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NACCQ Qualifications – A Performance Review and Future Developments

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ABSTRACT

In 1986 a committee, consisting of industry and polytechnic computing representatives, was formed to design a new qualification in computing that would replace the outdated New Zealand Certificate in Data Processing (NZCDP). As a result the Certificate in Business Computing (CBC) programme, a radical new approach to computing education incorporating competency-based assessment, was offered nationally in polytechnics for the first time in 1988.

The National Advisory Committee on Computing Qualifications (NACCQ), formed to replace the NZCDP review committee, continued with the development of the Advanced Certificate in Business Computing (ACBC), introduced in 1989, and the National Diploma in Business Computing (NDBC), introduced the following year. The organisation has continued to strive to serve its member institutions over the last fifteen years by endeavouring to keep up with, and ahead of, developments in the rapidly changing field of Information and Communications Technology (ICT).

This paper presents the findings from a comprehensive survey of NACCQ sector affiliates (includes Polytechnics and Universities) on which NACCQ qualifications and modules are currently being offered. It focuses on the question of whether the organisation is currently perceived to be addressing the needs of its members, and those of the ICT industry, in terms of the content of the current edition of the New Zealand Qualifications in Information and Communications Technology (the Blue Book).

Keywords

NACCQ, Information and Communications Technology (ICT), APNZ, Blue Book

1. INTRODUCTION

Recent publications and public statements, such as those below, challenge NACCQ to review its effectiveness in supporting the field of ICT in the tertiary education sector.

> *"For the first time ever New Zealand has an explicit, connected, future-focused Tertiary Education Strategy that will directly contribute to broad national, economic and social goals"* (The Tertiary Education Strategy (TES) 2002/07)
> *"The effective emergence of an Information Economy and its sustainability depend on the interplay between (Australian) public policy, the education and training sectors, and industry"* (Morrison, 2001, p48).

The National Advisory Committee on Computing Qualifications (NACCQ) was formed in 1988 to replace the New Zealand Certificate in Data Processing (NZCDP) review committee. The NZCDP review committee, consisting of committed industry and polytechnic representatives, and under control of the Information Technology Education Authority (ITEA),

was charged with the responsibility of reviewing the existing NZCDP qualification with a view to developing a new, more relevant computing qualification. The review committee successfully fulfilled their obligations by creating an exciting and revolutionary new qualification called the Certificate in Business Computing (CBC), which was based on a grouping of individual modules and used a competency-based assessment scheme (a modified form of mastery assessment). Within two years NACCQ had developed an intermediate qualification, the Advanced Certificate in Business Computing (ACBC) that built on the introductory level CBC programme, and the National Diploma in Business Computing (NDBC), the purpose of which was to extend student topic knowledge and skills to a higher level. These qualifications were published in the New Zealand Polytechnic Qualifications in Business Computing, colloquially referred to as the 'Blue Book' because of its blue cover.

During this same period the then national government announced a commitment to develop a new national curriculum, a draft of which appeared in late 1991. The foreword by the Minister of Education, Dr Lockwood Smith, drew attention to a perceived need for New Zealand to compete in the modern international economy and achieve educational standards that would produce a workforce capable of raising the nation's competitiveness in the international marketplace. After allowing a very short time for public response to the draft, The New Zealand Curriculum Framework was published in 1993 (McGee, 1997).

In 1994, a unit standard writing party assembled at the Western Institute of Technology at Taranaki (WITT) under the leadership of New Zealand Qualifications Authority's (NZQA's) Computer Consultant, David Christie, to write the unit standards for computing, levels 5 to 7. This move was in response to an identified need to bridge a gap in student computing and information technology (IT) knowledge between post secondary school and pre-industry, identified at the 1994 NACCQ conference in Christchurch. The elements and performance criteria for each unit standard produced were based on the content of the modules contained in NACCQ's Blue Book. All of the computing unit standards developed that way were finally registered in August 1996, but it was a further six months before the structure for the computing qualifications, levels 5 to 7, was registered on the NZQA National Qualifications Framework (NQF).

