Graduate Diploma: An Effective Route into a Computing Career?

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An investigation has been undertaken to determine how students completing a Graduate Diploma in Applied Computing from Lincoln University fare in the job market. The students involved in the study were those who entered the graduate diploma with little computing background. Twenty eight recent graduate diploma students, mostly of mature age, were interviewed. Their reasons for re-entering education, and their subsequent experiences in studying and undertaking new employment were investigated. Nearly all chose to return to study to facilitate a change either in career direction or to improve their employment prospects. Although many achieved higher grades than they were expecting, about half reported some problems while studying with getting started, grasping concepts or managing the workload. Almost all are now in paid employment, although not necessarily in I.T. related fields. Some perceived that their age or inadequate English were an impediment to getting employment in I.T. while others felt there were no barriers. No one had experienced serious gender related problems either when studying or in the workplace.

Keywords

Computing education, graduate diplomas, mature age students, cultural and gender influences, I.T. careers

1. INTRODUCTION

Graduate diplomas are now common in tertiary institutions in New Zealand. The Graduate Diploma in Applied Computing (Grad.Dip.Appl.Comp.) at Lincoln University was introduced in 1999 to provide a route into a computing career for people who already had a degree in some other discipline. We were aware that there were a number of students already in our degree classes for whom this would be an attractive option. These included some students of mature age (defined as 25 or older) and some highly qualified recent immigrants who have been unable to get suitable employment in New Zealand. We were also aware of others who were looking for a career change, e.g. caregivers wanting to re- enter the workforce or bored or redundant lab technicians or accountants. The diploma has attracted about 20 students each year.

The Graduate Diploma in Applied Computing requires students to complete eight papers. These must include at least four of the seven 300 level computing subjects available, with the remainder being any 200 or 300 level subjects. Students can study part-time. It is possible to take out a Graduate Certificate after one semester (four papers) but few students take this option as such a short course does not provide much depth or breadth.

The graduate diploma students fall into two broad groups: those who have had some recent computing experience and those who may have little or no computing background. The weaker background students usually study an introductory computer programming paper (COMP102) as one of their eight papers. Those who study COMP102 inevitably end up with a weaker qualification than those with sufficient background to start with 200 or 300 level programming subjects.

It was decided to do a follow-up study of those recent graduate diploma students who included COMP102 in their programmes. We thought it interesting to see how these students, with little or no computing background, succeeded academically and how well their graduate qualifications prepared them for the workplace. In the next section we investigate how these students achieved academically compared with their whole classes. In a later section we present the results of interviews which enquired about their experiences as students and later in the workplace.

2. SUBJECTS

The subjects of this study are the graduate students who were enrolled in COMP102 in the years 1999 to 2001. This time frame was chosen so that the participants would be likely to have completed their qualifi-

Students from 1999 to 2001

	Female	Males	Total Number
	(Percentages are of the top row totals)		
Total number	124	227	351
Median age when studying COMP102	23	22	22
Median mark in COMP102	61	62	61
Graduate diploma/certificate students	24 (19%)	32 (14%)	56 (16%)
Median age of graduate students	36	35	35
Median mark of graduate students	81	81	81

Table 2: Study Outcomes for the Graduate Students from Comp102

	Number
Completed or very nearly completed a Grad.Dip.Appl.Comp.	33
Completed a Grad.Cert.Appl.Comp.	7
Completed a B.Appl.Comp. degree	5
Stopped with an incomplete diploma	9
Withdrew early in course	3

cations and re-entered the workforce. The people interviewed were those who had also:

■ received a passing grade in COMP102

■ completed (or very nearly completed) a graduate diploma or certificate

■ not gone on to postgraduate study at Lincoln University.

