



A DIGITAL EDUCATION REVOLUTION

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Introduction:

To have the best job and life opportunities in the future, Indian 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 India 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 web chats 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:

Those Indian 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 Indian business. They also have the potential to transform the way our schools operate in the future for the better.

Computers: The toolbox of the 21st century

Whichever industry, trade, skill or profession they work in, India'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. 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.

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 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.

- 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.
- 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.
- 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 India 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 web chats 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 Indian 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 • 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
4-6 Mbps upwards	High definition video conferencing	<ul style="list-style-type: none"> • Virtual classrooms for distance education – both for students in rural and regional areas; and for specialist courses • Virtual museum tours for art, history and science classes • 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 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. 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."

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.

The Digital Education Revolution (DER) aims to contribute sustainable and meaningful change to teaching and learning in Indian schools that will prepare students for further education, training and to live and work in a digital world.

In this context, the Indian Government is investing to support the effective integration of information and communication technology (ICT) in Indian schools in line with the Government's broader education initiatives, including the Indian Curriculum.

The National Broadband Network (NBN) will deliver high speed broadband connections to individual schools, homes and workplaces. The NBN will mean that Indian school students will have access to similar bandwidth capabilities at home and at school, anywhere and at any time.

Industry Status

The last few years have seen digital content bringing about phenomenal changes in the field of education and entertainment. There is a huge transformation in the way educators today are using digital content in the classroom. Today, digital content on mobile phones and other multimedia content can be linked with social networks. Besides, satellite-based education is revolutionising classrooms worldwide by facilitating live delivery of lectures.

Further, digital content is being beamed through DTH services; this is providing learners access to quality entertainment right in their homes. In terms of media, the trend has shifted from 2D to 3D, whether it is in the real-life video or in the animation industry. Recently, stereoscopic 3D has made an entry into movies and in education and is likely to feature in televisions and mobiles too.

Growth Areas

Growth areas in digital content are branching out in animation and filmmaking. Animations can be 3D or 2D animations. In addition, the area needs subject matter experts, instructional designers (ID), graphic visualisers and software professionals.

Skill-Set Required

Freshers entering this area must have good writing, editing, and ID skills. They must be creative and have knowledge of 2-D /3-D animation, video editing, sketching, programming and project management.

Remuneration

Fresher's are paid anything from 10,000 - 20,000 per-month depending on their qualifications. Growth in this field is similar to the IT industry, with 15-20 % growth in salary. Of course, highly talented individuals command a higher salary as in any other

industry, and experienced creative managers and media experts get a six-figure monthly salary.

Conclusion:

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 Indian 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. A Career in

digital content could be exciting as it allows professionals to combine knowledge with pedagogy and technology. It also gives ample scope to multimedia experts to unleash their creativity by creating engaging visuals to bring abstract concepts to life. The digital content revolution has accelerated the demand for academicians, editors, instructional designers, graphic animators, illustrators and technology experts. Some of the industries where these skills are used include education, television and film industry, advertising and media, publishing, web and IT industry.

References for Further Studies

Thin clients are computer terminals that have their data and applications stored on a hard drive in a remote server.

OECD (2006), *Press Release, Are students ready for a technology rich world?*

'When everything connects – Information Technology has nothing to lose but its cables', in The Economist, 28 April 2007, page 11.

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

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*

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 utilizes ICT to produce online curriculum content to encourage student learning and to provide support for teachers in Australian and New Zealand schools. <http://www.thelearningfederation.edu.au/node1>.

*National Office for the Information economy (2002), *Broadband in Education: Availability, Initiatives and Issues*, August 2002, page 4.*

*Australian Labor Party (2007), *A Broadband Future for Australia – Building a National Broadband Network*, ALP Policy Document. March 2007.*