

OTAGONET ICT AMBASSADORS PROGRAMME: DISSOLVING DISPARITY AND DISTANCE

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Abstract

The delivery of Information and Communication Technology (ICT) programmes in high schools, and the recruitment of school leavers to tertiary Information Technology (IT) programmes are especially critical issues for New Zealand, with its small population base, and comparatively large rural community.

Many schools find it difficult to provide and staff innovative and challenging ICT programmes. Students are often unaware of the extent and variation in the field of IT and that IT is primarily a creative problem solving exercise. Students are often uninformed of the range of IT programmes offered by tertiary providers or the potential variety of positions that are available in the IT industry. These issues are exacerbated in rural school communities.

All tertiary IT providers report falling rolls, and recognise the need to attract more school leavers into our programmes.

This paper outlines and reviews a six-day holiday course run in 2005 by Otago Polytechnic for ICT-talented secondary school students from rural Otago and Southland schools. The approach presented increases the interactions and connections between schools and tertiary providers to their mutual benefit.

Keywords: Computing education, tertiary, high school, outreach programmes.

1 Introduction

Tertiary providers have long used “outreach” programmes for secondary school students to promote their institutions and recruit more students into their programmes. Murphy, Richards, VanDeGrift and Wilson (2005), described a range of programmes which targeted

special interest groups such as students with disabilities, bright but disadvantaged inner-city students, girls, and home schooled students. Fox, Newell and Frank (2004) were motivated by a desire to “give something back to the community”. Their program resulted in increased exposure and improved reputation of their university in the community and opportunities to recruit quality students. They discussed other outreach activities such as running conferences and competitions, and point out the advantages of running a camp, where students are brought into the tertiary institution, and the students are exposed to the available resources and become familiar with the tertiary environment. Sabin, Higgs, Riabov and Moriera (2004), looked specifically at avenues for delivering computer science courses to school students. They maintain that “an early start in studying computer science belongs in the high school for those who might associate their professional future in computer science.” They also hoped that by offering a holiday programme, they would increase student numbers in their Computer Science degree. Pollock, McCoy, Carberry, Hundigopal and You (2004) describe their summer course aimed at attracting more female students to major in Computer Science. They sought to raise the self confidence and awareness of female students. The key features of the summer programme was a focus on web programming, and the use of cooperative learning, group work, and hands-on experiences. They promoted positive, female role models in their choice of teaching assistants and visiting speakers. Information leading to education and careers in Computer Science were provided. The high school students were encouraged to meet undergraduate and graduate students informally with the prospect of forming networks for support and mentoring.

While the motivation is distinct in each of these courses, the format is remarkably similar: to provide fun, positive experience of IT, to provide hands-on activities that captivate and challenge, to provide empowering role models to interact with the school students, and to encourage these students to consider IT as an area of tertiary study and as a potential career.

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2 An issue for New Zealand schools

New Zealand schools find it difficult to provide innovative and challenging programmes in Information and Communication Technology. Few schools offer more than application based programmes. There is a disparity between the ICT that students will need for the world they will live in and the ability of schools to provide such instruction.

The ICT Taskforce Report (New Zealand Trade and Enterprise, 2003) proposed that New Zealand needed to be “a world leader at using information and technology to realise our economic, social and cultural goals”. This would be shown by the ICT sector “at least doubling the ICT sector’s importance to the economy over the next 10 years”. The New Zealand Government released its Digital Strategy, in 2005, to encourage the increasing use of ICT throughout New Zealand.

The FIT NZ (Fluency in IT New Zealand) project was commissioned to establish a programme to develop a framework of ICT programmes in schools for years 11-13 secondary students and pathways to their employment in ICT. The Project Overview (J. Speight, personal communication, September 16, 2005) states that “there is currently no year 11-13 ICT Curriculum...New Zealand does not support an ITO for Information Technology or Telecommunications. Secondary and tertiary ICT educators and the ICT industry have no framework for consultation and the lack of understanding and communication around ICT as an educational or career option is leading to misperceptions by both community and industry.”

The Ministry of Education and The HiGrowth Project Trust (S. Mann, personal communication, February 14, 2006) have issued a Request for Proposal to construct an ICT framework for “programmes of work” for a Years 11-13 Information and Communications Technology for use in New Zealand schools. The focus is on electronics, software and telecommunications.

The position and significance of ICT in the New Zealand senior secondary curriculum is confusing. ICT can be taught and assessed either by units within or outside the Technology curriculum. The Post Primary Teacher Association (2005) recommended in their “Advice to the New Government” paper that “ICT to be developed as a stand alone curriculum at years 11-13 (and not be subsumed in technology).”

The assessment of ICT as a subject area in the senior school is also an anomaly. The Computing Unit Standards provide a narrow assessment schedule for Information Technology, with an emphasis on computer literacy rather than technical skills and concepts. The Generic Computing domain is the only computing domain that is included on the Approved List to be counted towards the University Entrance qualification. Computing is also regarded as a Conventional subject and cannot be resourced using STAR (Secondary Tertiary Alignment Resource) funding. Schools are therefore

unable to purchase expertise to teach ICT from tertiary providers.