Table 1 gives statistics for COMP102 students from 1999 to 2001. For comparison purposes statistics are given for all the students in the classes as well as for the graduate students. The median ages and marks for males and females are indistinguishable in all categories. A larger proportion (43%) of graduate students were women compared with the classes as a whole (35%). With a median age of 35 the graduate students were surprisingly old. Their very much higher median mark compared with all students was expected. Success in COMP102, over a number of years, has been modelled using regression techniques (McLennan *et al.*, 1999), (McLennan *et al.*, 2000) and neural networks (Li *et al.*, 2002). The most significant factors in all these studies have been that older students are more likely to do well and that gender has no bearing on success.

Table 2 shows the study outcomes for the 56 graduate students. Because one student, who went on a study exchange, completed both a diploma and a degree the total number of study outcomes is 57. The first category includes three people who still need one more subject to complete their diplomas. (All have good jobs and are showing no inclination to finish!) The students who completed a degree initially regis-

tered for a diploma. These people have not been excluded from the study.

Approximately 80% of the graduate students have essentially completed a computing qualification. Four subsequently went on to further postgraduate study at Lincoln. These people and the 12 who either withdrew early or gave up part way through their qualifications were not interviewed. Therefore there are 40 people (six with graduate certificates) who met all the criteria given at the start of this section.

3. INTERVIEWS

It was decided to ask the graduate students, who met all the criteria above, open-ended questions in three broad areas:

■ reasons for returning to study for the graduate diploma at Lincoln University

■ experiences while studying

■ current and future employment.

Participants were also encouraged to make comments on other issues as well.

Initial contacts were made by email or phone. The purpose of the study was explained, and if they were prepared to participate, people were asked to choose between phone or email interviews. Not one of the 30 people successfully contacted refused but two have not yet returned their emailed surveys. At present we do not have contact details for the other 10 people. The results for the 28 people interviewed are summarised below with the first two areas combined into one section. The full results are available from http://www.lincoln.ac.nz/amac/profiles/mclennan.htm.

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3.1 Returning to Study and Experiences while Studying

Seven people were Lincoln graduates changing study direction. All but one of the remaining 21 came to Lincoln specifically to study for the Grad.Dip.Appl.Comp. Nearly everyone studied for employment related reasons. A number made comments about wanting to change career direction. For example there were two accountants who wanted to move into developing business applications. Others, particularly but not exclusively recent immigrants, wanted to better their employment prospects. There were eleven people, recently arrived from China, India and the former Yugoslavia, who had English as a second language. Typically they thought they were more likely to get a good job if they had a N.Z. qualification. They also thought I.T. offered better prospects than their original fields (all science or engineering). Some were already highly qualified with three having Ph.D.s from Australasian universities.

The most common reason given for choosing Lincoln University was that there was a suitable one-year programme. Some moved to N.Z. or Christchurch specifically to study for the graduate diploma. The small size of Lincoln University (about 3500 students), its rural location and reputation for being friendly, were other factors influencing this choice. Several people reported that when they made enquiries the staff were very helpful. Friends, family and work acquaintances were also very influential. About half said they got their first information from these sources. Others responded to a newspaper or T.V. advertisement. Several said they knew of Lincoln and rang up to get information. Surprisingly, only three people had searched the web for suitable programmes.

Most participants recalled low points while studying. Over half mentioned a high workload or difficulties adapting to the learning style needed. For example, one student said there was a lot of rote learning in her previous degree (B.Med.Lab.Sci.) and it took time to realise that a problem solving approach was required for computing. Several others, who were ultimately very successful, also described problems with getting started. In contrast, one of the younger students with an arts background, found it easy to learn the basics even though he didn't enjoy returning to large classes. This was interesting as he also said that at his previous university he had dropped out of a first year computer science paper because he felt isolated.

Some thought group work was particularly challenging. Altogether, working in a group was mentioned by seven different people: sometimes negatively; sometimes positively; and sometimes both! Several people specifically referred to the pleasure of working with other mature age students or with other people from the same culture. One person volunteered that it was "Great to discover that there were lots of other mature age students. It felt like it was 1/3 mature, 1/3 foreign, 1/3 young," (these thirds actually overlapped). This interesting remark supports the notion of "normality" (Byrne, 1993). When a minority (whether by gender, age, ethnicity, etc) makes up at least 1/3 of a group, its members are likely to feel comfortable.