With the infrastructure and the standards of the NACCQ programmes already well established, polytechnics could not see any added value in the NZQA levels 5 to 7 unit standards, so there was no uptake of the NZQA qualifications. Manawatu Polytechnic (now UCOL) in Palmerston North was the exception in developing a NQF level 5 diploma in place of their CBC programme, which they had ceased teaching in 1996. It was abandoned after just one year (Kelly, 1998).

The primary focus of NACCQ is best described by its motto 'Fostering Computing Education in New Zealand'. Although very aware of the parallel development of computing unit standards by NZQA, especially at levels 1 to 3, NACCQ turned its attention to fostering the development of other computing and information technology qualifications. Within a relatively short time the Introductory Certificate in Computing (ICC), with threads of numeracy and literacy woven into the whole programme, was developed and introduced into polytechnics in 1990. The Introductory Certificate in Information Technology (ICIT), a programme specifically designed for secondary schools, was subsequently developed. This encouraged cooperation in IT education between secondary schools and the tertiary sector. The Waikato Institute of Technology (WINTEC) IT staff developed a Graduate Diploma in Computing Education (GDICE) to meet the growing demand of computer technology and IT education in the school classroom. This was acquired by NACCQ to provide all polytechnics with the opportunity to offer the programme throughout New Zealand (Young and Joyce, 1998).

NACCQ is an organisation that provides help and support to member institutions in the development, teaching and quality assurance of courses and programmes, from certificate to degree level, in the field of Information and Communications Technology (ICT). But is it meeting the expectations of member institutions?

A comprehensive survey of polytechnics and their equivalents ('institutes') was conducted towards the end of 2002 and the beginning of 2003. Respondents from the member institutions surveyed were asked to indicate the NACCQ programmes that their institutes offered from 1995 to 2002, qualifications to be offered in 2003 and qualifications planned for offering in 2005. They were also asked about the modules offered across the various programmes and several questions relating to the performance of NACCQ, in terms of its quality assurance and leadership roles.

Twenty of the 22 institutions responded and this paper offers a 'snapshot' of the organisation NACCQ's performance, derived from the responses. It takes a critical look at whether NACCQ is meeting the needs of its sector affiliates, in terms of quality assurance and educational leadership, and discusses its possible

Table 2. NACCQ Programmes offered

NACCQ Programme	Year Offered							
	1995	1996	1997	1998	1999	2000	2001	2002
ICC	7	5	3*	2*	2*	2*	2*	2*
CBC	16	15	15	15	15	15	15	15
#DipBC/ACBC	13	13	12	11	10	11	11	10
NDBC	9	8	7	8	8	7	6	5

Table 1. Designated Responsibilities.

Designation	Total
Programme Leader	8
Programme Manager	5
Team Leader	1
Programme Coordinator	1
Head of Department	4
Head of School	1
Total Respondents	**20**

future role, in terms of what is on the ICT horizon, especially in light of our Prime Minister's statements identifying ICT as a key sector in the Government's "Growth and Innovation Framework" (ICT Taskforce Draft Report 2002).

2. NACCQ'S PHILOSOPHIES

"The second biggest constraint to growth of the ICT sector is the supply of appropriately educated graduates." (ICT Taskforce Report, 2002, p.20)

NACCQ, as a subject forum of the Association of Polytechnics of New Zealand (APNZ) and, as the only national ICT advisory body recognised by the NZQA, has occupied a unique position in the New Zealand computing education scene for fifteen years. At its inception, NACCQ identified a set of philosophies to underpin the development and maintenance of its business computing programmes and its quality assurance processes. Selections of those relevant to this study follow:

♦ Programmes must be capable of rapid response to significant industry changes.

♦ Programmes must offer the possibility of in-depth study of chosen areas, reflecting the increasing diversity of knowledge requirements and career options.

♦ Programmes must be capable of satisfying the differing regional needs throughout New Zealand.

♦ Programmes must be the outcome of continuous close liaison between the New Zealand computing profession and New Zealand sector affiliate educators.

♦ Programmes must be maintained as national courses with consistent nationwide standards, producing portable and recognised qualifications.

(The New Zealand Qualifications in Information and Communications Technology, 9th Edition, P.9)

This research helps identify how well NACCQ has lived up to these philosophical statements and how has it endeavoured to provide focus and direction for fifteen years in the field of ICT education in New Zealand.

