

Increasing the Participation of Indigenous Australians in the Information Technology Industries

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ABSTRACT

Indigenous Australian people continue to experience chronic disadvantage relative to the living standards and well-being of non-Indigenous Australians. Despite the increased availability of education to Aboriginal Australians, their participation in Information Technology programmes is very low, as is their awareness of the options available in the Information and Communications industries. In this paper we report our findings and recommendations from a project designed to investigate how to increase the participation of Indigenous Australians in Information Technology courses. We sought out existing examples of successful Indigenous education initiatives and considered how appropriately situated variations could be developed within an Information Technology Faculty. We have learned that successful initiatives to improve the lives of Indigenous Australians depend on the active participation of Indigenous people. The insights from Participatory Design practices, including the tools and techniques for involving participants in the design process, whatever is being designed, will continue to inform the evolution of this project.

Keywords

Access and equity issues, Indigenous participation, Education and training, ethics and social justice

INTRODUCTION

Very few Indigenous Australian students are enrolled in Information and Communications Technology (ICT) courses or are working in the ICT industry. Out of the 8,000 Indigenous students participating in tertiary studies in

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Australia, during 2000, only 107 are enrolled in computer science programmes [6]. Most of these students are studying at technical institutes with very few enrolments in universities.

The University of Technology, Sydney (UTS) has made a major commitment to the process of Reconciliation between Indigenous and non-Indigenous Australians. It was among the earliest Australian institutions to make a formal commitment to the Reconciliation process, committing to the *UTS Reconciliation Statement* in 1999 [8]. This statement recognises the centrality of education to the Reconciliation process and commits the university to 'ensuring that Indigenous participation in the higher education system is increased across all levels and all areas'. The project reported here is an investigative project, initiated by the Faculty of Information Technology (IT) and designed to find ways to increase the participation of Indigenous students in the Faculty's courses.

We report on the project here for a number of reasons. However, there are two particular points of relevance for the Participatory Design Community. The first is that there is a long history of initiatives aimed to improve different aspects of the lives of Indigenous Australians that have failed miserably, often at enormous cost to Indigenous people. A major reason for this failure, now widely acknowledged, is that there has been little participation of Indigenous people in the design and implementation of policies and processes that directly affect them. Successful policies and processes are notable for their participatory commitments where Indigenous people define their own problems and their own solutions to them. Historically, it is clear that the integration of information and communications technologies into Indigenous communities and enterprises will benefit from the use of Participatory Design techniques and approaches.

The second point of relevance is that, at the present time, the participation of Indigenous people in any kind of relationship involving those who design ICT and those who

use it will be constrained by the scarcity of Indigenous IT professionals. Users may increasingly be Indigenous Australians, but designers will, almost always, be non-Indigenous. This current project, therefore, is situated in some prior historical space to traditional Participatory Design projects, but we are relying on the insights from the field to shape how we proceed. It is a project aimed at the participatory design of access and participation of Indigenous Australians in IT. This report includes some discussion of the background and scope of the project, our findings to date and our plans for future work.

SOME BACKGROUND

Indigenous Australian people continue to experience chronic disadvantage relative to the living standards and well-being of non-Indigenous Australians. Over the last twenty years education has been increasingly accessible to Aboriginal Australians and has been a key initiative in reversing disadvantage. Higher education has also played an important role in providing education and training that is responsive to Indigenous community needs and aspirations. This has been achieved through the provision of culturally appropriate support and academic assistance and the development of academic programmes that are inclusive of Indigenous Australian perspectives and needs. However, continuing educational inequalities prevail.

The experience of Indigenous people in education is very different to that of non-Indigenous people. Non-Indigenous students are much more likely to have completed secondary education, while Indigenous students are more likely to have no formal qualifications at all. Indigenous students are much more likely to be admitted to higher education on the basis of special entry schemes or institutional assessments and less likely to be admitted on the basis of past higher education or school education. The lack of pre-requisite knowledge needed for success in university has been identified as a key factor affecting the performance of Indigenous people in higher education [2].

Moreover, after nine years of steady growth, the number of Indigenous students at Australian Universities is dropping. In 2000 there was a drop of fifteen percent in the number of commencing students [7]. The decrease in numbers effected full and part-time students, internal and external students, all age groups, all levels of study and all fields of study, except agriculture and architecture that had only 10 students nationally when the data was compiled [3]. There is no category in this report for students in IT programmes. Changes in the criteria for financial support for Indigenous students, introduced in 2000, are blamed for the decline in commencements that year. But enrolments have been slowing since 1997, coupled with declining rates of success and participation in school education. Anecdotal evidence suggests that there may be other factors in this decline, including early disengagement by Indigenous high school

students. Yet there is a significant increase in the numbers of Indigenous people of school and university age; 40 percent of Indigenous people are under the age of 15 compared with 20 percent of non-Indigenous Australians.

