



Fostering Computing Education in NZ

Bulletin of Applied Computing and Information Technology

Refereed Article A4:

06:01

Dec 08/Jan 09

Curriculum Alignment: Lessons from a Panel Session

Garry Roberton
Wintec, New Zealand
(Garry.roberton@wintec.ac.nz)

Roberton, G. (2008/2009, Dec/Jan), Curriculum Alignment: Lessons from A Panel Session. *Bulletin of Applied Computing and Information Technology* Vol. 6, Issue 1. ISSN 1176-4120. Retrieved January 19, 2009 from http://www.naccq.ac.nz/bacit/0601/2008Roberton_Curriculum%20Alignment.htm

ABSTRACT

Curriculum alignment (CA) is referred to often as a collaboration between secondary schools and tertiary providers with regard to curriculum pathways. The purpose of aligning the curriculum is to facilitate the removal of barriers between secondary and tertiary study so that the curriculum interface between schools and tertiary institutions becomes aligned and clearly communicated for mutual benefit. There is often misalignment between secondary and tertiary study and lack of clarity in the pathways into higher study. Key reasons for this include the lack of transparency in the link between education, employment and access to income and the lack of appreciation of the value of tertiary study as a driver of economic and social development. Institutes of Technology and Polytechnics (ITPs) can play an important role in facilitating transition from school to tertiary study. Panel members at the NACCQ Conference in 2007 based their presentations on current project initiatives intended to foster collaboration with secondary schools in their regions. The purpose of the projects is to align information and communications technology (ICT) curriculum. This paper presents a summary of the presentations and analyses the outcomes, including recommendations derived.

Keywords

Curriculum alignment, curriculum pathways, Information and Communications Technology, ICT, collaboration.

1. INTRODUCTION

There have been significant changes in the secondary and tertiary education sectors over the last ten to fifteen years, in terms of the training and education needs of students. This has generated greater opportunities for many students and created barriers for others. A lack of across-sector coordination has led to frequent misalignment of secondary and tertiary study and a lack of clarity in the pathways into tertiary study for students, their teachers and for ITPs (MIT, 2007).

In 2002 the Manukau Institute of Technology (MIT) began a curriculum alignment project, which developed a model that was adopted by the Tertiary Education Commission (TEC). MIT led the national project funded by TEC and involving seventeen New Zealand ITPs. The model involved close collaboration between secondary schools and their neighbouring ITPs to establish clear curriculum based pathways for students transitioning from secondary to

tertiary education (MIT, 2007). TEC funding for this project ceased at the beginning of 2006.

One of the major problems negatively affecting the ICT industry in New Zealand is the disconnect that exists between secondary schools, tertiary institutions and the industry (Clear & Bidois, 2005). Reasons include:

- A lack of appreciation of study/career opportunities offered to tertiary graduates , by secondary students and parents.
- A perceived lack of value of computing subjects not contributing towards university entrance (NZQA, 2006).
- 'Boring' generic computing unit standards.
- Too few high school teachers with the necessary IT knowledge and skills.
- An industry that lacks a governing body to provide high level oversight and guidance, such as a sector skills council ([ICT-NZ](#), 2007).

This has resulted in falling enrolments into tertiary institutions, especially the female cohort. This has led to a shortage of ICT graduates in New Zealand (NZ) coincident with a steadily increasing job vacancy market ([NZ Department of Labour, 2007](#); Robertson, 2007).

Aligning the ICT curriculum between secondary schools and ITPs is a major initiative by ITPs to help address a number of these problems. The panellists discussed their respective strategies and projects for generating greater opportunities for tertiary education and workforce participation in ICT for all students.

2. PRESENTATIONS

The panellists were Peter Brook (Otago Polytechnic), Chris McCarthy (CPIT), Michael Andrews (MIT), and Paul Lo (Microsoft), chaired by Garry Robertson (Wintec). Murray Brown (Ministry of Education) and Rod Bentham (NZQA) were also present.

