and frameworks for collaboration and coordination. We have accordingly decided that it would be sensible to structure this report, and the subsequent international report, around the same goal areas. We have done this, with the addition of a chapter on the evolving context of the information economy.

The five goal areas built into the Education and Training Action Plans<sup>2</sup> are: 1. People; 2. Infrastructure; 3. Online Content, Applications and Services; 4. Policy and Organisational Framework; 5. Regulatory Framework.

As noted above, the database structure requires the addition of a further category of Overarching Strategies. This is discussed in Chapter 3 below.

The range of policies which bear on the use of ICT in education is extensive. These policies will be summarised in the database. However, we have taken the position that the Australian and international reports should be more than an inventory of policies, but rather that these reports should provide a comparative analysis of key directions for policy so that individual policies summarised in the database can be

considered in the interpretative frameworks provided by the two reports. In this way the two reports involve a shift of perspective from individual policies to broader strategies directed at adapting education and training to the information economy and society.

For this reason we have not attempted to provide a comprehensive listing of all relevant policies in the two reports. Rather, our approach has been selective with representative policies discussed to illustrate what we have taken to be the key policy directions involving the role and impact of ICT in education.

Given the ambitious scope of this study, there will inevitably be gaps in our analysis and we welcome comments on significant omissions which should be rectified in the final draft of this report. It is also our intention, when the database is completed, to add appendices to this report to provide links to the database through listings of key policy variables to facilitate the use of the database, and to extend the analysis of this report to a wider set of policies.

For this reason, this report should be regarded as an interim report which is being submitted for comment, in particular with respect to the overall analysis of the report and any significant omissions in the analysis.

In addition to providing an overview of Australian policy development, the Australian report serves as a platform for the comparative analysis of the international report. For this reason we have been concerned in each chapter of the report to identify what we take to be the key issues and directions for policy which will be taken up in the international report which will include Australia as well as a selection of OECD and other countries.

A prime objective in the international report is to identify insights and lessons from international experience which might be useful inputs to further Australian policy development. The field of policy for ICT in education and training is a dynamic area of change in which policy makers are confronted by the daunting challenge of keeping up with the pace of technological change, and with the socio-economic outcomes of technological change, which are providing a radically different context for educational policy.

We have also found this task daunting, but in the international report we will draw on a growing body of international experience and knowledge which international agencies such as OECD and the European Commission are contributing to, as well as individual education systems and researchers.

Perhaps above all, our encounter with international experience suggests the central significance of collaboration and partnership in addressing the educational challenge of the information age. The sharing of new ideas fuels creative responses and innovative forms of partnership so that this report is seen as a contribution to this necessary process of adapting education to a new era in human history.

## NOTES

1. In addition to Australia, the international report will cover the United States and four American States (California, Texas, Ohio, South Carolina), Canada and three Canadian Provinces (Quebec, British Columbia, Ontario), European Union, OECD, Britain, Sweden, Finland, Ireland, New Zealand, Singapore, Malaysia.
2. We refer to these as Education Action Plans throughout this report and refer to the School, VET, and Higher Education Action Plans as the constituent sectoral action plans.

## 2. THE EVOLVING CONTEXT OF THE INFORMATION ECONOMY

*But we are in the midst of a revolution from which a new order is emerging. The solutions of past decades will not suffice in the new knowledge age. Intangible assets - our human and intellectual capacity - are outstripping traditional tangible assets in land, labour and capital - as the source of growth. If we are to take the high road, a road of high growth based on the value of our intellectual capital, we need to stimulate, nurture and reward creativity and entrepreneurship.*

Communiqué of National Innovation Summit, 2000

*The Internet is perhaps the most transformative technology in history, reshaping business, media, entertainment and society in astonishing ways. But for all its power, it is just now being tapped to transform education.*

Report of the United States Web-based Education Commission, 2000

There has been wide recognition across OECD countries that a 'new world order' is emerging. While various terms have been given to this new era in human history - such as information society, information economy, knowledge economy, new economy, learning age - the defining characteristic to this new era is the pervasive impact and influence of information and communication technology.

It is also widely recognised that the current changes are pervasive in their impact throughout society, and irrevocable. This reality is articulated in the Queensland *Communication and Information Strategic Plan for 2001-2002* in the following terms:

*We are witnessing the emergence of a new world order. Rapid technological advancements and an information explosion have precipitated change which is both pervasive and irrevocable. We are living increasingly in an 'e-world'.<sup>1</sup>*

This impact ranges across economic, social, educational, and cultural domains, and is reflected in the spectrum of terms given to the emerging post-industrial society. In Australia, we have found that the concept of an 'information economy' is more commonly used, while in some parts of the world the concept of an 'information society' has gained greater coverage. While noting that the terms are often used synonymously, we will examine in the international report the policy implications arising from these conceptual distinctions.

A further distinction found in the literature exists in the use of the terms 'information economy' and 'knowledge economy'. While some scholars distinguish information and knowledge,<sup>2</sup> there is considerable overlap in the use of these terms. Both terms reflect the critical significance of information and knowledge for economic success in

the new environment of business and the need for information to be managed and converted into knowledge which has a commercial value. Success in the knowledge society for individuals, enterprises, and communities is highly dependent on the capacity to generate, manage, disseminate, and use knowledge for innovative and creative purposes.

### **The Drivers of Change**

The key drivers of change in the emerging information society and their implications for the education industry have been examined in a recent report by Merrill Lynch. The study identifies six megatrends which are driving the education market forward and shaping its contours.<sup>3</sup> These are:

- technology, globalisation, consolidation, demographics, branding, and outsourcing.<sup>4</sup>

These megatrends impact in different ways in the sectors of education, but in their interaction create a dynamic (and unpredictable) pattern of change which we discuss in the chapters of this report in terms of policy responses.

A critical element in this environment is the exponential pace of change and the blurring of many traditional boundaries. These conditions require people able to adapt to changing conditions and to 'think outside the box' so that a capacity for innovation, enterprise and creativity has become increasingly important in this environment as is reflected in recent assessments of generic skills required by the conditions of the new economy.<sup>5</sup>

### **Australia and the Information Economy**

Australia rates fairly well on most indicators of participation in the information economy. The Australian situation is reported regularly by the National Office of the Information Economy (NOIE) in its *Current State of Play* reports. Overview statistics for Australian householders online and for the characteristics of Australian adults online are given in Appendix 2 and discussed in Chapter 4 in the context of a consideration of access and equity issues.

The statistics for November 2000 show that:

- 37.1% of Australian households were online at that date;
- 50% of Australian adults accessed the Internet from any site in the 12 months to November 2000;
- there were significant differences in access in terms of household and personal income, age profile, employment status, and household family type, and some differences in terms of region.

A characteristic of the Australian situation has been the rapid growth for most indicators. For example, in June 2000, an estimated 56% of employing businesses were connected to the Internet (an increase of 93% since June 1998) while the

Australian Bureau of Statistics projected that 50% of Australian households would be online by November 2001.

The good performance of Australia in ICT connectivity is confirmed in the latest annual A.T. Kearney Globalisation Index. In the Technology component of the Globalisation Index, Australia ranks second behind the United States with New Zealand seventh.<sup>6</sup> The Technology component of the index measures the number of Internet users, Internet hosts, and secure servers. However, in the Globalisation Index overall, Australia ranks only twenty first and has only moderate performance on a number of OECD education indicators in areas such as the literacy skills of the adult population.<sup>7</sup>

This suggests the challenge of building on the relatively high proportion of the Australian population online through innovative policies and strategies to address social, educational, and economic issues reflected in other indicators.

### **Implications of the Information Society for Education and Training**

The evolving context of the information economy and society is challenging many traditional habits and attitudes, including traditional views on the organisation, objectives, scope, and management of education and training. These implications are discussed below, and throughout this report in terms of policy responses to the challenge of the information age.

There is widespread international recognition that the impact of the information economy and society requires a fundamentally new approach to education and training.<sup>8</sup> This recognition is also present in the Education Action Plans as, for example, in the Higher Education Action Plan which comments on the need to get to grips with the fundamental socio-economic shifts in an information economy,<sup>9</sup> in the VET framework for national collaboration, which argues that the meaning of the word 'learning' is in a state of transformation,<sup>10</sup> while the School Action Plan refers to the progressive transformation of education.<sup>11</sup>

In examining policies for ICT in education jurisdictions across Australia, we observed a cluster of key issues being brought forward in the policy agendas. These included:

- responses to the pressures for lifelong learning;<sup>12</sup>
- new strategies for teaching and learning;
- a start to the process of redefining roles and relationships including school and community relationships;
- balancing and harmonising competing educational, economic, social and cultural objectives;
- fostering new forms of partnership and collaboration;
- providing access to affordable infrastructure;

- addressing equity issues including the core social issue of assisting those 'left behind' by the changes.

A significant feature is that policies for ICT in education have now been brought into the mainstream of the education policy debate with growing linkages to whole-of-government issues and strategies. These linkages in broader policy frameworks are discussed in Chapter 3.

The growing linkages between policy for ICT in education and policy responses to other significant changes in the world of education and training, and more broadly in society and the economy, means that the interplay and synergy between these developments have assumed a critical significance in terms of policy outcomes. Framework strategies to develop these linkages are discussed in Chapter 3 and are taken up throughout this report.

While policy for ICT in education connects to a broad spectrum of education, training, and economic and social, developments the following key issues appear to be assuming increased significance:

- how to respond to the growing demand for education and training on a whole-of-life basis;
- how to meet the skills needs of the information economy;
- how to link local communities and the education sector more closely through strategies such as learning communities;
- how to combat exclusion and to assist those lacking essential skills and knowledge for the information age.

Strengthening the role of education and training in addressing these key issues requires new approaches to teaching and learning which foster the capacity of students to be motivated self-directed lifelong learners in a world of exponential change. The policy response to this challenge, with ICT as a major tool of policy, is a central theme in this report.

### **The Search for Holistic Responses**

A particular challenge for education systems resides in the need to address the economic, social, and pedagogical rationales for the inclusion of ICT in education. These rationales and their implications were examined in a recent OECD report on the impact of ICT in schools.<sup>13</sup> While there is some overlap, each can lead to different emphases in a way that ICT is introduced and used in education, in particular at the school level. The rationales are:

- the **economic rationale** which has a focus on the perceived needs of the economy and the requirement to meet the skill and learning needs of the information economy;

- the **social rationale** which focuses on facility with ICT becoming a prerequisite for participation in society and employment so that ICT competence is seen as an essential life skill and a basis for maintaining employability throughout life;
- the **pedagogical rationale** which concentrates on the role of ICT in teaching and learning and the ways in which ICT can increase the breadth and richness of learning, foster motivation for learning, and support the development of higher-order thinking skills.<sup>14</sup>

OECD asserts that there is a growing convergence between the economic, social and pedagogical rationales,<sup>15</sup> and we found evidence of such a convergence in the progression of Australian policy for ICT in education through several stages of development, and overall in the search for more holistic and integrated responses to these imperatives.

### **General Comment**

The search for holistic responses and strategies that foster “seamless interdependence” across educational, social, economic and civic objectives is discussed in the chapters of this report which follow.

In a dynamic context of exponential change, there is a particular challenge for education policy in responding to competing priorities, such as meeting the skill needs of the information economy, while also redefining and reasserting the essential role of education in an information and learning society in the process of rapid transformation.

Policy for ICT in education lies at the frontier of these competing forces so that the overview of policy given in this report must inevitably attempt to gain a sense of the ‘big picture’ in the key directions for policy, while also identifying the issues which remain to be addressed in this journey towards a learning and knowledge society.

## NOTES

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- 1 Queensland Department of Communication and Information, Local Government, Planning  
and Sport, 2001.
- 2 See Davenport and Prusak 1998, Nonaka and Takeuchi 1995, Halal 1998.
- 3 Merrill Lynch 2000. Cited in Moe and Blodget 2000.
- 4 Ibid.
- 5 Kearns 2001.
- 6 A.T. Kearney 2002.
- 7 OECD 1998.
- 8 See for example European Commission 2001, OECD 1996, OECD 2001a.
- 9 DETYA 2000, p.81.
- 10 Ibid., p.61
- 11 Ibid., p.49.
- 12 By 'lifelong learning' we mean: " All learning activity undertaken throughout life, with the aim  
of improving knowledge, skills and competencies within a personal, civic, social and/or  
employment-related perspective".
- 13 OECD 2001b, pp.10-11.
- 14 Ibid., pp.10-11.
- 15 Ibid., p.11.

### **3. OVERARCHING STRATEGIES AND FRAMEWORKS FOR ACTION**

Australian education policy for ICT has been caught up in recent years in a maelstrom of activity as governments have sought to adapt to the conditions and requirements of the information economy. While this has led, on the one hand, to whole-of-government strategies which have sought to connect disparate government activities into coherent action frameworks directed at a vision for success in the information economy, it has also stimulated education policy responses concerned to balance and harmonise competing economic, educational, and social objectives. The story of the subsequent responses is the story of this report, and will be central in the international report.

In this highly dynamic situation of challenge and change, six key directions for education and training policy can be identified:

1. meeting the skill requirements of the information economy;
2. enabling all members of the community to benefit from the information economy including possessing basic ICT skills;
3. enhancing the quality of teaching and learning in education;
4. supporting strategies for lifelong learning;
5. enhancing quality of life; and
6. fostering new forms of collaboration and partnership in furthering this range of objectives.

A range of policy initiatives adopted across Australia has supported these key policy directions.

The balance and emphasis in these policy directions vary between jurisdictions, including the extent to which these key directions for policy are integrated in holistic strategies. For example, while all jurisdictions have policies to address goal 1, not all jurisdictions are linking their ICT policies to strategies for lifelong learning (goal 4) in explicit ways.

In general, the trend in policy development for ICT in education has been to progress from “domestic” educational strategies to more comprehensive multi-faceted strategies that range more broadly across these directions for policy. In doing this, policy has been increasingly strategic in linking educational objectives to the economic objectives driving government responses to the imperatives of the information economy and society.

These trends mean that technology in education is no longer a self-contained topic, but is now a key feature of the mainstream education debate on objectives, strategies, and priorities, a point noted by OECD.<sup>1</sup>

Nevertheless, tensions exist between educational, economic and social objectives, and the way systems are seeking to harmonise competing objectives is a key question for this report, and for the international report.

There are grounds for taking the view that varying balances in these policy directions may be observed between the various sectors of education and training. At the level of compulsory schooling, for example, enhancing teaching and learning assumes a particular significance, while a different emphasis is found in post-compulsory schooling and in the VET sector and higher education. These are questions that will be examined further in the comparative analysis of the international report.

## **The Federal Context**

The development of overarching strategies and frameworks for action has been strongly influenced by the roles and responsibilities of the stakeholders in Australia's federal system. The impact of the information economy is national and international so that national initiatives such as the Strategic Framework for the Information Economy<sup>2</sup> and the national Education Action Plans<sup>3</sup> have influenced action taken by the States and Territories, in particular since 1999. The interplay of national and State/Territory initiatives has been a key driving force in Australian policy development in recent years.

## **The National Agenda**

A key influence has been the development of a national strategic approach to the information economy. This approach led to the establishment of NOIE in 1997 and consultations during 1998 on a draft national strategy, *Towards an Australian Strategy for the Information Economy*.<sup>4</sup>

The response of the education community to the draft national strategy was unambiguous. Endorsed by MCEETYA in April, 1998 as the national forum for advice on issues relating to the educational use of information and communication technologies, the EdNA Reference Committee (now the Australian Information and Communication Technology in Education Committee – AICTEC) commented, in part, as follows:

<http://www.noie.gov.au/projects/information%5Feconomy/strategic%5Fframework/consultations/submit32.html>

*The ERC supports the view of the Government's preliminary statement on a Strategy for the Information Economy that Australia's future prosperity calls for a national cooperative effort to develop Australia's information economy. However, in the preliminary statement, education and training appear as merely useful additional factors in a model for the information economy which is narrowly focussed on transactional and private commercial features, rather than encompassing all the essential framework required to make an economic model valid. For the vision in the preliminary statement to become a reality in any further development of the strategy, the key role*

*of education and training in achieving that vision must be fully integrated into the police approach.*

The response included several recommendations, among them:

- that a national strategy be developed for the effective involvement of the education and training sector in the information economy, encompassing all sectors including the adult and community sector;
- that there should be close national cooperation in the development and application of online resources for flexible delivery across all education and training sectors;
- that affordable access to online services must be achieved;
- that resources must be made available for infrastructure, professional development, support services and the production of high quality Australian online educational content.

The Commonwealth Government's *Strategic Framework for the Information Economy*.<sup>5</sup> was released in January 1999. <http://www.noie.gov.au>. It is based on the premise that Australia's success and prosperity in the new world of the information economy requires a co-operative effort on the part of all levels of government, the private sector, and the general community.<sup>6</sup> In setting a national strategic framework for such co-operation, this document established a whole-of-government approach which has been taken up in similar State and Territory strategic frameworks.

The *Strategic Framework* provides a vision and mission for Australia in the information economy, values (or guiding principles) behind the strategic approach, the priorities to advance that vision, and key action areas.<sup>7</sup>

The vision statement in the *Framework* is broadly stated, and ranges across economic, social, educational, and cultural objectives. Because of this, a whole-of-government approach to the information economy has become imperative, a reality recognised by the States and Territories in their counterpart strategies.

The mission of the *Strategic Framework* is then stated in the following terms:

*To ensure that the lives, work, and well being of Australians are enriched, jobs are created, and the national wealth is enhanced through the participation of all Australians in the growing information economy.*<sup>8</sup>

The aspiration that all Australians should benefit from the information economy sets an ambitious and daunting social objective that has major implications for the role of education and training, in particular in addressing the situation of those excluded from these benefits.

The *Framework* identified ten priority areas for action. While most of these priorities have implications for education policy in some way, the main implications for education and training policy flow from the following priorities:

1. Maximise opportunities for all Australians to benefit from the information economy.

2. Deliver the education and skills Australians need to participate in the information economy.
3. Increase significantly the use of electronic commerce by Australian business.<sup>9</sup>

Progress reports on the *Strategic Framework* were published by NOIE in July 1999 and May 2000, and NOIE's annual report for 2000/2001 provides further information on progress. <http://www.noie.gov.au>

## The Education Action Plans

The objective that the education and skills Australians need to participate in the information economy should be provided has been addressed at a national level through the development of an *Education and Training Action Plan for the Information Economy*.<sup>10</sup> This *Action Plan*, published in 2000, is an education response to the Commonwealth's *Strategic Framework for the Information Economy*.

This Action Plan, titled *Learning for the Knowledge Society* (<http://www.dest.gov.au/edu/edactplan.htm>), comprises the cross-sectoral plan and separate plans for each of the sectors of education and training as well as for the then Department of Education, Training and Youth Affairs.<sup>11</sup> The contribution of a cross-sectoral action plan with separate plans for each sector is a distinctive feature that does not appear to have a counterpart in strategic planning in other countries.

The *Action Plan* is significant in setting a five part action framework for policy development which has been followed in follow up activities, and which has had some influence on policy development in the States and Territories.

The five action areas are:

1. People
2. Infrastructure
3. Online content, applications and services
4. Policy and organisational framework
5. Regulatory framework.

We have followed the five action areas in the structure of this report and in the development of the database, so that our detailed comment on each of these action areas is given in the chapters that follow.

These identified action areas reflect what were seen as critical success factors in adapting education and training to the requirements of the information economy. For example, the success factors in areas 3 and 4 were described in the following terms:

3. *Promoting co-operation throughout the education and training sector and between governments and industry in the development, promotion and delivery of online content, applications and services.*

4. *Developing a comprehensive government policy framework for education and training that supports the information economy and the knowledge society.*<sup>12</sup>

A feature of the Australian approach is that the action areas are defined in broad, general terms rather than as targets to be achieved as in a similar American national strategy.<sup>13</sup> This has meant that monitoring progress has required separate action to develop targets and indicators.

