

Australian Computer Society

**Policy Statement
On
COMPUTER LITERACY**



ICT Professionals Shaping Our Future

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TABLE OF CONTENTS

ICT LITERACY IN AUSTRALIAN SCHOOLS	2
Summary of ACS Position.....	2
Recommendations.....	3
1. INTRODUCTION	4
2. BACKGROUND	4
3. CURRENT LEVELS OF STUDENT ICT LITERACY	5
4. INHIBITORS TO INTRODUCING ICT.....	6
5. ACS RECOMMENDATIONS	10
REFERENCES	12

ICT LITERACY IN AUSTRALIAN SCHOOLS

Summary of ACS Position

ICT literacy has moved from being a fringe issue to the centre stage of the school education platform. While ICT has become embedded into all aspects of our home and work lives, this has not yet been achieved in the nation's class rooms.

Increasingly we are seeing Australian school students completing school with differing levels of ICT accomplishment due to the variety of state requirements and disparate school systems. The ACS believes that ICT literacy must be seen as an essential life skill. Students that graduate from school without an adequate grasp of ICT are setting themselves up for a life with a limited ability to meet their fundamental needs such as employment, quality health care, access to facilities and information.

To remedy this situation, we need to develop and test a national standard for ICT literacy consistent with the national standards for numeracy and literacy. It should be applied to all primary and secondary students.

The aim should be for all students to be not only fluent in the use of ICT but able to use it to their advantage in learning. It is a skill they will need regardless of their career paths, whether it is University, TAFE, or a trade.

Impediments to achieving this are the levels of available infrastructure and support within schools, lack of integrated ICT strategies in teaching programs and the capacity of teachers to make meaningful use of technologies in their teaching programs.

Extensive preparation, adequate time and ongoing support for teachers to ensure they have the knowledge, skills and confidence in teaching with ICT is critical to achieving ICT literacy. Without this ongoing support and training, use of ICT in learning will inevitably be limited and superficial.

The ACS believes the way ahead is through a concerted and united effort by state, territory and federal governments in developing a national ICT literacy standard for schools, promoting ICT literacy among teaching staff and by immersing students in technology rich teaching environments where ICT literacy is a learning enabler as well as a learning outcome.

The ACS believes the government should investigate developing a National Education Portal that will allow on line content to be delivered by teachers that are not 'in house' allowing students from all over the country access to the best on line teaching resources with time and distance no longer being a barrier, providing significant benefits to rural Australia.

Recommendations

The ACS commends the following recommendations to the federal, state and territory governments:

- Implementing affordable, high speed broad band for all schools. In particular, the ACS recommends that state and territory governments match the Victorian Government Broadband Strategy Framework to deliver a high speed optical fibre network across the nation.
- Investigate the development of a National Education Portal to deliver online learning content and allow students nation wide to access high quality on line education material.
- Develop a national ICT literacy standard and model that is applied to all students including assessment of ICT literacy at all levels of schooling. ICT literacy could be assessed as a component of other assessments rather than creating a separate testing strategy
- State, territory and federal governments to develop policy to give direction and intent to schools, develop specific KPIs associated with ICT literacy standards and expectations, provision of appropriate resources to support schools and evaluation and appraisal feedback mechanisms.
- Provide sufficient professional support and development for teachers with ready access to ICT resources.
- Provide adequate and up to date equipment and software to all schools.
- High level technical support to ensure ongoing access to quality services.
- Establish forums and networks at the state and national levels for schools to share good practice and successful outcomes.

It is vital that federal, state and territory governments co operate to develop a consolidated framework that includes infrastructure, learning management systems, ICT literacy standards and tests, professional development for teachers, hardware, software and ICT support.

More importantly, these efforts must happen concurrently within a defined timeframe because each component depends of the other for its success and effectiveness in achieving ICT literacy standards for all school students.

1. INTRODUCTION

ICT has developed to a point where it now underpins almost every aspect of our work and home lives. It forms the backbone on which Australian industry functions, facilitating production and efficient resource use.

