

A Digital Education Revolution



New Leadership.

A Digital Education Revolution

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Policy Document

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Overview

To have the best job and life opportunities in the future, Australian students must receive a world class education today.

A world class education system requires significant government and private investment, quality subjects to study, well-trained and dedicated teachers, and the best classroom facilities such as computers, laboratories and workshops.

In coming years, a critical component of a world class education system in Australia will be use of a computer and access to reliable, high speed broadband. This will provide closer links between schools, teachers, students and parents, and help realise the true potential of e-education. It will change the way teachers teach, and the way students learn.

Information and communications technology is no longer just another subject taught by schools, it is a means of learning across all subjects – from English, mathematics and science, to the humanities, technical and applied studies, music and visual arts. It is also a driver of productivity and growth across all sectors of the economy, from farming and mining to manufacturing and services.

Australian students need greater access to, and more sophisticated use of, information and communications technology. They need a digital education that prepares them for the jobs of tomorrow. They need the best hardware, high speed broadband connections and the best trained teachers to integrate new technology into classroom lessons.

Understanding the importance of a digital education to the future of Australia, a Rudd Labor Government will invest \$1 billion over four years to provide capital grants to Government, Catholic, and Independent Secondary Schools and schooling systems to assist them to provide world class information and communications technology (ICT) for every secondary student in years 9 to 12.

Schools will be able to apply for grants of up to \$1 million to revolutionise their classrooms with new or upgraded ICT equipment. This could include personal laptops, thin clients with virtual desktops¹, and internet network infrastructure to plug our schools into the information superhighway.

This initiative is aimed at ensuring that one million Australian secondary school students get an education with the latest technology, to prepare them for the jobs of the future.

A Rudd Labor Government will also revolutionise classroom education by providing Australian schools with fibre to the premises (FTTP) broadband connections, which will deliver internet speeds up to 100 megabits per second (mbps) – around 100 times faster than most current speeds in schools.

Fast, reliable broadband will give Australian students access to new e-education applications such as virtual classrooms, electronic books (e-books), visual and audio streaming and high definition video conferencing.

The provision of a FTTP broadband connection to Australian schools will be a condition of Labor's competitive assessment process for the construction of a National Broadband Network. This commitment enhances Labor's broadband plan, announced in March 2007, under which a Rudd Labor Government will invest \$4.7 billion, in partnership with the private sector, to facilitate the roll out of a National Broadband Network.

To contribute to the additional cost of deploying FTTP connections to Australian schools, Labor will commit additional funds of up to \$100 million out of its \$1 billion investment in ICT in schools.

Schools in remote areas will receive a standard of service which, depending on available technologies such as fixed-line, wireless and satellite, will be as close as possible to the standard provided by the National Broadband Network.

A Rudd Labor Government will also:

- Work with the States and Territories and the Deans of Education to ensure new and continuing teachers have access to training that enables them to use the technologies broadband delivers to enrich children's education experience.
- Develop online curriculum resources for all students, and support conferencing facilities for those studying specialist subjects such as languages.
- Develop web portals that enable parents to participate in their child's education.

A Rudd Labor Government will revolutionise classroom education by putting a computer on the desk of every upper secondary student and by providing Australian schools with fibre to the premises connections, which will deliver broadband speeds of up to 100 megabits per second.

Introduction

To have the best job and life opportunities in the future, Australian students must receive a world class education today.

A world class education system requires significant government and private investment, quality subjects to study, well-trained and dedicated teachers, and the best classroom facilities such as computers, laboratories and workshops.

In coming years, a critical component of a world class education system in Australia will be having computers on every desk and having access to reliable, high speed broadband. This digital infrastructure will provide closer links between schools, teachers, students and parents, and help realise the true potential of e-education and internet-based learning. It will change the way teachers teach, and the way students learn.

E-education applications are currently being developed at a frenetic pace. While the most innovative educational tools have probably not yet been thought of, few doubt the potential of computers and broadband to revolutionise the classroom. While e-education is in its infancy, the potential of computers and broadband is clear:

- Standard professional applications such as word processing and spreadsheets have significant classroom applications such as essay and letter writing, interpreting statistics and learning practical financial skills.
- Technical subjects such as woodwork and industrial design have been transformed through the use of computer aided design software.
- Quality online content can enhance student learning, such as through virtual tours of museums for art and science classes and e-books for those not available at the school library or local library.
- Online communication across great distances, such as interaction with overseas students for foreign language classes, and webchats with subject experts such as business people, academics and scientists.

