The ICT Journey from Diplomas to Degrees: The CPIT Staircasing Experience

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Abstract

The purpose of this paper is to explore aspects of the pathways from diploma level study in Information and Communication Technology (ICT) to degree level study in ICT. The aspects explored include the role that such pathways play for students who for a variety of reasons did not enter degree level study upon leaving the school education system and to evaluate their success rates when they transferred to degree level study mid way through their degree.

Over seventy (70 students) who have completed the Diploma in Information and Communications Technology Level 6 (DipICT L6) have transferred into the Bachelor of Information and Communication Technologies (BICT) at Christchurch Polytechnic Institute of Technology since 2002. These students are exempted from completing 180 credits of the 360 credits that are required for the BICT degree. This paper compares the success rates of these students in the BICT courses that they complete with the success rates of students who entered the BICT degree at year one and draws the conclusions that these students have success rates that are on a par with those of other students in the BICT degree and that the Staircasing arrangement that is in place is successful.

Keywords: pathways, staircasing, ICT, computing, education

1   Introduction

In 1995 Christchurch Polytechnic Institute of Technology (CPIT) introduced a Bachelor of Business Computing (BBComp) which was subsequently redocumented and renamed as the Bachelor of Information and Communication Technologies (BICT) in 2001.

Prior to offering the BBComp degree, CPIT had offered the Certificate in Business Computing (CBC), the Advanced Certificate in Business Computing (ACBC) and the National Diploma in Business Computing (NDBC) that were part of the National Advisory Committee in Computing Qualifications (NACCQ) family of qualifications. Following the introduction of the BBComp

degree, CPIT ceased offering the NDBC qualification, and in the years since, NACCQ has replaced the CBC with the Diploma in Information and Communications Technology Level 5 (DipICT L5) and has replaced with ACBC with the Diploma in Information and Communications Technology Level 6 (DipICT L6).

With the introduction of the BBComp and subsequently the BICT degree, staircasing arrangements were put in place to enable students to move smoothly from the NACCQ family of qualifications into the degree level qualifications. These staircasing arrangements have taken the form of students being exempted from courses in the degree(s) based on having completed one of the NACCQ qualifications and on the modules that had been completed as part of the qualification. In general a student who had completed the DipICT L5 would be exempted from 0.5 years of the degree, a student who had completed the DipICT L6 would be exempted from 1.5 years of the degree and a student who had completed the NDBC would be exempted from 2.5 years of the degree.

In the years since the introduction of the degree programmes at CPIT, many students have commenced their study in the NACCQ family of qualifications. This has been due to two factors. Firstly, the academic entry requirements for the DipICT L5 are slightly lower than they are for the degree programmes and secondly, many students who were not able to commit to three years of full time study found a one or two year diploma programme more attractive as an initial step. One of the outcomes of this has been a number of students entering the degree programme at the middle stages of the degree which has served to boost numbers in year two and year three courses. This is consistent with Corich (2001) where it was described that those institutions within the NACCQ sector that do not have the NACCQ programmes as feeder courses have their student numbers decline as they progress through the degree.

In Boyd (2006) a number of case studies are described of students who progressed on to degree level study having not initially planned to do so. In this study it highlighted the importance of having different pathways to degrees than the traditional three year approach, to enable staircasing through certificate and diploma programmes. This study highlighted the importance of such an approach in that it provided opportunities for students from socio-economic backgrounds who typically do not enter degree level study when they leave school to gain degree level qualifications. Other aspects of this study also

highlighted the importance of students being able to see that they can gain complete qualifications, with this having some parallels in students choosing to enter the NACCQ qualifications as opposed to entering degree programmes at year one.

2   The Staircase

In February 2004, the Tertiary Education Commission (TEC) decided on Pathways and Staircasing as a priority area for a strategic review. For the purposes of that review Pathways refers to the linking of qualifications within and between tertiary education providers, "to ensure that learners have access to flexible, transparent and clear learning paths." Staircasing, a subset of Pathways, refers to the "upward linking or progression of qualifications", and feature the "two important factors" of recognition of prior learning and credit transfer. (TEC, 2004)

The New Zealand Ministry of Education (2005) stated that the key to achieving improved outcomes for learners is likely to be in the early identification of the aspirations and barriers of each learner, and tailoring a coherent plan for "staircasing" them through one or more programmes [of study] that will raise their education and skill levels to the point that they are able to either obtain on-going employment or participate in further education. The Ministry went on to say that while there is evidence that "staircasing" is happening in some areas, it is far from universal – obviously implying that they believe it should be as extensive as possible.