Paul Lo, Microsoft New Zealand Academic Advisor (Developer & Platform Strategy Group) began his presentation by stating the following:

- There are more opportunities that exist within NZ for Microsoft than (for) any other technology
- Microsoft have more partners and organisations using their platform and technology than any other
- Today we see a disconnect (between) what we see being used in the market and what is taught in academic institutions

Paul then asked whether:

- We are equipping people with the right tools for their future?
- A disconnect exists between what is used in industry and what is being taught?
- The programming languages used in industry are being taught in the (diploma and) degree programmes (and) to the required level?

He suggested that tertiary institutions perhaps need to be more mindful of teaching the software technologies being applied in industry He illustrated his proposition , with reference to statistical data collected by Microsoft in NZ (refer Figures 1 to 3).

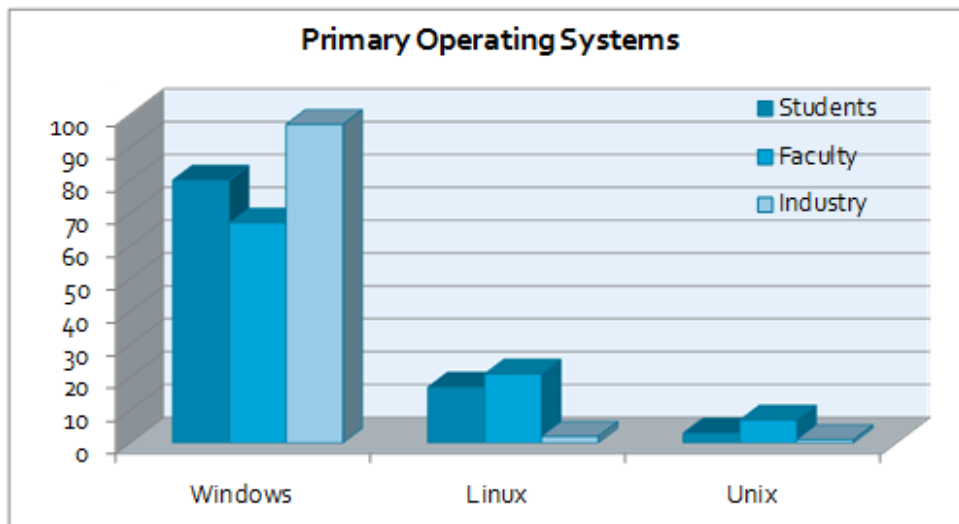


Figure 1. Distribution of Operating Systems

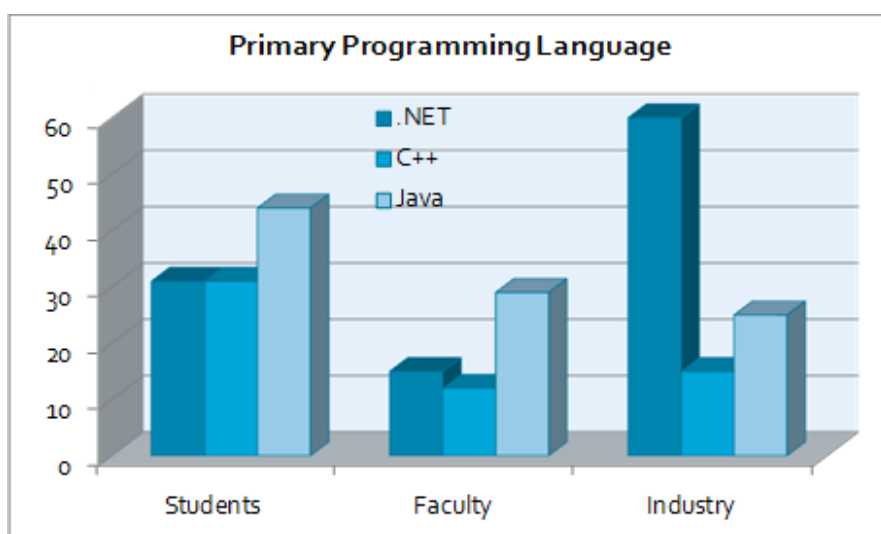


Figure 2. Distribution of Programming Languages

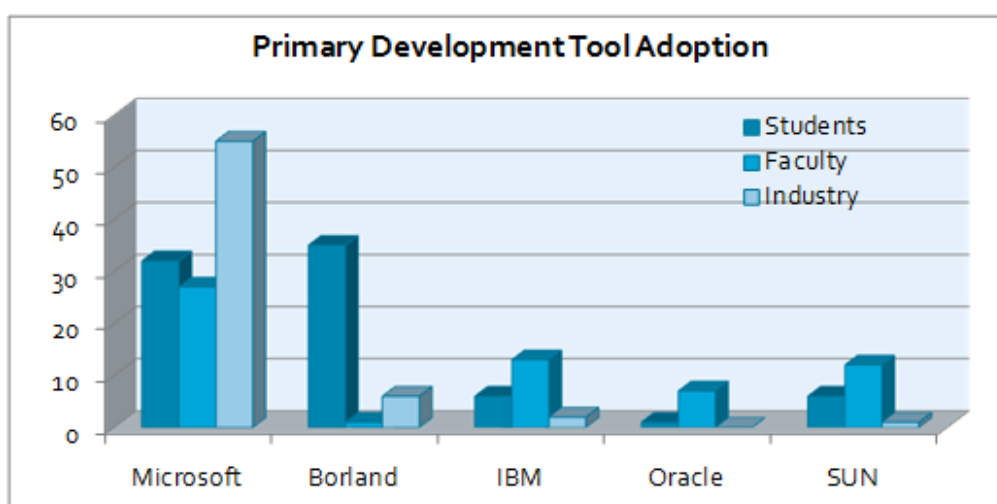


Figure 3. Distribution of Development Tools

Paul concluded with a chart (Figure 4) that looked at the current status of tertiary institutes registered for the MSDN Academic Alliance and for teaching .NET.

Current Status

Universities Tertiary/Institution	Department	LOC	MSDN AA	Teach .NET
University of Auckland	Computer Science	AKL	YES	YES
	Information Systems	AKL	YES	YES
	Software Engineering	AKL	YES	YES
	Information Management	AKL	YES	YES
Auckland University of Technology	Computing & Information Science	AKL	YES	YES
