2003

Indigenous Australians in the Information Age

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Indigenous Australians in the Information Age: Exploring Issues of Neutrality in Information Technology

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Abstract

Information Technology is not a neutral tool but a medium which embodies the values of the civilization which produced it. This could have serious implications for Indigenous Australians as they adopt the new technologies and move into the Information Age. Computer use is certainly low amongst Indigenous Australians, but a review of the existing literature shows no evidence of rejection of the technology on the grounds of its ideological bias. Instead, there appears to be an overwhelmingly enthusiastic response, limited only by a difficulty in accessing the technology due to cost, isolation, poor telecommunications infrastructure, low computer literacy and lack of awareness. It is proposed that attributes inherent in Information Technology, such as its flexibility, interactivity, its non-judgemental and non-hierarchical nature, and its use of graphics mitigate any potentially negative effects and allow Indigenous Australians to achieve their own goals while avoiding Western enculturation.

Keywords

Indigenous Australians, technological neutrality, computer-mediated values, Digital Divide

1. Introduction

There have been concerns expressed by many commentators on the non-neutrality of Information Technology (IT). These worries centre around the idea that IT, like all technologies, comes embedded with the values of the society which produced it. From this premise one could conclude that computer technology would have a serious impact on traditional communities as they move into the new technologies, loading unwanted Western values onto them in a modern form of cultural imperialism. This is of particular concern to the Faculty of Information Technology at the University of Technology, Sydney (UTS), as we embark on a new, ambitious project to attract Indigenous Australians into IT courses and hence into the IT industry, the first venture of its kind in Australia.

Certainly the adoption of computer technology by Indigenous Australians up to now has remained low, suggesting a possible rejection of IT and the values that accompany it. Robertson, Dyson, Norman and Buckley (2002a) found that few Indigenous school students own a computer. Low computer ownership persists into tertiary education: a case study into students at UTS showed that Indigenous students had less access to computers at home than a control group (Barraket, Payne, Scott & Cameron 2000). Few Indigenous students have undertaken studies in IT at the tertiary level and as a result few have found employment as IT professionals. Of the 8,000 Indigenous students enrolled in university and technical college

courses across Australia during 2000 only 107 were enrolled in IT programs (Ruddock 2001). Cameron, Edwards, Grant and Kearns (1999) found that Indigenous university participation in IT degree courses as well as IT subjects in non-IT degrees was close to 0% of total enrolments. Moreover, Robertson et al. (2002a, p. 290-1) found that IT professionals were 'very few in number' and that their participation rate was 'so low that it has not been measured.'

This paper represents a review of the existing literature on the adoption of computer technology by Indigenous Australians. This review will form the basis of empirical work over the next few years as the Faculty begins to attract Indigenous students in significant numbers through its current project and the recent employment of its first Indigenous staff members. This study enquires into the potential causes of the low adoption of IT by Indigenous Australians and specifically seeks to interrogate whether the values inherent in the technology are of concern to them and discourage use, or whether other factors, such as the cost of the technology, create more important barriers. Answers to these questions are important in informing the Faculty's current initiative.

The first part of this paper briefly discusses the issue of neutrality and IT, and then presents an examination of published studies of Indigenous Australians using computers as evidence of any rejection of the technology by these people. Other possible barriers to the adoption of the technology are examined, and finally qualities of IT which might mitigate its rejection are discussed.

2. Information Technology: Neutral or Non-neutral Tool?

Information Technology can be viewed in various ways. Most simply, it is a tool fulfilling the functions for which it was designed. This is what Chandler (1996) calls a 'voluntarist' approach: the individual chooses a tool and controls its use. The technology is pure object: an assembly of interacting computer parts, data processing and storage functions, a string of electrical signals representing bits. It is neutral, content free, devoid of meaning beyond its function.