While in New Zealand we refer to pathways between qualifications and institutions as "staircasing" it can often be more formally referred to as "articulation" – especially overseas. Queen's University in Belfast (2007) defines articulation as "a formal relationship between two linked programmes […] and the arrangements for articulation being negotiated through credit accumulation and transfer schemes or combined studies frameworks or are consciously designed for the purpose of linking programmes."

As with the New Zealand Ministry of Education, the Australian Department of Education, Science and Training (2005) believe that effective credit transfer and articulation is a key component in making lifelong learning a reality. They take it further and believe that articulation, or "staircasing", can also mean efficiencies in both time and money for students, institutions, and governments.

Figure 1 Pathways and Staircasing of qualifications at CPIT shows the flow of a student's progress through the various qualifications offered at CPIT. Which qualification a student enrols in usually depends upon the potential student's academic background, and therefore whether he/she meets the entry criteria, or that student's level of self-confidence or belief in his/her own ability to achieve, or perhaps an unwillingness to commit to three years of study at that stage in his/her life.

For whatever the reason a student enters or is taken into the DipICT L6 (and whatever pathway he/she may have taken

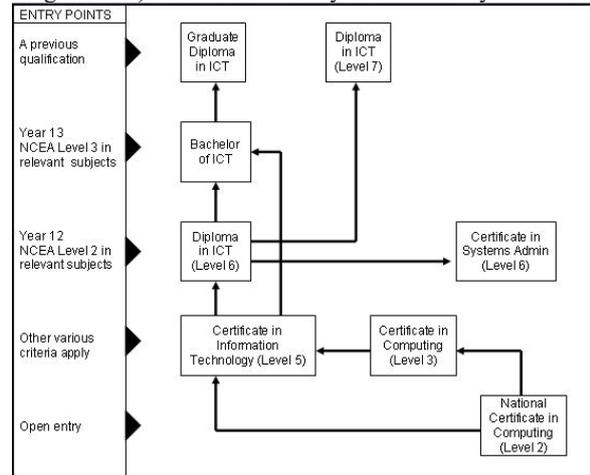to get there) he/she will study a common year in the

Fig 1 Pathways and Staircasing of qualifications at CPIT.

student's first year and then will specialise in either software development, web development/multimedia, and PC systems support. Upon completion of the DipICT, the student will then either choose or be encouraged to take up further study in the BICT degree programme.

At this point the student will discuss a personalised programme of study with the degree leader based on a semester catch-up period and then the third year of the BICT. The semester long catch-up period will consist of courses that are compulsory for the BICT where the equivalent courses were not taken within that student's DipICT L6. For example, the BICT requires each student to do a minimum of two different programming languages. Any DipICT student coming through either the web development/multimedia or PC systems support specialisations will normally have only completed one programming language. Again, BICT students are required to do database administration to level 6 whereas a number of DipICT L6 students will only have it to level 5.

CPIT have no prior claim to the principle of staircasing as many academic institutions make provision for it here in New Zealand. In fact, a literature search on the relevant keywords shows it to be not just an extensive phenomena here in this country, but also an almost exclusively a New Zealand phenomena. However, at CPIT almost every possible scenario can be accommodated as a starting point. From whatever the starting point, many students do go on to further study and gain higher level qualifications.

3   Methodology

After a literature search on the topic was done, the BICT degree leader selected a range of courses from the BICT on the basis of having been completed by at least 10 of the former DipICT L6 students (see Table 2). The DipICT Programme Leader then identified former DipICT L6 students now enrolled in those degree courses over the 2002 to 2006 designated timeline. Once identified, each student's academic record was accessed from CPIT's student record system, JASPER. Overall pass rates were then calculated and compared with all other BICT students

(see Table 1). Individual course pass rates were also compared between former DipICT L6 students and all other BICT students (see Table 2).

4 Results and Analysis

Table 1 shows the success rates across all students broken down into students who had transferred from DipICT L6 and all other BICT students, as well as showing the total across all students. This shows that the overall pass rates of the students who have transferred from DipICT L6, is only slightly lower that for the other students in the degree, with the difference being in significant, to the point where if one of the 3347 courses that were passed by the other students had been failed the overall pass rate would have been the same to 2 decimal points.

	Courses Attempted	Courses Passed	Overall Pass Rate
Students Transferring from DipICT L6	782	590	75.45%
All Other BICT Students	4435	3347	75.47%
All Students	5217	3937	75.46%

Table 1 – Success Rates across All Courses 2002-2006

With 782 of the 5217 courses being attempted being completed by students who have transferred from DipICT L6 this amounts to 15.0% of the BICT enrolments coming from this source, with this being shown in Figure 2. In CPIT (2007) it shows the equivalent full time staff teaching on the degree ranging from 7.25 to 8.69 over the years under review, with 15% of this amounting to between 1.1 and 1.3 equivalent full time staffing being provided by these enrolments.