	Computer Science	HAM	YES	YES
University of Waikato	Computer Science	PLN	YES	YES
	Information Systems	PLN	YES	NO
Massey University	Computer Science	AKL	YES	NO
	Information Systems	AKL	YES	YES
	Computer Science	AKL	YES	YES
Victoria University of Wellington	Computer Science	WLG	YES	NO
	Information Management	WLG	YES	YES
Lincoln University	Applied Computing	CHC	YES	YES
University of Canterbury	Computer Science	CHC	YES	YES
	Information Systems	CHC	YES	NO
University of Otago	Computer Science	DUN	YES	NO
	Information Systems	DUN	YES	YES
Polytechnics & Technical Institutions				
Tertiary/Institution				
Unitec	Computing & Information Technology	AKL	YES	YES
		AKL	YES	YES
Manukau Institute of Technology	Computing & Information Technology	AKL	YES	YES
Northland Polytechnic	Business & Computing	WHA	YES	NO
Waikato Institute of Technology	Information Communication Technology	HAM	YES	YES
Waikiri Institute of Technology	Business & Computing	ROT	YES	YES
Bay of Plenty Polytechnic	Information Technology	TAU	YES	YES
Whireia Community Polytechnic	Business & Information Technology	POR	YES	YES
Wellington Institute of Technology	Information Technology	PET	YES	YES
Tai Poutini Polytechnic		PET	YES	NO
Western Institute of Technology at Taranaki		TAR	YES	NO
Universal College of Learning		PLN	YES	YES
Nelson & Marlborough Institute of Technology		NEL	YES	NO
Christchurch Polytechnic	Computing & Information Technology	CHC	YES	YES
Otago Polytechnic	Information Technology & E-letratechnology	DUN	YES	YES
Open Polytechnic		NZ	NO	NO
Aoraki Polytechnic		NZ	NO	NO
Eastern Institute of Technology		NAP	YES	YES
Souther Institute of Technology		INV	YES	YES
Tairāwhiti Polytechnic		GIS	YES	YES
Telford Rural Polytechnic		NO	NO	NO