3. FINDINGS

3.1 Designated roles

Respondents to this survey had titles or designations as listed in Table 1.

3.2 NACCQ Programmes Offered

All 20 institutes who responded indicated that they offered NACCQ programmes over the period illustrated in Table 2.

Figure 1. NACCQ Qualifications Offered in 2003 and 2005.

* No longer available as a national programme due to the introduction of the National Qualifications Framework National Certificate in Computing Level 3 qualification and a sunset clause imposed by the NZQA. Now offered as a local programme.

The ACBC was renamed the Diploma in Business Computing in 1999 to align the programme name with NZQA qualifications nomenclature.

The figures in Table 2 indicate that the CBC and the DipBC programmes have remained the dominant computing and IT qualifications offered by a majority of the responding institutes. In spite of the rapid introduction of degree programmes into polytechnics from 1996 onwards, the number of institutes offering the NDBC programme remained relatively stable until 1999. It was still offered in 2002 by almost a third of the institutes who responded.

The number of institutes offering NACCQ qualifications in 2003 and 2005, including the Certificate in Computing (CIC), is illustrated in Figure 1.

Notes:

1. 2003 is a transition year for phasing out the CBC and DipBC programme names and replacing them with the Diploma in Information and Communications Technology (DipICT) Levels 5 and 6 respectively. The responses have been grouped accordingly.

2. The CIC qualification was available in 1999 as a local programme.

Figure 1 indicates that just over a third of the respondents are offering the CIC programme. Seventy-five percent continue to offer the DipICT L5 (CBC) programme with the DipICT L6 programme indicating a slight upward trend with twelve polytechnics offering it for 2003 and 2005. Figure 1 shows that four institutes offer NDBC, thus continuing the downward trend, as illustrated in Table 1.

An additional institute is planning to offer the CIC programme in 2005. Interestingly, the NDBC qualification continues to be provided at four institutes. This includes two small polytechnics that are not planning to offer a degree and two polytechnics, one medium sized and one large, which offer a degree programme in parallel with NDBC.

3.3 Certificate in Computing (CIC) Level 3

The CIC was developed by a working party at the 1999 conference in Dunedin in response to demands from polytechnics for a level 3 programme that was not an NQF unit standards-based qualification. It was then made freely available to polytechnics on a national basis, although it was not included in the Blue Book until the release of the ninth edition at the beginning of 2003.

Table 3 Module Categories

	Module Category	Subject Area Code
1	Systems Hardware & Software	HS
2	Software Applications	AP
3	Business Skills	BS
4	Software Development	SD
5	Electronic Communication	EC
6	Special Topic	ST

Table 4 CIC Modules with Highest Uptake

Code	Module	Number of Institutes
HS310	Hardware	7
AP310	Word Processing	7
AP320	Databases (Flat-file)	7
AP330	Spreadsheets	7
EC320	Email and Internet	7

Table 5 CIC Modules with Lowest Uptake

Code	Module	Number of Institutes
AP380	Project Management	2
BS325	Professional Practice	2
BS370	Accounting Introduction	2
SD340	Multimedia	2
EC330	Working Collaboratively	2

At the time of writing (May 2003) the CIC was awaiting NZQA approval as a NACCQ qualification under the umbrella of the Blue Book family of ICT qualifications.

The distribution of the twenty-three modules offered, representing a 100% uptake, is influenced by the regulations, as stated in the Blue Book. These require that no more than 30 credits (5 modules) be obtained from any one category and that the programme must include modules from at least 3 of the first 5 categories, shown in table 3.

Tables 4 and 5 illustrate the CIC modules with the highest and the lowest uptake, respectively.

CIC modules with the highest uptake are those that cover fundamental skills required by any person using computers in a study or working environment. These skills, involving knowledge of basic hardware and the use of applications software (word processing, spreadsheet, database), email and Internet, are essential and the five highest rated modules include all of those topics. These modules can be easily matched with unit standards at levels 2 and 3 on the NQF and this has allowed institutes to continue to deliver material that is likely to be standard in their curriculum at this level.

3.4 Diploma Programmes Levels 5 to 7

Respondents were asked to indicate diploma modules offered for 2002 and Tables 7 to 9 provide some interesting data about the levels 4/5 to 7 modules. The nine compulsory DipICT L5 modules, listed in table 6, are excluded.