In December 2000, through MCEETYA, Ministers released a Joint Statement <http://www.curriculum.edu.au/mceetya/public/pub3313.htm> to provide a strategic agenda for the Commonwealth, States/Territories and all parts of the education and training sector to work together to achieve the national outcomes identified in *Learning for the Knowledge Society*. Ministers identified the following as the highest priorities for cooperation during 2001-2003:

- *Ensuring that the education and training sector is able to provide all learners with opportunities to develop their ability to use technology confidently and creatively, and to develop the specialist skills needed to service the needs of the information economy;*
- *Supporting education and training workers, especially teachers, to acquire and maintain the skills needed to take full advantage of the potential of ICT to transform learning;*
- *Providing effective and affordable access to the Internet for all learners, regardless of their geographic location;*
- *Promoting collaboration in the development and dissemination of high quality digital educational content, services and applications that enable Australian learners to gain maximum educational benefits from the online revolution, while also developing a market and generating export income;*
- *Sharing leading practice and research on ICT issues; and*
- *Working across agencies at all levels of government to ensure the development of a policy and regulatory framework that supports the uptake of ICT in education and training.*

Follow up action on the national Education Action Plans is being mainly undertaken on a sectoral basis, although the Australian Information and Communication Technology in Education Committee (AICTEC) provides a vehicle for co-operation across sectoral boundaries. AICTEC, which is comprised of representatives from all major sectors of education, reports to MCEETYA and so provides a national forum for cross-sectoral information sharing and collaboration. <http://www.aitect.edu.au/>

At the school level the MCEETYA Information and Communication Technologies in Schools Taskforce (ICTST), previously the EdNA Schools Advisory Group, is a major national collaborative advisory and advocacy group on the use of information and communication technologies (ICTs) in school education and the development of national services such as EdNA Online. It represents all States and Territories, the peak non-government schools associations, and education organisations (e.g. education.au limited, Curriculum Corporation, and The Le@rning Federation). <http://www.curriculum.edu.au/mceetya/taskfrce/task223.htm>

The ICTST aims to:

- provide strategic advice to the Australian Education Systems Officials Committee (AESOC) and MCEETYA on the use of ICTs to support teaching and learning;
- provide leadership to the Australian education community in the effective use of ICTs;
- advance the use of ICTs that meet the needs of education;
- initiate, implement and support national projects related to the use of ICTs in education; and
- provide a forum for Australian education representatives to share information and advance collaborative initiatives in the use of ICTs in education.

The ICTST, which is funded under the Framework for Open Learning Programme (FOLP) of DEST, aims to promote the awareness, and maximise the benefits of ICTs to the education and training sector and contribute to the development of the EdNA initiative. <http://www.pa.ash.org.au/acce/folp/>

Follow up action in the VET sector which involves national strategic action over the five years 2000-2004 with annual strategic plans for each year funded by the Australian National Training Authority (ANTA) up to \$20m. In this way the VET Action Plan has become a rolling action plan with research and development initiatives in each goal area giving a dynamic impetus to the plan as new research is built into successive annual strategies.

While Strategy 2000 and Strategy 2001 were seen as the knowledge-building phase of the five-year plan, the strategies for 2002 and 2003 will provide the intensive phase of implementation directed at larger-scale change.<sup>14</sup> The annual VET strategies are available at <http://flexiblelearning.net.au/>.

In the higher education sector the group with a key role in ICT matters is the Council of the Australian University Directors of Information Technology (CAUDIT), the task of which is to promote and advance the use and support of information technology in teaching and learning, research and administration in the universities of Australia and New Zealand through the competent management of IT services and the education of their clients. Although not a committee of the Australian Vice-Chancellors' Committee (AV-CC) the Council and the AV-CC work in close consultation. <http://www.caudit.edu.au/>

Follow up on the Education Action Plans is discussed in the chapters that follow.

### **State and Territory Whole-of-Government Strategic Frameworks**

The Commonwealth's *Strategic Framework for the Information Economy* has its counterpart in similar whole-of-government strategic frameworks developed by the States and Territories since 1999.

These strategic frameworks include:<sup>15</sup>

**Victoria:** *Connecting Victoria* (1999)<sup>16</sup> [www.mmv.vic.gov.au](http://www.mmv.vic.gov.au).

<b>Queensland:</b>	<i>Communication and Information Strategic Plan (1999)</i> <sup>17</sup> <a href="http://www.dcilgp.qld.gov.au">www.dcilgp.qld.gov.au</a> .
<b>South Australia:</b>	<i>Information Economy 2002: Delivering the Future (2000)</i> <a href="http://www.ie2002.sa.gov.au">www.ie2002.sa.gov.au</a> .
<b>New South Wales:</b>	<i>Skilling People for an Information Society (2000)</i> <a href="http://www.oit.nsw.gov.au">www.oit.nsw.gov.au</a> .
<b>Tasmania:</b>	<i>Intelligent Island</i> <a href="http://www.dsd.tas.gov.au">www.dsd.tas.gov.au</a> .

These whole-of-government strategic frameworks combine economic, social, and educational objectives, as does the Commonwealth's *Strategic Framework*, and are administered by agencies, like NOIE, outside of the education sector. These include agencies such as Multimedia Victoria and the NSW Department of Information Technology and Management. They typically involve follow up reporting on progress, as with the Commonwealth's *Framework*, which in some cases involves reporting to the State Premier.

The State strategic frameworks differ somewhat in the balance of economic, social, and educational objectives built into them. This is often reflected, for example, in the extent to which lifelong learning and the digital divide are recognised as important issues in the development of the information economy.

The New South Wales strategy has a focus on the skill requirements of the information economy which are addressed through a ten point action plan,<sup>18</sup> while the Victorian strategy has a broader perspective in its plan. The Victorian objectives include:

1. *Building a learning society*
  - *We will create Victoria as Australia's leading learning society through increased attention to lifelong learning for all Victorians.*<sup>19</sup>

Similarly, the South Australian strategic plan has a broader orientation which links economic, social, educational and cultural objectives through four important themes (or touchstones) which underlay the strategic directions of the strategy.

These themes are:

- engagement and participation;
- capturing attention;
- stimulating imagination;
- connecting people.<sup>20</sup>

The Tasmanian *Intelligent Island* is somewhat different to the other State strategies in that it is rather a \$40m funding program, funded by the Commonwealth Government from the partial sale of Telstra, directed at the long term sustainable growth of Tasmania's ICT industries rather than a strategic framework. Nevertheless its impact is somewhat analogous in a number of respects to the State strategic frameworks discussed in this chapter, and the program includes skills development.

The independent Board overseeing the *Intelligent Island* initiative has developed a draft strategic plan to meet the skill requirement of the ICT industry.<sup>21</sup>

Western Australia up to now has not had a whole-of-government strategic framework along the lines of those discussed above. However, a vision statement by the government is currently in preparation, with consultations with stakeholders proceeding. Western Australia is well placed to build on its comprehensive school and training strategic documents, and to elaborate on the policy directions set out in those documents. It is expected that the vision statement will be released around the middle of 2002.

Like South Australia, the Queensland *ICT Strategic Plan* has an emphasis on connecting people which goes along with a general community orientation towards the whole community.<sup>22</sup>

*A key feature of the information age is connectedness whether it is between business and consumers, government and citizens, or rural communities and urban communities.*<sup>23</sup>

A significant aspect of Queensland planning for ICT skills is the recognition of the relevance of policy for lifelong learning.

*Sustained IT&T skill development can only occur in a lifelong learning context.*<sup>24</sup>

In these ways, these strategic frameworks are combining a whole-of-government perspective with a search for whole-of-community strategies which involve new forms of partnership action. The current interest in learning communities<sup>25</sup> is a reflection of this evolving orientation towards holistic strategies. It is likely that the Queensland Smart State strategic framework, when released in 2002, will carry this search to a further stage of development.

The implications of the emergence of whole-of-government strategic frameworks at both the Commonwealth and State levels are significant for policy for ICT in education, and the emergence of whole-of-government frameworks in the period 1998-2000 may be seen as a watershed between an initial phase of policy for ICT in education in most States, and a subsequent phase which seeks to balance and harmonise competing economic, educational, social, and cultural objectives in more holistic strategies. This trend is not uniform in all States, but does point to major directions for policy for ICT in education.

## **State Policies for ICT in Education**

### **Government Schools**

It was suggested above that policy for ICT in education in most States and Territories may be seen as evolving through two phases of development:

1. an initial phase of rolling out computers for institutions with associated professional development for teachers and some online content development;
2. a second phase of more strategic and holistic development which responds to both the national Education Action Plans and State whole-of-government strategic frameworks, and which seeks to harmonise educational, economic and social objectives.

While these levels may be observed when adopting a national perspective, there are fairly significant differences between jurisdictions in the policies and strategies adopted.

The New South Wales *Computers in Schools* program, initiated in 1994, is a typical example of the initial phase of ICT development in education.<sup>26</sup> By June 2000 this program had invested \$263.5 million in the program with 90,000 multimedia computers supplied to schools, with every school connected to the Internet, and with 15,000 teachers trained in using ICT under the *Technology in Learning and Teaching* (TILT) program.<sup>27</sup> Similar programs existed in other States. The ACT Department of Education and Community Services, for example, provided \$4.5m per annum over the period 1997-2000 to cover grants to schools for IT, PCs for teachers, computer software, and development of a wide area network.<sup>28</sup>

Phase one objectives may also be seen in programs across other jurisdictions, including infrastructure programs designed to give schools access to computers and the Internet. This action included:

- initiatives under the *DECStech* project in South Australia, which commenced in 1996, and which aimed, among other objectives, to achieve a computer/student ratio of 1:5 by 2001;
- the Victorian computers in schools program over 1996-99 which provided nearly 150,000 computers to schools and which achieved a State average computer-to-student ratio of 1:4.65, below the 1.5 target set for June 2002;
- the Queensland *Connect-Ed* project in 1997-98 which extended the *EdNet* (enterprise network) to 1300 schools throughout Queensland;
- the *Learning and Technology in Schools* (LATIS) project in the Northern Territory directed at improving student access to ICT.

### **Non-Government Schools**

The non-government schools in Australia, both systemic (as in the case of schools administered by the Catholic Education Commission) and non-systemic or independent, typically link in with the policies of the State and Territory education departments in such areas as curriculum, assessment and standards for teacher training. The same applies to developments associated with the use of information and communication technology in schools though in some areas, such as in the

application of flexible learning techniques, resources are allocated to explore aspects of particular interest to non-government schools.

The New South Wales Catholic Education Commission, for example is exploring the greater flexibility which the Internet offers in extending the learning and teaching options available to students in the Catholic school system. The Commission has established the *Internet Instruction Projects*, the aims of which are:

- to explore the pedagogical (teaching) practices that work best when the internet is the mode of delivery, and
- to develop generic software tools which teachers can use to offer courses on the internet.

Based on the findings to date the Commission has concluded, among other things,

- that the use of the internet to deliver instruction seems to facilitate learning in a manner at least equal to and probably superior to that offered by conventional correspondence schooling,
- that students need more regular feedback in an on-line environment as compared to face-to-face instruction where much communication between students and staff happens unconsciously,
- that content can be created and edited remotely with low-cost software and hardware, that system redundancy is a sine qua non for this mode of delivery,
- that back-up servers must be available and accessible to students and instructors and
- that Internet-based instruction is comparable in cost to the current costs of correspondence instruction as offered by the NSW Open High School.  
<http://www.cecnsw.catholic.edu.au/default3.asp?ID=59>

The independent schools, ie the wide variety of self-governing schools ranging from large denominational K-12 day/boarding schools to small 'community schools' present a diverse and largely undocumented picture in terms of ICT facilities and educational programs. They enrol some 11% of Australian school students. Although not representing all schools of this type, the National Council of Independent Schools' Association (NCISA) provides a range of services to these schools through its national and State offices. It also provides a link to federal and state governments on funding and professional matters. In the field of ICT the NCISA is represented on the EdNA Reference Committee and Schools Advisory Group and contributes to the sectoral follow-up reports on the progress of the action plan. In relation to its member schools the NCISA reports that it is very difficult for some schools to afford even the most basic of IT equipment and services, while others have embarked on ambitious programs for the development of ICT infrastructure. [http://www.ncisa.edu.au/html/ncisa\\_anrev\\_00\\_01.htm](http://www.ncisa.edu.au/html/ncisa_anrev_00_01.htm)

### ***The Vocational Education and Training (VET) Sector***

The government VET sector is primarily a responsibility of State and Territory governments, though significant influence is exerted by the Commonwealth through the Australian National Training Authority. Commonwealth Government departments, most notably Defence, are also heavily involved in the delivery of vocational education and training. In all but two of the States/Territories VET is administered by a department which also has responsibility for schools. Thus in most cases strategic directions for ICT developments in VET, as in other key areas of education and training policy, tend to be the responsibility of a single State department with responsibility for education and training.

Those States/Territories which have published ICT strategies for the VET sector include:

**Victoria:** *TAFE IT Strategic Planning Guide: A guide to information technology strategic planning for providers of training and further education*  
<http://www.ofe.vic.gov.au/publications/itstrategy/index.htm>

**Western Australia:** *Information and Communication Technology Strategy*  
<http://www.training.wa.gov.au/training/content-ictstrat.asp>

As the name implies the Victorian statement is a methodology for use by TAFE providers in developing their strategic planning for ICT. The WA strategy identifies three major themes: providing a skilled workforce for industry; responding to the computer literacy/fluency needs of the community and the provision of on-line training and employment sector related services; and points to a major shift in its capital works budget with one third of the funds being allocated to IT infrastructure.

In some other States strategies for ICT in VET are embedded in broader policy statements for the sector. The *Skilling Queensland* strategy, for example, identifies four strategic objectives, the second of which is: "Embrace the information and biotechnology age." <http://www.training.qld.gov.au/polsguides/vetstrat/vetstrategy/pdf>

The private VET sector is also a significant provider of vocational education and training. In Australia there are 4462 private registered training organizations (RTO's) of which 3089 offer formal qualifications. Together these RTO's offer 63% of all qualifications, the remaining 37% being offered by the 72 government VET institutions. As providers of training in information technology, 852 of the private RTO's offer the national IT Training Package (and 68 of the government institutions). In terms of total participation in formal vocational education and training the non-government providers account for some 25% of enrolments and 16% of the hours of training effort.

There are no national or State/Territory-level policies or standards which apply generally to private VET providers nor are they represented at the national level on such committees as AICTEC and the EdNA advisory groups. Nor is there any national structure of self-regulation which encompasses the sector although there are a number of groups which exert an influence on standards. The Australian Council of Private Education and Training Providers (ACPET) claims to be the largest of these with a membership of over 400 providers. Through its Code of Ethics and a range of other professional and representational activities ACPET aims

to promote the quality and recognition of its members. <http://www.acpet.edu.au/> Another is the Australian Council of Independent Vocational Colleges Ltd., which was formed in 1976 with the aim of promoting the interests of private business colleges and raising standards. <http://www.acivc.edu.au/>

Private providers are, however, subject to the registration procedures of the State/Territory Accreditation and Registration Councils should they wish to offer nationally recognised qualifications and in doing so they are required to use the Training Packages where they have been developed in the various fields (some 70 Training Packages having been developed to date). These two requirements (of becoming registered and using Training Packages) are designed to ensure that appropriate standards are achieved. In the field of ICT, for example, in which an IT Training Package has been developed, the assessment of training providers against the Australian Qualifications Training Framework for RTO endorsement takes into account the IT infrastructure of the provider and the qualifications and industry experience of staff.

## Second Phase Developments

Following the round of whole-of-government strategic frameworks most State and Territory systems have revisited their strategies for ICT in education. In some cases the ICT policies are linked to broader strategic statements on directions for education in the jurisdiction, such as the *Tasmanian Learning Together* policy statement and the *Queensland QSE-2010*, the Queensland Government's blueprint for education in the State over the next decade. These broader policy statements provide a framework for a focused and aligned response to ICT needs in schools.

Typical examples are provided by the Tasmanian and Queensland strategic visions:

- The *Tasmanian Learning Together* document provides a vision for adapting Tasmanian education and training to the requirements of the information age. It is linked to the whole-of-government *Tasmania Together* vision and sets out a vision of lifelong learning and institutions as learning organisations. This vision includes "information-rich communities" with access to global and local resources.<sup>29</sup>
- *The Queensland QSE-2010* blueprint provides a similar vision of information-rich communities with widened learning opportunities. These objectives are to be achieved through key learning initiatives - New Business, New Pathways, New Foundations, New Opportunities to Learn and a New Deal on Equity which will be "underpinned by excellence in the use and application of information technology" so that overall "Education Queensland will commit itself to developing a networked learning community with effective support for schools."<sup>30</sup>

The strategies in both the Tasmanian and Queensland documents link a vision of the school in the information age to a broader vision of information-rich communities able to respond to the challenges of the information age.

A similar vision underpins the Western Australian Education Department's e2c strategy for ICT in the K-12 education sector in schools.<sup>31</sup> This is also a vision of learning in an information-rich environment which involves a more distributed approach to learning without the constraints of physical buildings and timetables.<sup>32</sup>

While this vision changes the role of the teacher, the Western Australian vision is of interest in its attempt to define an enlarged role for the teacher which draws upon the innate knowledge and experience of the teacher.

*The e-learning strategy is about capturing appropriate digital curriculum components (content) and then "wrapping" the knowledge and experience of our teachers and other members of our education community around those components.*<sup>33</sup>

The statement is of interest in its application in a school context of an approach to the generation and use of knowledge which is now becoming common in the corporate world as firms seek to develop as effective knowledge enterprises with their knowledge workers a prime resource. Applying concepts of social and human capital to the school situation in the context of the knowledge economy and policies for ICT in education, opens up creative opportunities to enhance the status of teachers and to link schools more closely to information-rich communities. This also suggests opportunities to align learning community and ICT policies.

South Australia is another State which has taken the view that technology should be the tool of educational purposes. The State's \$85.6 million *DECStech 2001* project, which operated between 1996 and 2001 was directed at the objective "that by 2001 technology ... is able to be an embedded, integrated part of learning activities, and technological applications will be, at all levels, curriculum driven."<sup>34</sup> (<http://www.tsof.edu.au>) As in other States, the *DECStech 2001* approach has gone along with measures to strengthen school and community relationships, in particular through the *Partnerships 21* program.

South Australia has also brought ICT into its strategic education plan for 1999-2002 as one of the five strategic directions for this period.<sup>35</sup> This objective, titled *IT Smart*, involves an aligned IT strategy, with IT integrated within curriculum development and training initiatives, and with targets and key performance indicators set.<sup>36</sup> Initial targets were set for 1999-2000.

The Victorian 1998 policy strategy also presents an embedded and integrated vision of the role of learning technologies in Victorian schools, and is of particular interest in the school-based implementation strategy built into the plan.<sup>37</sup> This involves schools achieving specific system and school objectives over the three year period 1998-2001. We discuss the Victorian approach in Chapter 7 below.

In progressing to a more strategic and integrated second phase of ICT development we found a fairly general recognition that the outcomes of the initial phase of investment in ICT in schooling had been mixed. The Western Australian Education Department in its e2c strategy noted that while some schools have done relatively well, "others have lagged badly".<sup>38</sup> The Tasmanian Department of Education in

comments to this study observed that “at present ICT planning often sits in parallel with rather than being a key component of school planning. Integration of learning technologies is still not a high enough priority for many schools. Few schools have linked ICT planning to student outcomes and there is a lack of evidence of planning for ICT beyond the IT grants funding.”<sup>39</sup>

The Tasmanian, Queensland, Western Australian and Victorian visions discussed above all appear to be moving in similar general directions so that policy for ICT in education is not only more closely integrated with general strategic directions for education linked to a broader social vision, but also, as a consequence, becomes more complex in its relationships and more dependent on partnership strategies.

In this dynamic world of rapid change and technological advance, it is not surprising that State policies for ICT in education are subject to constant review and revision. At the time this report was drafted, the Tasmanian ICT policy was being revised, a new South Australian ICT policy was waiting release by the Minister, and the Queensland and Victorian whole-of-government frameworks were under revision. While this may be seen as a race between technological advances and policy responses, there are also grounds for believing that the current second phase for ICT in education is moving inexorably towards more holistic and integrated strategies which stand to benefit the whole community, as well as the education sector, in adapting to the requirements of the information economy.

In the context of these overarching strategies and frameworks for action, we turn in the chapters that follow to consider policies for ICT in education in respect of the five goal areas of the *Education Action Plans*.