Figure 4. Tertiary Institutes Registered for MSDN AA & Teaching .NET (zoom)

Chris McCarthy, a senior lecturer and programme manager at CPIT, began by referring to an Organization for Economic Cooperation and Development (OECD) document (OECD, 2001) that had a major influence on the NZ ICT Taskforce 2003 report. OECD data were used to reinforce the report's focus that NZ's long-term need is to build and sustain a highly skilled ICT workforce. The report also states that it is imperative that New Zealand takes urgent measures to address future ICT skill shortages, especially since ensuring an adequately trained and continuous supply of ICT talent will have a long lead-time (ICT Taskforce, 2003).

Chris stated that less than 10% of secondary school [computing] students were continuing on to university and that the majority were going directly into the workforce. Chris then briefly reviewed the history of the Christchurch College of Computing (CCC) from a CPIT perspective. This project, a full-scale ICT-orientated senior Year 13 high school was unique in NZ at the time. CPIT believed that this project resulted in the capture of a potential market of students better prepared to handle the demands of tertiary study. CPIT even coined a new phrase for this type of activity; "EFTS harvesting". Of the 159 students who had gone through the CCC computing courses between 2001 and 2003, 77 enrolled in computing programmes at CPIT (McCarthy, 2005).

Chris concluded by lamenting the closure of the CCC at the end of 2005, which was due to a drop in enrolments and the lack of affordability by the schools that were responsible for its resourcing. He stated that five local schools are continuing to engage with CPIT on curriculum alignment through the STAR (Secondary Tertiary Alignment Resource) funded programme. This programme enables schools to better meet the needs of senior students in facilitating a smooth transition to further study, or to the workplace (MoE, 2007).

Peter Brook, Principal Lecturer and programme manager at Otago Polytechnic, used a presentation entitled 'Raising the Bar on VC: Using Video Conferencing and NACCQ modules in Secondary Schools'. He described the Otago polytechnic programme for 2007 offering computer science to rural secondary school clusters throughout NZ (Figure 5). This programme built upon the successful pilot, undertaken in 2006, that delivered 'real computing' to rural high school year 13 students via a hybrid delivery model. Peter stated that the programme is providing ICT content that:

- Is interesting and relevant to the students and attracts NCEA credits.
- Has educational merit beyond that currently available in schools .
- Reflects IT practice and demonstrates pathways for tertiary study in IT.

(Gasson, Baldwin, Brook, & Mann, 2006)

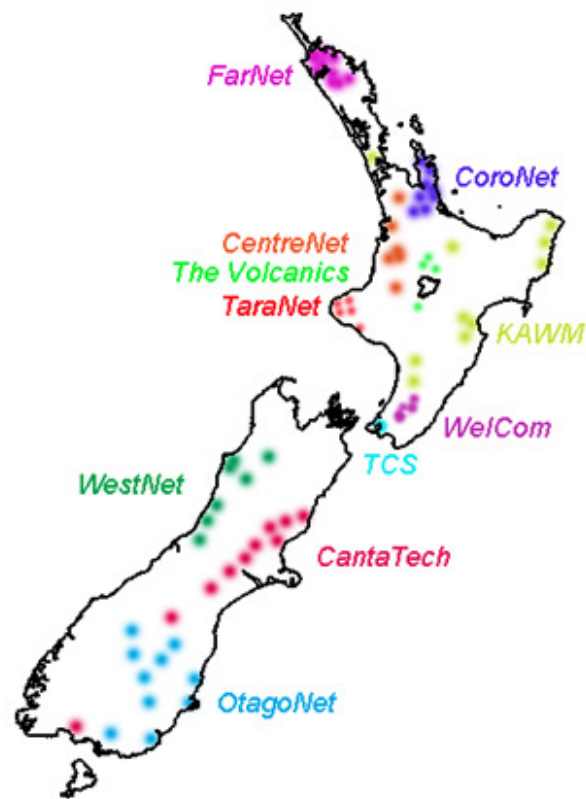


Figure 5. Secondary School Network Clusters (Baldwin et al., 2006)