Of those interviewed 26 had either completed or nearly completed a diploma and the other two certificates. More than half said that they did better or much better than they expected but five people said how disappointed they were to get a low (by their standards) grade or grades. One student, who eventually got an A- in the subject, referred to how she felt when she failed a test for the first time ever. Only two said they would have got better marks had their English been better. Several specifically mentioned personal health or family issues as interfering with their studies. For example, one part-time student had her third child at the start of her final semester and her culture prevented her from leaving the house for one month.

3.2 Current and Future Employment

The majority were in permanent employment when interviewed. Four had short-term contracts and one person was working as a volunteer. Another, who was a new mother, was just starting to look for paid work. Most still worked for the firm they went to on leaving Lincoln. Two had already moved from computing jobs to higher paying positions in other areas.

Half the graduates were employed locally in software development jobs that ranged from designing and building or testing embedded systems through to developing database applications to be deployed over the web. These people had in general obtained better grades and studied more 300 level papers than the rest. Five others worked in I.T. positions in education and support roles.

Seven other people were working in areas that were not primarily in computing, though most used some of their newly acquired computing knowledge. Two of the three with Ph.D.s had set up their own education

consultancy together. Both thought that they didn't really have enough experience to get a well paid computing job. Another person, with an overseas engineering background, was now a compliance engineer in the same firm where she had previously worked on the assembly line. Even though her job was not directly in I.T., she attributed this promotion to her now having an up-to-date, N.Z. qualification.

No one reported having serious gender related issues at work. Two mothers of small children volunteered that their employers were "very family friendly". Both were software engineers with different large firms that had fewer than 10% female employees.

When it came to why they got their jobs, many people thought that it was a combination of their previous work history and having an I.T. qualification. Several mentioned their maturity was definitely a positive factor. These views are supported by Bland (2003) in her short article "What makes the perfect I.T. graduate?" She reports that employers regard problem solving ability, maturity and good communication skills as crucial characteristics.

When asked about impediments to getting a job there were quite mixed responses. About a third thought that there were no impediments at all. Five thought their ages, perhaps combined with their higher salary expectations, were an issue. Other impediments were lack of confidence (three responses) and limited English (four responses). One of the two not in paid employment gave both these reasons. She also thought her grades, age, culture and the "dull" job market were other reasons. It may also be a factor that she had only completed a graduate certificate. The youngest interviewed had poorer grades than most. He had been to 20 interviews before securing a job. He thought his lack of experience was his major problem. A couple of others mentioned the poor job market as being a problem.

4. CONCLUSIONS

Almost all those interviewed had returned to study to enhance their career prospects. They studied the graduate diploma to provide a route into an I.T. career. Some found studying computing difficult but most were pleased with their overall results. Several thought they hadn't acquired sufficient computing expertise to get sufficiently well paid positions. Three others, having got good I.T. jobs, did not see the need to complete their diplomas. This suggests that they valued the qualification more for providing a route into I.T. than for its value on a C.V.

Two thirds were working in I.T. positions often alongside younger people with conventional computing degrees. Not all had sought I.T. positions and almost all were suitably employed. Few were actively job seeking and opinions varied but some thought their age or salary expectations worked against them in the job market. A minority also thought their lack of confidence or limited English were problems.

Most people considered they were using at least some of their recently acquired computing knowledge in their jobs. For most people interviewed the outcome has been good and they are now suitably employed. This is especially encouraging given that these were people who came into the programme without a strong computing background.

Care needs to be taken when drawing conclusions given the small number of participants. The majority have been employed locally where the Lincoln Grad.Dip.Appl.Comp. has been marketed to employers. Furthermore, most of those interviewed obtained positions before the downturn in the local I.T. job market.

ACKNOWLEDGEMENTS

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