These issues are exacerbated in rural areas. Many rural schools find it difficult to provide the students or staff needed for an effective ICT programme at senior levels.

3 Issues for tertiary providers

Tertiary providers of IT programmes have suffered, since 2000, from falling rolls (Roddick and Nieuwenhuis 2001). There are few female and non-pakeha students (Varma 2006, Besana and Dettori 2004, West and Ross 2002). School leavers are an easily identifiable and accessible market for tertiary providers to target when recruiting students.

The delivery of IT in high schools and the recruitment of school leavers to tertiary IT programmes are especially critical issues for New Zealand, with its small population base, and comparatively large rural community.

4 A positive ICT experience for rural students

A positive ICT experience for rural students was proposed by Alan Jackson and Howard Baldwin of OtagoNet utilising the resources of Otago Polytechnic.

OtagoNet is a large and extensive eLearning collaborative community, and is cited in the New Zealand Government’s Digital Strategy (2005, p.28) as an example of best practice. It includes eleven rural and provincial schools: Mt Aspiring, Cromwell, Dunstan, Roxburgh, Lawrence, The Catlins, Blue Mountain, South Otago, Tokomairiro, East Otago and Maniototo. The eSchool has 26 weekly scheduled classes using the School Zone video conference link (VC) and approximately 200 enrolled eStudents (OtagoNet, n.d.)

Otago Polytechnic, in Dunedin, New Zealand, provides tertiary degree and certificates IT programmes. The Department of Information Technology was keen to work directly with schools in its immediate area, and particularly with OtagoNet.

In February 2005, OtagoNet asked Otago Polytechnic to design a six-day residential holiday course to encourage a small group of ICT talented students to undertake advanced training, gaining NCEA credits as well as a high degree of intellectual and social satisfaction. It was planned that when the students returned to their schools, they would share those skills with the staff. During the year, each student would work with, not for, up to three teachers on some aspect of ICT: for example, movie making, web design, or publishing. In this way, both the school and the students would benefit from the experience.

It was suggested that the course was modelled on the TechAngel concept, where students at Wellington Girls’

High provide ICT support for staff, assist with the upkeep of the school's servers, and assist in community IT projects and to speak of the TechAngel experience at conferences. In return, Tech Angels are given specialist IT training (Wellington Girls' High School, 2004).

After considerable discussion, it was agreed that the OtagoNet ICT Ambassadors course should be tailored to meet the needs of the OtagoNet students and to maximise the opportunities that Otago Polytechnic could provide.

4.1 Course organisation

The ICT Ambassadors course was conducted as two holiday courses, the first for four days in the April holidays and the second for two days in the July holidays. Students were accommodated at a local secondary school's boarding hostel.

The Otago Polytechnic provided the course content, teaching staff, organised the hostel accommodation and some of the evening activities. OtagoNet provided all communication with schools and students. The supervision and pastoral care of the students was the responsibility of OtagoNet. One teacher was delegated at each course to take responsibility for all matters concerning the supervision, attendance and welfare of students. A group of OtagoNet teachers supervised the evening activities and hostel accommodation.

The schools selected the 22 Years 9 – 13 students based on a flier that was sent to the schools. There was a wide range of ages, interests, and expectations of the course.

The Otago Polytechnic Marketing Department was invited to be involved in the design of the course. Students would be treated as tertiary students during the course, we would be careful not to patronise them: they were our honoured guests. Students were given an information pack, name badge, T-shirt, a USB pen drive to store their work on, and a Polytechnic certificate at the completion of the course. The students were taken on a tour of the most interesting and pertinent departments at the Polytechnic.

Some evening activities were provided and organised by the Polytechnic, including movies, 10 pin bowling and Laser Strike.

4.2 Course content and assessment

The objectives of the course were:

- To provide training in exciting and challenging areas of IT,
- To provide opportunity for students to gain NCEA Unit Standard credits,
- To encourage students to interact socially,
- To encourage students, on their return to school, to share their new skills with the staff.

The students were divided into two groups of eleven students. Each class was held for 1.5 – 2 hours, longer

than students were used to in school, but more appropriate for the course content and a tertiary standard. In the April course, students learned about web design, robotics and computer networking. They were taken on industry visits to see commercial robotics development at Scott Technology, large network administration at Otago Polytechnic and a local IT start-up company at Braeside Informatics. They toured Otago Polytechnic and were given a presentation on Games Programming. In the July course, students were given opportunities to complete their three assessments. They were required to demonstrate individually programming their robots, present the details of their school network and produce an OtagoNet website. They also visited the web design office at Otago University.

The programmes for the two courses are included in the Appendix.

The programme allowed assessment to three Level 3 Generic Computing Unit Standards. As the students were the most talented from their school, they were expected to learn at a very rapid rate and to cover a half term's normal school subject work in less than half a week of intensive application.

The Unit Standard assessments used were:

- 18737 Create a web site for organisation use
- 5967 Create a computer controlled robot using a kitset
- 5969 Investigate the use of telecommunications in an organisation

The teaching staff for the ICT Ambassadors course included a Lecturer and senior students from the Department. The senior students were experienced peer tutors and STAR tutors, and were chosen to provide positive role models for the secondary students.