He stated that the rural schools involved do not have the expertise or equipment to teach ICT. This applies especially to the NACCQ credit inclusion modules that give students a greater opportunity to study at a more interesting and challenging level. There are also very few students wanting to learn about ICT in these schools. Peter also emphasised the communications and engagement methods that Otago Polytechnic are using to deliver their programme. The students receive one hour of direct contact via the SchoolZone video conferencing (VC) link each week. Photos of Peter with the students were used to reinforce his view that meeting with the students in their environment is essential if the programme is to be successful. Students are also brought into the Polytechnic for scheduled practical lab sessions to supplement and reinforce the VC lessons and the weekly self-directed study.

Peter concluded by summarising what works and some of the problems encountered, including:

- The hybrid model works and could be implemented using all forms of communication.
- There are issues associated with curriculum content, funding (needs to be investigated), and credit inclusion.
- The existing networks; e.g. SchoolZone, can and should be used.
- Respect for the High School culture is needed.
- Students like the engagement and personalised learning.

He stated that all ITPs could look at using this model for the rural students in their areas. Finally, Peter emphasised the need to reach out to secondary school students who might otherwise never engage in tertiary studies, let alone consider a career in ICT.

Michael Andrews, a senior lecturer and programme manager at MIT, began his presentation with the subject of the National Certificate of Achievement (NCEA) credit

inclusion. He stated that the inclusion of a selection of National Advisory on Computing Qualifications (NACCQ) level 4, 5 and 6 diploma modules for credit on the NZQA web site (NZQA, 2007) was a major achievement that supported curriculum alignment. This gave NACCQ a presence in secondary schools and would help them to develop coherent and transparent pathways for their senior ICT students into tertiary studies with ITPs. Michael acknowledged the problems associated with the credit inclusion process, namely that the modules do not count towards university entrance (UE) and they don't appear on the students' record of learning (a problem referred to as ghost credits).

He stated that only a limited proportion of ICT teachers at secondary schools have hardcore ICT knowledge, which highlighted the problem of getting senior students interested in ICT as a specialist subject. Michael also referred to Target 2010, MIT's internal strategy in response to the Tertiary Education Strategy. "By the year 2010, 20% of MIT graduates will be Maori, 20% of MIT graduates will be Pasifika and there will have been a 10% increase in the participation of school leavers (other than Maori and Pasifika) in its programmes. Target 2010 is aimed at MIT's traditional catchment area of South/East Auckland" (Steedman, 2004).

Michael concluded by saying that NACCQ multimedia modules had been successfully taught to senior secondary school students from a local Decile 1 school. Students had enjoyed the challenge of tackling a subject pitched at a higher level and being in a tertiary campus environment.

Garry Robertson, a senior lecturer and programme manager at Wintec, gave the final presentation entitled 'Developing a Waikato ICT Curriculum Framework (CF) of Assessment Year 11 to 13: A Wintec Curriculum Alignment Project'. This project consisted of an iterative process of consultation, collaboration and commitment over a period of fifteen months that involved:

- Engaging with Waikato secondary schools.
- Surveying, analysing and informing.
- Drafting a 'Framework'.
- Forming a steering group.
- Facilitating workshops.
- Waikato secondary schools taking ownership.
- Developing a Moodle presence.
- Launching the Waikato ICT CF of Assessment Year 11 to 13

Its purpose is to strengthen the interface between secondary schools and tertiary institutes for ICT programmes of study. Garry stated that there are the two perspectives, or needs, arising out of the development of a curriculum framework. Secondary schools could use it to ensure that their students develop knowledge and skills in specific topic areas (core ICT, multimedia and graphics, programming, electronics, internet/web, networking and communications and application software) to pathway into tertiary studies. Tertiary institutes would use it to improve their understanding and appreciation of the secondary school ICT graduate profile as they progress into tertiary ICT programmes of study. Garry's last slide contained a series of links to the Careers Services web site giving access to a full description of the many and varied ICT careers available (Figure 6).



