Abstract

Many students lack any interest in studying Information and Communication Technology subjects at the secondary school level. This factor is reflected further along the pipeline in the low number of students enrolling into ICT degrees at the tertiary level. The ICT profession is therefore experiencing a shortage of skilled workers. Recent studies have indicated that more research is needed to identify what factors contribute to the lack of interest by students.

Keywords

ICT curriculum, implementing the ICT curriculum, student perspectives

Motivation for Research

Previous research revolving around skill shortages in Information and Communication Technology (ICT) delved into the attitudes and perceptions of young adults to ICT (McLachlan, Craig & Coldwell 2008; McLachlan, Craig & Coldwell 2010). Recent results indicated that while many still believed in stereotypical attitudes in ICT there appears to be some shifting of perceptions. Most young adults were plainly uninterested in taking ICT subjects in secondary or tertiary education and did not see it as an attractive industry in which to work. This seemed a little unusual as they were dependent on and enjoyed the use of computers and other technological devices.

The issues of ‘uninterested’, ‘disinterested’ and ‘not interested’ in ICT and ICT studies were a recurring factor that emerged out of the research (McLachlan, Craig & Coldwell 2008; McLachlan, Craig & Coldwell 2010); other researchers have also reported this phenomenon (von Hellens & Neilsen 2001; Rommes et al 2007; Lynch 2007; Clayton 2007; Multimedia Victoria 2007).

Lang (2007) and Clayton (2007) indicated that more research is needed in this area. Lang (2007) suggested that an investigation into secondary student attitudes to core ICT curriculum is needed and indicated that these attitudes may impact on students’ decisions to continue studying in ICT. Clayton (2007) recommended that more research is needed in the experiences of ICT study and career choices in Australia. Clayton found that ‘students have negative interpretations of their ICT experiences…the ICT teaching and curriculum’ and that ‘subject descriptions did not accurately reflect the content’ (Clayton 2007, p. 224).

This current research will investigate and explore why students think ICT subjects are uninteresting. Student disinterest is also reflected in the reduction of students enrolling in ICT at senior secondary subjects and tertiary courses. One avenue to investigate is to explore the ICT curriculum and students opinions of that curriculum. To do this the current Victorian Essential Learning Standards (VELS) in Information Communication Technologies (ICT) will need to be investigated. A look into the frameworks interpretation and delivery methods, and its impact on students could provide some useful explanations as to why students are shying away from ICT subjects.

Student Enrolments

Past research has been carried out to investigate the enrolment numbers in Information and Communication Technology (ICT) courses at senior secondary and tertiary levels. Since the 1980’s the enrolment numbers in ICT related tertiary courses have dropped (Lomerson & Pollacia 2006; Fisher & Margolis 2002; Clayton & Lynch 2002; and Camp 1997) as well as the enrolment numbers in secondary school ICT subjects (Craig 2009; Lang 2007; Clayton 2007; Van Der Vyver, Crabb & Lane 2004). These authors have investigated multiple factors; the shrinking number of women in computing (Clayton & Lynch 2002; Camp 1997), motivations behind conducting intervention programs (Craig 2009), inadequate information provided to students on computing courses (Lomerson & Pollacia 2006), experiences in Computer Science (Fisher & Margolis 2002), experiences and influences on girls ICT study and career choices (Clayton 2007), topics covered in secondary classes (Van Der Vyver, Crabb & Lane 2004), and factors that shape adolescents attitudes to ICT (Lang 2007). Evidence shows that it is not only females that have shied
away from studying tertiary ICT, the number of male students has also decreased.

The number of students who have elected to study Victorian Certificate of Education (VCE) ICT subjects and successfully passed them has been steadily decreasing since 2001. There has been on average a 64% (males 55.3%, females 81.2%) drop. The number of Victorian schools that offer VCE ICT has also decreased since 2001, there are up to 170 less schools offering IT related subjects (Victorian Curriculum Assessment Authority 2010a). The phenomenon of declining enrolments since 2001 is not restricted to Victoria alone, evidence of this has been shown in South Australia (Vickers & Ha 2007).