## NOTES

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- 1 OECD 2001, p.47.  
2 NOIE 1999.  
3 DETYA 2000.  
4 NOIE 1998.  
5 NOIE 1999.  
6 Ibid.  
7 Ibid.  
8 Ibid., p.5.  
9 Ibid., p.6.  
10 DETYA 2000. The sectoral plans are:  
• *Learning for our Online World* (schools)  
• *Flexible Learning for the Information Society* (VET)  
• *The Way Forward* (higher education).  
11 Ibid.  
12 Ibid., p.16.  
13 Department of Education USA 2000.  
14 Flexible Learning Advisory Group 2001, p.1.  
15 The States mentioned have presented reasonably comprehensive frameworks. The ACT, NT  
16 and WA either have frameworks under development or have adopted a different approach.  
The *Connecting Victoria* plan is currently under revision and a research plan is expected to be  
17 released during 2002.  
A *Smart Start* strategic plan is under development and is expected to be released during  
2002.  
18 NSW Government 2000.  
19 Minister for State and Regional Development (Victoria) 1999, pp.3-4.  
20 Minister for the Information Economy (South Australia) 2000, p.30.  
21 Department of State Development Tasmania 2002.  
22 Queensland Department of Communications and Information, Local Government and  
Planning 1999.  
23 Ibid., p.7.  
24 Queensland Department of Communications and Information, Local Government, Planning  
and Sport, 2000, p.4.  
25 By 'learning community' we mean "any group of people, whether linked by geography or by  
some other shared interest, which addresses the learning needs of its members through  
proactive partnerships. It especially uses learning as a way of promoting social cohesion,  
regeneration and economic growth."  
26 NSW Government 2000, p.24.  
27 Ibid., p.24.  
28 ACT Department of Education and Community Services 2002.  
29 Minister for Education (Tasmania) 2000.  
30 Queensland Education Department 2000.  
31 Education Department of Western Australia 2001.  
32 Ibid., p.20.  
33 Ibid., p.20.  
34 Department of Education, Training and Employment (SA) 1999.  
35 Department of Education, Training, and Employment, South Australia 1999.  
36 Ibid., p.7.  
37 Education Victoria, 1998.  
38 Education Department of Western Australia 2000, p.21.  
39 Department of Education, Community and Cultural Development 2001.

## 4. PEOPLE

There is a wide recognition in policy statements on ICT in education and training that the new technologies have the power and potential to transform education and training.

As yet, the ways in which this transformation will occur are imperfectly realised, and the current phase of considerable experiment and exploration signifies a search for strategies that will transform education and training and bring about the necessary alignment of education and training systems with the conditions and requirements of the information society. Policies directed at people and cultural change are central to this search.

There is, accordingly, a general recognition in the national Education Action Plans, and in equivalent State and Territory strategic plans, that strategies directed at the people in education systems are central to bringing about the necessary cultural, pedagogical, and organisational changes. Beyond these “domestic” education policies and strategies lies the larger question of ensuring that all members of the community are enabled to benefit from the information age, including possessing basic ICT skills. This broader question involves addressing the so-called ‘digital divide’ in society.

The national *Education Action Plans* and the equivalent State and Territory plans generally have three key objectives:

- all citizens are able to use technology confidently and creatively;
- adequate numbers of people with specialist ICT skills are produced to meet industry needs;
- the education and training workforce is able to take full advantage of ICT.

### **ICT Skills for All**

The objective of ICT skills for all involves:

- ensuring that all young people acquire basic ICT skills and are able to use them confidently and creatively;
- further developing ICT skills through VET and higher education;
- assisting adults without these skills to acquire them.

While there has been significant policy development directed at the first and second of these, the third raises a complex spectrum of issues, including cost and appears to be a longer term funding objective to be achieved through a number of stages over time. The spectre of the ‘digital divide’ is real, and poses a stark challenge for governments and communities in enabling all citizens to benefit from the information society.

The objective of ensuring that all young people acquire basic ICT skills is being addressed through a mix of national and state and territory action.

At the national level a particular thrust has been towards the assessment of ICT skills in school students. The *National Goals for Schooling in the 21<sup>st</sup> Century* includes the following goal:

*When students leave school, they should be confident, creative and productive users of new technologies, particularly information and communication technologies and understand the impact of those technologies on society.<sup>1</sup>*

In line with MCEETYA's direction that work should be undertaken on key performance measures to monitor and report on progress in achieving the national goals for school, work has been undertaken on assessing progress in achieving ICT skills for all students.

This work has been undertaken through the National Education Performance Monitoring Taskforce (NEPMT) which submitted its recommendations to the July 2001 MCEETYA meeting. At that meeting Ministers endorsed a framework for national assessment and reporting of students' ICT skills and knowledge and authorised the development of assessment instruments and key performance measures with a view to a first field assessment taking place no later than 2003.

Ministers endorsed in principle the national monitoring of ICT skills and knowledge of Year 5/6 and Year 9/10 students by means of two or three-yearly sample assessments. The development and trialing of instruments is to be completed so advice can be submitted to Ministers in the second half of 2002 with a view to the first full assessment cycle taking place no later than 2003. Work is being undertaken through a new MCEETYA body (replacing the NEPMT), the National Education Performance Measurement and Reporting Taskforce (NEPMRT). <http://www.curriculum.edu.au/mceetya/taskfrce/task224.htm>

Some States have already commenced action in assessing the ICT skills of school students in line with their strategic planning for skilling people for the information economy. New South Wales, for example, under its *ICT Skills Action Plan* is to conduct computer skills assessments in Years 6 to 10 to ensure that students are developing the desired knowledge, understanding and skills, and is monitoring progress in this area.<sup>2</sup>

South Australia provides a further example of the development of monitoring systems for the ICT skills of both students and teachers. Under the Education Department's *Strategic Plan for 1999-2000* key performance indicators for ICT skills have been identified and targets set for 1999-2000.<sup>3</sup>

The key performance indicators involved:

- % and number of students with core IT competencies;
- % of department staff with core IT competencies;

- % achievement of identified benefits in agreed business issues;
- % and number of students who have online learning experience.<sup>4</sup>

The targets for 1999/2000 involved establishing baseline data on staff and student IT competencies for ongoing monitoring.<sup>5</sup>

### **Addressing the Digital Divide**

While monitoring performance by school students in achieving ICT skills represents a major advance, the more complex and intractable policy issue lies in addressing the needs of the adult population lacking basic ICT skills. This involves addressing the so-called 'digital divide'.

NOIE has defined the digital divide in the following terms:

*Digital divide is a term increasingly used to describe the social implications of unequal access by some sectors of the community to information and communications technology and to the acquisition of necessary skills.*<sup>6</sup>

A number of sober assessments exist on the extent of the digital divide in Australia. The New South Wales Government's *ICT Skills Action Plan* cites a growing IT skills gap in Australian society based on socio-economic, demographic and geographic factors and gives an assessment that nearly one third of the adult Australian population cannot use a computer and more than half lack the skills to use the Internet.<sup>7</sup> Western Australia estimates that up to one-third of the state's adult population (400,000 persons) lack basic computer literacy skills.<sup>8</sup>

A recent study by the National Centre for Social and Economic Modelling (NATSEM) undertaken for Telstra focussed on sociodemographic barriers to the take up of new technologies.<sup>9</sup> The study found considerable variation in access with the main variables being:

- level of income
  - 70% of the top income group had access in March 2000 compared with 22% of the bottom income group;
- educational qualification
  - adults with a tertiary qualification are 2.3 times more likely to have Internet access at home than adults with a school education only.<sup>10</sup>

The study found that the presence of children in a household increased the likelihood of Internet access but that region was only a relatively mild discriminator.<sup>11</sup>

NOIE has taken a close interest in digital divide issues and has recognised the disparities in online access which exist. These are seen by NOIE as involving people on low incomes, without tertiary education, living in rural and remote areas, of Aboriginal and Torres Strait Islander heritage, with disabilities, with a language background other than English, and aged over 55.<sup>12</sup>

The proportions of Australian households and adults online as at November 2000 are given in Figures 1 and 2 at Appendix 2. These statistics show significant variations for household and personal income, employment status, age, and household family type, and some variation for region.

It is of interest that the national *Education Action Plans* address the delivery of education through the schools, VET and higher education sectors without direct reference to the range of less formal means of delivery which is a characteristic of the sector usually known as 'adult and community education.' Thus while the promotion of flexible delivery will clearly assist those in this sector, the needs of the large proportion of the adult population without basic ICT skills do not come into the *Education Action Plans* in a significant way commensurate with the needs.

While Department of Communications, Information Technology and the Arts (DCITA) has sought to address the digital divide, the main focus of DCITA action has involved a supply side orientation in using infrastructure funding to address geographic disparities in respect of people living in rural and remote areas. While this action also caters for groups of people on low incomes and without tertiary education etc, there has not been a co-ordinated policy response focussed on all the main causes of disparity and inequity and seeking to address both demand and supply side barriers. Australia does not have, for example, any programs similar to the American *E-rate* which support access for populations with low incomes (<http://www.nichcy.org/erate.htm>).

The main DCITA funding response has been through the use of Networking the Nation and other funding to provide infrastructure in rural and remote areas, and the role of programs such as telecentres which support access in these regions. Networking the Nation is to conclude in 2002 and the National Communications Fund will then provide \$50m in a three year program to support telecommunications projects in the education and health sectors in regional Australia. A good deal of useful experience has been acquired through telecentre programs, and some States, such as New South Wales, have now progressed to a program of Community Technology Centres with a broader range of objectives.

### **State Action**

Some States have been active in developing strategies to address the digital divide. Western Australia provides a good example with the State's approach guided by market research which identified the factors which prevented non-ICT users from either attaining or wanting to attain computer literacy skills. This report, *Bridging the Digital Divide in WA – an Understanding of Computer Literacy Training Needs* is

available on the Department of Training's web site:  
<http://www.training.wa.gov.au/resources/content-publications-categories>.

The Western Australian research identified similar at risk groups to NOIE with older people, the unemployed, other groups on low incomes, and people with lower levels of educational attainment most at risk of being left behind in the transformation to the digital economy. This research also confirmed that there is a strong correlation between the digital divide and existing economic disparities in the community.<sup>13</sup>

This research also added to the growing evidence that favours community-oriented strategies rather than formal education institutions<sup>14</sup> with the target groups most comfortable and at ease in locations such as libraries, cultural meeting places, clubs, Telecentres and community centres. The Department's *First Click* strategy focuses on communities in this way. We comment further on the Western Australian approach below.

In the Australian Capital Territory the Government is implementing its *Bridging the Digital Divide* project and has announced its intention to appoint a Community IT Advisory Panel to advise on implementation. The plan is to conduct a study into connectivity issues for disadvantage people as part of a comprehensive strategy and framework for bridging the digital divide in the ACT. The Government has also announced \$300,000 in *Digital Divide* grants to 20 community organisations to provide seniors, young people, persons with disabilities, persons from non-English speaking backgrounds, Aboriginal and Torres Strait Islanders, and single-parent and low-income families with better access to information technology and training to use computers and the Internet. <http://www.act.gov.au/digitaldivide>

### **Community-based Access Strategies**

There is a growing international interest in community-based access strategies which is reflected in a number of current developments in Australia. These include learning community programs supported by the Victorian Government and ANTA, and community skills development programs funded by some States.

In Queensland the *Community Skills Development Program in ICT* provides funding to community service organisations located in rural, regional, or remote communities with populations less than 10,000 to provide basic ICT skills training for the community.<sup>15</sup> (<http://www.diiersq.qld.gov.au>).

The use of information technology to create and strengthen communities is demonstrated by the Victorian *Connecting Communities* program.<sup>16</sup> This program is directed at the digital divide in society, and is accordingly intended to increase community access to the Internet, and generally to strengthen communities through capacity building. There are seven program elements:

- access @ schools
- Libraries Online
- Skills.net
- Skills.net Roadshow
- VICNET Multi-media Centre

- My Connected Community
- Virtual Library.<sup>17</sup>

In this way, the program ranges widely across linked initiatives relating to libraries, skills development, content and multimedia resources, and Internet promotion. *Connecting Communities* is seen by the Victorian Government as a new phase in its program to reduce the digital divide.<sup>18</sup> A particular feature is that *Skills.net* will be refocussed on the most disadvantaged groups in the community including people in remote areas, people with disabilities, and those from non-English speaking background.

While most of the programs under *Connecting Communities* have their separate web site, these can be reached through the *Connecting Communities* program on the Multimedia Victoria web site ([www.mmv.vic.gov.au](http://www.mmv.vic.gov.au)).

We comment above on the Western Australian approach to addressing the digital divide which also favours a community oriented strategy. The Western Australian approach recognises the need to connect skill, community, and learning objectives in building up a learning culture which supports on-going skilling in a world of rapid change, as well as including disadvantaged groups. This orientation is reflected in the Department of Training's *ICT Strategy*, as well as in the e2c corporate strategy of the Education Department with its core theme of "bringing communities together online."<sup>19</sup>

*Fundamental to achieving these goals is the development of a lifelong learning culture.*<sup>20</sup>

*Learning opportunities need to be extended to all members of the community and increasingly, the establishment of learning communities is seen as the way to involve more people in the learning process.*<sup>21</sup>

The approaches being taken in Queensland, Victoria and Western Australia combine community capacity building with fostering specific skills. Together with initiatives which promote lifelong learning and enhance access to both formal and informal education and training opportunities the direction in policy-making is towards a comprehensive co-ordinated approach to the digital divide - a key area that is examined in the international report in terms of approaches adopted in other countries. To the extent that initiatives consistent with a coordinated approach are already being taken in a number of States/Territories there is an opportunity for the Commonwealth to consider national support across the traditional sectoral boundaries of education.

### **Meeting Specialist ICT Skills**

The second main policy thrust in the area of people involves ensuring that adequate numbers of people with specialist ICT skills are produced to meet industry needs. This is an area where there has been considerable policy development, in particular at the State level where the strategic frameworks discussed in Chapter 3 have a focus on ensuring that this requirement is met.

A good example is provided by the New South Wales *ICT Skills Action Plan*.<sup>22</sup> This plan was developed in close consultation with the ICT industry with the ICT Industry Skills Consultative Group having a key role in its development. The *Action Plan* is based on partnership between government and the ICT industry with the industry giving a number of commitments to support the action proposed by government. In this way it typifies the forms of partnership action that are emerging in policy responses to the information economy.

The ten action areas under the plan involve both short-term action and longer-term measures to ensure that the skill needs of the ICT industry are met. Some of these measures relate to action in schools directed at the ICT skills of teachers and students.

There are similar strategies in other States and Territories. These include the *Queensland Communication and Information Strategic Plan for 1999-2004*<sup>23</sup> and a Victorian strategy released in November 2001.<sup>24</sup>

Overall, meeting the skill needs of industry has been a particular focus of policy development in Australia in recent years, and considerable progress has been made in developing strategic planning for this purpose. Delivering results is inevitably tied to the outcomes of reform measures in schooling, but the assessment and monitoring systems being instituted should contribute to progress.

### **Fostering the Skills and Motivation of the Education and Training Workforce**

The third key policy thrust in the *Education Action Plan* involves ensuring that the education and training workforce is able to take full advantage of ICT. This objective involves professional development of teachers, and overall building a culture in education institutions that is adapted to the conditions, challenges and opportunities of the information society.

The mainstreaming of policy for ICT in education in recent years also means that this objective is intimately linked to other strategic objectives for schools and VET, so that the interplay of policy objectives and strategies across these strategic areas has become increasingly important.

We cited in Chapter 3 above examples of these broader strategic frameworks, such as the Tasmanian *Learning Together* vision and the *Queensland QSE-2010* blueprint which link the role of schools to a vision of information-rich communities with widened learning opportunities for all.

Specific measures adopted by State and Territory systems include large-scale professional development programs, such as the New South Wales *Technology in Learning and Teaching* (TILT) program which has trained some 15,000 teachers. <http://www.tdd.nsw.edu.au/tilt/about/index.htm>

More recently, there has been an increased interest in linking professional development of teachers for ICT skills with innovation strategies so that ICT is seen as a tool for innovation and reform in schooling.

A common approach has been to establish a centre of excellence to provide a catalyst to fresh thinking on strategies for teaching and learning in the information age.

An example is provided by the South Australian *School of the Future* which has had a key role in the professional development of teachers in that State. Other systems are now adopting this approach with Tasmania establishing a *Centre of Excellence in Online Learning* (now called *e-magine*) in 2001 to integrate a number of services relevant to the role of ICT in schools, and to link to Innovative Schools throughout the State. New South Wales is now adopting a similar approach with the establishment of a *School of the Future* at the Australian Technology Park as a centre of excellence for e-learning in partnership with industry.<sup>25</sup>

The Tasmanian *e-magine* initiative links professional development of teachers with units providing online learning materials, literacy and information services, and fostering the use of ICT in learning. This approach is aimed at a more integrated and holistic approach so that the professional development of teachers is more closely related to other components in providing for effective use of ICT in schools.

The New South Wales *School of the Future* will also have multiple roles. These include professional development of teachers, careers advisors, and principals, a student learning exchange and e-learning projects for students, and a showcase for new technologies with active relationships with hardware, software and multimedia producers.<sup>26</sup>

In Queensland five *Learning Development Centres for Learning Technology* have been established following the evaluation in 2000 of the *Apple Classrooms of Tomorrow* project. The Centres aim to foster the integration of technology in the curriculum with a view to improving teaching methods and learning outcomes, especially in literacy and numeracy, and to improving school/home/community linkages (<http://www.burlheadss.qld.edu.au/lcd/overview.html>).

These examples illustrate how State systems are seeking to link professional development of teachers with innovative strategies directed at diffusing new ideas and strategies throughout the system.

The impact of the information age has encouraged some education departments to re-conceptualise the role of the teacher in a knowledge society. The Western Australian Education Department in its e2c strategy recognises that learning in an information rich environment will be a different kind of process, involving new levels of relationships between teacher and students and students and students.<sup>27</sup> The e-learning strategy is seen as being about “capturing appropriate digital curriculum components (content) and then wrapping the knowledge and experience of our teachers and other members of our education community around those components.”<sup>28</sup> This approach is seen as enhancing the status of teachers and recognising the rich knowledge resources within the experience and learning of teachers.

A central issue is whether ICT skills for teachers should be mandated or acquired through other strategies. Industry bodies have sometimes urged that ICT skills should be mandatory for all commencing teachers, as is the case in some overseas systems, or even for all serving teachers. The New South Wales Premier's *ICT Skills Forum*, for example, recommended that education authorities employ only teachers who are computer literate and skilled in applying IT across their teaching programs.<sup>29</sup>

Education Departments have generally adopted a more cautious and evolutionary approach while adhering to the principle that all teachers should have ICT skills. The New South Wales policy, for example, is to "raise IT skills for all teachers entering employment in NSW public schools and review on an ongoing basis."<sup>30</sup>

Some States have sought to assist teachers to acquire the necessary skills by providing templates or minimum standards, of the required skills and advice on ways of acquiring these.

Victoria adopted this approach with its *Teacher Capabilities Statement and Skill Development Matrix* which was distributed to schools in 1998 to support school and teacher professional development planning. This statement outlined three skill stages and related professional development. Self-paced training packages were made available to support teachers in acquiring the identified skills.<sup>31</sup>

Queensland has adopted a similar approach with its *Minimum Standards for Teachers – Learning Technology*. The standards are in four areas: IT skills, curriculum application including classroom planning and management, school planning, and student-centred learning. The standards are intended to develop teachers' confidence in the use of information technology across these four areas. ([http://education.qld.gov.au/curriculum/learning/technology/sin\\_mst.html](http://education.qld.gov.au/curriculum/learning/technology/sin_mst.html))

## **The VET Approach**

A feature of the VET approach to people aspects of ICT policy has been the significant role of national collaboration undertaken through the five year *Australian Flexible Learning Framework*. Some \$6.54m was devoted to people initiatives in 2001. \$6.69m is projected expenditure in 2002 making this goal area, along with online content, the main areas for national collaboration.

National projects include *Learnscope*, which provides work-based learning projects for VET staff, *Flexible Learning Fellowships*, a *Flexible Learning Leaders* program, and a good practice demonstration program.<sup>32</sup> These projects are directed at building up a critical mass of leaders who can carry through the necessary reforms in the VET sector.

Despite this effort, the Flexible Learning Advisory Group in its draft Strategy 2002 conceded that insufficient progress had been made.

*Flexible learning remains at the margins of VET delivery. Sustained strategies are needed to encourage middle and senior managers in particular to appreciate*

*that flexible learning is an integral part of all vocational learning.*<sup>33</sup>

This assessment suggests that while visionary projects have been undertaken, the need exists to progress beyond a phase of projects and experimentation to policies and strategies that mainstream flexible learning in the day to day operations of the VET sector. This suggests the need for attention to strategies that bring about cultural change and supporting policies that enable these changes to occur.

## **Higher Education**

While the “people” goal area was included in the *Higher Education Action Plan*, follow up action is primarily a matter for individual universities. At the cross-institutional level CAUDIT is taking a leadership role in promoting best practice in the use and understanding of ICT at both staff and student levels in universities <http://www.caudit.edu.au/caudit/information/strategic.html>. In a report on IT literacy in universities commissioned by CAUDIT<sup>34</sup> Winship concluded, among other things, that at the organisational level few universities are in good shape to achieve the vision of *The Way Forward*, while the IT literacy of students across and within universities appears to be very variable. Subsequently Winship was commissioned by CAUDIT to prepare a policy framework statement on IT Literacy including its relationship to other policies and plans such as those for teaching and learning and to recommend strategies and best practice for the implementation of the policy. [http://www.caudit.edu.au/caudit/information/projects/itlit\\_2001.html](http://www.caudit.edu.au/caudit/information/projects/itlit_2001.html).