Figure 6. Careers Services - ICT Careers

He emphasised the importance of having a dedicated curriculum alignment manager in each ITP, with an appropriate budget to drive the associated projects. This enabled meaningful engagement with schools in each of their regions to collaboratively develop coherent pathways from senior secondary subject areas into the appropriate ITP programmes.

Garry mentioned that the NACCQ Annual Conference, to be held in Auckland next year, would feature a careers forum. The format would be similar to the Forum held during the Wellington conference last year, where secondary ICT teachers were sponsored to attend the one day "Perspectives on IT Careers" forum. Its aim was to link stakeholders to ensure the continued availability of a highly skilled workforce to sustain a vibrant and healthy Information Technology industry in New Zealand (NACCQ, 2006).

3. DISCUSSION

A number of points raised in the general discussion that followed were centred round specific issues highlighted by the presenters. These issues included:

- Secondary school teachers approaching tertiary institutions for information about teaching NACCQ Blue Book modules (for credit inclusion).
- Funding for the Beacon Practice Project for teaching technology subjects (including ICT) has been extended for 2007 so other schools can participate; e.g. St Johns in Hamilton.
- The MIT 2010 Project is also engaged with the 'Accelerating Auckland' project.
- Anecdotal evidence suggests that exposure to ICT prior to Year 11 appears to be high, but drops off at early high school level. It appears that resources are an issue (teachers and computer labs).
- There is no actual curriculum or funding for ICT at high school.
- It was felt that some pressure should be applied to government to set up an IT curriculum; i.e. to ensure that the Digital Technology Framework (DTF) project progressed.
- Computing is now a bursary subject; i.e. from June 2007.

Participants expressed their concerns about the problems that are associated with the credit inclusion process and wanted the following point noted for action by NACCQ:

NACCQ needs to lobby NZQA strongly to have the credit inclusion policy and processes changed so that the Blue Book modules attracting NCEA credits for credit inclusion appear

on student's record of learning.

A solution to the problem of ghost credits is needed in the long term, in conjunction with the development and rollout of the DTF. It was also noted that the person selected to negotiate this with NZQA would need to be well briefed on the associated issues.

4. CONCLUSION

Collaboration between secondary schools and ITPs to ensure the development of coherent pathways through an improved alignment of ICT curriculum is vital. The presenters have each illustrated, and indeed demonstrated, that there are a number of different strategies and approaches that can be used to successfully remove the barriers to progression to tertiary study.

One common strategy that has emerged involves ITPs actively engaging with the secondary school ICT teachers in each of their regions. This approach is absolutely vital if the disconnect between secondary schools, tertiary institutions and the ICT industry is to be overcome. Correcting this problem provides an opportunity to arrest falling enrolments in tertiary ICT studies and to begin to close the growing gap between the number of graduates available and the increasing number of job vacancies. This should have benefits for students and employers as well as the wider community which relies heavily on having an appropriately skilled and sized ITC workforce.

The development of the MoE DTF initiative and its planned rollout is eagerly anticipated by the secondary school sector. This framework is designed to provide a flexible structure and systematic approach to the teaching of computing and IT in the senior secondary school sector in NZ. The project has the potential to strengthen the appeal of computing and IT as a subject in its own right and to raise its visibility from under the umbrella of the technology learning area.

5. ACKNOWLEDGEMENT

My thanks to the following participants:

- Evellen Powell from Unitec, Auckland, New Zealand for providing a valuable record of the session.
- Paul Lo from Microsoft New Zealand.
- Chris McCarthy from CPIT, Christchurch, New Zealand.
- Peter Brook from Otago Polytechnic, Dunedin, New Zealand.
- Michael Andrews from Manukau Institute of Technology, Auckland, New Zealand.