Desktop and personal computers have become ubiquitous in the workplace and in our home life. Over the past two decades the meaning and use of ICT has shifted from having a complete emphasis on technical skills associated with programming and hardware design towards the conceptual use and application of technology in our day to day lives.

In real terms this means that it has become more important for most people to understand the concept of how technology works and how to use and apply software packages than it is to have specific technical skills associated with the functioning and design of the computer and its software.

A high level of competence in the use of technology is becoming increasingly necessary for Australians to function in their daily work and home lives. It is essential that school students become familiar and competent in the use of technology from the earliest stages of their schooling.

The extent with which this message has been taken up by our primary and secondary education systems is wide ranging, creating a divide between the skills that students graduate with and the needs of the workforce and higher education institutions.

2. BACKGROUND

The notion of a literate population can no longer only be seen as competency in the 'three Rs'. It must now also encompass ICT literacy – the critical and cognitive use and application of ICT skills.

While many of our school ICT programs have focused on adequate access to hardware within schools (the ratio of students to computers for example), it is important to recognise that hardware access in itself does not enable a student to become ICT literate. The focus on providing ICT infrastructure to schools must be complemented by an equal effort to provide the necessary tools to acquire skills in ICT to manage, integrate and create information to facilitate learning within the traditional numeracy and literacy framework.

The ACS believes that students who graduate from school without these essential ICT literacy skills will have a restricted ability to meet their fundamental future needs such as employment, quality health care and access to facilities, information and social infrastructure. Just as the role of

traditional literacy and numeracy has been accepted as having a strong positive impact on the economic future of individuals and countries, it is time to acknowledge that ICT literacy will have a similar impact.

Generally, ICT literacy is considered to have seven components:

- Using ICT – being critical, reflective and strategic in the use of ICT;
- Accessing information – knowing how to access, research and collect information;
- Managing information – applying/reconfiguring existing organisational or classification schemes;
- Integrating information – interpreting, integrating and representing information;
- Evaluating information – making judgements about the quality, relevance, usefulness, or efficiency of information;
- Creating new information – generating information by adapting, applying, designing, inventing or authoring information;
- Communicating – transmitting, exchanging or transforming information using ICT.

School curriculums should be built around these seven components from the earliest stages of schooling.

3. CURRENT LEVELS OF STUDENT ICT LITERACY

Past measures of ICT literacy have tended to concentrate on statistics such as the number of internet connections or the number of students per computer and the like.

While these issues are important, they don't provide a view on how literate our school students are in ICT and what level of skills they are graduating with in moving from primary to secondary school and from secondary school to tertiary education or the work force.

We need to be sure that school students are learning to be strong and confident users of ICT.

Although there is a lack of information about the current levels of ICT literacy of Australian school students, both state and federal governments are beginning to develop and implement programs that will allow determination of ICT literacy amongst Australian school students.

Government and non government education agencies have combined to work on a series of national policy and framework documents to support jurisdictions and schools to use ICT in their day to day teaching and schooling practices.

The first national assessment of literacy in Australian schools is to be undertaken by the Federal Government commencing in September 2005.

This program will incorporate a national exam to be used to benchmark ICT literacy for a sample of 8,000 year 6 and 10 students across 500 schools and will be repeated every 3 years to gauge progress in student ICT literacy.

The results of this program will ultimately be used to form the basis of a national ICT literacy standard to apply across all schools in Australia.

At an international level, Australia participates in the OECD Program for International Student Assessment (PISA) which develops an international assessment of mathematical, reading and scientific literacy and problem solving for school students. Questions aimed at measuring familiarity with ICT have been included in the PISA assessment process since 2000.

It is expected that ICT literacy will be included as part of the PISA assessment process for the first time in 2006. Use of ICT has been included in the PISA definition and selection of key competencies – essential skills and knowledge needed for full participation in society.

Under the federal government's 2005 – 08 schools funding legislation, all states and territories will need to commit to development of an ICT statement of learning by January 2006. This will provide a basis for assessing the key knowledge, understanding, skill and capabilities students should be acquiring in ICT at school.

In addition to national programs being undertaken by the federal government, there are many programs being undertaken at a state and territory level. While these initiatives are praiseworthy, we need greater, overall coordination of the efforts between the state and federal sectors to improve the effective uptake of ICT into curriculums.