Many Australian universities have a department or centre that is dedicated to attracting and supporting Indigenous students. Jumbunna was launched as the *Indigenous House of Learning* (IHL) at UTS in 2001. It has grown from an Aboriginal student support centre, first established in 1986, to become one of the most successful academic, research and support centres in the country with approximately 350 Indigenous Australian under-graduate and post-graduate students studying throughout UTS.

Indigenous support units were developed in recognition of the importance of education in bringing about self-determination for Indigenous peoples and to counter prevailing cycles of poverty, including contributing factors such as unemployment, health and welfare dependency. Past government policies of exclusion from accessing education and inappropriate and sub-standard education provision as well as many other interrelated issues have created cross-generational poor educational experiences. These include broken and / or limited attainment of formal education. Educational outcomes at the school level have been slow to improve and to accommodate Indigenous learning perspectives and experiences.

While UTS now has a number of well-established and successful programmes to promote the participation of Indigenous students in higher education, these programmes have, to date, focused on areas of immediate need to Aboriginal communities such as law, education and nursing. There is a clear need, both in response to changing demographics in the Aboriginal community and for reasons of ethics and social justice, to expand and facilitate access and participation of Aboriginal people across all academic disciplines and to encourage increased Indigenous participation in the full range of professional training available to other Australians.

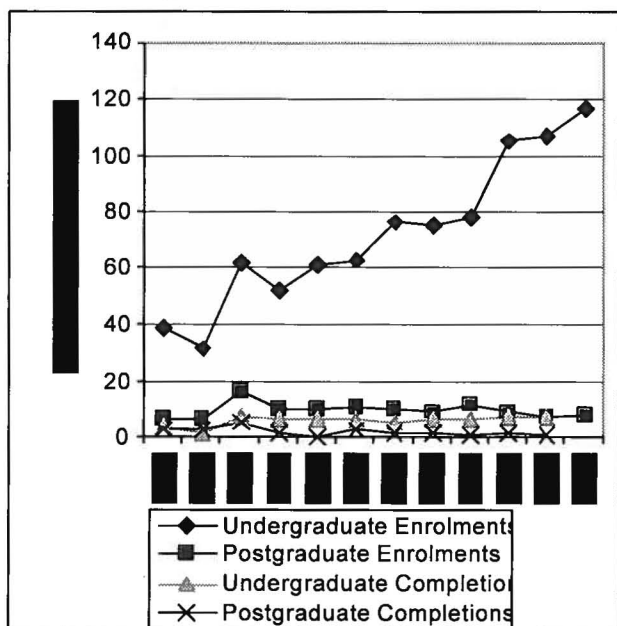
In September 2001, during the development time for this project, the Federal Department of Immigration and Multicultural Affairs (DIMA), the Aboriginal and Torres Strait Islander Commission (ATSIC) and the Australian Information Industry Association (AIIA) announced a joint initiative to increase the participation of Indigenous Australians in the ICT industry. The initiative involves programmes and strategies to improve education, employment and business development outcomes for Indigenous Australians [4]. At the launch of the initiative, Geoff Clark, Chairman of ATSIC, noted that the tiny number of Indigenous students already in IT courses carry a great responsibility:

They are pathfinders, but they carry a double burden.
They are role models for their communities but they

also need to break through barriers to the employment of Indigenous people in IT industries. Their efforts will lay the foundations for future careers. It is our task to ensure these young people - and their younger brothers and sisters inspired by them, have the freedom to choose careers in the IT sector. It is up to us to ensure that they are not unfairly excluded from their choice of career because of institutionalised poverty, racism or denial of culture [1].

Despite a growing commitment from parts of the ICT industry to social responsibility issues, particularly the needs of Indigenous Australians, despite a growing number of organisations providing cadetships for Indigenous trainees and despite a genuine interest and commitment from the Faculty of IT to increase the participation of Indigenous students in our programmes few Indigenous people are entering IT programmes either here or elsewhere. Moreover, as shown in Figure 1. (below) those who do are not completing their courses. The unacceptable completion figures indicated in Figure 1. are another confirmation of the prevailing wisdom that Indigenous students are most successful when they are in learning environments that are culturally affirming and incorporate Indigenous perspectives. These figures also demonstrate the need for programmes that both attract students to IT courses and then, most importantly, provide the support required to enable these students to complete their courses.

