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A question of Australian national interest - we need more young people to take up careers in Information and Communication Technology. Sustaining and increasing productivity in modern economies largely depends on the application of new technology, and current and projected labour force figures suggest we do not have sufficient graduates entering ICT jobs.

The Australian Computer Society

University of Canberra – Education Institute.

To generate detailed primary evidence about high school student use of ICT, perceptions of use of ICT at school, perceptions of ICT as a discipline, and motivations regarding career choices.

Quantitative and qualitative data generated -

- purpose-designed four page written survey administered in school classes
- semi-structured interviews
- descriptive and inferential statistical analysis
  
- stratified random sampling (strong research design)
- 202 high school subjects, surveyed July-October 2012
- 20 high school subjects, interviewed July – October 2012
- aged 12-18 years
- male and female
- 8 high schools in the Australian Capital Territory:
  - from both government and non-government sectors; and
  - from a range of Low, Medium and High ranks on the Index of Community Socio-Educational Advantage (ICSEA). ICSEA is a measure of school socio-economic advantage (available on the [www.myschool.edu.au](http://www.myschool.edu.au)).



**1. Young people’s engagement with ICT**

- Communication with friends and family, and relaxation.
- Finding information (eg for homework) also a common usage.
- Use of technology for creative purposes, eg composing music or blogging, were far less typical uses.
- ... increased almost linearly from the ages of 12 to 18 years, and were not gender-dependent.
- 95% of students owned a mobile phone, and at age 12 years, 50% of students slept with their phone turned on next to their bed either all the time, or “sometimes”. By age 18 years, this figure had risen to 82%.
- ... the most typical game player was a Year 7-9 boy playing first person shooter games. A range of other games was played, but not as extensively. Interest in gaming waned with age after Year 9.
- YouTube was the most frequently used technology after Facebook, mobiles and computer games; and peaked at age 15 years.

1	Spending time with family (90%)	6	Playing sport (67%)
2	Doing homework (82%) - which includes extensive use of the internet	7	Seeing friends (65%)
3	Watching television (75%)	8	Reading (62%)
4	Doing jobs around the house (73%)	9	Facebook (61%)
5	Spending time doing a hobby (72%)	10	Playing computer games (46%)

- The number of students with a casual job attended once or twice a week increased with age, and students from Low ICSEA school ranks were more likely to have a casual job than students from High ICSEA school ranks.

Young people are still doing what they have always done after school: spending time with family, doing homework, playing sport; relaxing with friends or watching TV. But today digital technologies have opened new avenues to explore regarding these enduring needs to communicate, to learn and to enjoy leisure, and for many the mobile phone is a constant companion – as it is with adults.

In a way young people have “dual citizenship” of two environments: the physical environment, with a reasonably clear set of values and expectations; and the digital environment, in which expectations about behaviour are perhaps less well understood.

Parents, educators and professional bodies all have a role in assisting young people to make connections regarding these two environments, and in establishing and maintaining fluency in both “languages”.

## **2. Attitudes to ICT learning**

- Many students would like teachers to use more technology in the classroom (78%).
- A number commented that there was already enough technology and didn’t want more; or that its use depended on the subject.
- Some students remarked on the need for teacher competence using ICT.
  
- 53% of students had studied ICT as a subject at high school, for at least one year.
- Boys were more likely to have studied ICT than girls.
- There was a statistically significant relationship between Age, and interest in studying IT, with students aged 12 to 15 years being most likely to be receptive to studying IT.
- Significantly fewer girls thought they would like to study ICT than did boys.
  
- There was no statistically significant difference between students who had already studied IT, and those who had not, with regard to an interest in studying IT in future.
- Regardless of whether IT had been studied previously, there were still between 23-31% of students who were at least undecided about whether or not they would like to study IT. This group of “undecided” students is an opportunity to encourage more students to study IT.
  