4. INHIBITORS TO INTRODUCING ICT

The greatest inhibitors to introducing ICT as an integrated part of the school curriculum are:

- Bandwidth – sufficient bandwidth must be available at affordable rates to allow schools to integrate online services into their curriculums;
- Professional development for teachers – effective pre service teacher education and ongoing teacher development are critical. Research has indicated that teacher knowledge, skills and confidence in the use of ICT is key to the successful integration of ICT into schools.
- Online content – all school teachers and students need access to quality on line education resources that support their curriculums.

Additionally, the rapid change in technology can act as an inhibitor with schools reluctant to commit the necessary resources because of the rapid rate of redundancy of ICT hardware and software.

Students

In 1999, the Ministerial Council on Education, Employment, Training and Youth Affairs established national goals that were adopted by all state, territory and commonwealth ministers that students leaving school should 'be confident, creative, productive users of new technologies, particularly information and communication technologies, and understand the impact of those technologies on society'.

Many programs are underway at both the state and federal levels to give effect to this agreement. However progress towards achieving this goal appears slow.

National standards for how ICT should be taught and the competencies that should be taught to primary and secondary students seem some years away. Despite the integration of computers into everyday home and work life, they are still often seen as a novelty in the class room to be used when the real business of teaching is over.

Although most schools and classrooms have computers and other technologies, there is considerable variation in how they are used, what students are taught and how they are taught. The result is that students from different schools and in different states graduate with varying levels of competency in ICT.

Generally, students are provided with limited opportunity to use computers within their school curriculum. When they do have access, there are constraints and restrictions on their use.

There is a tendency for ICT to be taught only as a separate discipline resulting in a mismatch between students' perceptions and use patterns at home and those they have towards ICT use in schools.

The ACS believes that ICT should be taught as an integral part of the curriculum, integrated throughout different syllabus courses at all levels of primary and secondary school and as a separate discipline for those students who want a more in depth knowledge of ICT.

This allows all students to learn to use ICT in the broadest sense and will provide the essential understanding of the connection between ICT and the process of applying these skills across other disciplines.

Teachers

State and territory governments have primary responsibility for education and schooling, including the provision of ICT infrastructure. State and territory governments are the major employers of teachers and determine the criteria for employment of new teachers, the terms and conditions of

service and to a large extent, access and funding for continuing professional development of teachers.

All state and territory education departments have published comprehensive guidelines for the personal skills and classroom practices in ICT expected from new and experienced teachers.

The ACS believes these programs are a strong step in the right direction to providing teachers with the necessary skills to teach with ICT. However ability must go hand in hand with access, good policy, planning and practice to lead to confident use of ICT resources in teaching, learning and administration. Ongoing training for teachers in ICT is essential if they are to keep up with the skills that are expected of the students.

In particular teacher professional development must include:

- Knowledge and ability to adapt the potential of ICT to the learning process and integrate ICT into curriculum planning using a variety of technologies and applications;
- Use of basic software applications, planning tools, learning software and on line services;
- Use of multimedia in teaching;
- Establishing an ICT based learning environment that is not necessarily restricted to school boundaries.

By and large this level of development is highly varied across schools and teachers are getting left behind in the ICT avalanche. Teachers report that there is a general expectation that they should get on with the business of real teaching rather than spending too much time with computers.

Our school teachers need to be up to date with new technologies and have the education tools to embrace the use of ICT in learning and development as an integral part of the curriculum.

To achieve this we need national ICT teaching standards, improved infrastructure, greater support and better professional development for teachers so that they are confident in exploiting ICT as part of their teaching and class room practice.

While there is an unprecedented willingness by teachers to embrace ICT, there are still many who struggle with unfamiliar technologies and are apprehensive about its use.

Teachers need greater professional support and professional development to transform their teaching methods, give them confidence and focus on how ICT can have a positive effect on teaching, learning and development of students skills.

Schools

Adapting school environments for ICT based learning strategies is presenting a challenge.