A less naive way of looking at IT is from a socio-political perspective. According to this view, technology is inseparable from the social, cultural, historical and political context which produced it. It is 'part of a social environment, an agent of social change, the physical medium through which symbolic values are expressed, the trace of a civilization' (Martinand 1995, p.52).

This is obviously a far more complex approach, one that questions the neutrality of IT. Essentially it encompasses two main ideas:

- IT is the product of a culture and hence embodies the ideologies of that culture

- IT, because of the values it embodies, in turn has the ability to influence and effect change in society, the world and the user.

This second idea embraces technological determinism, which in its most extreme form sees technology as reconstructing the whole of society:

> New technologies alter the structure of our interests: the things we think *about*. They alter the character of our symbols: the things we think *with*. And they alter the nature of community: the arena in which thoughts develop (Postman 1992, p. 20).

Postman, one of the main protagonists of technological determinism, takes a pessimistic view. He interprets computer technology as undermining confidence in human judgement in favour of calculation, as emphasizing the communication *process* at the expense of the substance of the communicated idea, as leading to the acceptance of a dangerous metaphor: humans as machines; computers capable of human thinking and decision making.   Most important for Postman is the loss of the 'psychic, emotional and moral dimensions' of human thought, the loss of subjectivity and traditional values (Postman 1992, pp. 118).

If, as the technological determinists say, IT has the power to change our culture, transform us and the way we think, then this has serious implications for the adoption of the technology by Indigenous Australians. Even if we take a less extreme view, the potential transference of some Western values onto Indigenous users should be of concern. From this one would assume that Indigenous Australians would reject the technology as antithetical to their traditional values and world view. Their low adoption of computer technology would seem to support this assumption, and yet there is other evidence which challenges this idea.

3. Indigenous Australians And Information Technology: Evidence From The Classroom And Workplace

The area of Indigenous Australians and IT remains much under-researched. However, those studies which have been done show an overwhelmingly positive response when access to the technology is made available.

3.1 School Studies

Studies of Indigenous school students consistently show an enthusiasm towards computers and the rapid development of competence in their use (Steen 1997, Stanton 1992, Fryer 1987).

Findings are consistent across urban, rural and traditional communities. Fleer (1989), in a study which monitored Aboriginal children across six West Australian schools covering the full range of community locality types, found that the children were so eager that, when permitted, they worked on the computers in their spare time, both during recess and lunch breaks and after school. The type of software generally did not deter them, and they welcomed drill and practice programs equally as much as games. Most students, even at pre-primary and junior primary levels, were proficient in operating both hardware and software and, at one school, undertook software editing normally performed by teachers. Fleer (1989, p. 8) concluded that:

> Student responses over the twelve-month period did not appear to change, and students seemed to be as motivated to use the computer at the end of the study as they were at its commencement.

O'Donoghue (1992) also found that Indigenous children from the remote Kimberley region in Western Australia were highly successful in using computers. This was despite the

cultural bias of the software employed. For example, at the primary school level the children relied on BBC software, which O'Donoghue (1992, p. 49) noted is 'very British and western in culture', yet with a 'universal appeal':

> 'Podd' is loved by all; 'Albert's House' is understood and enjoyed by children who live in shanty huts and 'Zoopak' brings cheers when Petra is found or the giraffe is put together again.

These studies bear out the author's own experience assisting AIESEC international exchange volunteers at a Saturday morning computer school begun in the inner Sydney suburb of Redfern in April 2002. These primary school children often stay glued to their screens for the full two hours duration of the class while employing a wide variety of programs. Graphics software, games and web searches for their favourite singer or for information on their hobbies are most popular, but they also learn other skills such as word processing and how to create simple webpages.

The only reservations held by some researchers in this area regard inappropriate software. O'Donoghue (1992) noted that the software for secondary students was not as successful as that aimed at primary school. Fleer (1989) found that traditional communities, where the main language is not English, had trouble with software which was text-oriented and therefore English-language based. Several Education Departments, including those of Western Australia, the Northern Territory and South Australia, have developed software especially designed for Indigenous students to help overcome some of these problems (Anderson, in Fryer 1987). However, when given software with an Indigenous cultural content or with 'universal appeal' as described by O'Donoghue, there appears to be no unwillingness in the adoption of computer technology by school children.