As indicated by the data in table 7, only 3 modules are not being offered. This is out of a total of 40 level 4/5 modules that were available from the NACCQ Blue Book in 2002, which represents a 92.5% uptake.

The Hardware & Operating Systems modules (Table 7), offered by one institute, are included in their DipICT L5 programme, technician stream. It is the only institute currently offering this specialisation stream in New Zealand, according to the survey response.

Table 8 indicates that 4 modules across two of the eight categories are not being offered. From the total of 55 level 6 modules available, this represents a 92.7% uptake.

Table 9 indicates that 8 modules, across three of the eight categories are not being offered by any of the five institutes providing the NDBC programme. This is out of a total of 28 level 7 modules and represents a 75% up take. Note PJ700 is a compulsory module for all NDBC students. In spite of the decline in the number of institutes offering level 7 modules, NACCQ has added six new level 7 modules since 1996 and during the same period has extensively revised thirteen.

3.5 Other Responses

The responses from the twenty institutes, to the five additional questions relating to various NACCQ quality assurance issues, are tabulated in Table 10.

Figure 2 indicates a strong level of satisfaction with NACCQ in terms of meeting the needs of its members with the New Zealand Qualifications in Information and Communications Technology (Blue Book) publication.

There were several comments supporting the 90% overall rate of satisfaction that indicated an appreciation of the amount of effort required by the organisation in

Table 6 Compulsory Modules

Module Name	Designation
Business Applications	BA500 (BA100)
Business Communications	BC500 (BC100)
Data Organisation	DT500 (DT100)
Hardware Fundamentals	HF500 (HF100)
Interpersonal Skills	IP500 (IP100)
Systems Overview	SO500 (SO100)
Ethics & Professionalism	ET600 (ET200)
Either	
Program Development and	PD500 (PD100)
Programming Principles	PP400 (PP100)
Or	
Programming Concepts & Tools	PP490 (new)

Table 7 Level 4/5 Modules

Categories	Not Offered in 2002	Offered by only One Institute	Offered by Most (12 to 14)
Business & IS Management		EP500	
Data Comms. & Networks			NM500
Hardware & Op Systems	PC500	AC500 BS500 EL500	OS500
Professional Skills			
Software Applications	SP520		
Software Development	PR530		
Systems Analysis & Design		ID500	
Web & Multimedia			IN500 MA500

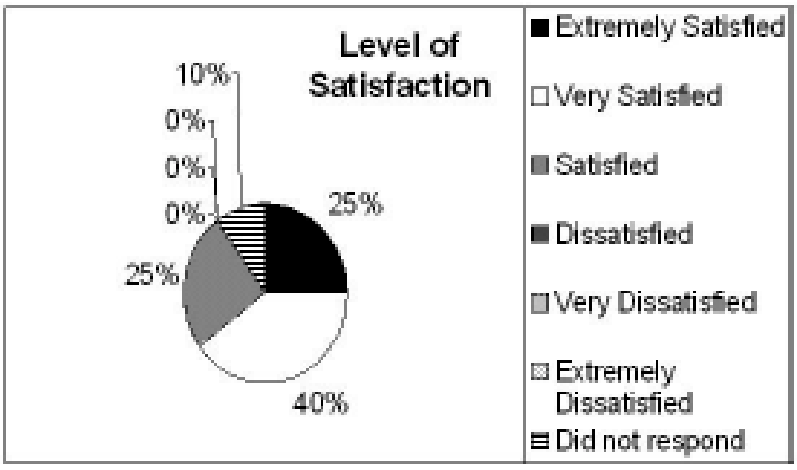

Figure 2 Level of Satisfaction with NACCQ

Table 8 Level 6 Modules

Categories	Not Offered in 2002	Offered by only One Institute	Offered by Most (10 to 12)
Business & IS Management		AA600	
		AP600	
		BA620	
Data Comms. & Networks			NM600
			NM61n
Hardware & Op Systems		CA600	HS600
		SC600	
		TS600	
Professional Skills			
Software Applications			
Software Development	EX600	PS600	
	PR60n		
	PR630		
Systems Analysis & Design	FS600	DB620	DB600
		SA61n	
Web & Multimedia			IN600