Connectivity is a major barrier to introducing ICT in schools. Broadband data communication services are a critical element for the successful use of ICT in education. The availability of sufficient bandwidth and high speed broadband services are not only the only problem here. There is also a substantial cost involved.

Australia lags significantly behind its competitors in the introduction of true broadband services. The bandwidth available to schools is markedly inferior to that available to schools in the USA, Canada, Singapore, South Korea and the United Kingdom.

In this context, the ACS highly commends the actions of the Victorian Government in developing its Broadband Framework Strategy which will deliver a fibre optic network to support high speed broadband applications across the state, including schools. The ACS calls on other state governments and the federal government to adopt measures similar to that of the Victorian government to ensure that all schools, including those in rural areas, have access to a fast and reliable fibre optic network for their communications and teaching needs.

Introduction of high speed broadband applications needs to be accompanied by appropriate education materials. The ACS considers the government should investigate the development of a national education portal that provides on line content that supports and blends with the curriculum. Subjects can be delivered by a mix of on line and in class teaching methods. On line content can be delivered by teachers that are not 'in house' meaning that students from all over the country can access the best on line teaching resources with time and distance no longer being a barrier.

The ACS believes federal, state and territory governments should implement a seven point model for effective use of ICT in schools:

- Resources – sufficient, up to date, reliable hardware, software and technical support. Software must be well integrated to meet curriculum needs;
- Policy – intent and direction on the use of ICT in teaching. ICT should be internalised throughout the school curriculum in every grade. This should be mapped to the student ICT literacy standards;
- Investigation of the development of a national education portal to provide online content that supports school curriculums;
- Departmental commitment – development of a commitment and policy for ICT professional development, specific expectations of ICT use in the class room and provision of appropriate resources to schools;

- Ongoing training programs – implementation of a robust and measurable teacher professional development program that comprehensively audits and updates their ICT skill set;
- Evaluation and appraisal – crucial feedback to drive the message on the departmental and school commitment on the effective use of ICT in class rooms allowing for a process to flag training needs, resource requirements and adequacy and other issues to facilitate teacher use of ICT.
- Student ICT literacy standards – complementary to staff ICT skills training and teaching must be a student ICT skills program that provides broad based exposure to generic ICT skills as an integral part of the curriculum in accordance with national ICT competency standards and a national assessment process.

Schools must have the systems and connectivity to cope with the demands of ICT facilities, software availability and technical support that will be needed to integrate ICT into the daily school curriculum.

Our school systems and teachers must be geared to teach with ICT rather than simply teach about ICT.

Finally, the ACS considers that forums and networks to share good practice and successful outcomes should be established at the state and national level so that schools can share information and learn from each others successes in planning, curriculum design and implementation of integrated ICT learning programs

5. ACS RECOMMENDATIONS

The ACS considers the development of ICT literate school students is key to a productive, effective and efficient future workforce for Australia. Developing and enhancing the ICT literacy of students should commence from the earliest stages of school. It should be assessed on an ongoing basis as part of the normal curriculum assessment process against a national standard for ICT literacy applied to all Australian students in the same way as national standards for numeracy and literacy are currently applied and assessed.

The ACS commends the following recommendations to the federal, state and territory governments to help achieve successful integration of ICT into school curriculums:

- Implement affordable, high speed broad band for all schools. In particular, the ACS recommends that state and territory governments adopt a framework similar to the Victorian Government Broadband Strategy to deliver a high speed optical fibre network across the nation.

- Investigate the development of a National Education Portal to deliver online learning content and allow students nation wide to access high quality on line education material.
- Develop a national ICT literacy standard and model that is applied to all students including assessment of ICT literacy at all levels of schooling.
- State, territory and federal governments to develop policy to give direction and intent to schools, develop specific KPIs associated with ICT literacy standards and expectations, provision of appropriate resources to support schools and evaluation and appraisal feedback mechanisms.
- Provide sufficient professional support and development for teachers with ready access to ICT resources.
- Provide adequate and up to date equipment and software to all schools.
- High level technical support to ensure ongoing access to quality services.
- Establish forums and networks at the state and national levels for schools to share good practice, evaluations and successful outcomes.

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