Figure 1. Indigenous Students in Australian IT Programmes (Source DEST, Higher Education Student Statistics, 1989-2000)



So we are at a time when overall Indigenous participation in higher education is declining, when rates of success and completion in secondary schools are declining and when economic support for Indigenous students has been made

less accessible. It is also a time when the local ICT industry is seeking greater participation of Indigenous people starting from a participation rate so low that it has not been measured. But it is also a time when increasing numbers of both Indigenous and non-Indigenous Australians are recognising the centrality of the Reconciliation process to the national interest and seeking ways to drive the process forward. This research project is one such initiative.

The main aims of the project were to identify the relevant issues we need to understand and to provide a thorough and well-grounded understanding of them. This understanding will guide initiatives to increase Indigenous student participation in IT programmes while continuing to build a stronger relationship between the IT Faculty and Jumbunna IHL. Within this context, there were a number of strands defined to guide the initial research project so that it could contribute to the information requirements of both the Faculty of IT and Jumbunna Indigenous House of Learning. The strands were to:

- research existing feeder programmes, supplementary programmes and other related programmes, designed to increase the participation of Indigenous students and other disadvantaged groups, run by other faculties within UTS, by other universities and by other agencies. The objectives of this strand of research are to establish the strengths and weaknesses of existing programmes, to investigate how successful programmes have been tailored to specific disciplines and to identify relevant implications for IT at UTS;
- research IT, as a discipline, with the aim of articulating the different levels, areas and aspects of the discipline that need to be considered when developing programmes to increase the participation of Indigenous students;
- work closely with Jumbunna IHL to build and develop relations between Jumbunna and the IT faculty and to ensure that this research is consistent with, and furthers, the aims and objectives of Jumbunna;
- develop a range of options, strategies and recommendations for the Faculty of IT to increase the participation of Indigenous students in the IT industry.

Over 40 interviews with representatives of other UTS faculties, and other institutions, that have had success in the delivery of courses to Indigenous students, or other disadvantaged groups, formed the main basis of the research. Local representatives of the local Indigenous Communities were initiated via these schools. An assessment was also made of the resources of the Faculty of IT, and UTS in general schools with significant enrolments of Indigenous students were visited and teachers interviewed. Preliminary consultations with, that could be used to provide support to Indigenous IT students. Relevant literature was reviewed and web sites searched. Most

importantly, Indigenous people already working in some area of IT were sought and, where possible, interviewed.

SOME FINDINGS

At the time of writing, the research for the initial project has been completed and its findings and recommendations are being considered by the Faculty. Here, our findings have been organised to address questions of the current potential for attracting Indigenous students to IT programmes, the kinds of programmes that might be made available to them and the options for providing support to Indigenous students once they have enrolled.

Awareness

History has taught us, and our own findings confirm, that if we are to succeed in increasing Indigenous participation in IT courses and the ICT industry then the participation of Indigenous people in the shaping of their involvement is essential. Our most significant and sobering finding was that employment in the ICT industry, and preparation for it by studying IT courses, was rarely even visible as an option for Indigenous people. Moreover, it appeared that IT was not included as an option by those who might advise Indigenous people about career choices. At best counsellors, and other similar advisers, had little understanding of the kinds of work available to people in the industry or how IT professionals might be trained. There appeared to be no perception of the differences between technology literacy and the use of computers, and the various kinds of skills required and roles available to trained IT professionals. We suspect, too, that the success of Indigenous people, in areas of traditional and immediate concern, such as law, teaching and health might be filtering Indigenous students directly into those areas so strongly that other options were not being considered. Moreover, there are few existing Indigenous IT professionals to act as role models for those still considering further training.

The Indigenous people we found who were already working in ICT areas had got there via other means. While still very few in number, they had moved into web development via design backgrounds or because they had needed to learn some IT skills as part of their existing jobs in Indigenous and other community organisations. We found no evidence that Indigenous people had any specific problems with learning and using technology, but there are major problems of access and awareness.

The implications for us are that no matter what kinds of IT programmes are available and/or developed for Indigenous students, they will be unsuccessful until such time as enough Indigenous people consider working in IT an option, and will consider enrolling, and are in a position to enrol, in the programmes available to them. This may mean that similar strategies to those commonly used to attract women to IT programmes can be extended to attract

Indigenous students. But round 35 percent of IT students at UTS are women while there are only four Indigenous students (up from two as a result of this research project).