- Students overall were very confident with using technology. The main reasons given for confidence with using technology were “I use IT a lot”; “I know what I’m doing” and “It’s fun”.
- Confidence was not influenced by whether or not a student had studied IT as a subject.
  
- How computers work; how to fix them; and how to program them (42%)
- Building websites; graphic design; animation (29%)

Although these topics are covered in ICT courses, in another question many students had indicated that they believed they would find the study of ICT “tedious”.

This suggests that students may not always understand what studying ICT is about; and they have not made the connection between what they want to know, and how they can learn it.

- For most students, using the internet at home, every day, was the major method of locating information for homework and assignments. They used Google to locate information, and Wikipedia frequently as a “first port of call” for background.
- Significant minorities of students at all ages did not have a clear understanding of who puts information on the internet (apart from schools and governments); or how to evaluate sources for credibility and relevance.

### **3. Students’ perceptions of careers in ICT**

- The percentage of students interested in “how computers work” was much closer to percentages for students liking Maths and Science, than for liking IT as a subject. In other words, students were interested in computers, but not as interested in IT as a subject.
- The number of “don’t know” responses concerning interest in “how computers work”, suggests an opportunity to engage students in this field.
- The ages of 12-13 years had the highest level of uncertainty.
- Importantly, interest in “how computers work” was not statistically related to whether or not students had studied IT as a separate subject.

It may be that a lower rate of interest in Information Technology as a subject of study compared with interest in “how computers work” may simply be a matter of student (mis)perception, and a lack of understanding of what the study of ICT entails. This could be a result of a number of factors – including curriculum design, subject availability, course advice, parental influence and lack of exposure to information from ICT professionals.

- Most students believed that studying ICT at university would be interesting, but not very easy.
- There was a statistically significant linear relationship between Age, and belief that studying IT would be interesting. An appropriate age at which this perception of IT study as interesting should be encouraged is at ages 12-13 years – before interest declines.

Most students understood that there is a range of work involved with being an ICT professional, such as graphic design or managing networks. But fewer understood that they design “faster computers”; or that IT work might also involve designing robotic and computer systems.

- This suggests that there may be a lack of understanding of the range of work that is available through studying IT.
- Most students thought that an IT job would enable creative thinking, and a little more than half of the students believed that working in IT would be fun. In contrast, about half of the



students also had a negative perception - that working in IT would mean sitting at a computer all day.

- It was important to nearly all students to have a job that was interesting and well paid, and many also wanted to “make a difference” and to use creativity.
- Given that 62% of students believed that studying IT at university would be interesting, it would be appropriate to capitalise on this interest when seeking to engage students’ interest in IT as a field of study.
- Importantly in terms of making careers advice available at schools, there was a clear difference in the range of careers that had been considered by students as a function of school ICSEA category. Low ICSEA school students provided limited responses to this question in comparison to High ICSEA school students, whose responses showed a much wider range of choices being considered; and their supporting reasons were more differentiated.

Considering students’ general goals for a career, the disjunction needs to be highlighted between what students stated that they want in a career (interesting work, good money, creative, to help people); their statements about working in ICT (would allow creative thinking; studying IT would be interesting); and their views on IT in general - only 31% of students had considered IT as a career.

It is possible that a number of students are not aware that careers in IT are able to meet their generalised career needs for interesting work, good pay and creativity.

- There was a statistically significant difference between girls who had considered an IT career, and boys. Although clearly there is much work to be done regarding changing girls’ perceptions of IT study and careers, such a task should be attempted. After all, it was not many years ago that girls did not study Law or Medicine.

Findings indicate a range of student misperceptions about the study of ICT; some are related to gender; others to age; others to school ICSEA rank; or a combination of these.

There is considerable scope, particularly in early high school, to take advantage of students’ interest in computers; to develop an interest in studying ICT; and to challenge misperceptions about ICT careers. A range of initiatives and interventions can be developed and implemented by professional bodies, educators and other stakeholders to target these opportunities.