This document outlines the educational applications of computers and broadband and details Labor's plan to revolutionise classroom learning.

Digital education

Computers and broadband are shaping the 21st century. We need to ensure that Australian schools are able to provide students with the tools they will need to live and work in a world shaped by technological change.

Computers and broadband are critical enabling technologies that are driving substantial productivity gains around the world.

Computers and broadband will not only increase efficiency, help reduce costs and create new markets for Australian business. They also have the potential to transform the way our schools operate in the future for the better.

Australian schools must have a computer on every desk and high speed, reliable broadband access to drive a digital education revolution

Computers: the toolbox of the 21st century

Whichever industry, trade, skill or profession they work in, Australia's children will need to be equipped for computer applications such as word processing, spreadsheets, and making presentations. These are the basic skills of the 21st century.

“An effective use of ICT in schools can have an immediate positive impact on the schools’ learning environments, for example by: creating more dynamic interaction between students and teachers, increasing collaboration and team work in problem-solving activities, stimulating creativity in both students and teachers, and helping students to control and monitor their own learning...Further, a successful use of ICT in schools can help students to develop skills, both specific to ICT and more generally, that will be useful for them in their future academic and professional lives.”

‘Are students ready for a technology-rich world?’, OECD 2006

Computers will enhance the learning experience of every high school student in the country, giving them the tools they need to engage more effectively in the classroom and with the world. There are a broad range of applications for computers in our schools, from basic applications such as spreadsheets to help teach practical financial skills, to supplementing a trades education with skills in computer aided technical design.

FIGURE 1: CLASSROOM APPLICATIONS OF COMPUTERS

Computer Application	Classroom Application
Word Processor	<ul style="list-style-type: none"> • Writing and formatting documents such as letters, reports, stories, scripts and essays • Learning how to footnote, source and index documents for a range of essay based subjects such as English and History • Electronic submission of assignments
Spreadsheets	<ul style="list-style-type: none"> • Interpreting data, and analysing statistics in Mathematics and learning simple, practical financial skills • Creating diagrams and graphs for science subjects such as physics, biology and chemistry
Slide presentations / desktop publishing	<ul style="list-style-type: none"> • Designing presentations to communicate key ideas • Producing brochures and promotional material in business studies and commerce subjects
Multimedia and editing software	<ul style="list-style-type: none"> • Recording, publishing and editing music for music classes • For design and art classes, creating and editing photography and videos and design websites
Computer aided technical design	<ul style="list-style-type: none"> • Use Computer Aided Design (CAD) for trades projects like furniture and materials • Design basic circuits such as lights switches, sensors and simple motors in electronics
Specialised software	<ul style="list-style-type: none"> • In biology, using time lapse photography and video technology to follow experiments over time • In physics, modelling unobservable experiments for astronomy

Students with better access to technology can receive a stronger education and achieve better academic performance. The OECD has found that in Australia, along with 14 other OECD countries (out of 29 surveyed) there is a strong relationship between students who have used computers for several years and performance in mathematics.² This shows that the use of computers at school should not be seen as recreational relief from studying, but instead as being crucial to helping students to learn.

Australia's overall use of computers in schools ranks well amongst other developed economies. Nevertheless, there is room for improvement both in the accessibility and sophistication of computer use in the classroom – 34 per cent of students are in schools where principals report that instruction is hindered by a shortage of computers.³

The computer skills that our children will gain from their school education will be invaluable to help them secure their future jobs. ICT skills are not just necessary for jobs in programming and systems maintenance – they are critical to well-paid jobs across all industries, in agriculture, mining, manufacturing and services. Examples of applications of computers in some industries that our children will work in include:

- In agriculture, through the use of 'virtual farming' for operations such as remotely monitoring the health and security of livestock; remote measuring of temperature, moisture and light, and controlling irrigation systems.⁴
- In mining, ICT applications are used for stockpile management, logistics, ore body evaluation, blast and mine design, mineral sampling and quality analysis, and seismic monitoring and geologic sensing.⁵
- In manufacturing, applications used to boost productivity include incorporation of (computerised) numerical controllers into machines, robotics, and local area communication and control networks in factories.⁶
- In service businesses, computers are used by architects transmitting fully rendered 3D models of buildings, by engineers transmitting geo-spatial models, and by doctors examining data intensive patient test results.

It is critical that Australia increases the accessibility of computers in schools and improves how they are used to maximise their benefit in the classroom.