5 Analysis

The course was designed for 25 students, with 22 attending the April course from 10 contributing schools. Only eleven attended the second course in July 2005. There appear to be a number of reasons, including pre-scheduled family holidays and sporting commitments. Without the complete original group, and given the amount of time that needed to be spent on assessment to complete the unit standards, it was difficult to re-establish the excitement of the first course.

The supporting teachers were keen to be involved not only in the evening supervision, but to attend the classes as well. They commented that they enjoyed observing the students in their learning, were keen to work with the students on their return to school and to develop robotics, networking and web design into their existing ICT courses.

There was a warm camaraderie between the students, teachers and tutors where all enjoyed the experience of

learning together. The tutors were invited by the students to join the evening activities.

The evaluations were positive about the learning and social aspects of the course, for example: "Good course, great people, worthwhile", "I had a great time and learnt heaps", "a great course, good kids, great week". Their criticisms were often complimentary to the course, for example "to have a longer week, "more time on web design" and "advancement on robots".

5.1 Analysis of the course objectives:

- **To provide training in exciting and challenging areas of IT**

The three areas chosen: networking, web design and robotics were topical and there were appropriate unit standards available at Level 3. We were not able to accommodate individual interests such as film editing, or to address the need to provide skills needed for each individual school.

- **To provide opportunity for students to gain NCEA Unit Standard credits**

It was most ambitious to provide the three unit standards at Level 3. We were assuming that the students were exceptionally able and experienced in ICT and would be coming with a great deal of independently acquired knowledge. Many, especially the younger students, were not motivated by the Unit Standards as shown by the attendance at the second course. The level of documentation required by the Unit Standards was also a deterrent to some.

There were a total of 16 credits for the three unit standards. Sixteen credits is almost a full year's work for a Year 13 subject. A substantial amount of independent and quality work between the two courses was needed to achieve the required standards. Only 4 students achieved all three unit standards, which undoubtedly reflected the level of difficulty in the tasks. Clearly it was an ambitious undertaking to get these students through three Level 3 Unit Standards in such a short time span.

Schools expect their students to pass the Unit Standards offered. While this was not the essential or only ingredient of this course, one school gauged the success of the course on this one factor.

- **To encourage students to interact socially**

The students enjoyed the many opportunities for social interaction during the day and evening activities. The group melded easily and positively.

- **To encourage students, on their return to school, to share their new skills with the staff**

There was a vast variation in the amount of support offered to students, on their return, to complete the

networking assignment. Where schools were actively involved, students were able to apply their knowledge in practical and useful ways. A system needed to be set up to ensure all students could to share their new skills with the staff.

5.2 Unexpected developments

The OtagoNet teachers were keen to continue their learning experiences, and an opportunity was given to attend courses within the Otago Polytechnic Computer Technician Certificate by distance delivery. These courses were aligned to the CompTIA A+ technician's certificate. In Semester 2 2005, 26 adults associated with OtagoNet enrolled in the Operating Systems course, with most continuing their studies in 2006 with the PC & Printer Hardware course.

On the basis of the established relationship, OtagoNet has asked Otago Polytechnic to provide a Year 13 Computing course using the School Zone VC Link during 2006. This course focuses on electronic logic, microcontrollers, and operating systems.

5.3 Planning for the 2006 ICT Ambassadors course

Overall, the 2005 ICT Ambassadors was judged a success and will run again in 2006. After consideration of the student and teacher evaluations, and personal reflection on the course, there are number of aspects that need to be reworked:

- The course will run for three days in each of the April and July school holidays. Releasing students from school during term time is impossible.
- There will be less emphasis on unit standards.
- There should be more emphasis on hardware components and computer support.
- Schools need to be more involved in supporting and using their students when they return to their schools.
- The July course needs to have new, challenging and exciting modules, rather than purely completing assessment tasks.

There is a continuing need to make the objectives of this course clear and apparent to all stakeholders, so that misunderstandings do not occur, that we target the appropriate students and that students are up-skilled and valuable when they return to their schools.

6 Conclusion

The ICT Ambassadors course is notably different from those documented in the literature. It arose from the needs of rural OtagoNet students, and not as a marketing exercise from the Otago Polytechnic. However, the considerable benefits to Otago Polytechnic in terms of potential recruitments were always obvious and

appreciated. OtagoNet made the initial contact and chose the direction of the course, which was then developed cooperatively. The strength of the course was the enthusiastic embracing of the many and varied opportunities by all participants. This venture shows the power of a collaborative partnership where the need to provide for the mutual benefit of all is acknowledged, recognised, actively encouraged. Its success is due to the personal relationships established at every level, and primarily in making the students feel special.

The ICT Ambassadors course provides opportunities to meet the needs of students, schools and the tertiary provider. It provided interesting yet challenging IT experiences, skills that could be transferred to their school environments, and the opportunity to showcase IT at Otago Polytechnic.

It is a course that will need to evolve and to develop in order to capitalise on the many and varied opportunities that it presents.

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