Many universities have taken specific action on the identified strategic priority that universities should be encouraged to ensure that their graduates enter the workforce with the competencies needed, including information literacy skills and lifelong learning skills.<sup>35</sup>

The University of South Australia, for example, has developed a *Teaching and Learning Framework* which places flexible delivery at the centre supported by student centred learning for the professions and with guidelines for a UniSA graduate identified. These guidelines include being prepared for lifelong learning. <http://www.unisanet.unisa.edu.au/PVC/qualities.htm>

The Digital Media Centre at the University of Wollongong aims, among other things, to improve learning outcomes using digital media technologies and to facilitate professional and postgraduate education and training programs relevant to the digital media industry. <http://www.digitalmedia.uow.edu.au/> At the Australian National University the *Information Literacy Program* provides training in both information and IT skills for staff and students. <http://ilp.anu.edu.au>

## **Reform and Managing Change**

The people directed policies discussed above are central to issues involved in adapting education and training systems to the requirements of the information age, and in stimulating and managing the necessary change processes.

Cultural change is a complex phenomenon,<sup>36</sup> and the comment of the VET Flexible Learning Advisory Group points to the issues involved in progressing beyond a phase of pilot projects and experimentation to achieving systemic change.

In some international discussions of adapting education systems to the requirements of the information age, this is seen as a fundamental re-engineering of the system.<sup>37</sup> How people policies and strategies relate to the achievement of systemic change is a question we will take up in the international report.

### **General Comment**

Policies directed at the human aspects of ICT in education and training are central to the cultural and other change processes involved in adapting education and training to the conditions and requirements of the information age.

While this area has been a priority in Australian policies for ICT in education, cultural change is a slow and complex process and there is a growing interest in community oriented strategies which link changes in education institutions to changes in the broader community of the institution. The progression from first phase to second phase policies for ICT in education recognises the growing significance of these linkages in the search for whole-of-government and whole-of-community strategies. A convergence of policy for lifelong learning and for ICT in education is part of this process.

There are, moreover, grounds for believing that some Australian systems are poised on the threshold of progressing to a third phase of development in the role of ICT in education which will witness a much more comprehensive transformation of education and training than has been the case up to now.

While there has been substantial policy development in addressing people aspects of ICT agendas in formal education institutions, less has been done in a strategic sense in addressing the needs of the adult population lacking basic ICT skills. The digital divide is a reality in Australia, and the main policy action to date has been left to bodies such as DCITA and NOIE (and State counterparts) in addressing access and equity issues through mainly supply side policies, in particular infrastructure policies directed at people in rural and regional Australia.

This approach has meant that demand side barriers to access are not being addressed sufficiently and the necessary comprehensive strategic framework which integrates supply and demand policies does not yet exist. The education sectors, including ACE, can play a major role in addressing demand side issues, and emerging strategies such as learning communities can be significant instruments in the context of a whole-of-government approach. This is perhaps the key area for future policy development in Australia.

## NOTES

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- 1 MCEETYA 1999.
- 2 NSW Government 2000, p.25.
- 3 Department of Education, Training and Employment 1999.
- 4 Ibid., p.7.
- 5 Ibid., p.7.
- 6 NOIE, Digital Divide 2001.
- 7 NSW Government 2000, p.5.
- 8 Department of Training Western Australia 2001
- 9 NATSEM 2000.
- 10 Ibid., p.6.
- 11 Ibid., p.6.
- 12 NOIE, Digital Divide 2001.
- 13 Education Department of Western Australia 2001.
- 14 Ibid., p.1.
- 15 Queensland Department of Innovation and Information Economy 2001.
- 16 Multi-Media Victoria 2001b.
- 17 Ibid.
- 18 Ibid., p.5.
- 19 Education Department of Western Australia 2001.
- 20 Department of Training 2001, p.2.
- 21 Ibid., p.3
- 22 NSW Government 2000.
- 23 Queensland Department of Communication and Information, Local Government, Planning & Sport 1999.
- 24 Minister for State and Regional Development Victoria 2001.
- 25 NSW Government 2000, p.23.
- 26 Ibid., p.23.
- 27 Western Australian Education Department 2001, p.20.
- 28 Ibid., p.20.
- 29 NSW Government 2001, p.24.
- 30 Ibid., p.25.
- 31 Education Victoria 1998.
- 32 EdNA VET Advisory Group 2001.
- 33 Ibid., 2002, p.7.
- 34 Winship 2000
- 35 DETYA 2000, p.82.
- 36 See Kearns and Papadopoulos 2000 for an analysis of policies adopted in five OECD countries to build a learning culture.
- 37 See, for example, Thornburg 2000, Lemke & Coughlin 1998.

## 5. INFRASTRUCTURE

In the ten years since it was established in its current form, the Internet – a means of transmitting and accessing information stored on computers that are connected to the telecommunications network - has become the backbone of the information economy. Initially a “not for profit” service it has since the mid-90’s become a major commercial player as a customer of the telecommunications industry, a generator of such services as internet service providers and internet browsers and a key facilitator in all sectors of industry including the education industry. In the previous decade universities in many countries had become leaders in using computer networks for data transfer and email, culminating in Australia in the establishment of the Australian Academic and Research Network (AARNet) in 1989.

Broadband Internet, though lacking precise definition, is the current stage of development of the Internet. There is a focus both on the speed of the connection (for example a speed of greater than 200kbits/sec) and on the mix of media. The International Telecommunication Union, for example, has pointed out that while governments have been under some pressure to define broadband in terms of speed or with reference to a particular technology or technologies, broadband policy might, more usefully, be developed in terms of the applications to be provided - entertainment, health care, education, government services, or commercial applications (<http://www.itu.int/osg/spu/ni/broadband/workshop/chairfinal.pdf>). High capacity cables allow much more data to be sent over the network allowing users to watch movies, play networked games, participate in videoconferencing, engage in on-line learning and establish networks for a wide variety of purposes.

Access to broadband Internet in Australia and internationally is limited and uneven. With more than 50 per cent of Internet users having high speed connection, Korea is the world leader in broadband Internet. In Australia (and the United States) less than 10 per cent of users have high speed access.

The international agenda for developing the ICT infrastructure for educational purposes has been identified by UNESCO under its *New Information and Communication Technologies Programme* (UNITE)<sup>1</sup> as:

- set standards for educational hardware that are derived from educational needs, have long lifetime, and are cost-effective. Specifications will vary according to availability of supporting infrastructure and financial resources;
- explore and encourage new technologies that are most appropriate for education, particularly in developing countries;
- explore and encourage new modes of connectivity for different educational solutions;
- facilitate connectivity to educational institutions at preferential prices;

- facilitate accessible platforms for distributional networks of teaching/learning materials and collaborative environments.

As the report notes:

*ICT infrastructure and hardware are a necessary - but not sufficient – ingredient of the effective use of ICT’s for education. The education sector is plagued with insufficient infrastructure on one side and inappropriate technologies on the other side. Also, education technology is usually vendor driven, rather than generated by educational needs. UNESCO, as an intergovernmental body, will use its convening power to initiate dialogue and build consortia with the private sector to address these issues.*<sup>2</sup>

In Australia the sectoral contributions on infrastructure to the national action plan *Learning for the Knowledge Society (2000)* identify similar issues of concern. Principal amongst them is access to sufficient and affordable bandwidth, noting the exponential growth in demand, the unevenness of access and cost and other factors. In summary the issues identified are:

- access to sufficient bandwidth<sup>3</sup>
- appropriate standards to ensure compatibility
- cost and who pays/affordability
- regulatory issues
- hardware
- technical support
- cross-sectoral communication (eg constraints on AARNet)
- implications for buildings and other facilities

In its annual report for 2001 to MCEETYA, the Education Network Australia Schools Advisory Group observed that of the three key priorities identified in *Learning in an Online World* (bandwidth, professional development and online curriculum content) “bandwidth provision remains the issue on which there has been insufficient progress to date.” <http://www.aictec.edu.au/advisory/sagnov01.htm>

### **The National Agenda**

Australia, like other OECD countries has implemented policy in recent years to develop a deregulated, competitive telecommunications market as a strategy to lower costs, encourage innovation, and improve quality of service.

This policy was incorporated in the *Strategic Framework for the Information Economy* as one of the ten strategic priorities under the *Framework* directed to “advance the growth of a world class infrastructure for the information economy”.<sup>4</sup> The policy is justified in the *Framework* in the following terms:

*It is widely recognised that a deregulated, competitive telecommunications market is the best way to drive down costs, encourage innovation and increase quality of service. An effective infrastructure strategy must be based on the right mix of market freedoms, an appropriate regulatory environment including adequate pricing arrangements, and targeted government assistance.*<sup>5</sup>

This policy has been implemented at a time of major changes in the global communications industry marked by developments such as:

- the shift from voice to data;
- a spectacular growth in the demand for services and the capacity of networks to provide them.

This has meant that the market for bandwidth has been dynamic with changes in market factors and the relationships between them.<sup>6</sup>

It is hardly surprising that in this environment of radical change there have been tensions between competing objectives as, for example, between the policy of deregulated competitive markets and the policy of targeted assistance, in particular in achieving the access and equity objectives of the Commonwealth's Strategic Framework.

It is also not surprising that competition has developed unevenly across Australia since the Australian telecommunications market was opened up to full competition in 1997, with the consequence that there is not one market for bandwidth but a number of markets with different characteristics, a development noted by the national AIEAC inquiry into bandwidth in its 2000 report.<sup>7</sup> This feature has significant implications for education systems which are required to provide adequate bandwidth for schools and colleges across large geographic areas.

Rectifying the geographic inequities in access to bandwidth has been a particular objective of national policy through programs such as *Networking the Nation* and the new *National Communications Fund*, with most funding under these programs going to rural and regional areas.

Of equal importance to the development of rural and regional areas is enhanced connectivity. As described by James in relation to regional development in Victoria<sup>8</sup> [http://www.ballarat.edu.au/non\\_academic/external/techpark/ceca/interact99/Program.html](http://www.ballarat.edu.au/non_academic/external/techpark/ceca/interact99/Program.html) - 10:00 :

*Regional Connectivity is a focus for leadership development, opportunities for youth and business development. Through the development of a community-driven culture of lifelong learning and community ownership, regional connectivity will enable the Golden West to become a smart region in a global economy.*

Connectivity is thus more than a question of giving people access to the Internet (with appropriate bandwidth at an affordable price) – it is also about making effective use of the technology for educational, business and other purposes.

Connectivity also requires appropriate standards to allow effective interoperability. As defined by NOIE in a business context “interoperability is the ability to transfer and use business-critical information across multiple organisations and technology systems.” [http://www.noie.gov.au/Projects/ecommerce/interop/eBus\\_paper/start.htm](http://www.noie.gov.au/Projects/ecommerce/interop/eBus_paper/start.htm) Applying this definition to a learning environment requires little imagination and it is clear why the enhancement of bandwidth, connectivity and interoperability are part of the national ICT agenda.

### **The Legislative Framework**

The Commonwealth’s deregulation and competition policy was given effect in the Telecommunications Act 1997 (Telecoms Act) and the Telecommunications (Consumer Protection and Service Standards) Act 1999 (Consumer Act).

The main objective of these Acts is to provide a regulatory framework for telecommunications that promotes two things :

- (a) the long-term interests of end-users of carriage services or services provided by carriage services; and
- (b) the efficiency and international competitiveness of the Australian telecommunications industry.

There are also a range of secondary objectives which include :

- reasonable accessibility to all people in Australia on an equitable basis wherever they reside or carry on business;
- supplied at performance standards that reasonably meet the social, industrial and commercial needs of the Australian community;
- the promotion of industry self-regulation.

An immediate effect of this legislation was on the status and scope of AARNet, the telecommunications network established by Australian universities and CSIRO in 1990 to bring the Internet to Australia. Determinations made by the Minister under the Act, which expired on 30 June 2001, prevented non-university education institutions, such as TAFE colleges, becoming members or clients of AARNet. This question is discussed below.

### **The National Bandwidth Inquiry**

Strategic issues in the provision of bandwidth were discussed in the National Bandwidth Inquiry conducted by the Australian Information Economy Advisory

Council. This inquiry had a focus on the supply of, demand for and price of bandwidth.

The report of the inquiry set out an egalitarian vision of an information society.

*We see a society in which communications becomes the truly enabling technology it has the potential to be, not simply for technological elites, but for society generally, continuously enhancing the knowledge, power, and control of individuals over their personal, social and working lives.<sup>9</sup>*

The key issues identified in the report of the inquiry included how to equitably address the needs of regional Australia and to foster a culture of innovation in the provision of bandwidth.<sup>10</sup>

In its analysis of the evolution of communications markets in Australia, the report identified three stages of development :

- Stage 1: the legacy world of the traditional model with vertically integrated supply and with a monopoly telecommunications carrier.
- Stage 2: the stage of complex transition with a wider range of technologies and players, and with new possibilities still emerging.
- Stage 3: the new order of the data world with the former simple vertical integration of supply largely removed and with services connected under a “bandwidth cloud”.

If this analysis is valid, Australian education systems are confronted by the challenge of the stage of complex transition, but with new possibilities emerging. This analysis suggests that education systems should keep open, and explore, innovative options which better advance the egalitarian social vision of the National Bandwidth Inquiry.

### **Targeted Government Assistance**

The main form of targeted Commonwealth assistance has been through the *Networking the Nation* fund (NTN) which was launched by the Commonwealth in June 1997 for a five year period to assist the economic and social development of rural Australia by funding projects which:

- enhance telecommunications infrastructure and services;
- increase access to, and promote use of, services available through telecommunications networks; or
- reduce disparities in access to such services and facilities.<sup>11</sup>

The Commonwealth Government originally set aside \$250m for the program as a General Fund and in June 1999 added a further \$214m, funded from the proceeds of a sale of a further 16.6% of Telstra, to establish a number of additional elements including a \$36m program for regional and rural Internet access called the *Internet Access Fund*.<sup>12</sup>

The Internet Access Fund has been used to support projects designed to stimulate Internet access in regional and rural Australia in a manner that enhances the commercial, competitive roll-out of these services. The Fund has supported community owned Internet points of presence and private sector owned facilities operated in partnership with community organisations.

NTN has also supported the extension of telecentres across rural and regional Australia so that a more extended network of telecentres and community technology centres now exists in rural areas as access points for the community. The opportunity now exists to support the access role of these centres in a more coordinated strategic way as occurs in countries such as Britain.

While the NTN program is to terminate in 2002, the Commonwealth's new *National Communications Fund* will be available from 2002-2003. The fund of \$50m is intended to support significant telecommunications projects in the education and health sectors in regional Australia. The program aims to improve service delivery in these sectors, and will also encourage the development of high bandwidth data services in regional communities.

Reasonably large scale projects are envisaged under the Fund, with a minimum project grant of \$3m, so that it affords opportunities for partnership action and innovation to extend infrastructure in regional areas.

### **Higher Education and Research: the AARNet Approach**

The development of AARNet by the Australian universities and research community illustrates an innovative approach to meeting growing bandwidth requirements through collaborative action. AARNet has continued to evolve in the dynamic environment of telecommunications development and demonstrates a good practice model of collaboration and partnership.

The Australian universities and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) took an initiative to bring the Internet to Australia in 1989. The Australian Academic and Research Network (AARNet) was established for this purpose, initially owned by the Australian Vice Chancellors Committee (AVCC), a private company whose members are the Vice Chancellors of Australian Universities. CSIRO, ANSTO, DSTO, and AIMS also became members (CSIRO) or clients of AARNet.<sup>13</sup>

The ownership of AARNet is now vested in the shareholders (Members) who are most Australian Universities and CSIRO. ANSTO, DSTO, AIMS, the AVCC Secretariat and the University of the Sunshine Coast are clients of AARNet. Applications from other organizations to become clients of AARNet are being considered.<sup>14</sup>

The operations of AARNet have been affected by changes in Australian telecommunications legislation. When the Commonwealth's 1997 Telecommunications Act came into effect, AARNet was exempted from being required to hold a carrier licence, and being required to comply with the rules and conditions applying to carriers and carriage service providers, through determinations made by the Minister under the Act. The conditions applied to these determinations restricted access to AARNet, and prevented institutions such as TAFE colleges becoming clients of AARNet.

However, AARNet acquired a carrier licence in November 2000 so that these regulatory restrictions no longer apply.<sup>15</sup> Access is now determined by the AARNet Board with the AARNet Access Policy and the Expanding Access to AARNet statement given on the AARNet web site:

<http://www.aarnet.edu.au/about/accesspolicy/index.html>.

While AARNet has its counterparts in other countries (such as JANET in Britain, CANARIE in Canada, and Internet 2 in America), AARNet is unique in that it does not receive direct government funding with costs met on a user-pays basis by the membership and other clients. There is, of course, indirect Commonwealth Government funding of AARNET through university budgets while the Commonwealth, through DEST, has specifically funded some regional universities to connect to AARNet because of the high initial costs involved.

AARNet operates through regional hubs located in each state and territory, with Regional Network Organisations (RNOs) responsible for development within the areas covered by each hub. The RNOs are unincorporated joint ventures of the members connected in that State or Territory. The RNOs are responsible for the delivery of services to members. Moves are underway in several of these RNOs for AARNet to take over this responsibility and deliver services all the way to the member's front door.

The policy on expanding access to AARNet has catalysed further innovation, as illustrated through initiatives in Canberra and Sydney.

The Canberra initiative centres on the extension of the current client base of the Regional Network Organisation through providing access to the Canberra Institute of Technology as a client along with national cultural organisations located in the national capital. The latter include organisations such as the National Gallery of Australia, National Library, National Museum, War Memorial, Australian Archives and Screensound. The War memorial is already connected, with the Australian Archives, CIT and the National Library due to connect shortly using fibre connections put in place by AARNet using its carrier status.

AARNet is currently acting as agent for the Sydney Basin Universities to deploy a fibre network in metropolitan Sydney which may also service hospitals and cultural organizations.

If the Canberra and Sydney initiatives are successful, these regional hubs will have much of the characteristics of the "bandwidth island" model examined by Kelso in a

recent report prepared for DETYA on this development in Canada, the United States, and Sweden.<sup>16</sup>

Other current developments and proposals under discussion in AARNet point to the flexibility of the AARNet concept, and its capacity to evolve to meet changing conditions and opportunities. A particular value of AARNet lies in its capacity to broker non-traditional alliances, as for example in the current Canberra developments, in meeting needs in areas less well served at present.

The AARNet model, as outlined above, illustrates an evolutionary approach to extending bandwidth provision within a collaborative framework, with incremental advances occurring as opportunities arise. In a dynamic context of technological change there is substantial value in models such as AARNet which foster collaboration, partnership, and responsiveness to changing conditions. This is one option for future development in meeting education needs for affordable bandwidth.

### **State Strategies**

In developing their strategies for the development of ICT infrastructure the State and Territory Governments have expressed similar objectives and priorities. The *Queensland Strategic Plan 2001-2005*, for example, refers to the role of electronic networks in the expanding global marketplace, and the importance of Queensland's physical and intellectual resources being positioned to take advantage of the growing knowledge-based economy.<sup>17</sup> It goes on to emphasise the importance of stimulating, encouraging and facilitating dialogue and action between areas of government, industry, community groups and market sectors and "the vital role regional Queensland has to play in the future of the Smart State."<sup>18</sup>

Among other things the Victorian strategy sets out the multi-faceted nature of the task:

*The communication and multimedia future is coming very quickly, and with it enormous possibilities for change. The task for the Victorian community will be to ensure that we have the infrastructure, the regulatory environment, the content and the capabilities to realise enduring benefit for Victoria<sup>19</sup>.*

Information and communications technology has radically changed how people do business and create economic value, often in ways that were unpredictable just a decade ago. Computing and rapid communications are now major tools for achieving economic growth. Investment in these technologies contributes to the health of a nation's economy, creating new companies and new jobs. States with skilled ICT workers, a robust ICT infrastructure and a reputation for supporting innovation will be prime locations for firms at the cutting edge of technology. The NSW Government, for example, has committed itself to developing a society well versed in using ICT in order to maintain the NSW position as a strong and robust economy<sup>20</sup>.