Feeder Programmes

These are tertiary pre-courses for Indigenous students who may then go on to further study. Some are domain specific and run by university faculties and TAFE colleges while others are more general. Domain specific pre-courses for Indigenous students are generally run over several weeks prior to the start of the academic year. The courses are intended to identify and accelerate the learning of interested students and to establish close relationships between the host faculty, students, their communities and existing members of the professional domain. The most successful pre-course is Pre-Law run since 1995 at the University of New South Wales. Over 117 Indigenous students have completed the programme and most have proceeded to undergraduate law studies. Indigenous tertiary colleges in the Technical and Further Education (TAFE) sector also offer pre-courses but these tend not to be domain specific. There is no well-developed and respected feeder programme for Indigenous students to enter ICT courses either at UTS or any other university.

Supplementary Programmes

Jumbunna IHL has offered a Supplementary Course for Aboriginal and Torres Strait Islander students (SCATS) since 1998. This is delivered concurrently with the first year of faculty programmes and subjects are offered in communications and mathematics. SCATS runs on a weekly tutorial basis and has been highly successful in providing Indigenous students with ongoing assistance to develop the necessary academic skills for achievement in university courses. There is currently no SCATS subject in IT although the IT Faculty has provided introductory, support programmes previously to all first year IT students. Extra tutorial assistance, funded directly by the Federal Department of Education, Science and Training (DEST), is also available to all Indigenous students.

Degree Programmes

Special degree programmes for Indigenous students are offered by a number of universities including UTS. These courses are most successful when taught in blocks (e.g. six one-week blocks over a year). Block release means that courses can be tailored for Indigenous students so that they are not permanently removed from their communities and can continue their work, family and community commitments while they study. To date, special degree programmes taught in block release all focus on Indigenous specific content such as Aboriginal and Torres Strait Islander Education, Indigenous Social Policy, Indigenous Health, etc. Some universities have included Indigenous content within their general degree programmes. This has the advantage of reducing the need for pre-courses,

supplementary programmes and specialised Indigenous programmes while at the same time offering a more widely recognised and transferable qualification. But this strategy is most suited to areas, such as medicine and public health, where knowledge of relevant and identifiable Indigenous issues is already accepted as basic to the profession.

Student Support

We found that all educational institutions that have been successful in attracting and retaining Indigenous students have provided very high levels of counselling and social and cultural support. By high levels of support we mean a full-time staff member who will focus solely on the counselling and support programmes of students involved in a special degree programme. These institutions had also created a culturally appropriate and Indigenous-friendly space that can include dedicated centres within individual faculties and the main library. Financial support is crucial both as a result of the reduction in direct Government support to Indigenous students and increases in university fees. We found some Indigenous people who were eager to pursue IT training but who could not afford the fees, nor imagine being in a position where they would earn enough to pay off loans. Moreover, full fees are charged for all post-graduate courses in IT, including those designed as bridging courses to facilitate entry of people with undergraduate degrees in other areas into the IT industry. The school teachers and counsellors we interviewed all stressed that economic disadvantage means that few Indigenous students own computers. Most high school students who intended to study computing had computers at home as do virtually all undergraduate IT students.

RECOMMENDATIONS

We have made 25 recommendations in the report from this project. The main recommendation is that the Faculty of IT run a five year pilot project to increase the participation of Indigenous students in IT courses. This length of time would enable us to develop some awareness of IT as an option for Indigenous students, to develop support mechanisms for them once they have enrolled and to graduate Indigenous people to carry the project forward once the pilot phase has been completed. The priority in the early stages of the programme will be building awareness within the Indigenous Community of the options currently available in the IT industry while increasing our support for Indigenous students who wish to participate in our existing courses. We will need time to gather the resources and develop the expertise to design and deliver Indigenous specific courses.

The pilot project will be driven by a working group that includes representation from Jumbunna IHL. This working group will be responsible for implementing the recommendations of our report, including the procurement and organisation of necessary resources from the Faculty, the University and other potentially interested parties. An

ongoing research strand is included as a central part of the pilot project. Reflection on the various initiatives of the pilot project is an important aspect of this research as is the continued effort to find Indigenous people currently working in IT and to gather their perspectives on technology design and use. But another aspect is an investigation of the potential contributions Indigenous people and their cultures can make to the ongoing development of both the technology that the ICT industry relies on and industry itself. We are acutely aware that Indigenous culture can offer great insights and contributions to a range of academic disciplines and professional domains. We would expect IT to be no exception particularly in areas such as knowledge management and supporting strong and robust communication between distributed groups of people.

In developing our recommendations we have been mindful of the complexity of the issues involved and have explicitly recommended action wherever we identified either an area of opportunity or an area where problems currently exist. Our recommendations have been summarised here to correspond to the structure of the previous section.