Table 9 Level 7 Modules

Categories	Not Offered in 2002	Offered by only One Institute	Offered by Most (3 to 5)
Business & IS Management	AA700	EC700	HR700
	AS700		
	BA700		MA700
	IS710		
Data Comms. & Networks		DC700	NE700
Hardware & Op Systems			
Professional Skills		TR700	PJ700
Software Applications		SP700	
Software Development	GW700	OO700	FG70n
	PR730		
	PR740		
Systems Analysis & Design	DM700	SR700	DB700
Web & Multimedia			

Table 10 Responses to Additional Survey Questions

Questions 9 to 13	Responses (%) Yes	No	No Resp	Summary of Comments in Support & Suggestions for Improving the Process
9. Do you think that the current moderation process is adequate/working?	90	5	5	The process should be similar to NQF (moderation) standards where institutions respond to the moderator about actions taken. Would be more effective if the process was compulsory, with the necessary follow-up action, and there was an appeal process, where necessary, to allow determination of final moderation outcomes.
10. Would you use a degree moderation scheme if the NACCQ CQ working group were to coordinate a process?	80	10	10	Moderation scheme would need to be similar to current (local) process, as efficient and would depend on cost. A centralised coordinated process would be very useful, especially if it was a national degree.
11. Do you think that the content of the current qualifications addresses the need of the computing and information technology industry?	75	15	10	Handy to have the Blue Book as your "bible". Mostly meets needs – can always add more modules. Graduate diploma(s) a good move. Graduates appear to gain employment relatively quickly. SIGs dealing with content change – doing a good job. Content should cover internationally recognised qualifications; e.g. A+. Appreciate the ability to offer a proportion of local modules and to have these considered for inclusion in the Blue Book.
12. How satisfied are you that NACCQ is meeting the needs of its members, in terms of the content of the Blue Book?				Refer to Figure 2 Level of Satisfaction with NACCQ
13. Is there anything that you would like to suggest that NACCQ could do for its members, in terms of the Blue Book qualifications, that would help lift the profile of these qualifications relative to the PTE offerings?				Refer to Table 11 Suggestions and Ideas for NACCQ to Consider

reviewing and updating the contents of the Blue Book every two years.

4. CONCLUSIONS AND COMMENTS

All of the current NACCQ qualifications will continue to be offered in 2005 and at least 15 institutes plan to continue offering the one year DipICT L5. Figure 1 shows that there may be a slight increase in the number offering CIC but that no significant change is expected for the other qualifications. This, along with the high level of satisfaction illustrated in figure 2, strongly suggests that NACCQ is meeting the needs of its sector affiliates, in terms of The New Zealand Qualifications in Information and Communications Technology.

The newest qualification, CIC, allows institutes to offer an introductory level programme within the framework of the Blue Book family. There is a 100% uptake of the twenty-three modules on offer and Table 4 shows that the most commonly offered modules are those that provide essential knowledge and skills at a fundamental level.

Tables 7 to 9 show that within the diploma qualifications offered throughout the polytechnic sector, very few modules were completely omitted in 2002. At levels 5 and 6, more than 92% of the available modules were being used. Even in the highest and least offered (level 7) group, 75% of modules were utilised. The 75% affirmative response to question 11 in Table 10 further suggests that respondents consider that programmes are responding rapidly to significant industry changes and are capable of satisfying the differing regional needs throughout New Zealand. In reviewing and updating the content of the Blue Book every two years NACCQ is meeting the stated Blue Book objectives (2002, P.7) to incorporate new material to keep the contents abreast of the rapid developments in the New Zealand and international computing and information technology industry.