Full-time tertiary student numbers studying Information Technology (IT) courses in Australian also show a marked decrease. Since 2002 there has been a reduction of 38% (males 33%, females 52%) in all students, 39% (males 35% and females 49%) in commencing students, and 35% in overseas students studying IT courses (Department of Education, Employment and Workplace Relations 2010). These statistics do not include students studying IT in related courses, as a major, or those studying at Technical and Further Education (TAFE) venues.

Research into secondary and tertiary ICT enrolments has indicated a number of reasons why this may be happening. Students at secondary school start to establish an interest in individual subjects and careers (Jacobs & Simpkins 2005); they tend to make subject choices for their senior years based on what they learnt in their junior secondary years (Vickers & Ha 2007). Akbulut, Looney and Motwani (2008) investigated the decline in tertiary students choosing Information Systems (IS) as a major and found that ‘instrumental assistance’ was a ‘significant positive influence on computer self-efficacy’ (Akbulut, Looney & Motwani 2008, p. 90). Instrumental assistance related to the students environment and their belief in seeking academic assistance ‘outside of the classroom’ (Akbulut, Looney & Motwani 2008, p. 85), and computer self-efficacy is a person’s own evaluation of their computer abilities. Koppi et al (2008) looked into the affects of reduced tertiary enrolment numbers in relation to the infrastructure of ICT education. Details were mentioned about the reduction of entry requirements in order to attract more students, less university courses in ICT on offer, and the long-term affect on educational quality (Koppi et al 2008).

A major research project undertaken at the Carnegie Mellon University’s (CMU) school of Computer Science (CS) to combat the problem of declining student numbers was conducted by Margolis and Fisher between 1995 and 1999, and later by Blum and Frieze between 2002 to 2004 (Wing 2008). Initially in 1995 only 7% of the enrolled CS students were female and Margolis and Fisher set out ‘to understand the experiences and choices of both men and women with respect to studying computer science and to design interventions that would involve more women’ (Fisher and Margolis 2002, p. 79). CMU changed the admissions procedures to encourage a more diverse population of students, they removed the criteria for previous programming experience, included multiple entry pathways, assisted in setting up a women’s CS support community, and conducted summer school classes for secondary ICT teachers and instructed them on gender neutral teaching (Margolis and Fisher 2002). Blum and Frieze described the cultural changes to the undergraduate CS environment as a result of Margolis and Fishers project (Blum and Frieze 2005). However the statistics presented by Wing (2008) show that the number of females applying did not vary greatly between 1995 (11%) and 2006 (12%), applications peaked at 15% in 2001. The number of females enrolling into CS increased from 7% in 1995 to 40% in 2000 but then dropped to 21% in 2006 (Wing 2008). The increase in female students gaining entry into CS at CMU occurred due to the changes in admission procedures rather than more females actually applying.

It can be seen by the above discussion that the problem of low enrolment numbers in ICT related subjects and courses is not restricted to Australia.

**The Victorian Curriculum Structure**

The Victorian curriculum structure is divided into two main sections. Study for students from Prep to Year 10 is considered to be the compulsory learning years and most students are educated using the Victorian Essential Learning Standards (VELS). Senior students in Years 11 and 12 have the option of studying from four areas; The Victorian Certificate of Education (VCE), The Victorian Certificate of Applied Learning (VCAL), Vocational Education and Training (VET) (Victorian Curriculum Assessment Authority 2010b), or The International Baccalaureate (IB) Diploma Programme (The IB Diploma Programme 2005-2010) where offered.

All Victorian Government and Catholic Schools base their curriculum on VELS, while Independent schools can opt to use VELS, another curriculum framework, or devise their own curriculum (Independent Schools Victoria 2010). VELS became the standard for schools from 2006 and was revised and adjusted in late 2008. The VELS
framework outlines the requirements for students for each learning area and stage of achievement. The framework is divided into three main learning areas; Physical, Personal and Social Learning; Disciplined Based Learning; and Interdisciplinary Learning. There are 14 domains (subjects) which are divided into these three areas (Victorian Curriculum Assessment Authority 2010b).