3.2 University Students and IT

Fewer studies have been conducted of Indigenous tertiary students and Information Technology. However, these again show a favourable response.

One of the few Indigenous IT doctoral candidates Peter Radoll (*ATSIC News* 2002, p. 29) states that 'There's no big secret. It's quite easy if you just work and be persistent.' He admits that programming is difficult to learn but believes that hardware is 'fabulous': 'It's more hands on and that's where a lot more of us would feel more comfortable.'

Grant (1996, p. 101) reported the results of a computer literacy class conducted for mature-age university students from rural New South Wales and outer-suburban Sydney: 'Although they were off to a sometimes shaky start, by the year's end, in almost all cases, they were using IT with a high level of enthusiasm and reasonable competence.' During the course they learnt to use a range of applications, including word processing, database and graphics; employed email, including attachments, and began to participate in a listserv; performed web searches and contributed to a web site; as well as producing video-graphics illustrating Indigenous themes and legends.

Another study by Rehn noted that remote Indigenous university students enjoyed point-to-point chat-room communication with their teacher and found it 'stimulating', in addition to working with email and other remote technologies (1992, p. 27).

In yet another course, mature-age students undertaking tertiary preparation at Edith Cowan University learnt word processing, spreadsheets and how to use the Internet and displayed a 'wonderful enthusiasm', according to one newspaper report (*Koori Mail* 1999, p.23).

3.3 Computer Use in the Workplace

There are very few reports of Indigenous computer use outside the educational context, but again these confirm the ready take-up of computer technology when people are given access to it. In an article entitled 'Working with Computers. Dream job in sight', the *Koori Mail* describes two people competently working with computers. In fact, one of them was 'very keen on computers, if I could have my dream job it would be computer consultant' (1994, p.4).

4. Access And Equity: The Maintenance Of The Digital Divide

Despite Indigenous Australians enthusiasm for computers, the fact remains that the adoption of computer technology by these people is low. There are several factors that might be the cause of this low take-up of the technology, but the literature suggests that it is mostly an equity issue. Robertson et al. (2002a, p. 291) 'found no evidence that Indigenous people had any specific problems with learning and using technology, but there are major problems of access and awareness.'

4.1 Cost

The most important factor in stopping Indigenous Australians from using computers is probably the cost of the technology, both the cost of buying computers as well as the ensuing cost of usage, maintenance and repair (Barlow and de Lacey 1998). Barraket et al. (2000) identified the costs of hardware, software, the cost of remote access connections and Internet Service Provider fees as significant barriers. As one student in their study stated, 'The use of technology such as computers, fax's, and phones are extremely relevant to me, or would be if I could afford the costs associated' (Barraket et al. 2000, p. 80).

4.2 Environmental Constraints

Another significant factor is the isolation of many Indigenous communities and the poor telecommunications infrastructure in much of rural and remote Australia. Much information regarding telecommunications in outback Australia is dated and limited, yet there is enough anecdotal evidence to show that both basic telephone connections and Internet services are totally inadequate (DCITA). The Aboriginal and Torres Strait Islander Commission, in giving evidence to the Telecommunications Services Inquiry in 2000 (DCITA), raised concerns about:

- Low levels of provision of the standard telephone service

- Poor, unreliable and non-existent infrastructure

- Long delays in installing new connections and making repairs

- The high costs of phone installations and repairs as well as costs of wireless and satellite services.

Furthermore, the remoteness of many communities creates difficulties in buying software and hardware and in accessing computer support personnel (Fleer 1989).