Building Awareness

Nearly half of the recommendations in the report were developed to support the movement of Indigenous students into IT as a non-traditional area of study. They include recommendations to:

- establish ongoing relationships with the two local high schools and the two local colleges with significant Indigenous enrolment;
- initiate dialogues with local Aboriginal Land Councils in the hope that support and involvement from Aboriginal Elders will drive the participation of the Aboriginal Community in the shaping of the programmes, encourage Indigenous students to enrol and, most importantly, to complete;
- seek out Indigenous people currently working in IT and encourage their involvement in all aspects of the pilot project, including the working group;
- invite the local professional IT organisations to participate in regular training days for counsellors and education staff at schools and colleges with Indigenous students and in the running of an Information Technology Week, where Indigenous students will be invited to participate in a programme of familiarisation with aspects of ICT that are particularly relevant to their communities and their culture.
- develop promotional materials for the Faculty's programmes specifically for Indigenous people that can be distributed via appropriate places and advertise the Faculty's programmes through Indigenous media.

Dedicated Programmes

There are a range of options for dedicated Indigenous programmes designed for different levels of expertise and different demographics within the Indigenous community. As a priority we have recommended that the faculty establish a Pre-IT Course for Indigenous students intending to study IT programmes at any Australian university. This would be a four-week intensive course including both Information Technology studies and tertiary preparation studies (computer literacy, academic literacy, and numeracy). Other universities and various industry groups would be encouraged to participate in the course.

We have also recommended that the Faculty consider options for the development and delivery of programmes in block release mode specifically for Indigenous students. For example there is some interest in e-commerce programmes for people working in a variety of Indigenous enterprises including those located in regional areas. CISCO network training via the Faculty's CISCO Regional Academy is another potential area of IT training that could be delivered in a dedicated programme.

In the short term, however, we have recommended that the working group investigates opportunities for inclusions of Indigenous perspectives and issues within the existing IT curriculum. For example, the domain and context for some assessment projects in standard courses can be one that requires a consideration of these issues and perspectives. Indigenous people are the domain experts in the major interaction design project in the existing undergraduate Human-Computer Interaction subject.

Student Support

The remainder of our recommendations are concerned with increasing completion rates by providing appropriate support for Indigenous students once they have enrolled in our programmes. A full investigation to determine how best to support Indigenous students once they are enrolled in the Faculty still needs to be undertaken. The initial report includes recommendations to:

- work with Jumbunna IHL to ensure that accessible and effective tutorial assistance is available to Indigenous students from the beginning of the first semester of enrolment;
- ensure that students enrolled in IT courses have access to computers at their homes;
- employ and train Indigenous staff to be involved in, and eventually manage, all aspects of the programmes directed to Indigenous students;
- establish a mentorship programme for Indigenous students with at least two levels; Indigenous students could be mentored by individual members of Faculty staff and / or by recent graduates;

- set aside culturally appropriate space for Indigenous staff and students within the Faculty that can function as a centre of support and communication for students;
- make available a generous range of scholarships and cadetships for Indigenous students at both undergraduate and postgraduate levels particularly while the first generation of Indigenous IT professionals are trained. We will count it as one measure of the success of this programme when all such scholarships and cadetships are filled. We found a number of organisations willing to provide cadetships but the mechanisms for doing so still need to be established.

THE NEXT STAGE

We have included this discussion of our recommendations to show the range of activities we feel are needed if we are to increase the participation of Indigenous Australians in IT courses. Sadly, none of our recommendations will be trivial to implement successfully. We are now preparing the plans and strategies, and gathering the resources to continue the project.

We recognise that there is some fundamental and wide ranging educational innovation required in this project. It represents one of the first attempts in Australia to open a area of study to Indigenous people that has not been traditionally associated with the immediate needs of their communities. Historically, our immediate challenge is to graduate a first generation of IT professionals just as Health and Education faculties started to do, some 20 years ago, and Law and Business faculties have done since. At the same time we need to initiate opportunities for Indigenous participation in the shaping and delivery of IT programmes and projects that may have specific relevance to them.

Participatory Design has the potential to be used not just as a method for technology design but, most importantly, as a rich and relatively well-developed resource for negotiating and designing participation in, access to, and appropriation of IT by Indigenous Australians. It is unique among technology design methodologies and practices in its deliberate and systematic blurring of the distinction between the users and designers of technology. As such it can offer support for the development of Indigenous use of IT into the Indigenous design and development of IT. The insights from Participatory Design practices, including the tools and techniques for involving participants in the design process, whatever is being designed, will continue to inform the evolution of this project.

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