The comparative data from Table 2, which is also reproduced in Figure 3, gave some interesting anomalies which will give rise to further action as outlined in the Recommendations section. The names of the courses are shown in Appendix A of this paper.
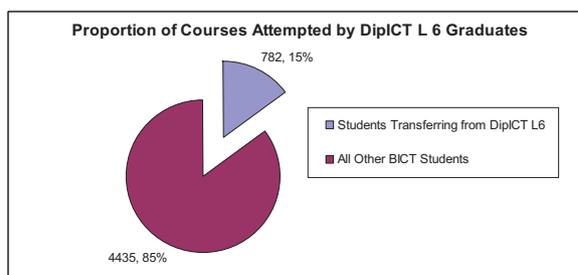

Figure 2 – Proportion of Courses Completed by DipICT L6 Graduates
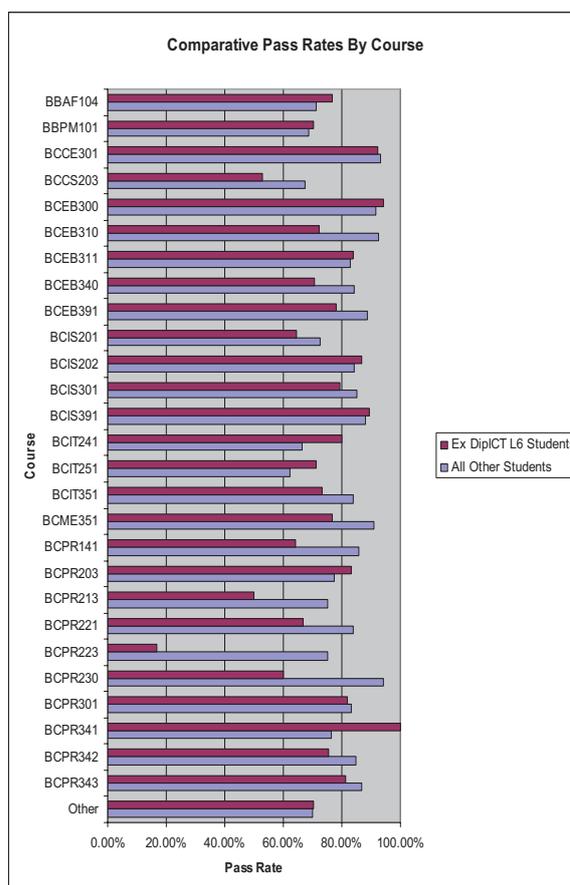
Figure 3 – Comparative Pass Rates by Course

Course	Former-DipICT L6 Attempting	Former-DipICT L6 Pass Rate	Others Attempting	Others Pass Rate	Difference
BCPR223	12	16.7%	93	75.3%	58.6%
BCPR230	10	60.0%	87	94.3%	34.3%
BCPR213	12	50.0%	136	75.0%	25.0%
BCPR141	14	64.3%	14	85.7%	21.4%
BCEB310	47	72.3%	109	92.7%	20.3%
BCPR221	12	66.7%	75	84.0%	17.3%

Table 3 – Courses Where Former DipICT L6 Students Have Pass Rate 15% Lower

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Course	Former-DipICT L6 Attempting	Former-DipICT L6 Pass Rate	Others Attempting	Others Pass Rate
BBAF104	13	76.9%	52	71.2%
BBPM101	37	70.3%	128	68.8%
BCCE301	38	92.1%	102	93.1%
BCCS203	17	52.9%	126	67.5%
BCEB300	53	94.3%	130	91.5%
BCEB310	47	72.3%	109	92.7%
BCEB311	25	84.0%	47	83.0%
BCEB340	24	70.8%	51	84.3%
BCEB391	41	78.0%	62	88.7%
BCIS201	48	64.6%	150	72.7%
BCIS202	30	86.7%	170	84.1%
BCIS301	63	79.4%	143	85.3%
BCIS391	19	89.5%	51	88.2%
BCIT241	10	80.0%	193	66.3%
BCIT251	14	71.4%	45	62.2%
BCIT351	15	73.3%	25	84.0%
BCME351	13	76.9%	22	90.9%
BCPR141	14	64.3%	14	85.7%
BCPR203	12	83.3%	177	77.4%
BCPR213	12	50.0%	136	75.0%
BCPR221	12	66.7%	75	84.0%
BCPR223	12	16.7%	93	75.3%
BCPR230	10	60.0%	87	94.3%
BCPR301	11	81.8%	66	83.3%
BCPR341	14	100.0%	38	76.3%
BCPR342	41	75.6%	66	84.8%
BCPR343	16	81.3%	38	86.8%
Other	121	70.2%	2039	70.1%
Total	782	75.4%	4435	75.5%