Infrastructure issues loom large in the policy processes of each State/Territory. The Queensland Government Information Architecture document, for example, summarises key aspects of the GIA Reference Framework and Domain Statements

(<http://cip.govnet.qld.gov.au/gia.html>), as “a process and tool that will require continual monitoring, analysis and updating to ensure alignment of information systems and technology with changing business requirements”<sup>21</sup>. Within its *Network and System Management Principles* sections, the following are prominent:

- Physical location should not restrict user access. Users should be able to undertake their duties regardless of whether they are connected to their agency network, are telecommuting from home, are visiting another agency, or are travelling interstate.
- Network infrastructure should be shared, avoiding unnecessary duplication of resources and also encouraging and enabling business improvement.
- Business needs have priority.
- Increase capital investment to offset support costs.<sup>22</sup>

As Papandrea et al reported in mid-2001 in a study of telecommunications pricing structures and options for servicing education and training needs for support infrastructure:

*Arrangements for the provision of telecommunications services in the States and Territories tend to reflect differences in Agency structures and responsibilities and complexities of delivering services to differently distributed populations. Historical, political and other legacy factors also contribute to the differences.*

*Most States and Territories have or are developing centralised purchasing arrangements for the supply of telecommunications services, particularly data services, to government owned education institutions. These vary from the establishment of dedicated networks, such as VicOne in Victoria, to the purchase of services from designated carriers at centrally negotiated prices. In some States, centralised arrangements are in place only for schools.*

*Access to centrally provided or negotiated arrangements in some States is extended to non-government education and training providers. Non-government schools, for example, have access to government arrangements for the education sector in Victoria, Western Australia, Tasmania and the Northern Territory. Similar access is planned for the future in South Australia and the ACT. Private VET and ACE providers do not typically have access to centrally negotiated arrangements. Some initiatives in this regard, however, are emerging in some States (for example, Victoria)<sup>23</sup>.*

Representing some 12% of the dynamic and competitive market for bandwidth in telecommunications, the education sector has both benefited and been constrained by the considerable similarities in telecommunications provision across States and differences in metropolitan, regional and rural services. As Papandrea et al reported on the implications of competition among providers:

*(The) greater the non-metropolitan proportion of a State the more likely that the degree of competition is lower and that prices for services are higher. The quality of the available services is also likely to be lower in the non-metropolitan areas of those states”, while Schools and TAFE’s have been beneficiaries of initiatives by most State and Territory Governments to use their buying power to secure better services and competitive prices for government agencies. ... In some cases, however, ‘lock-in’ effects have been reported suggesting that contracted prices may not have kept pace with downward movements in market prices. ... The dynamic character of the telecommunications industry places a premium on the retention of some flexibility in longer-term purchasing arrangements.<sup>24</sup>*

Private VET providers and ACE organisations are typically stand-alone units and lack the interconnected statewide formal structure that is a feature of school systems and TAFE’s. They also lack the size and related buying power of higher educational institutions. In practice they are in position similar to that of most small and medium enterprises. This means that they have little influence on the quality and prices of services available to them...Other than for services subject to regulated prices, ACE and private VET providers invariably paid higher prices for their services<sup>25</sup>.

The *Connecting Victoria* strategy to help schools and VET resources students’ IT needs, like similar programs under the Tri-State Alliance on Regional Communications (Queensland, NSW and Victoria) and the Telecommunications Purchasing Strategy to cover data networking, telephony and facilities management needs, for example, take into account in their smaller scale initiatives experiences with projects such as *VicOne* where cost reductions achieved through a large scale strategy were substantially below expectations.

Northern Territory’s *Learning and Technology in Schools* (LATIS) project to deliver a telecommunications framework for government and non-government schools through Optus (the whole of government provider) provides for downloads by satellite and back links by dialup modem, ISDN, or satellite (community or other) connection as appropriate.

A list of the various State/Territory documents relating to their arrangements and plans for connectivity is given at the end of this chapter.<sup>26</sup>

Differences within and between States and Territories reflect the dynamism of the market and “trade-offs between the benefits attainable from highly aggregated

demand and the benefits attainable from specialisation and flexibility”. There are “economies and diseconomies of scale to consider. Broadly, smaller markets might seek the highest level of demand aggregation they can muster, perhaps using whole-of-government arrangements, while larger markets might find they can achieve better tailored outcomes within the scale of their aggregated educational demand alone.”<sup>27</sup>

## Equity of Access

The ‘digital divide’ and its causes and implications are addressed in various parts of this report. It deserves attention no more so than in our discussion of infrastructure given that without adequate access to the hardware and networks of the knowledge society it is impossible to develop the new literacy of information technology and participate effectively in the emerging information economy. All governments in Australia have stressed the importance of access both to ICT infrastructure and to the means of acquiring the personal and vocational skills needed to take advantage of it. As stated, for example, by the Western Australian Department of Training: “Participation in the information age goes beyond having a skilled workforce, it is a basic right for all members of the community”

<http://www.training.wa.gov.au/training/content-ictstrat.asp>.

As we have noted in Chapter 2, Australia ranks highly in terms of the numbers of computers overall and the number of these on-line. There is a high usage rate of computers in the home and in the workplace and a high computer literacy rate, particularly amongst younger people. In terms of infrastructure, what it lacks is equal access to the technology in different geographic regions and across different groups in the community. Also lacking in comparison with some other countries is access to broadbanding, or where broadbanding is available, access at reasonable cost. In terms of the skilled workforce needed to maintain and develop the infrastructure Australia is well placed amongst comparable countries.

We have suggested that education systems in Australia have generally given priority over the last decade to a ‘computers in schools’ approach to launching the information age in Australian education. This has been supported by the Commonwealth Government through its *Computer Technologies for Schools* program which since 1998 has provided some 21,000 surplus computers and other ICT equipment to schools across Australia. In South Australia, a target was set of one computer for every four students by 2001. In the ACT a *PC’s for Teachers* program was launched in 1997, all teachers being supplied with a computer by mid 1999 and thus given the incentive to develop their skills in using them and explore their use as an educational tool. In the VET sector several States and Territories have developed wide area networks and local network infrastructure. At the university level, AARNet has proved an invaluable tool for teaching, research and administrative activities. But as recent studies have shown (eg Kearns et al 2000) effective access to this infrastructure is extremely variable and a function of many factors, including:

- funding, noting that while system-wide programs usually attempt to achieve a balanced distribution, decisions taken at the local level significantly affect the availability of equipment and services;

- geography, noting that while the technology may be available to cope with distance the cost can be prohibitive;
- commercial considerations such as where the decisions of commercial carriers about the availability and cost of services can inhibit the take-up of ICT;
- cultural issues such as where groups in the community may take exception to the unfettered access of children to on-line information;
- climate and other physical factors to which the technology may be poorly adapted;
- individual circumstances such as age, employment status and previous education and training.

As mentioned above, the Western Australian Department of Training has referred to the importance of all members of the community having the opportunity to participate in the information age. In order to provide this opportunity the Department has investigated ways of reaching all groups in the community:

*Research indicates that older people, the unemployed, other groups on low incomes and people with lower levels of educational attainment are most at risk of being left behind in the transformation to the digital economy. ...Many individuals will not undertake training at a large institution. People in identified target groups are most likely to undertake training in small groups comprised of similar people and in locations that they are comfortable with. Preferred training locations include libraries, cultural meeting places, clubs, TeleCentres and local government facilities such as community centres).*

<http://www.training.wa.gov.au/training/content-ictstrat.asp>

At the international level UNESCO has announced its intention to enhance access to ICT-based education and training by funding flagship programs in out-of-school learning environments, including:

- ICT-enhanced community learning centres
- Use of mass media for lifelong learning
- Use of ICT-mediated training centres for youth and adults
- ICT-enhanced self-study second chance programs to prepare youth and adults for basic education completion examinations.<sup>28</sup>

Access to ICT infrastructure is a necessary precursor to participation in the knowledge society. As the above examples illustrate there are many ways in which that opportunity can be provided.

### **General Comment**

While there has been considerable policy activity in the area of infrastructure, continuing advances in technology on the one hand and creative developments in how best to use the technology for educational purposes on the other, are part of a dynamic environment which will generate an ongoing demand for policy and program development, resource allocation and ongoing review.

As discussed in this chapter the major issues associated with the provision of ICT infrastructure for educational purposes include:

- access to sufficient (and ever expanding) bandwidth;
- affordability;
- standards/compatibility;
- connectivity;
- interoperability;
- regulation;
- technical support;
- equity of access.

Although national telecommunication policy and regulation sets a framework for education options in this area, there are still opportunities for innovative policy action as the history and evolution of AARNet illustrates.

The range of options developed to date should not be seen as limiting future development. Whether education interests at the school and VET levels are better served by whole-of-government schemes, or innovations such as “bandwidth islands”, which have developed in countries such as Canada, the United States, and Sweden, is an open question that requires further examination, and we will comment further on this question in the international report.

## NOTES

- 1 UNESCO 2001, p.10.  
 2 Ibid.  
 3 For access to a wide range of information on 'bandwidth', 'broadband', 'high speed internet services' and related matters see, for example, the website of the Monash University Centre for Telecommunications and Information Engineering: *Visioning the Future* [http://www.ctie.monash.edu.au/visioning\\_the\\_future/vtf7000.htm](http://www.ctie.monash.edu.au/visioning_the_future/vtf7000.htm)  
 4 Minister for Communication, Information Technology and the Arts 1999, p.14.  
 5 Ibid, p.14.  
 6 AIEAC 2000, p.9.  
 7 Ibid., pp.39-40.  
 8 For details of the *Connecting Victoria* project see the web site reference in the table below. For details of NOIE projects for enhancing connectivity in regional Australia see <http://www.noie.gov.au/projects/access/regional/>  
 9 Ibid., p.81.  
 10 Ibid., p.26.  
 11 NOIE 2001.  
 12 Ibid.  
 13 Moon 1999.  
 14 AARNet 2001.  
 15 Ibid.  
 16 Kelso 2001.  
 17 Department of the Premier and Cabinet *Queensland Strategic Plan 2001-2005* p.8.  
 18 Ibid., p.2.  
 19 Victoria 21.  
 20 NSW Premier's ICT Skills Forum.  
 21 Queensland Government Information Architecture (GIA) Mk 1.  
 22 Ibid., p.15-17.  
 23 Papandrea 2001, p.viii-ix.  
 24 Ibid., p.56-7.  
 25 Ibid., p.56.  
 26

State	Title	URL
ACT	Infrastructure - Establishing learning environments in the info. society	<a href="http://www.decs.act.gov.au/publicat/decsit/dec00/decs_html/infrastruct.htm">http://www.decs.act.gov.au/publicat/decsit/dec00/decs_html/infrastruct.htm</a>
ACT	TransACT's Broadband Connection for ACT Schools	<a href="http://www.innovation.act.gov.au/programs_detail.asp?ID=10">http://www.innovation.act.gov.au/programs_detail.asp?ID=10</a>
NSW	NSW Government Radio Network (GRN)	<a href="http://www.oit.nsw.gov.au/Publications/fact/grn.html">http://www.oit.nsw.gov.au/Publications/fact/grn.html</a>
NSW	TAFE New South Wales Online Project - "TAFE Connect"	<a href="http://www.tafensw.edu.au">http://www.tafensw.edu.au</a>
QLD	Connect-ED	<a href="http://www.telstra-ccc.qld.schools.net.au/adsl/main.html">http://www.telstra-ccc.qld.schools.net.au/adsl/main.html</a>
QLD	Draft Telecommunications Infrastructure Strategy	<a href="http://www.sd.qld.gov.au/dsdweb/htdocs/global/content.cfm?ID=7170">http://www.sd.qld.gov.au/dsdweb/htdocs/global/content.cfm?ID=7170</a>
QLD	Queensland Advanced Research Network (QARN)	<a href="http://www.iie.qld.gov.au/ciid/projects_subpages/qarn/qarn.html">http://www.iie.qld.gov.au/ciid/projects_subpages/qarn/qarn.html</a>
SA	Pathway SA	<a href="http://www.iepo.sa.gov.au/projects/pathway">http://www.iepo.sa.gov.au/projects/pathway</a>
SA	DECStech 2001	<a href="http://www.tsof.edu.au/LT.SA/decstech.htm">http://www.tsof.edu.au/LT.SA/decstech.htm</a>
TAS	Connecting Tasmanian Schools	<a href="http://www.noie.gov.au/projects/access/community/digitaldivide/DDtelecommunications.doc">http://www.noie.gov.au/projects/access/community/digitaldivide/DDtelecommunications.doc</a>
VIC	Learning Technologies in Victorian Schools	<a href="http://www.sofweb.vic.edu.au/lt/index.htm">http://www.sofweb.vic.edu.au/lt/index.htm</a>
VIC	Connecting Victoria: The Victorian Government's Strategy for ICT	<a href="http://www.mmv.vic.gov.au/Web/MMV/MMV.nsf/cc983b3d177fc0bc4a2567920046d852/1a8d8f6df0d04b9d4a2569a000180d0a/\$FILE/connvic3.pdf">http://www.mmv.vic.gov.au/Web/MMV/MMV.nsf/cc983b3d177fc0bc4a2567920046d852/1a8d8f6df0d04b9d4a2569a000180d0a/\$FILE/connvic3.pdf</a>
WA	Technology 2000 Draft Strategic Plan	<a href="http://www.eddept.wa.edu.au/t2000/overview.htm">http://www.eddept.wa.edu.au/t2000/overview.htm</a>
WA	SPIRIT: Strategic Partnering in Resourcing Info.Technology project - WA	<a href="http://www.commerce.indtech.wa.gov.au/industries/spirit/index.htm">http://www.commerce.indtech.wa.gov.au/industries/spirit/index.htm</a>
NT	Learning and Technology in Schools	<a href="http://www.latis.net.au/projoffice">http://www.latis.net.au/projoffice</a>

- 27 Ibid., p.20.  
 28 UNESCO 2001, p.9.

## 6. ONLINE CONTENT, APPLICATIONS AND SERVICES

*Connectivity, content, community. There are the buzzwords of the new education landscape and it is a global landscape.*

Peter Stokes, 2000.

Policies and strategies for online content, applications, and services are inevitably caught up in the wider debate over the transformation of education in the information age. The connections between content issues and the search for new learning strategies, appropriate to the new environment of education and training, are intimate, so that this is a dynamic area of development in which the interplay of technological advance, pedagogical innovation, and professional and community development create shifting requirements and the need for innovative responses.

The dynamic nature of these interactions has focussed attention on the nature of the market for online educational materials and the role of government interventions, in various ways, in furthering market development to meet rapidly evolving educational requirements. This has inevitably led to interest in new forms of public and private partnership, a feature of development in countries such as Britain.

A recent OECD report on partnership issues in e-learning development noted that the market for online education materials produced its own distortions because the market was highly fragmented (in terms of targets such as age, grade, subject matter) with high costs to compete in the specialised sub-markets, forcing many providers to focus on "big-ticket general studies content."<sup>1</sup>

The influence of these market factors, the pace of change, and differing sectoral strategies has led to somewhat different policy responses across the sectors of education and training in the development of strategies to meet the distinctive needs of each sector. The emergence of various forms of partnership is perhaps the key feature to be observed and it is likely that collaboration and partnership will be further developed in the future, including innovative forms of public/private partnership. This will be a significant theme in the international report.

Four key themes present in the *Education Action Plans* have influenced and been reflected in subsequent policy development. These themes are:

1. fostering a viable market for the generation of quality online curriculum content;
2. developing collaboration and partnership to support these market objectives, including innovative public/private partnership;
3. ensuring quality and acceptable standards;
4. providing necessary support services.<sup>2</sup>

Comment follows on these policy issues which inevitably involve tensions between aspects such as market development and ensuring quality and standards.

### **Fostering a Viable Market**

The small size of most Australian education systems, and the fragmentation of the market for online materials, raises a spectrum of issues involving the cost of online materials in relation to the size of the market and shifting educational requirements. This imperative has led to increased interest in collaboration and partnership which has been the most significant policy response. Examples such as *The Le@rning Federation* (formally Schools Online Curriculum Content Initiative - SOCCI) are discussed below.

While the fragmentation of the market for online materials raises a broad spectrum of issues, a number of key developments, in part relating to growing pressures for lifelong learning, are producing a further set of issues for educational policy in responding to the dynamics of current developments.

A recent OECD report on e-learning identified a four-way breakdown of the emerging lifelong learning education market.<sup>3</sup> This involves:

1. the early years and compulsory school cycle where e-learning is likely to bring significant changes in terms of unit costs, efficiency, and reach, and to address issues of quality, standards, diversity, and inclusion;
2. initial tertiary (VET in Australia) and the higher education level usually regarded as ages 18-24 where still rising participation rates have moved most OECD countries from elite to mass systems, and where continuing high demand raises pressures for cost containment. In terms of student participation a feature is a *learning and earning* clientele with part-time employment common;
3. the adult or continuing education market where massive growth is already occurring and where further exponential growth is widely predicted. As most clients are in employment, this is an *earning and learning* market;
4. a fourth market or clientele, ultimately possibly the most important but also the least tangible and predictable, is the whole of society learning nation. The ultimate vision of lifelong learning and the learning society will see a rapid growth of this market. The rapid development of diverse modes of e-learning in some OECD countries points to the development of this market.<sup>4</sup>

It is significant that Australian public policy for online content is focussed on the first two of these markets through policies implemented through the formal sectors of education (schools, VET, higher education). While some aspects of VET development, such as *Toolboxes*, reach into the third market to some extent, the overwhelming focus is on online content for the formal education system with the third and fourth market mainly left for commercial exploitation. This reflects the

absence of a comprehensive national policy for lifelong learning in Australia. This raises issues in respect of equity objectives in an inclusive society and the overarching objective that all Australians should benefit from the information economy.

This situation is reflected in the fact that public media organisations such as the ABC and SBS have only a marginal connection with public policy for online education materials, whereas in Britain the BBC has a formal agreement with the University for Industry so that BBC education programs from its dedicated digital television channel, BBC Knowledge, can reach a wider audience. Britain gains from quality BBC programs on basic ICT skills, such as *Computers Don't Bite* and *Web Wise* becoming available for a wider spectrum of adult learners through the national network of learning centres of the University for Industry.

The question of producing quality online materials for the third and fourth of the market segments is closely connected with the issue of a national approach to addressing the digital and learning divide in Australian society and needs to be addressed in that context. Action being taken by some States and Territories to address the digital divide could be strengthened if such a comprehensive national approach existed.

While market development policies have had the orientation discussed above, a significant objective has been to achieve a deepened understanding of the online market through market research on both the national and international markets.

This has been a feature of the VET sector where national and international "E-VET" market research studies have been funded under the annual research programs of the *Australian Flexible Learning Framework*.<sup>5</sup>

These projects have encouraged the sharing of market intelligence across Australian VET systems and have contributed to the VET objective of assisting Australian VET systems to maintain and expand their share of training markets. While the national study has been useful in identifying product development priorities, international market research has so far pointed to the barriers confronting VET in entering international markets, including the limited VET knowledge of international markets for online training, products and services.<sup>6</sup>

In the higher education sector, a distinctive feature has been the development of consortia arrangements associating groups of universities and private firms. At the school level a key response has been to strengthen collaboration and partnership between jurisdictions with *The Le@rning Federation* the prime example of this approach.

These and other examples as discussed below suggest that overall policy directed at fostering a viable market for online content is intimately connected with the emergence of a range of partnership strategies.

## Developing Collaboration and Partnership

The development of various forms of collaboration and partnership has perhaps been the distinctive feature of policy for online content. These have included major collaborative development projects at the school level, collaborative projects under the *VET Australian Flexible Learning Framework*, and the emergence of market driven consortia of universities and private firms in higher education.

These partnership developments derive from the nature of the markets for online education content discussed above and bring the benefit of sharing expensive development costs.

### ***The School Sector***

A major national initiative at the school level has been the *Schools Online Curriculum Content Initiative* (SOCCI) now renamed *The Le@rning Federation* (TLF) (<http://www.socci.edna.au>). This initiative supports a large-scale collaborative development of a national pool of online curriculum resources that address national priorities, support cultural identity and nurture innovative skills in young people. The initiative also contributes to the development of supporting mechanisms for sharing resources across school systems and to advancing the development of a national market in quality-assured Australian online school resources.

The Initiative is underpinned by a shared set of educational values, in particular the value of active learning processes and building on prior learning. The materials deriving from *The Le@rning Federation* can be used by the various jurisdictions in flexible ways while the work of *The Le@rning Federation* draws on the strengths of all Australian education systems and a range of commercial suppliers.

The work of *The Le@rning Federation* will lead to:

- a body of highly interactive quality-assured online curriculum content for all Australian school systems in the areas of Science, Mathematics and Numeracy, Literacy, Australian Studies, Innovation, Enterprise and Creativity, and Languages other than English;
- articulated standards for education soundness, interoperability and intellectual property rights consistent with other sectors of Australian education and training, and international standards; and
- development of systems, tools and services to support the distribution of, and access to, the content and management of intellectual property rights.

*The Le@rning Federation* is funded by joint Commonwealth and State/Territory funding. At a meeting in July 2001, MCEETYA agreed that the States and Territories will collectively match the Commonwealth contribution of \$24.1 million over the five years 2001-02 to 2005-06.

