

# Measuring Australian



# students' ICT literacy



**By Dr John Ainley**

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*Proficiency with Information and Communication Technology (ICT) is becoming increasingly important for participation in work and society, but how ICT literate are Australia's students?*

**Dr John Ainley** describes a major project that will provide some answers to this question.

The importance of ICT literacy is recognised in Australia's National Goals for Schooling in the Twenty-First Century: 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."

Although ICT has been embraced with enthusiasm by Australian schools there is relatively little experience in measuring the development of ICT literacy by students. While recent national assessments in science and civics and citizenship have added to the picture of student achievement developed through state-based literacy and numeracy assessments, to date there has been no national assessment program to determine how well Australia is progressing towards meeting this important goal.

The Ministerial Council for Education, Employment, Training and Youth Affairs (MCEETYA) through its Performance Measurement and Reporting Taskforce (PMRT) commissioned ACER to conduct the National Sample Assessment of information and communication technology literacy. For the purpose of these assessments the PMRT adopted a definition of ICT literacy as "the ability of individuals to use ICT appropriately to access, manage, integrate and evaluate information, develop new understandings, and communicate with others in order to participate effectively in society".

So how ICT literate are Australia's students? This question will soon be answered after thousands of students in Year 6 and Year 10 from across Australia undertook the country's first major national survey of ICT literacy from September to November 2005. In what is believed to be the first assessment of its kind, all of the testing and marking took place in a totally computer-based environment with no pen and paper components.

The assessment instrument developed by ACER consisted of seven assessment modules and a student background questionnaire. Each student completed three assessment modules and the questionnaire. A successful trial of the assessments was undertaken by ACER in April 2005 involving 620 Year 6 and Year 10 students from around 31 high schools and 35 primary schools. The main sample assessment in term 4 of 2005 involved approximately 260 schools and around 4000 students at both Year 6 and Year 10.

The National Sample Assessment of ICT literacy is a major undertaking for ACER. A team of staff across the organisation including administration staff, test developers, IT specialists and external providers have worked together to develop the assessment and the infrastructure behind it, facing some major challenges along the way.

A team of ACER test developers had the task of coming up with assessment items that were meaningful to the students and



allowed them to demonstrate both a productive and creative use of ICT, while, at the same time, evaluating students' analytical skills in creating and dealing with information. This required a new approach to ICT assessments, which to date have typically focused on students' use of particular software packages. Previous assessments have tested skills such as applying formatting to text in a word processing document or using a spreadsheet. A major goal of the National Sample Assessment was to move beyond these skills-based tests and incorporate something more challenging and original.

Test developers wanted to introduce tasks that required students to create meaningful products using a range of real software in a live environment. This posed a number of difficulties: no existing product could be used to test a students' ability to create a product using software and also assess their basic skills in using common software applications. A new infrastructure had to be developed.

Software developers at ACER worked with companies in the US, the Netherlands and Melbourne to create a software infrastructure specially designed for the assessment. Existing software that emulates the entire Microsoft Office suite of products in an environment in which students' use of the products can be automatically captured and scored was sourced through the US company SkillCheck. For example if a skills test requires a student to select and format a piece of text within a Word document, the software is able to recognise how the student completed the task and score the response automatically.

While this existing product was sufficient for the skills component of the national assessment, it did not have the capacity

to test students' ability to create the new products that test developers hoped to include in the assessment. Extra components of the software were developed to integrate with the package. It was then possible to develop a test platform to allow students to complete the skills test component of the assessment and the creative components while moving between the two platforms.

Seven separate modules were developed for use in the assessments. One module was a test of general skills to determine whether a student possessed basic skills in using the ICT products. In this skills-based module, students responded to multiple-choice questions and completed basic file management and generic software skills tasks. Students needed to successfully complete this first skills test to proceed to the rest of the assessment. In light of the trial data it was expected that more than 90 per cent of students undertaking the assessment would be able to complete the tasks and proceed to the rest of the assessment.

Having successfully negotiated this first component students were then asked to complete two of the remaining six modules that were selected at random. Each module was linked by a common context or theme. In each module students negotiated a series of lead up tasks using research skills to look at a range of information and decide what information to use in creating a product. For example, in one module students were required to conduct some research by navigating a small, controlled web environment and then create a report incorporating information collected from that website. The final products created by the students were captured by the software as electronic

images and transmitted to markers who assessed them electronically as an interactive piece of documentation. Students achieving less than the predetermined cut-score on the general skills module were automatically allocated the two easiest assessment modules.

At each participating school, 15 students were selected randomly to take part in the study. Specially configured notebook computers with local network connections were used to complete the assessment. Each session included five students and a supervisor. The assessment took about 100 minutes for each student to complete.

Test administrators indicate that the assessment has been very well received by students with high levels of engagement and very positive feedback regarding the electronic environment and the interactivity of the tool. The only negative feedback has been a backhanded compliment with students indicating that they would have liked more time to interact with the free response product oriented modules. The more able students wanted to demonstrate their skill in manipulating new applications.

The national assessment of ICT literacy will provide Australia's educators and policy makers with a comprehensive picture of the level of ICT literacy of Australian students. Feedback on the assessments will be provided to participating schools in December this year. A detailed report, based on the results of the National Sample Assessment, on the ICT literacy of Australia's students is due to be published in mid 2006. ■