REFERENCES

- Clear, T., & Bidois, G. (2005). FITNZ - Graduate profiles for ICT education at senior secondary level (retrieved from http://www.naccq.ac.nz/conference05/proceedings_05/concise/clear_fitz.pdf on 21/11/2005). In S. Mann & T. Clear (Eds.), 18th Annual NACCQ Conference (pp. 145-150). Tauranga, New Zealand: NACCQ.
- http://www.naccq.ac.nz/conference05/proceedings_05/concise/clear_fitz.pdf
- Gasson, J., Baldwin, H., Brook, P., & Mann, S. (2006). *Real computing at Year 13*. Presented to the NACCQ 19th Annual Conference. Retrieved 9 August 2007, from <http://bitweb.tekotago.ac.nz/staticdata/papers06/papers/320.pdf>
- ICT-NZ (2007) *ICT-NZ News*. Retrieved 7 July 2007, from <http://www.ict-nz.org.nz/>
- ICT Taskforce (2003). *Breaking through the barriers*. Retrieved 7 August 2007, from <http://www.nzte.govt.nz/common/files/ict-final-report.pdf>
- McCarthy, C. (2005). *Where are they now? Making the transition - Three years on*. Retrieved 7 August 2007, from http://www.naccq.ac.nz/conference05/proceedings_04/mccarthy_transition.pdf
- MIT (2007). *Curriculum alignment*. Retrieved 7 August 2007, from <http://www.manukau.ac.nz/initiatives/cap/default.asp>

- MoE (2007). *STAR-Secondary Tertiary Alignment Resource*. Retrieved 7 July 2007, from <http://www.minedu.govt.nz/index.cfm?layout=index&indexID=11550&indexparentid=1004>
- NACCQ (2006). *Perspectives in IT Careers Forum*. Retrieved 9 August 2007, from http://naccq06.unitec.ac.nz/careers_forum.html
- NZ Department of Labour (2007) *Job Vacancy Monitor*. Retrieved 7 July 2007, from <http://dol.govt.nz/publications/jvm/job-ad-monthly-report.asp?from=rss>
- NZQA. (2006). *Changes to the 'approved subjects' list for university entrance*. Retrieved 7 August 2007, from <http://www.nzqa.govt.nz/news/releases/2006/120606.html>
- NZQA (2007) *Credit inclusion*. Retrieved 6 July 2007, from <http://www.nzqa.govt.nz/ncea/acrp/secondary/7/74112.html>
- Organisation for Economic Development (2001). *The New Economy Behind the Hype: The OECD growth project*. Retrieved 7 August 2007, from <http://www.oecd.org/dataoecd/2/43/2380415.pdf>
- Robertson, G. (2007). Sectoral linkages (secondary, tertiary and industry): A panel session. *BACIT 5(1)*. Retrieved 23 June 2007, from http://www.naccq.co.nz/bacit/0501/2007Robertson_ICT_Linkages.htm
- Steedman, S. (2004). *Aspirations of rurally disadvantaged Maori youth for their transition from secondary school to further education or training and work*. Retrieved 9 August 2007, from <http://www.dol.govt.nz/PDFs/maori-youth-transitions.pdf>

Copyright © 2008-2009 Garry Robertson

The author(s) assign to NACCQ and educational non-profit institutions a non-exclusive licence to use this document for personal use and in courses of instruction provided that the article is used in full and this copyright statement is reproduced. The author(s) also grant a non-exclusive licence to NACCQ to publish this document in full on the World Wide Web (prime sites and mirrors) and in printed form within the Bulletin of Applied Computing and Information Technology. Authors retain their individual intellectual property rights.

Copyright © 2008-2009 NACCQ, Krassie Petrova and Michael Verhaart 9Eds.). An Open Access Journal, DOAJ # 11764120.