## **The VET Sector**

National collaborative action in the VET sector has been undertaken under the annual Strategy programs of the *Australian Flexible Learning Framework*. National objectives have included the development of a significant body of nationally developed online content, the establishment and promotion of a quality assurance framework, efficient access to and distribution of flexible learning products and services, and creating a demand for Australian online training products and services in the global marketplace.<sup>7</sup>

A particular feature of this collaborative effort has been the development of Toolboxes to provide for flexible delivery of ANTA Training Packages.

Toolboxes are a collection of resources, suggested learning strategies and supporting material to facilitate online delivery of vocational education and training. Toolboxes provide a flexible resource base for learning programs based on accredited Training Packages.<sup>8</sup>

Four series of Toolboxes have been developed with considerable refinement of this concept following evaluation studies of the initial series. Toolboxes are available to support Training Packages in such fields as Retail Operations, Community Services, Information Technology and Administration.<sup>9</sup> However, further work is being done and the findings of market research is being made available to VET providers of online products.

Information on national VET initiatives is available on the *Flexible Learning* web site (<http://www.flexiblelearning.net.au>).

## **Higher Education**

Partnership development in higher education is marked by the emergence of consortia of universities, linked for commercial purposes, rather than by government initiatives as in the school and VET sectors. Such consortia are usually linked to one or more commercial partners, and are usually directed at the global market. In its 1999 White Paper: *Knowledge and Innovation: A Policy Statement on Research and Training* <http://www.detya.gov.au/archive/highered/whitepaper/2.htm-2.4> the Commonwealth Government encouraged universities to develop international partnerships, particularly where research facilities are of such a scale and cost that they are too expensive to be provided by any single research organisation and, in the case of very expensive facilities, by a single country. It is the view of the Government that these facilities are most appropriately supported through collaboration involving consortia of research organisations, including overseas collaborators in the case of major international facilities.”

The global *Universitas 21* consortium is one example of a global partnership. This consortium, led by the University of Melbourne, includes the University of NSW and Queensland University, and a number of well known universities in other countries. The consortium has a formal agreement with the education publisher Thomson Learning, a division of the Thomson Corporation.

The *U21* universities provide badging and quality assurance while Thomson develops the course material and is responsible for assessment, student database management and translation. Similar consortia arrangements are emerging in North America and Europe, and are likely to be a feature of online content development for the global market in higher education, and possibly for the lifelong learning market.

The *Digital Harbour* project, part of high technology development at Melbourne's Docklands, is an example of a partnership between a university (Melbourne) and a range of industry partners, in this case from the computing, communications, consulting and commercial development industries. According to the consortia the project will "prepare education for the knowledge society" by changing the future of teacher training, the way children learn in schools and the interaction between school, higher education and industry.

[http://www.edfac.unimelb.edu.au/digital\\_harbour](http://www.edfac.unimelb.edu.au/digital_harbour)

Many universities have established formal partnership arrangements with industry for research and development purposes, linking the academic expertise of university staff with the resources and skills of the commercial world – the rationale, for example, behind the successful Cooperative Research Centres program and such initiatives as Australian Technology Park in Sydney <http://www.atp.com.au/>.

### **State and Territory Policy Initiatives**

In addition to national and international initiatives, such as those discussed above, the States and Territories have been active in online content development, applications and services in line with their overall policies for adapting education to the requirements of the information age.

Queensland provides a typical example with the following initiatives:

- *Curriculum Exchange* which provides quality resources for teachers and students to assist the teaching and learning process. The resources include units on Computers in Learning and Connecting Teachers: Project Examples  
[http://education.qld.gov.au/curriculum\\_exchange/](http://education.qld.gov.au/curriculum_exchange/)
- *EduList* is a selection of reviewed Internet sites with curriculum relevant content.  
<http://education.qld.gov.au/tal/edulist/index.html>
- *Virtual Schooling Service* combines data and voice conferencing with web based interaction and resources for secondary schools.  
[http://education.qld.gov.au/virtual\\_school/html/index.htm](http://education.qld.gov.au/virtual_school/html/index.htm)

A key aspect of the State role is to provide support services to assist schools in accessing and using online materials.

Victoria has established a Resource Centre which is seen as giving an impetus to local multimedia content.<sup>10</sup> Partnerships have been developed with the multimedia industry directed at better multimedia products being available for schools. Schools

are assisted in selecting, purchasing, and using multimedia resources by guidelines which describe, categorise, and appraise the content of new multimedia products.<sup>11</sup>

The *SOFWeb* site (<http://www.sofweb.vic.edu.au>) enables teachers to access a wide range of information and materials on such subjects as using the Internet, implementing learning technologies, learning technologies support programs, the global classroom, and products and privacy.

A particular thrust of Victorian policy has been to encourage teachers to participate in collaborative projects and interactive professional networks. The Resource Centre, which built on the earlier work of the *SOFWeb* project, provides a ready mix of content suggestions and curriculum ideas.

Other States have similar web sites to provide information and materials for teachers such as the *Learning Technologies* web site of the South Australian Department of Education, Training, and Employment (<http://www.tsof.edu.au>) which provides access to a wide range of resources including online projects, good ideas, and other relevant websites.

#### *TAFE NSW Online*

The *TAFE NSW Online* project illustrates an integrated approach to the development of online content with a set of related initiatives to support content development. The project aims to integrate e-business into normal TAFE NSW business processes so that it gives effect to a mainstreaming philosophy similar to that in most school systems.

*TAFE NSW Online* is centred on *Learningware* development which aims to have a significant number of modules and units of competency available online by Semester 1, 2002.

This action is supported by other initiatives involving:

- website development
- network enhancement
- Internet involvement
- metadata tagging
- learningware maintenance
- professional development
- online systems interface
- marketing
- integration of equity principles in development of learningware

This project demonstrates a systemic approach to addressing all aspects that bear on the success of online delivery [www.tafensw.edu.au](http://www.tafensw.edu.au).

## Ensuring Quality and Acceptable Standards

Issues involved in ensuring quality and acceptable standards of content, applications and services are being taken up in the contexts discussed above. *The Le@rning Federation* initiative at the school level includes the aim to develop articulated standards for educational soundness, interoperability and intellectual property rights so that these issues will be addressed in the course of development of online materials under this initiative.

Similarly, collaboration in the VET sector under the *Australian Flexible Learning Framework* includes the objective of establishing and promoting the use of a quality assurance framework, including national protocols for nationally funded projects, for the development and implementation of online VET programs.<sup>12</sup>

In the development of technical standards for VET, ANTA has supported the *VET Preferred Standards* project which since 1997 has developed a range of standards for the use of ICT in the sector. <http://www.vicnet.net.au/~neptune>

The Australian *IMS Centre* at the University of New England, established with DETYA funding in 1997, operates on a cross-sectoral basis in supporting the development and dissemination of IMS standards. The *IMS Global Learning Consortium Inc* (formerly the *Instructional Management Systems Project*) is a US-based initiative incorporating some 600 educational institutions across the USA as well as many non-US participants. It is developing and promoting open specifications for facilitating online distributed learning activities. DETYA has joined the Consortium as an investment member on behalf of the education and training community in Australia. Australia is one of four countries that have established IMS centres to facilitate national participation in IMS processes.

This approach means that quality assurance standards and principles will emerge from national collaboration in the development of online content.

## Providing Support Services

As stated in *Learning for the Knowledge Society* [www.detya.gov.au/edactplan.htm](http://www.detya.gov.au/edactplan.htm) (p. 29) the effective development of support services requires an understanding of the market, collaboration by providers, appropriate standards for interoperability, quality assurance, creativity and innovation, domestic diffusion and international saleability. Access to support services is increasingly being seen as an essential tool in the broader context of community development and the development of learning communities. The Commonwealth Government's *Rural Transactions Centres Programme*, for example, encourages the development of small regional, rural and remote communities and facilitates access to Commonwealth, State and local government services.

<http://www.dotrs.gov.au/regional/statement/consolidation/>

Access to online support services is also enhancing the delivery of health services, particularly in regional and remote areas. Under the *National Telehealth Plan* for Australia and New Zealand, for example, services and products which are being developed in conjunction with clinicians and health providers include: patient

services; patient management consultations; second opinions; face-to-face appointments or management of patient referrals; diagnostic support, clinical information transfer; remote patient monitoring e.g. in-home monitoring; continuing professional education; collaborative support and training; community health information access and education.

<http://www.health.gov.au/healthonline/telehealth.htm>

Within the schools sector, while support services continue to be provided through a combination of centralised and locally-based administrative and professional advisory services, a growing feature has been the development of online support services with direct access by teachers. The online information systems established by State and Territory education departments were discussed above. These portals, such as *Learning Technologies South Australia* and the Victorian *SOFWeb* site provide access to a wide range of information across areas such as courses, curriculum, research and ICT projects.

At the national level DEST has developed the *Education Portal*, the online entry point to a comprehensive array of Commonwealth Government information and services concerning all aspects and levels of education in Australia. In particular, it focuses on Commonwealth government policies, programs, events, publications and resourcing. It also provides links to key education and training sites at the national, state and territory level. <http://www.education.gov.au/>

### **Education Network Australia (EdNA)**

Also at a national level, *EdNA Online* ([www.edna.edu.au](http://www.edna.edu.au)) provides an education portal covering all sectors, with links to a wide range of information and services. The *EdNA Online* services create communities of educators online, making it a network of Australian education and training practitioners.

The EdNA collaboration was an initiative of the Australian Government which in 1995 obtained the cooperation of the States and Territories to establish a wide area network to connect schools and vocational education and training institutions.<sup>13</sup> This was quickly followed by the development of an online directory of quality educational resources and communications capabilities because of the ease of access to the Internet as a means of connecting educational institutions.

As described by the Chief Executive Officer of education.au limited <http://www.educationau.edu.au/jisc/> the online directory came to be known as EdNA Directory Service and began as an evaluated collection of online resources (web links) posited into a complex category structure reflecting the organization of education and training in Australia. Further resources were added to the categories by linking similar resources using an index crawler. The collection grew quickly and was complemented by an increasing number of approved educational discussion groups which were archived on the EdNA Directory Service, adding further to the resources available.

The idea of collaboration in relation to online learning using the Internet was manifest in an agreement by Ministers in July, 1996, to establish a company *education.au*

*limited* to manage the EdNA Directory Service. The company was to be supported by a national reference committee comprising representatives of the three education and training sectors, the Commonwealth and the new company. Under the agreement the Commonwealth, States and Territories agreed to jointly fund *education.au limited*, the Commonwealth agreed to fund the EdNA Directory Service and States/Territories agreed to fund their participation by providing expertise and advice to the service.

The *EdNA Online* site now includes a research database (EdResearch Online) which is managed by the Australian Council for Educational Research (ACER) following a trial phase up to October 2001. The research database provides access to some 7000 research articles and documents. *EdNA Online* also provides the technical infrastructure for *Online Curriculum Content for Schools*, the *Education Portal* and the *National Career Information System* (NCIS).

There have been a number of diverse forces at work contributing to EdNA's development, not all of which are clearly unique to Australia. In sum, the key factors were:

- the dramatic uptake of Internet usage in Australia since the emergence of the World Wide Web;
- the deregulation of telecommunications law;
- a diminishing in public funding for the education sector as a whole;
- a growing concern throughout the broader community for mechanisms which will protect children from access to unwholesome content and individuals on the Internet;
- the pursuit of equity of access to information and communications technologies, particularly for people in regional and remote communities;
- the 'globalisation' of the educational marketplace;
- the potential to secure a market leverage for collective bargaining of lower prices for computers and connectivity; reducing duplication of effort and adding value to initiatives already underway; and,
- a significant strengthening of commitment from governments to information technology in education.

[http://www.educationau.edu.au/edu\\_papers/icce99/aust\\_content.html](http://www.educationau.edu.au/edu_papers/icce99/aust_content.html)

## **General Comment**

The area of online content applications and services presents a scene of considerable collaborative activity with major initiatives such as the *Le@rning Federation*, and with significant partnership development. However, the focus is on the formal education system and there has been less development of content for the adult and continuing education market and the whole of society learning nation market identified in the OCED four-way breakdown of the emerging lifelong learning education market.

This orientation assumes significance in relation to policy to address the growing digital and learning divide in society. If the declared objective to “maximise opportunities for all Australians to benefit from the information economy” is to be seriously addressed, it would seem necessary to consider the adult and lifelong

learning markets, as well as the traditional education sectors, in developing public policy for online content and services. There are issues in this area that are relevant for consideration by DEST and AICTEC. The question of how other countries are addressing the issue of online content for adult and lifelong learning markets will be taken up in the international report.

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## NOTES

- 1 OECD 2001a, p.53.
- 2 DETYA 2000, pp.28-30.
- 3 OECD 2001a.
- 4 Ibid., pp.30-31.
- 5 For example, see EdNA VET Advisory Group 2001, p.10.
- 6 Ibid., p.11.
- 7 Ibid.
- 8 Ibid., 2002, p.6.
- 9 Ibid., 2001, p.10.
- 10 Education Victoria 1998.
- 11 Ibid.
- 12 Ibid., p.9.
- 13 At the higher education level the universities had already established their own network – the Australian Academic and Research Network (AARNeT), an initiative of the Australian Vice-Chancellors' Committee in 1989 - as described above in Chapter 5. The AV-CC has also participated in the development of EdNA Online such as in the introduction of multiple metadata schema providing access to Australian and international standards.

## 7. POLICY AND ORGANISATIONAL FRAMEWORK

The *Education Action Plan* for the information economy recognises that policies to support the information economy cannot stand alone. Rather, a critical facet lies in the connections between these policies and other policy directions across the education sectors and related areas of government policy. These symbiotic relationships are critical to the success of policies directed at adapting education and training to the requirements of the information economy.

A second and related theme in the *Education Action Plan* resides in the recognition that a comprehensive policy framework is required for education and training to support the information economy. This requirement is stated in the following terms:

*A comprehensive policy framework is required for education and training, including research and development, that will support the information economy and knowledge society. Policies at all levels (national, system and organisational level) must articulate a vision for the future, provide for the level of investment to effect change and promote equity and access and to enable Australia's education and training industry to become internationally competitive.<sup>1</sup>*

In addition to these key requirements, a further test of policy exists in the need for education policy to keep pace with economic, technological, and social change in a context of exponential change. This has posed difficulties for education systems around the world, and drawn considerable critical comment.

- The OECD in a report on ICT in schools comments:

*Compared with many other sectors, education has been slow to make changes in organisational practice and culture through the adoption of ICT.<sup>2</sup>*

- Thornburg in a paper commissioned by the United States Department of Education comments:

*While we have had computers in classrooms for many years now, they have yet to be used in ways that assist in radically transforming the very structure of education.<sup>3</sup>*

Thornburg further asserts that “unless our thinking about education is transformed along with our continuing expansion of telematic technology into the classrooms, our technology investment will fail to live up to its potential.”<sup>4</sup>

Comment follows on development of a policy and organisational framework for ICT in education in the light of the three key themes outlined above:

- mainstreaming policy for ICT in education and connecting to relevant policy areas;
- development of a comprehensive policy framework; and
- aligning policy with the pace of change.

### **Mainstreaming and Connecting Policy**

The overview of the development of overarching strategies and frameworks for action given in Chapter 3 above indicates that there has been substantial progress in mainstreaming policy for ICT in education and connecting such policy to other relevant policies. This has been an objective in all State and Territory education systems, and is reflected in the progression of policy through the phases of development discussed in Chapter 3.

This development has been influenced by:

- the development of Commonwealth and State whole-of-government action plans for the information economy;
- the national *Education Action Plans* for the information economy; and
- State and Territory strategic visions and planning for the development of their education systems.

Examples are given in Chapter 3 of policy developments in each of these areas.

It appears that the impact of the *Education Action Plans* and State whole-of-government action plans for the information economy, at much the same time, has influenced State and Territory systems to progress to a more reflective second phase in the development of policy for ICT in education with more concern for educational goals and purposes, in particular with respect to teaching and learning in the formal education and training sectors.

This orientation is reflected, for example in the Western Australian e2c corporate strategy with its shift in focus from technology to knowledge and community so that the role of teachers and schools is redefined in terms of the requirements of a knowledge society.<sup>5</sup> This orientation goes along with a shift from teaching to learning in an information rich environment involving a more distributed approach to learning.<sup>6</sup>

The Queensland vision of a networked learning community is elaborated in a 1999 strategic statement on directions for learning technologies:<sup>7</sup>

*The Vision for Education Queensland is that by 2005, the mainstream educational model will demonstrate a real or virtual classroom, where students are guided by facilitating “teachers” through a self learning process.*

*The curriculum will be characterised by the outcomes necessary for success in an information society.*<sup>8</sup>

The Queensland 1999 vision statement and strategic plan reflected “a quantum leap in the experience and consciousness of school personnel with respect to the application of information and communication technologies in education. The wave of momentum which had been slowly but relentlessly building over 15 years broke with the simultaneous implementation of these initiatives.”<sup>9</sup>

There is a similar emphasis on the role of the school in its community in the Queensland Government’s agreed blueprint for education in the State over the coming decade (*QSE-2010*). This strategy provides the framework for “a focussed and aligned response to ICT needs in schools”.<sup>10</sup>

*Education Queensland will commit itself to developing a networked learning community with effective support for schools...*<sup>11</sup>

This goal is elaborated in the *QSE-2010* strategy as including a range of specific actions relating to areas such as teachers, online curriculum materials, and access to regional, national, and global sources of information.

The Queensland experience suggests a progression from the initial phase of experimentation with computers in schools to a mature vision of the role of ICT in education in a learning society. The initial phase was recognised as being “piecemeal and patchy” with a “lack of strategic co-ordination of ICT initiatives at the system level creating barriers to their effective implementation at the school level.”<sup>12</sup>

The evaluation of policy in other systems such as Tasmania and Western Australia suggests a similar development from an initial phase of experimentation and rolling-out of computers to a more strategic and systemic second phase. The Tasmanian Education Department in comments to this study noted:

*At present ICT planning often sits in parallel with rather than being a key component of school planning. Integration of learning technologies is still not a high enough priority for many schools. Few schools have linked ICT planning to student outcomes and there is a lack of evidence of planning for ICT beyond the ICT grants funding.*<sup>13</sup>

Policies for ICT in education in Queensland have been aligned with the *Smart State* thrust in whole-of-government development, and with an orientation towards lifelong learning and the concept of Queensland developing as a networked learning community. This conceptual focus provides for an integrated approach to policy, with policy for ICT in education closely aligned with strategic policy directions.

Queensland, like Western Australia and other States, has been concerned to examine the implications for education of an information-rich society.

There is a similar connection in the Victorian *Connecting Victoria* strategy between policy for ICT and building a learning society, and this goal is included as the first of the six major strategy elements in the Victorian plan.<sup>14</sup>

The New South Wales *ICT Skills Action Plan* is based on a similar whole-of-government approach although the focus is more on skills for the information society rather than the broader social vision that underpins the Queensland, Victorian, and Western Australian strategies.<sup>15</sup>

Overall, it is evident that there has been substantial development in mainstreaming policy for ICT in education, and connecting this to comprehensive whole-of-government strategies for adapting to the conditions and requirements of the information economy and society.

At the same time, there are differences between State and Territory systems in the particular orientation and focus adopted. While some systems have focussed on meeting the skill and learning needs of the information economy, others have linked this requirement to a broader vision of a networked learning community that provides learning opportunities on a whole-of-life basis for all citizens. The implications of these differences for national policies and frameworks require examination.

### **Development of a Comprehensive Policy Framework**

The *Education Action Plan* for the information economy recognises that a comprehensive policy framework is required for adapting education and training to the conditions and requirements of the information economy and learning society.

The *Plan* attempts to provide such a framework through its definition of the five goal areas for policy action: people, infrastructure, online content applications and services, policy and organisational framework, and regulatory framework.

While the *Education Action Plan* has undoubtedly been valuable in providing a framework for collaborative national action, it is focussed on the formal education system, with a neglect of adult and community education, and without a vision of lifelong learning which provides a basis for a systemic approach that links all sectors of education to a broader social vision of Australia as a learning society. There is therefore an issue as to whether the *Education Action Plan* (and its component sectoral action plans) provides a sufficiently comprehensive policy framework for collaborative national action in the fast moving context of the knowledge society.

We comment above, and in Chapter 3, on how a number of State systems have progressed beyond the formal education sectors in developing a vision of a networked learning community<sup>16</sup> providing lifelong learning opportunities for all. The development of policy in Queensland may be taken as an example of development towards a more comprehensive policy framework which links the education sector to a broader social vision, and there are similar developments in other States which we have noted.

There is therefore an issue as to whether the absence of a comprehensive national policy for lifelong learning acts as an impediment to co-ordinated national

collaboration in adapting education systems to the conditions and requirements of the information economy and society.