The VELS are set out into three Stages of Learning; ‘Laying the Foundations’ for Year Prep to Year 4; ‘Building Breadth and Depth’ for Year 5 to Year 8; and ‘Developing Pathways’ for Year 9 and Year 10 (Victorian Curriculum Assessment Authority 2010b). The majority of students are generally expected to complete 6 levels during Years Prep to 10.

Research Problem

Low enrolment numbers have previously been investigated and possible factors have been mentioned (Lomerson & Pollacia 2006; Clayton 2007; Van Der Vyver, Crabb & Lane 2004; Lang 2007); as yet the interest in ICT studies have not changed as statistics show (Victorian Curriculum Assessment Authority 2010a; Department of Education, Employment and Workplace Relations 2010). As a result of research there have been secondary school and university program changes (Margolis & Fisher 2002), ICT programs aimed specifically at females (Margolis & Fisher 2002; Craig 2009), and one-of special come and try days run by many Universities in technology, engineering and computing.

The aim of this research is to explore the interpretation and delivery of the current Victorian Essential Learning Standards (VELS) in Information Communication Technologies (ICT), and the impact that these have on students experiences of ICT.

The main research question is:

How does the implementation of the ICT curriculum in Victorian Secondary schools impact on students’ perspective of ICT as a possible future career?

In order to answer this question the following sub questions would assist in this:

What are the VELS ICT guidelines for Years 7 to 10 and how are they determined?

In what ways do schools deliver the VELS ICT curriculum to students?

and

What impacts do the teachings of the ICT curriculum have on students?

Proposed Methodology

This research will take an interpretive approach to understand a phenomenon using case studies to study the issue at hand. Currently the theories under investigation are Social Construction Career Theory, Social Learning Theory and the Educational Learning Theory. These theories detail that people make choices in their lives based on a combination of cognitive, environmental, behavioural, or emotional factors.

It is anticipated that this project will use a triangulated approach. It will incorporate both a qualitative and quantitative approach with a combination of surveys, interviews, and documentation. The research participants will be drawn from schools that have students in Years 7 and 8 and base their curriculum on VELS. Schools that teach ICT either as stand-alone and/or integrated will be randomly selected from a region in Victorian. The regional boundary has been defined by the Department of Education and Early Childhood Development and is comparative to other Victorian regions in relation to school numbers. The participants sought are secondary school principals, teachers of ICT, and students in Years 7 and 8. These students are selected due to the fact that they have not yet had to choose elective subjects at school. Ethical clearance will be sought from three sources; a University Human Research Ethics Committee, the Department of Education and Early Childhood Development Victoria and the Catholic Education Office Melbourne. Permission will then be sought from the principals of the schools to be involved (including Independent schools), teachers, students and their parents or guardians.

Initially surveys to participants will be used to collect information; the answers will allow us to refine the questions for the interviews. Interview data will be collected using semi-structured interviews with participants. Each school will be asked to complete a short survey on demographic data. It is anticipated that interviews will take no longer than one hour, and may be conducted in two 30 minute sessions in order to fit in with school timetables. All participation is voluntary. The questions will explore the teaching of ICT, subject naming conventions, ICT skills, class environment, ways in which ICT curriculum is delivered, and interests in ICT. The results of the interviews will be transcribed and analysed qualitatively; the results of the surveys will be analysed with a statistical package.

Summary

The recurring theme of students disinterested in ICT study brings about research into ICT curriculum and the way it is taught. Further investigations into the influence of this factor on students ICT career and subject choices may lead
to an understanding on the lack of interest in ICT study.

References


Multimedia Victoria 2007, ICT Skills Research, Attitudes to ICT Careers and Study among 14-19 year old Victorians (Years 9-12), Multimedia Victoria, Melbourne, April 2007.