Broadband: plugging into the digital revolution

Access to world class broadband will revolutionise classroom education and enable students to engage more effectively with the resources from around the world.

The full potential of broadband in schools can only be realised through reliable, high speed and affordable broadband services.

The potential of high speed broadband connections is already clear, with the development of:

- Video conferencing for distance education, which will provide better opportunities for students in regional and rural areas, and give all students a greater range of subject choice.
- Quality online content that enhances student learning, such as virtual tours of museums for art and science classes, e-books for those not available at

the school or local library, and access to the latest news and current affairs.

- Online communication across great distances, such as interaction with overseas students for foreign language classes, and webchats with subject experts such as business people, academics and scientists.

High speed broadband will also mean that Australian students have access to world class infrastructure that is the ‘tool of the trade’ for jobs of the future in computing, information studies, engineering, and across the sciences. If Australian students cannot access broadband of the same speed or quality as students in other countries, they may struggle to compete in the labour market against better trained students from overseas for the most highly paid, satisfying and secure jobs.

FIGURE 2: CLASSROOM APPLICATIONS OF BROADBAND

Bandwidth Requirements	Broadband Application	Classroom Application
64 – 512 kbps	Email and messaging	<ul style="list-style-type: none"> • Student homework clubs • Submitting assignments to teachers • Parent / teacher communication on child's progress at school
64 kbps	Voice over internet protocol	<ul style="list-style-type: none"> • Low cost phone calls for schools and students
128 kbps	Web-browsing	<ul style="list-style-type: none"> • Online research for social science subjects such as history, geography and economics • News and current affairs learning
256 Mbps	Low quality video streaming	<ul style="list-style-type: none"> • Vision and clips of key speeches and events in history; science experiments and telescope pictures; audio/visual news and current affairs
512 kbps	Maintaining website	<ul style="list-style-type: none"> • Communication between schools and students and their parents • Subjects where students learn to construct websites such as computing, information technology and business studies
1 Mbps	Fast file downloading	<ul style="list-style-type: none"> • Accessing portable document files (pdf) of latest academic articles on critical issues
		<ul style="list-style-type: none"> • Downloading e-books unavailable at school library or local library
5 Mbps	High fidelity audio downloading	<ul style="list-style-type: none"> • Music classes with recitals from international concert halls – with a 5 minute music selection downloading in under a minute
		<ul style="list-style-type: none"> • Virtual classrooms for distance education – both for students in rural and regional areas; and for specialist courses
		<ul style="list-style-type: none"> • Virtual museum tours for art, history and science classes
4-6 Mbps upwards	High definition video conferencing	<ul style="list-style-type: none"> • Foreign language classes where students can interact and communicate with students in other parts of the world • ‘Web-chats’ with experts such as geo-thermal scientists on location in outback South Australia
12 – 24 Mbps	Internet protocol television (IPTV)	<ul style="list-style-type: none"> • Downloading documentaries for science, social science, and religious studies classes • Downloading contemporary productions of Shakespearean plays for English classes

Note: Broadband speeds required for performance of applications are indicative only

Broadband will also foster the development of students' online research skills. The internet is not a perfect information source, and it is important that students learn internet skills, and the limitations of the internet at school under the guidance of teachers. While the internet is undoubtedly one of the most powerful information innovations in history, it is important that it is used in conjunction with traditional information sources such as textbooks and reference materials in the school library.

Broadband also enables greater parental involvement in a child's education. There will be more feedback on their child's progress, and greater awareness of curriculum content, teaching methods and what homework is being set for their children.⁷

Broadband curriculum content

Getting curriculum content right is also important. Rich, interactive curriculum content across schools, irrespective of their location, can overcome the disadvantages faced by schools and teachers in rural and remote locations.

A digital education cannot and should not replace traditional schooling, but it can enrich the curricula and provide students with an exposure to educational technology and content.

To this end, the *Le@rning Federation* is assisting in the development of more online content.⁸ In the period between 2006 and 2008 the *Le@rning Federation* has agreed to produce:

- Online content for all Australian and New Zealand schools.
- A workable framework, standards and structure for the sharing of online curriculum content between jurisdictions within Australia and New Zealand, and with other countries.
- A framework to support sharing and peer-reviewing of teacher-developed online resources.
- Brokered arrangements with vendors to support the distribution and use of educational content in school.
- Consolidated schooling sector support for the local education content industry.⁹

Australian students need computers and broadband to maximise the benefits offered by online curriculum content.