The need for a comprehensive policy framework is most evident in addressing the access and equity objectives of Commonwealth and State strategic frameworks for the information economy. While the Commonwealth's *Strategic Framework for the Information Economy* contains the objective of "providing opportunities for all Australians to benefit from the information economy" and State strategic frameworks contain similar objectives, there is an absence of a comprehensive national policy framework which links the roles of bodies like DCITA and NOIE (and their State counterparts) with the work of national and State education agencies, in particular in addressing the needs of adults without basic ICT and literacy skills.

This deficiency is reflected in the neglect of adult and community education in the *Education Action Plans*, and in the absence of a national counterpart to the learning community vision emerging across a number of States. There are grounds for believing that, despite the action of DCITA, NOIE and State counterparts, the digital divide in Australian society is deepening. Initiatives that have been taken by bodies such as DCITA provide a basis for more co-ordinated partnership action in developing the necessary comprehensive policy framework for concerted action which links the formal education sectors in partnership with a range of other stakeholders.

As we noted in Chapter 4, the evolution of policy in some States and Territories towards more comprehensive frameworks, which link the role of education (and ICT in education) to a broader socio-economic vision of the future development of the State, also suggests that some States may be on the threshold of a third phase in the development of policy for ICT in education. We also comment further on this question in Chapter 9 below.

### **Aligning Policy with the Pace of Change**

The third key issue we have identified relating to the policy and organisational framework for ICT in education, involves the issue of aligning policy with the pace of social, technological, and economic change. While this issue is relevant to all the policy thrusts discussed in this report, it is particularly pertinent to:

- achieving responsiveness in education institutions; and
- the role of research and development and its links with policy.

We discuss action in these areas below. In the case of research and development, we comment on this role in relation to action taken under the *VET Australian Flexible Learning Framework*.

### **Making Institutions Responsive to Change**

The ultimate test of the effectiveness of education policy resides in the outcomes in education institutions, and in particular in the effects on student learning. In this respect, the policy adopted by Education Victoria under its *Learning Technologies in*

*Victorian Schools Strategy for 1998-2001* provides a good example of the role of local school planning in bringing about systemic change.<sup>17</sup>

Education Victoria, like the other systems discussed above, recognised that schools were at different stages in adapting to the requirements of the information age.<sup>18</sup> The Department therefore adopted an overall framework which set an immediate course of action for all schools based on a school based implementation strategy.

This approach involved:

- the development of a *Learning Technologies Plan* by every school;
- an agreed *Implementation Strategy* to accompany the plan;
- the provision of a *Learning Technologies Planning Guide* and associated development support materials and services for schools
  - these included a *Skill Development Matrix* to guide the professional development of teachers;
- the setting of specific objectives to be achieved by schools over the three year period commencing with specific objectives for 1998.<sup>19</sup>

The Victorian policy illustrates the integration of professional development, curriculum, infrastructure, and other aspects at the level of the individual school with the implementation of an agreed *Learning Technologies Plan* used as the instrument to achieve mainstreaming of ICT in the work of schools, and the integration of all necessary aspects.

This approach also involved a staged process which recognised the autonomy and diversity of schools, and the need for planning to be related to the school's vision, charter, curriculum plan, level of resourcing, and range of teacher skills.<sup>20</sup>

As a two-staged process, the strategy involved:

- Stage 1: Development of the *Learning Technology Plan*.
- Stage 2: Development of an *Agreed Implementation Strategy*.

Schools were required under this strategy to establish, in addition to the specified 1998 targets, their own achievable targets in key areas including:

- curriculum, teaching and learning strategies;
- professional development and learning technologies capabilities for teachers;
- integrated resource and organisational plan;
- leadership/administration staff achievement measures.<sup>21</sup>

Schools were expected to achieve the objectives outlined in the Department's strategy by 2001.

A particular feature of the Victorian strategy has been the strong thrust towards teacher professional development on the basis of all teachers being required to achieve appropriate Stage 1 goals of the *Skill Development Matrix*.<sup>22</sup>

The approach being taken in Western Australia is also based on identifying the responsibilities of schools in the implementation of ICT. The *Framework for Implementation of Learning Technologies in WA Government Schools* shows how schools can assess progress in key areas:

- integration in school planning;
- learning technologies in the teaching and learning program;
- staff skills in learning technologies;
- review and management of software resources including Internet sites;
- provision and management of hardware resources;
- Internet and network connections.

<http://www.eddept.wa.edu.au/t2000/chart.pdf>

In the *Queensland VET Strategy (2001-2004)* there is similarly a partnership approach: "a shared commitment of the Queensland Training system – government, industry, communities and training providers." Under four strategic objectives the *Strategy* identifies the responsibilities of the participants for planning, resourcing and action <http://www.training.qld.gov.au/polsguides/vetstrat/vetstrategy/pdf>.

Thus the approach typically adopted in Australian schools and VET systems is to develop policy frameworks within which educational institutions are encouraged to develop as flexible and responsive learning organizations. As the above examples illustrate, the strategy requires that the responsibilities at the systemic and institutional levels are identified and progress monitored. As a rolling planning process, this is well suited to managing change in a context of unpredictable exponential change. A number of systems in other countries have adopted a similar approach and we will comment further on this strategy in the international report.

## **Research, Policy, and Reform**

*The practice and pedagogy of ICT is in its infancy.*

BECTA Corporate Plan for 2001-2005

An American report sponsored by the National Research Council on research and education reform adopted the view that education reform is an organic, developmental process.<sup>23</sup> In place of the traditional linear research and development model, the reform of education was conceptualised as an evolutionary process that involves new research findings, the experience of practitioners, the course of public policy (both within and outside education), and other forces.<sup>24</sup>

This dynamic concept of the reform process involves the notion of a learning community in which the various stakeholders are at once both learners and contributors to the process. In a number of key respects, policy developments in

Australia in recent years (in particular since 1999) are converging towards this model of education reform with policy for ICT in education a catalyst for broader reform objectives.

The learning community concept can be applied both at a systemic level, and at the level of individual institutions. At the school level the Victorian approach discussed above illustrates an approach to developing schools as responsive and adaptive learning communities.

The *Learning Together* policy statement of the Tasmanian Government further illustrates this model, with an emphasis on shared responsibility and continuous monitoring, feedback and adaptation:

*Three key elements of an education system that are more easily measured, and which closely link to successful outcomes, are:*

- *access to programs, facilities and resources*
- *participation in learning throughout life and*
- *achievement through recognition or qualification processes.*

*Increasing access and participation rates will reflect success in providing relevant lifelong learning opportunities. Improving achievement levels among learners will validate the quality provision of the education system. However, neither one of these elements can be used in isolation from the other.*

*For example, if we are true to our set of shared values, we cannot use higher pass rates as an achievement measure while excluding 'at risk' students from our measures.*

*The fourth element by which we can measure our progress is:*

- *an increased use of direct '**customer satisfaction**' measures, particularly for those services used by the broader community.*

<http://www.education.tas.gov.au/learningtogether/success.htm>

At a system level, the experience of the VET sector in Australia in implementing the *Australian Flexible Learning Framework* illustrates the role of research and development in a series of rolling annual strategic plans within the framework of a five-year strategic plan for 2000-2004.

Under this approach, ANTA provides annual funding of around \$20m for developmental activities within the five action areas in a collaborative national approach involving Commonwealth, State, and Territory agencies.

Projects funded under the annual strategic plans involve significant numbers of VET practitioners across Australia creating knowledge through participation in innovative development projects.<sup>25</sup>

The five year strategy is progressive with the initial two years (2000, 2001) regarded as a knowledge building phase, with 2002 and 2003 representing the intensive phase while 2004 will be the consolidation phase directed at sustainability.<sup>26</sup>

The strategic plan is currently being evaluated by KPMG with a final report due towards the middle of 2002. Indications to date suggest substantial progress has been achieved through this national collaborative effort. A particular value resides in the development of a substantial body of new research, including knowledge about the different needs of learners, which is being used to inform the production of online content and the application of online learning methodologies.<sup>27</sup>

Overall, the national policy focus on adapting education and training to the conditions and requirements of the information age has seen a strengthening of research on ICT in education with national research agencies, in particular the Australian Council for Education Research (ACER) and the National Centre for Vocational Education Research (NCVER) contributing.

While there has been growth in research in this area, there are still issues as to whether the strengthening of research, and the building of linkages between research, policy, and practice, is sufficient. The concept of educational reform as an organic, learning process depends crucially on the quality of information provided for practitioners and the support for the application of research findings at the level of individual institutions. Whether there is yet sufficient cross-sectoral sharing of research information is an issue, with most research undertaken on a sectoral basis. Overall, the links of research, policy, practice, and reform is a key area that we will address in the international report in considering the necessary elements in a national innovation system.

### **General Comment**

While the policy and organisational framework is one of the five action areas under the national *Education Action Plan*, there has been less national follow-up in this area, and in the area of the regulatory framework, than in the other three action areas. Rather, this has been an area where there has been significant policy action in the States and Territories in line with their constitutional responsibility for education.

Policy action in the States and Territories may be seen as laying the foundations for the transformation of education and training in line with the conditions and requirements of the information age. If State and Territory systems now progress to a more fundamental phase of reform and transformation, there are likely to be further key policy and organisational issues that will require consideration at a national level.

Aligning national and State/Territory action in the reform process is a key issue in a federal system in achieving a whole-of-government approach. While much has been achieved through national partnership and collaboration, there are issues as to whether the development of a comprehensive policy framework is yet complete, in particular in addressing the access and equity objectives that are given prominence in both national and State/Territory policy frameworks and in addressing the lifelong learning objectives which have been enunciated by most States/Territories and ANTA.

Overall, there has been impressive policy development in the States and Territories in adapting their education systems to the requirements of the information age. National collaboration has been significant in the VET sector in the elaboration of the *VET Action Plan* through a strategic research and development program directed at fostering flexible learning in the sector. However, it is likely that further development of the policy and organisational framework will be necessary as the information age impacts even more deeply on Australian society.

## NOTES

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- 1 DETYA 2000, p.19.  
2 OECD 2000b, p.86.  
3 Thornburg 2000, p.2.  
4 Ibid., p.1.  
5 Education Department Western Australia 2000.  
6 Ibid., p.20.  
7 Education Queensland 1999a.  
8 Ibid., p.6.  
9 Education Queensland 1999b. The initiatives referred to included the Connect-Ed, Schools  
10 LANS, Schooling 2001 and SIMs projects.  
11 Education Queensland 2000.  
12 Ibid., p.1.  
13 Ibid., p.4.  
14 Department of Education, Community and Cultural Development Tasmania 2001, p.5.  
15 Minister for State and Regional Development Victoria 1999.  
16 New South Wales Government, 2000.  
17 By 'learning community' we mean: "A learning community is any group of people, whether  
18 linked by geography or by some other shared interest, which addresses the learning needs of  
19 its members through proactive partnerships. It especially uses learning as a way of promoting  
20 social cohesion, regeneration and economic growth."  
21 Education Victoria 1998.  
22 Ibid., p.17.  
23 Ibid.  
24 Ibid., p.17.  
25 Ibid.,p.18.  
26 Ibid., p.20.  
27 Committee on the Federal Role in Education Research 1992, p.5.  
Ibid., p.15.  
Flexible Learning Advisory Group 2001, p.1.  
Ibid., p.1.  
Ibid., p.1.

## 8. REGULATORY FRAMEWORK

*We are entering the 21<sup>st</sup> Century with antiquated regulations of educational policy and inappropriately restrictive copyright laws. It is as if we tried to manage the interstate highway system with the rules of the horse and buggy era... it is clear that a radical rethinking of the relevant body of regulation and law is in order.*

Report of the United States Web-based Education Commission 2000.

*Thus the massive educational system that was developed in the 20<sup>th</sup> century on the principles of industrial economy is struggling to cope with the shift to a radically different knowledge based economy.*

Report of the OECD Higher Level Forum on Knowledge Management 2000.

The report of the recent American Web-based Education Commission was strongly critical of what were seen as antiquated regulation of education policy and restrictive copyright laws which impeded realising the full potential of the Internet for education.<sup>1</sup> The Commission considered that the regulations that governed much of current education were focussed on supporting the welfare of the education institution, rather than the individual learner. In this they reflected an earlier model seen as the factory model of education. The Commission concluded that a wholesale rethinking of the regulatory foundations governing education institutions was required.<sup>2</sup>

In Australia the significance of an appropriate regulatory framework to support the use of ICT in education has also been recognised and is included as one of the five action areas in the national *Education Action Plan*. The action area is repeated in each of the sectoral Education Action Plans.

However, the approach taken in the *Education Action Plan* has been to restrict the scope of this action area to regulation relating to ICT administered by agencies external to education ministries.<sup>3</sup> This has meant that the focus has been on intellectual property, privacy, telecommunications, legal aspects of online content, electronic transactions and data protection<sup>4</sup> which, in general, are the areas that the Commonwealth Government has addressed in building a framework of law and regulation for the information economy.<sup>5</sup>

As this regulation is administered by agencies external to education ministries, the role of the education sectors has been mainly to formulate common views and positions and to communicate the preferred position to the relevant agency. This has led to a largely advocacy role, in particular with respect to copyright and telecommunications regulation which have significant implications for education systems. This approach led to a key role for the former ERC (now AICTEC) in

formulating education positions and communicating these. The wider aspects of education regulation, identified by an American Web-based Education Commission, have not been taken up at a national level.

It is moreover the case that most of the identified regulation, in particular in the key areas of intellectual property, copyright and telecommunications, is Commonwealth legislation, while in the area of privacy there is Commonwealth legislation and some States, but not all, also have privacy legislation so that a complex situation exists which varies from State to State.

Overall Commonwealth policy has been to establish market rules to facilitate the workings of the information economy in areas such as intellectual property, telecommunications, online content, privacy, electronic transactions, and data protection. This action has included developing a legal framework for electronic commerce so as to put e-commerce and paper-based commerce on the same footing, and has included the sensitive area of privacy.

This body of recent legislation has raised issues for the education sectors in respect of:

- removing excessive legal and regulatory barriers in access to content;
- protecting learners and institutions; and
- achieving affordable access to bandwidth under the terms of telecommunications regulation.

The last of these was discussed in Chapter 5 above. We comment on the other issues below.

The emergence of the digital era and the growth of commercial activities by higher education and VET, including international marketing, has led to a new spectrum of legal and regulatory issues for the education sectors so that this is an area that will require ongoing monitoring, the sharing of information, and the development of common education positions.

A key area for the education and research communities is the ownership of intellectual property, of which copyright issues are an important component. In a recent report commissioned by DEST on the regulatory environment applying to universities, Phillips Fox<sup>6</sup> advise that intellectual property is governed by Commonwealth legislation in the areas of copyright, patents, designs, plant breeding and trade marks. They point out that there is no relevant State or Territory legislation but note that there the establishing acts for universities in the various States and Territories differ in their treatment of intellectual property. In NSW, Queensland, NT, ACT and for the ANU, the establishing acts contain express provisions permitting the exploitation of intellectual property. In Victoria there are general references to the promotion of research and in WA and SA there is no reference to intellectual property at all. They advise, however, that this variation has no direct implications for the exploitation of intellectual property.

While attempts have been made to simplifying copyright law, copyright remains a complex area of law in the digital era, administered by two Commonwealth departments (Attorney General's and Communications, Information technology and the Arts), which is constantly under review.<sup>7</sup> The Australian Government Solicitor's recent report on the regulatory framework concluded that the VET sector had not been able consistently to maintain an effective participation in the reform process, and this is probably also true of schools, so that education interests have not always been taken into account sufficiently.<sup>8</sup> This emphasises the need for ongoing monitoring, formulation of shared education views, and active communication of these views.

This need has been recognised in the *Australian Flexible Learning Framework Strategy 2002* [http://www.flexiblelearning.net.au/Strt\\_02.pdf](http://www.flexiblelearning.net.au/Strt_02.pdf) and an Expert Advisory Group has been established to advise the Flexible Learning Advisory Group on current and future legal and regulatory issues that are, and will, impact on the provision of flexible delivery of VET in Australia and overseas. The FLAG Commonwealth, State and Territory representatives have been asked to provide input in addressing the focus questions aimed to assist in securing a snapshot of the key legal and regulatory issues facing States and Territories in their efforts to deliver vocational education and training using new information and communication technologies. <http://flexiblelearning.net.au/experts/overview.htm>

There have been, however, a few advances in simplifying regulation in areas such as copyright. One of these has been the development of AShareNet as an electronic copyright management system for the VET sector which is managed by a company formed for this purpose. AShareNet aims to streamline licensing transactions for training packages and other VET material, and to assist in rationalising copyright ownership within the sector. It will improve the speed with which materials can be exchanged and redeveloped, lower transaction costs, and improve co-operation generally in the management of VET materials.<sup>9</sup> AShareNet provides a useful model for other education sectors where copyright arrangements will be required in joint national projects such as The Australian Federation.

There is also a useful advance under the Copyright Amendment (Digital Agenda) Act 2000 which extends the statutory licence provisions of the Copyright Act to cover electronic uses. This is a major development which opens up the possibility for education institutions to scan works, e-mail digital copies of works, and install works on an intranet for use by students.<sup>10</sup>

Privacy is a further complex area of law and regulation where there are frequently tensions between competing principles, and where, in the education context, the interests of students, institutions, systems, families and the wider community are often involved.

Commonwealth legislation has evolved in this area from the initial Privacy Act of 1988 which applied principles developed by OECD in its Guidelines on the Protection of Privacy and the Transborder Flow of Personal Data to the use of information obtained from individuals by government agencies. The 1988 Act applied to Commonwealth Ministers and agencies, credit reporting agencies and certain private sector contractors to Commonwealth agencies.<sup>11</sup>

The more recent Commonwealth Privacy Amendment (Private Sector) Act 2000 established a national scheme for the handling of personal information by private sector organisations. Small businesses with a turnover of less than \$3million are excluded from the provisions of the Act, but private education providers with a turnover above this level are subject to the Act.<sup>12</sup>

As at March 2001, two States had enacted their own privacy legislation (NSW and Victoria) covering the public sector, and some other jurisdictions operated as if the principles of the Commonwealth Act applied. This is an untidy situation for education providers operating nationally where national consistency is desirable.

While privacy regulation is the main area of regulation at present relevant to the question of protecting learners and institutions, it is likely that as education moves increasingly to a lifelong learning basis, other areas of law and regulation will become relevant. This is likely to include consumer protection and fields such as negligence.

This will be an inevitable aspect of the more complex environment that confronts education institutions in the information age. This reality underlies the importance of the ethical dimension across most of these areas, with the values and professionalism of educational personnel a necessary adjunct and underpinning to the strict legal and regulatory requirements.

There is a growing recognition that values are increasingly important in a knowledge society and in knowledge work,<sup>13</sup> distinguishing information and knowledge, and this fact is especially pertinent to the regulatory framework for education and learning in a knowledge society. This means that action to develop an appropriate regulatory framework should be closely connected to human resource strategies to foster the necessary ethical sensitivity and capacity of educational personnel to work with values in a complex knowledge society.

### **The Reform Cycle, Policy, and Regulation**

While regulatory reform has not been a prominent feature of the national education policy landscape to date, this area is likely to become more significant as the information age impacts more deeply on the education sectors, and the process of transformation of education and training, heralded in the *Education Action Plan*, becomes a reality. It will therefore be desirable to institute processes to link regulatory review and reform more closely to policy processes, and to the reform cycle generally.

In Chapter 7 above we set out the concept of reform as a learning process in a cycle involving research and development, reflection, the generation of new knowledge, and the application of this knowledge in revised policy, regulation and innovative practice. This view argues for close connections between regulatory review and reform and the other elements in the reform cycle, and for institutional arrangements that build these connections. The key role of research and development, and the effective dissemination of research findings to systems and institutions, is a significant element in this process.

For these reasons, regulatory reform should not be seen in isolation, but rather in the connections that link law and regulation with policies, strategies and the change process in drawing education into the world of the knowledge society and information economy. It is probable, that as the pace of change and transformation accelerates, this systemic and holistic perspective will become increasingly important and necessary. We envisage this approach as a key feature of the third phase in policy for ICT in education discussed in the chapter that follows.

## NOTES

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- 1 Web-based Education Commission 2000, pp.87-102.
  - 2 Ibid., p.87.
  - 3 DETYA 2000, p.33.
  - 4 Ibid., pp.33-35.
  - 5 Minister for Communications, Information Technology and the Arts, 1999, p.19.
  - 6 Phillips Fox, 2001
  - 7 Crisp and Kearns 2001, pp.48-49.
  - 8 Ibid., p.49.
  - 9 Ibid., pp.46-57.
  - 10 Ibid., p.47.
  - 11 Ibid., p.36.
  - 12 Ibid., p.37.
  - 13 Ibid., p.81.