Table 11 Suggestions and Ideas for NACCQ to Consider

Category	Suggestions and Ideas	
Moderation	i) Create assessment sample folders to maintain standards across country ii) At the AGM in Napier's conference, the degree moderation scheme was discussed and agreed would happen. It did not. Are we going to relive that again for 2003?	
Marketing	i) Encourage industry contacts and advisory committee members to include qualification requirements in job adverts; e.g. "tertiary qualification required: DipICT or similar" or, NACCQ computing qualifications required, such as DipICT" ii) Get more recognition of these qualifications by universities; e.g. Massey, Waikato. Posters etc. to schools very helpful and worth repeating. Employer booklet helpful but needs updating. Equivalence to NCEA? TV advertising –"The nationally recognised qualifications that employers demand" iii) Higher profile advertising/promotion to end-users? Brand awareness beyond the providers? iv) We need to be more competitive. We need to work out how PTEs are gaining so many enrolments and compete at that level and do a better job of gaining students. vi) Lots of marketing (but the cost would be interesting!). vii) Profile some successful graduates – from an alumni association of grads. vii) Do employers know the difference between a PTE and a NACCQ qualification; e.g. a pseudo-diploma in web design involving cut and paste as opposed to DipICT?	
Industry Qual'cations	i) Industry applauds International Certification; e.g. MCP, A+. I would like to see some modules align to this. It is important if our focus is on the job market and preparing students for the IT industry. ii) Would like to see a work party established (by NACCQ) that would research the Blue Book modules and link them to the most popular Industry Quals; e.g. CompTIA, MSCA, CISCO, etc – this could be a valuable service to us as it is difficult to fund this type of project ourselves – and we would like to see the industry involved in this.	
Comments in support (70% of respondents support the concept) of NACCQ Developing Graduate Diplomas	**Subject Areas**	**Number in Support**
	Programming	7
	Multi-media	4
	Data Communications & Networking	4
	Web Design	2
	E-Commerce	2
	Information Management	2
	Linux	2
	Computer Graphics	1
	Databases	1

Question 9 in Table 10 focuses on current NACCQ moderation processes and this appears to be adequate or working, according to 90% of respondents. This supports the philosophy that programmes must be maintained as national courses with consistent nationwide standards, producing portable and recognised qualifications.

Overall, NACCQ appears to be meeting the needs of its members in terms of curriculum development and quality systems and it should therefore have the confidence to continue to consider new initiatives.

5. FUTURE DEVELOPMENTS

Some useful indicators for the future may be taken from the Tertiary Education Commission Strategy 2002/ 2007 statement; "The objective is to build on the many strengths of our current system to create a world-class tertiary system with a high level of strategic relevance to our economy and society. The new system will be outwardly focused on the world, able to meet the future development needs of our nation and distinctively 'New Zealand' in its style and tone," and from Morrison (2001, P.49); "The demand for ICT skills is large and growing, and the (industry) belief is that workforce related barriers constitute a growing predicament to the future development of IT and the high technology industry".

The NACCQ organisation, as a subject forum of APNZ and a collective voice for New Zealand polytechnics, has provided focus and direction for its sector members for fifteen years. It is well positioned to meet the ICT Taskforce Report (2002, P.6) imperative "that ICT businesses, entrepreneurs and role models work with schools, families and communities to

'showcase' New Zealand ICT success, to ensure that subject content and choices provided by all of our education institutions are well suited to a career in ICT (both 'soft' and 'skills'), and to convince students that they can have a rewarding career path in ICT in New Zealand."

The Government in "Growing an Innovative New Zealand" identifies ICT as a key sector. NACCQ occupies a unique position in the ICT tertiary education sector, as a Subject Forum of APNZ, in representing the collective voice of polytechnics throughout New Zealand. In responding to the questionnaire, Polytechnics have "spoken" in strong support of the organisation, thus bestowing a mandate for NACCQ to pursue its national ICT advisory role and to provide continued leadership.

Having been given this mandate the results of the survey identify several issues that the organisation may need to investigate, including:

- Incorporating internationally-recognised qualifications in the Blue Book Content
- Making the moderation process similar to those used by NZQA
- Increasing the marketing of NACCQ qualifications
- Profiling graduates, from an alumni of graduates, as a marketing tool
- Several projects suitable for immediate investigation and possible action as a result of further analysis of the responses include:
- Creating a degree moderation scheme (80% in support)
- Developing graduate diplomas (70% in support)

*"None of us can predict with any certainty where the industry will have moved in the next ten years, but it seems that the NACCQ is sufficiently adaptable to cope and continue to offer and invaluable service to the (ICT) industry and educational sectors that it services" (*Young and Joyce, 1998, P.12).

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