Australia's e-education policies are now being developed, with State and Territory Governments showing leadership in providing student and teacher online resources, and access to comprehensive shared resources. Slow broadband speeds, however, are restricting the development of e-education. Speeds in some government schools are as slow as 128 kilobits per second (kbps), while many Independent and Catholic schools do not have the infrastructure support of the State based education system.

In 2002 the now disbanded National Office for the Information Economy recognised that:

"Broadband technology has the potential to revolutionise the Australian education sector. The 'always on' nature of broadband connections allows

school students to use the internet as an everyday research tool in the classroom more easily. High bandwidth enhances the effectiveness of existing distance learning programs by enabling video conferencing on the desktop.”¹⁰

Emerging media-rich applications are bandwidth hungry. To give Australian students the opportunity to access the very best learning materials, our schools must be equipped with good computers and broadband connection speeds in excess of 100 mbps.

Labor's Digital Education Revolution

A Rudd Labor Government will invest up to \$1 billion over four years to provide capital grants to Government, Catholic and Independent Secondary Schools and schooling systems to assist them to provide world class information and communications technology for every secondary student in years 9 to 12. Federal Labor's plan for a digital education revolution has five components:

- Providing grants of up to \$1 million – depending on enrolment – to schools to provide a computer on the desk of every upper secondary school student, revolutionising their classrooms with new or upgraded ICT equipment.
- Providing Australian schools with FTTP broadband with connections with speeds of up to 100 mbps.
- In conjunction with State and Territory Governments and the Deans of Education, ensuring every new teacher graduates with ICT skills and that existing teachers have access to training that enables them to use broadband to enrich children's educational experience.
- Developing national online curriculum resources for all students, selective additional content for gifted students and conferencing facilities for those studying specialist subjects such as languages.
- Developing web portals that enable parents to participate in their child's education.

National Secondary Schools Computer Fund

A Rudd Labor Government will invest up to \$1 billion over four years in a **National Secondary Schools Computer Fund** to provide capital grants to Government, Catholic and Independent Secondary Schools and schooling systems to assist them to provide world class information and communications technology for every secondary student in years 9 to 12.

Schools will be able to apply for grants up to \$1 million to revolutionise their classrooms with new or upgraded ICT equipment. This could include personal laptops, thin clients with virtual desktops,¹¹ and internet network infrastructure to plug our schools into the information superhighway.

Individual schools will be able to apply for funding based on the number of students enrolled and existing information technology capacity at the school.

Government, Catholic and Independent school systems will tender for computers and installation of information technology on behalf of individual schools to maximise value for money.

Local schools working together may coordinate their efforts through the use of multi-campus data centres that pool maintenance and support resources.

Individual secondary schools would be able to reapply for capital grants every three years to update and upgrade their technology.

Labor's *Digital Education Revolution* will be a partnership with State and Territory Governments. State and Territory Governments will be responsible

for the implementation of sophisticated ICT strategies – including training, client support, maintenance, and integration of the new technologies with the school curriculum.

Students will have their own computer and access to the school's extranet and classroom content – both from their desktop and remotely.

This initiative is aimed at ensuring one million Australian upper secondary students get an education with the latest technology, to prepare them for the jobs of the future.

This initiative builds on existing grant provisions such as the *Investing in Our Schools Program*.

High speed, reliable broadband in schools

A Rudd Labor Government will revolutionise classroom education by providing Australian schools with FTTP broadband to deliver internet speeds of up to 100 mbps – around 100 times faster than most current speeds in schools.

Fast, reliable broadband will give Australian students access to new e-education applications such as virtual classrooms, e-books, visual and audio streaming and high definition video conferencing.

Benefits to students will include:

- Higher quality distance education for students in regional and remote areas, providing greater subject choice and helping overcome the lack of specialist teachers in some schools.
- Greater skills and experience in online research, and assistance from teachers in navigating the internet.
- Access to a wider range of digital resources such as e-books that are not available in the school library or local library.
- Communication and interaction with overseas students for foreign language subjects.
- Digital media that enhances classroom learning such as documentaries, production of plays, historical footage, and science experiments.
- First rate 'tools of the trade' for subjects such as computing, information studies, engineering and science.

The provision of FTTP broadband to Australian schools will be a condition of Labor's competitive assessment process for the construction of a National Broadband Network.