## 9. SOME GENERAL OBSERVATIONS

*Sustained IT&T skill development can only occur in a lifelong learning context.*

Queensland Department of Communication and  
Information, Local Government, Planning  
and Sport, 2001.

*I believe we can say that the Swedish school is moving into the third phase of the use of ICT.*

Swedish Minister for Education and  
Science, April 2001.

This overview of policy for ICT in education in Australia has shown a scene of considerable activity and development, in particular since 1998, as all education systems have addressed the question of adjusting their education and training policies to the conditions and requirements of the information age.

A particular feature has been the working of the Australian federal system in this context, with the collaboration and partnership between the Commonwealth, States and Territories in key areas of policy development. This is reflected in the development of the national *Education Action Plan*, with its component schools, VET and higher education sectoral plans, and in follow up on the Plan under the general oversight of MCEETYA.

There are, however, grounds for believing that partnership action can be taken further in certain areas of need that are discussed below.

A second distinctive feature has been the emergence and influence of whole-of-government strategic frameworks for the information economy at both Commonwealth and State levels from around 1998. These strategic frameworks have impacted on both the national Education Action Plans and policy development for ICT in education in the States and Territories, so that the period since 1999 has witnessed a dynamic process of interaction between these whole-of-government strategic frameworks and policy for ICT in education.

These policy interactions have moreover been driven by the dynamic character of technological change, in particular the pervasive influence of the Internet, so that education policy for ICT has been in a fluid state of ongoing development. The arrangements in the VET sector discussed in this report illustrate this feature well.

The cumulative impact of these influences has led to a mainstreaming of policy for ICT in education as Australian education systems have progressed from an initial “rolling-out” phase of development to a second phase where the role of ICT in education is integral to fundamental educational purposes and strategies. This has led to policy for ICT in education being linked more closely to strategic directions for

school and VET systems as, for example, in Queensland where the *QSE-2010* strategy provides a framework for “a focussed and aligned response to ICT needs in schools”.<sup>1</sup>

The current state of play in the schools sector is summarised in the EdNA Schools Advisory Group Progress Report for 2001 as follows: “The first major phase of ICT programs and projects is now nearing completion in most government education systems. As a result of these initiatives, most schools across Australia have begun the process of integration of ICT into the school curriculum and into the daily work of teachers. Many schools are demonstrating exciting and innovative approaches to teaching and learning using, ICT.” The Report points to the widespread availability and use of computers in schools, the basic computer literacy of most teachers and the internet connectivity of at least most urban schools  
<http://www.edna.edu.au/preview/schools/reports/learningonline.pdf>.

Discussing what we have defined as second phase developments the Progress Report finds that: “Increasingly, schools and school systems are realising the potential to link ICT integration with whole school reform. ICT’s are seen not as ends in themselves but as tools for improving student outcomes across all curriculum areas and as tools to drive organisational change.” It identifies several areas for attention, among them:

- the updating of hardware and technical infrastructure and in particular the connection of all schools to the Internet with sufficient affordable bandwidth;
- the need to link new educational directions and whole of government information economy strategies;
- the need to take a holistic approach to ICT planning and implementation, developing greater coordination across areas of curriculum, professional development and ICT infrastructure;
- the need to give a higher priority to online learning and virtual schooling within an overall ICT strategy.

In the VET sector the emphasis continues to be on the use of ICT in the development of flexible learning – as promoted through a range of strategies relating to people, technological infrastructure, content development, applications and services, enabling policies and problem-solving regulations. In assessing progress to date the Flexible Learning Advisory Group identifies as the most significant challenges:

- Finding ways to address the lack of time and workload pressures at all levels of the VET system.
- Addressing the widespread lack of knowledge among VET staff of the *Framework* and, more significantly, of flexible learning in general.
- Promoting the products, services and models which have been developed in the course of the *Strategy 2000* to VET providers and practitioners.
- Developing strategies to encourage the movement of flexible learning activities from the margins of VET practice into the normal mainstream of programs and services. <http://www.flexiblelearning.net.au/2fr-eval.htm>

The private VET sector, which accounts for up to 25% of training provision (depending on the measure used), is less well connected into State-level and national cooperative activities though the process of registering training

organizations provides a means of quality control for nationally recognised qualifications.

## **Objectives – Economic, Social, Educational**

While policy for ICT in all Australian systems is now more “focussed and aligned”, particular States and the Commonwealth differ in the balance of economic, social, and educational objectives brought into their whole-of-government strategic framework. While the Commonwealth and some States/Territories have a particular focus on economic objectives in meeting the skill needs of the information economy (this emphasis is evident, for example, in NSW) others (eg Victoria and Queensland) have taken a broader perspective with social goals also emphasised.

However, even where the focus is on the needs of the information economy, social issues inevitably come into policy consideration as, for example, in the close interest that NOIE has taken in digital divide issues.

A particular focus for these differences lies in the place assigned to lifelong learning and to meeting the learning needs of the adult population. These are the earning and learning and “whole of society learning nation markets” identified by OECD.<sup>2</sup>

The Commonwealth’s *Strategic Framework for the Information Economy* and the national *Education Action Plans* (which focus on the formal education sectors), while not inconsistent with a lifelong learning perspective, are not presented with this perspective explicitly stated. Meanwhile, some States such as Queensland and Victoria, have built a lifelong learning/learning community orientation into their whole-of-government strategic planning.

This issue assumes importance in addressing the learning and ICT skills needs of the adult population, including addressing the digital divide in society. There is around the world a growing market for adult learners, sometimes called ‘free agent learners’, which is not being addressed by Australian national policy for education so that this market in Australia is largely falling to private providers, often using overseas material.

Beyond commercial considerations, there is a lack of a comprehensive national policy framework to address the access and equity objectives of Commonwealth and State strategic frameworks beyond the supply side policies, mainly infrastructure, of bodies such as DCITA and its State counterparts.

As described in our international report, countries such as Britain and Sweden have adopted a lifelong learning perspective in developing demand side policies directed to disadvantaged groups beyond the digital divide. There is abundant research evidence on the sociodemographic factors which influence the digital divide,<sup>3</sup> in particular poverty and level of education, so that supply side infrastructure policies are unlikely, by themselves, to achieve the access and equity objectives of national and state strategic planning.

The quality and success of a knowledge society depends to a very considerable extent on the capacity of its citizens to keep learning throughout life in a range of contexts, including the home and the workplace, so as to maintain employability, build a necessary enterprise and innovation culture to support business and industry, and to enhance the quality of life of the community.

## **Removing Barriers**

While it is necessary for schools to turn out motivated lifelong learners with the skills and attributes to keep learning throughout life, it is also necessary for education policy to become increasingly systemic, rather than sectoral, in supporting learning throughout life in a range of contexts. The role of ICT as a catalyst and tool for learning in supporting these directions for education policy is critical, and is reflected in the policy directions of some Australian States and Territories. Progressing this orientation and perspective to the national level is now the critical challenge for Australian policy.

The impact of ICT is pervasive throughout society, creating options for new distributed learning opportunities in a networked learning community.

At the same time, markets for online content are global, national, and local so that the challenge for education systems is to think creatively, and develop policy beyond the traditional sectoral boundaries so that learning opportunities are extended throughout society for all.

This challenge is especially pertinent in addressing the access and equity objectives of governments, and the digital and learning divide in society. Supply side infrastructure policies, although important, by themselves will not achieve the desired access objectives for the more severely disadvantaged groups in society, so that education systems need to be active partners in building learning communities which foster and support a demand for learning from excluded groups.

While some key elements of such a more systemic and holistic approach are appearing in a number of States, there is not yet a comprehensive national framework to support extending collaboration and partnership on a whole-of-government, whole-of-community basis.

As recognised by a number of State departments the convergence of policy for lifelong learning and ICT in education is one essential feature of this requirement. In achieving this objective, there is a convergence of social, educational, and economic goals.

The need to actively foster a convergence of policy for lifelong learning and ICT in education means that the key features of the lifelong learning approach identified by OECD should also apply to policy for ICT in education.<sup>4</sup> These are:

- it offers a systemic view of learning as a connected system covering the whole lifecycle and comprising all forms of formal and informal learning;

- it is based on the centrality of the learner;
- it emphasises the motivation to learn so that self-paced and self-directed learning are central;
- it takes a balanced view of the multiple objectives of education policy.<sup>5</sup>

Policy for ICT in education in some States already encompasses the second, third, and fourth of these attributes, so that there is evidence in these jurisdictions of a move towards a lifelong learning approach with ICT seen as a tool and catalyst for this enlarged vision of the role of education in a learning and knowledge society.

### **The Enabling Pillars**

Viewed in the broad perspective of social and economic change, the key trend we have observed in this overview of Australian policies for ICT in education is the emerging convergence and interaction of policies in respect of learning, technology, and community. There are grounds for believing that these interactions will continue into the future in symbiotic relationships, and in creative expressions, that will drive Australia towards achieving an inclusive learning and knowledge society.

The interaction of these key enablers is being played out in different ways in the policy contexts discussed in this report. Some expressions include the beginnings of a paradigm shift in respect of teaching and learning in schools, in strengthened school and community relationships, in emerging concepts of VET institutions as learning organisations, and schools as learning communities, and in the growing interest across Australia in turning towns and cities into learning communities.. They are further given expression in visions such as the Queensland concept of a networked learning community and the Western Australian aspiration of “bringing communities together online”. The concept, often found, that ICT enables communities to open out to the world brings in a global dimension. However, some expressions, such as in workplace learning, are still in an embryonic form in much of Australian business and industry.

The growing interest in community oriented policies and strategies has particular value in bringing a strengthened demand-side perspective into policy development and balancing the traditional orientation of education policy towards supply side measures. It is a necessary development in the information age, and an essential foundation for effective access and equity policies directed at an inclusive society providing opportunities for all.

The interaction of the three prongs of the enabling pillars is taking different forms in other countries as, for example, in the Canadian program of Smart Communities which link the role of ICT with community-oriented strategies. These international variations on this theme will be covered in the international report.

### **Towards a Third Phase in ICT Development**

The policy directions emerging in some States suggests that these States stand poised on the threshold of a third phase in the development of policy for ICT in

education which will witness a more fundamental transformation of education and training to fit the conditions of a learning and knowledge society. While States are at various stages in the evolution of their policy for ICT in education, there are grounds for taking the view that all States are on the journey towards this more holistic, integrated, and systemic third phase.

The vision of a networked learning community, with learning opportunities for all, is a noble one that merits extended partnership and collaboration in progressing beyond the present condition of ICT in Australian education.

While there has been significant policy development for ICT in education, in particular since 1998, there is further work to be done if Australian education and training is to be transformed to enhance the achievements of the knowledge society where the opportunity to continue learning throughout life is the currency of success, inclusion and fulfilment.

## NOTES

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- 1 Education Queensland, 2000.
  - 2 OECD 2001a, pp.30-31
  - 3 See, for example, NATSEM 2000.
  - 4 OECD 2001c, pp.10-11.
  - 5 Ibid., p.11.

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## GLOSSARY

AARNet	Australian Academic and Research Network
ACER	Australian Council for Educational Research
AICTEC	Australian Information and Communications Technology in Education Committee - an advisory committee of MCEETYA
AIEAC	Australian Information Economy Advisory Council
ANTA	Australian National Training Authority
AVCC	Australian Vice Chancellors' Committee
CSIRO	Commonwealth Scientific & Industrial Research Organisation
DCITA	Department of Communication, Information Technology and the Arts
DEST	Department of Education, Science and Training (from 2001)
DETYA	Department of Education, Training and Youth Affairs (to 2001)
EdNA Online	The Internet web site launched by Australian Education and Training Ministers to serve as an authoritative portal for information on Australian education and training <a href="http://www.edna.edu.au">www.edna.edu.au</a>
EnNA.Au	The non-profit company owned by State/Territory and Commonwealth Ministers for Education which manages EdNA Online
MCEETYA	Ministerial Council on Education, Employment, Training and Youth Affairs
NCVER	National Centre for Vocational Education Research
NOIE	National Office of the Information Economy
OECD	Organisation for Economic Co-operation and Development

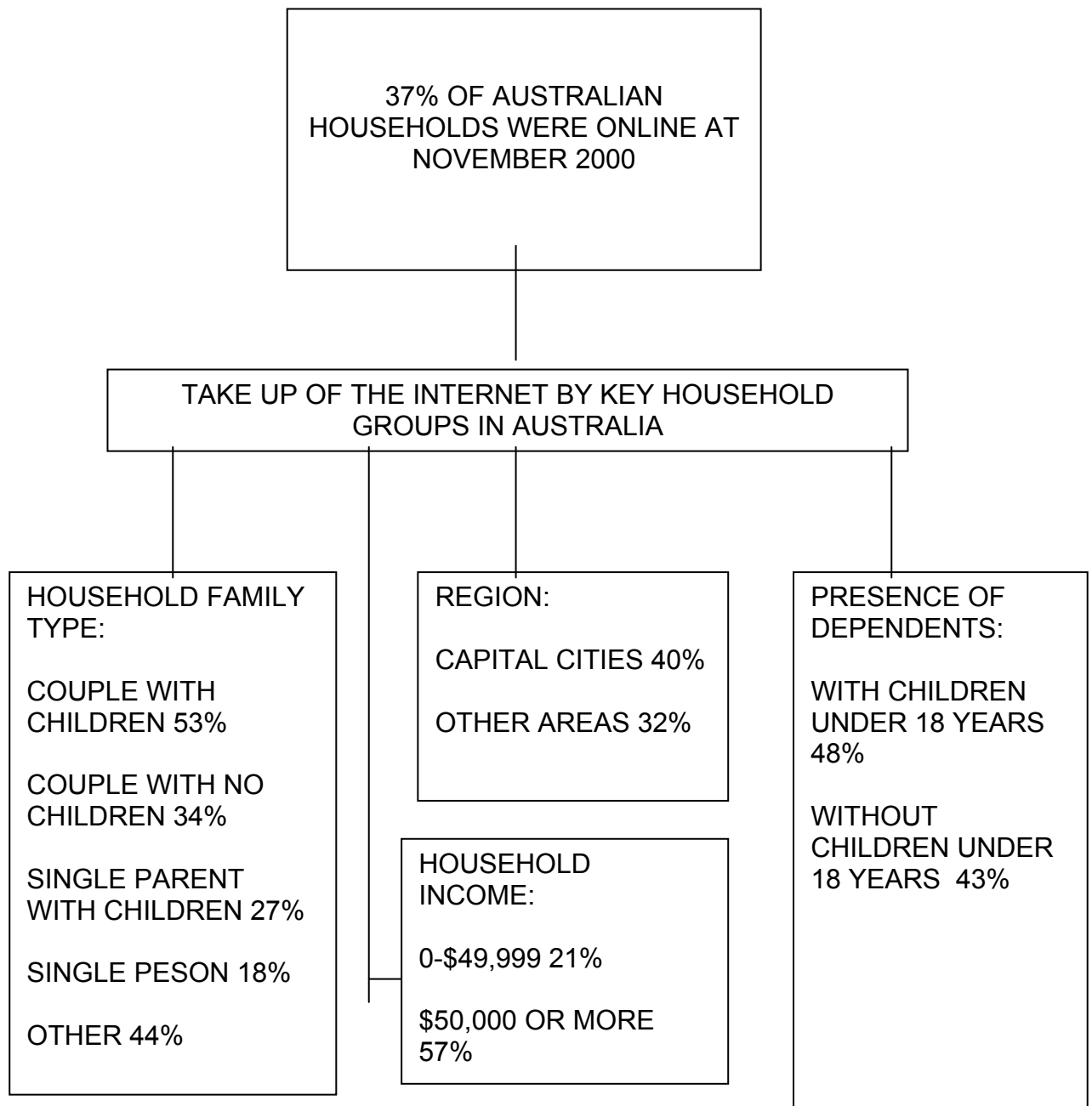
SOCCI Schools Online Curriculum Content Initiative. Now renamed  
the Learning Federation  
[www.thelearningfederation.edu.au](http://www.thelearningfederation.edu.au)

VET Vocational Education and Training

FIGURE 1: OVERVIEW

**CHARACTERISTICS OF AUSTRALIAN HOUSEHOLDS ONLINE AT NOVEMBER 2000<sup>a</sup>**

(SOURCE: ABS, USE OF THE INTERNET BY HOUSEHOLDERS; NOVEMBER 2000)

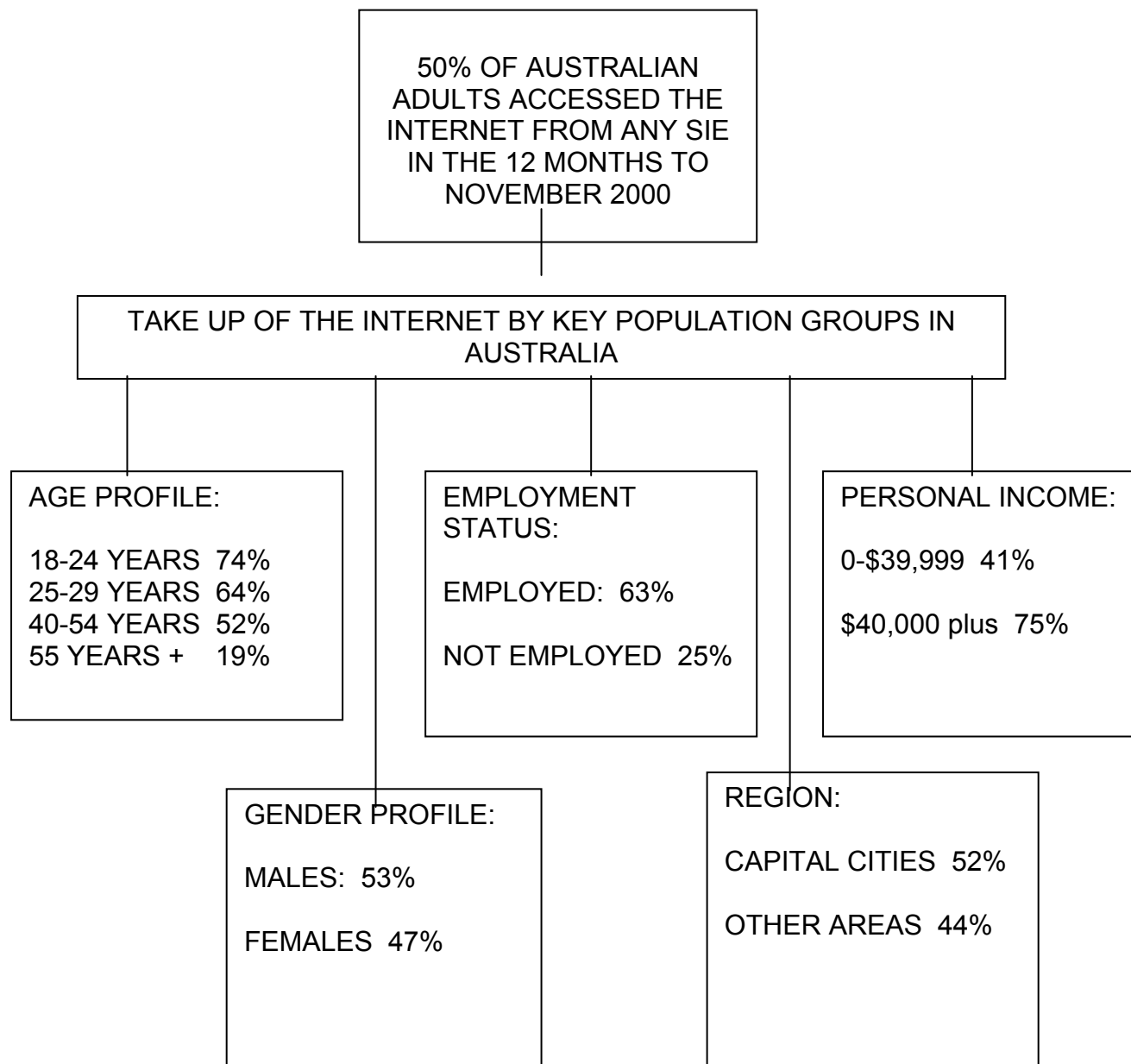


a. Source: NOIE, The Current State of Play, June 2001.

**FIGURE 2: OVERVIEW (cont)**

**CHARACTERISTICS OF AUSTRALIAN ADULTS ONLINE  
(PERSONS 18 YEARS AND OVER) NOVEMBER 2000<sup>a</sup>**

(SOURCE: ABS, USE OF THE INTERNET BY HOUSEHOLDERS NOVEMBER 2000)



a. Source: NOIE, The Current State of Play, June 2001.