Table 2 – Number of Students and Overall Pass Rates By Course

As shown in Table 3, there are six courses where the former DipICT L6 students have a pass rate at least 15% lower than other BICT students. Of particular note is that four of the six courses are second year programming courses. For the two courses that are not second year programming courses (BCPR141 and BCEB310) the pass rates for the former DipICT L6 students is higher than 60%. For the four second year programming courses, there are two courses where the pass rate for former DipICT L6 students is lower than 60% with these being BCPR213 and BCPR223 which

are the Introduction to Programming in VB.net and Programming Best Practice in VB.net courses respectively.

With four of these six courses having pass rates of at least 60% for former DipICT L6 students these are not of significant concern when low pass and retention rates are examined, particularly in relation to potential changes to funding models for courses. However, special attention needs to be paid to the two courses covering VB.net to determine the reasons for this. Some initial investigation reveals some of the reason for the

very low pass rate in BCPR223 being related to students who had failed BCPR213 staying enrolled in BCPR223 for student loan/allowance/visa issues. If there had been alternative courses to transfer these students to, the pass rate for BCPR223 would have increased to 33.3%, which indicates there is still the need for further investigation into this. Aspects to be looked at include the amount of programming that these students had completed as part of their DipICT L6 and whether this is in fact preparing them sufficiently for these courses.

There was only one course where the pass rate of the former DipICT L6 students was more than 15% higher than the other BICT students with that course being BCPR341 where the former DipICT L6 students had a pass rate of 100% and the other BICT students had a pass rate of 76.3%. This course was a combination of XML and Javascript and was assessed only using assignments. Interestingly it was replaced by BCPR343 in 2005 which only covers XML, is more of a conceptual course and includes an exam. The pass rate for the former DipICT L6 students in this course was 81.3% with the pass rate for the other BICT students was 86.8%. This suggests that the more conceptual nature and presence of an exam in BCPR343 suits the other BICT students more than the former DipICT L6 students relative to BCPR341

5   Conclusions

While the students who staircased from DipICT L6 into BICT do not necessarily do any better than direct-entry students, they certainly do not markedly do any worse – in other words they hold their own. Having staircased into the degree they are now successful. The unanswered question here is whether they would have been as successful if they had not done the full two-year Level 6 diploma, but rather had entered the degree programme immediately upon gaining academic entry to the degree.

There appears to be a pattern in the second year programming courses where there is a more than 15% difference between the pass rates in the two groups of students. This may be due to the courses completed by the former DipICT L6 students not preparing students quite as well for these courses.

6   Recommendations

- The reasons for the lower pass rates of the DipICT L6 students in the second year programming courses should be investigated with a view to requiring the students to have complete more programming in their DipICT L6 prior to enrolling in them, with this particularly relating to the courses covering VB.net (BCPR213 and BCPR223).

- That the reasons for students choosing to enter DipICT instead of the BICT be investigated to determine whether it was academic background, lack of confidence or being unable to commit to three years of full time study at the outset

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Appendix A – Course Codes and Names

Course Code	Course Name
BBAF104	Accounting and Finance
BBPM101	Principle of Management
BCCE301	Cooperative Education Project
BCCS203	Data Communications and Networks
BCEB300	eBusiness Strategies
BCEB310	eMarketing: Online Themes
BCEB311	eMarketing: Implementation
BCEB340	Knowledge Management: Tools and Concepts
BCEB391	Current Issues in eCommerce
BCIS201	Alternative Modelling
BCIS202	Systems Implementation
BCIS301	Management of ICT
BCIS391	Contemporary Issues in ICT
BCIT241	Website Development
BCIT251	Multimedia Application Development
BCIT351	Multimedia Application Development Management
BCME351	Communications Engineering
BCPR141	Object Oriented Software Development
BCPR203	Database Management Systems
BCPR213	Introduction to Programming in VB.net
BCPR221	Programming Best Practice in JADE
BCPR223	Programming Best Practice in VB.net
BCPR230	Software Engineering 2
BCPR301	Advanced Programming
BCPR341	Client Side Programming
BCPR342	Server Side Programming
BCPR343	XML Data Management