This commitment enhances Labor's broadband plan, announced in March 2007, under which a Rudd Labor Government will invest \$4.7 billion, in partnership with the private sector, to facilitate the roll out of a National Broadband Network.¹²

To contribute to the additional cost of deploying FTTP connections to Australian schools, Labor will commit additional funds of up to \$100 million from its \$1 billion *National Secondary Schools Computer Fund*.

Schools in remote areas will receive a standard of service which, depending on available technologies such as fixed line, wireless and satellite, will be as

close as possible to the standard provided by the National Broadband Network.

Federal Labor also recognises that certain online content is inappropriate for children.

That is why in March 2006, Labor announced its ISP filtering policy, under which Internet Service Providers (ISPs) will be required to offer a 'clean feed' internet service to all households, schools and public libraries.

The provision of capital funding will be conditional on schools using robust internet filtering technology to protect children from inappropriate content.

Improving the capacity of teachers

A Rudd Labor Government will work with the Deans of Education to ensure that all new student teachers achieve competence in the use of ICT. From 2009, new teaching students will have to attain appropriate skills in this area before they are able to graduate.

A Rudd Labor Government will also work with the States and Territories to ensure they progressively train all existing teachers to upgrade or develop competence in the use of ICT.

New resources for students

Providing students with access to consistent, high speed broadband also enables new learning resources to be delivered which improve the quality of education children receive.

Federal Labor will provide nationally consistent online curriculum content for Australian schools to help students with their studies.

This content will be developed in consultation with teachers so that it is easy to use and assists teachers in teaching advanced or complex subjects such as advanced mathematics or Asian languages.

A Rudd Labor Government will:

- Ensure that core materials developed by the National Curriculum Board are available to all schools online.
- Develop dedicated online curriculum applications for those subjects, including assessable components.
- Provide language conferencing and online classes to ensure students have access to the best quality teaching to learn a language of their choice, especially in areas where there is no qualified teacher.

Encouraging parental input into their child's education

Labor recognises that parents play a critical role in their child's education.

To better support parents, a Rudd Labor Government will encourage State and Territory Governments to provide consistent parent web portals which enable them to:

- Keep up to date with what their children are learning and studying, including recommended texts.

- Know what homework and other projects have been set, deadlines for completing work and teacher expectations.
- Interact with the teacher on a more regular basis than parent-teacher nights allow.
- Obtain guidance about how best to supervise or assist with homework, support children's literacy and numeracy skill development, encourage children's interest in reading, and help them to prepare for tests.

Financial implications

Labor's *National Secondary School Computer Fund* is fully costed and funded.

FINANCIAL IMPLICATIONS – IMPACT ON UNDERLYING CASH BALANCE (\$M)

	2007-08	2008-09	2009-10	2010-11	Total
National Secondary School Computer Fund	100.0	400.0	300.0	200.0	1,000.0
Net impact	100.0	400.0	300.0	200.0	1,000.0

Endnotes

- 1 Thin clients are computer terminals that have their data and applications stored on a hard drive in a remote server.
- 2 OECD (2006), Press Release, *Are students ready for a technology rich world?*.
- 3 *Ibid.*
- 4 'When everything connects – Information Technology has nothing to lose but its cables', in *The Economist*, 28 April 2007, page 11.
- 5 Department of Communications, Information Technology and the Arts (2004), *Australia's strategic framework for the information economy 2004–2006*, available at: http://www.dcita.gov.au/_data/assets/pdf_file/20457/New_SFIE_July_2004_final.pdf
- 6 *Ibid.*
- 7 See, for example, Queensland Department of Education (2004), *Homework Literature Review*, available at: <http://education.qld.gov.au/review/pdfs/homework-text-for-web.pdf> or *Hard Wiring What the Next Decade in Education Policy Means for Educational Technology*, available at: http://www.exploratorium.edu/research/digitalkids/HardWiring_Rotherham.pdf, p. 3
- 8 The Le@rning Federation is a joint initiative of the State, Territory and Federal Governments of Australia and New Zealand, and operationally is a joint venture between the Curriculum Corporation and education.au limited. The Federation utilises ICT to produce online curriculum content to encourage student learning and to provide support for teachers in Australian and New Zealand schools.
- 9 <http://www.thelearningfederation.edu.au/node1>.
- 10 National Office for the Information economy (2002), *Broadband in Education: Availability, Initiatives and Issues*, August 2002, page 4.
- 11 Thin clients are computer terminals that have their data and applications stored on a hard drive in a remote server.
- 12 Australian Labor Party (2007), *A Broadband Future for Australia – Building a National Broadband Network*, ALP Policy Document. March 2007.