4.3 Low Computer Literacy

The study by Barraket et al. (2000) showed that Indigenous university students had poor levels of computer literacy which they related to low computer use. Barlow and de Lacey (1998, p.11) found that for Indigenous students 'access to and competence in technologies often appear outside of their schooling and social environment and this creates a barrier'. Indigenous Australians lack networks of friends and relatives who themselves are sufficiently technologically competent to provide help in acquiring the necessary skills to operate computer equipment. This, together with low computer ownership, leads to low computer skills.

4.4 Lack of Awareness

An important factor in discouraging entry into IT tertiary studies identified by Robertson et al. (2002a) was lack of awareness of IT as a possible study and career option. School career counsellors had little understanding of the kinds of work available in the field, and the lack of Indigenous role models in this area was a problem. These authors also proposed that the success of Indigenous people in more accepted disciplines, such as education, law and nursing, 'might be filtering Indigenous students directly into those areas so strongly that other options were not being considered' (Robertson et al. 2002a, p. 291). This, together with lack of access to the technology, is helping to keep the numbers of Indigenous people working in IT low.

5. Attributes Of Information Technology: Open, Interactive, Non-Judgemental

Despite the access issue, there remains an apparent paradox: on the one hand a technology which is the product of Western civilization and ideology, and on the other hand people from a very different, more ancient civilization who embrace IT with great enthusiasm when given the opportunity. We must therefore question whether there are *other* qualities inherent in the technology, qualities which allow users to do what they want, to achieve their own aims and objectives, and to bypass, or at least counterbalance in some way, the Western agenda embodied in the technology. There is much evidence both from the classroom studies of Indigenous students and from research into IT generally that there are a number of characteristics which allow this to occur.

5.1 Non-Judgemental

For Indigenous users, computer technology appears largely free of cultural baggage and free of prejudice. O'Donoghue quotes a young teacher as saying 'Racial differences go out the window' with computers (1992, p.48). In the experience of Johnston (quoted in Robertson

et al. 2002b), Indigenous people relate well to computers because they are non-judgemental and don't see the colour of the person who is using them.

5.2 Beyond Text

Though many of the most widely-used computer applications such as word processing and email involve text, there are also many which do not require reading, or at least supplement text with graphics. In particular, multimedia has created what Bolter (2001, p. 72) calls the 'breakout of the visual' as the World Wide Web and CD-ROMs displace text with graphics, animation and streaming video. Furthermore, the development of the Graphical User Interface has resulted in a move away from the old command-line, text-based interfaces to a dependence on icons and graphical controls such as command buttons. Indigenous Australians come from a culture which did not have writing, but employed painting and carving to record their highest ideas, and in modern times this tradition has strengthened and expanded. It is not surprising, therefore, to find that computer technology appeals to their visual and spatial strengths (O'Donoghue 1992).

Indigenous Australian culture also depended traditionally on music and on oral forms of literature. The move of computer technology into sound, music and audio-streaming would therefore be expected to be significant to them, although no studies have looked at this area so far.

5.3 Flexible over Time

Asynchronous communication technologies such as email, message boards and file-sharing allow Indigenous Australians to fulfil the cultural and social obligations which are so important in their communities without being locked into a schedule imposed from outside (George 1992).

5.4 Self-Paced

O'Donoghue (1992, p. 52) describes computers as a 'most patient medium.' They allow 'many mistakes and the freedom to "try anything".' Users can proceed at their own pace and learn from mistakes made. This is important for Indigenous Australians since many come from a low level of computer literacy.

5.5 Adaptable to the User Styles and Goals

Computer programs can be easily customized, allowing for individual learning styles and the realization of individual goals (Barlow and de Lacey 1998). For Indigenous Australians it also offers the potential for common cultural values and iconography to be included in programs and for group goals to be achieved. One Dharawal IT professional Michael McLeod has already begun designing web sites and customizing e-learning packages specifically for Indigenous users (Robertson et al. 2002b).

5.6 Interactive

Computer interactivity allows for a two-way dialogue between the user and the machine or between two or more users, rather than the one-way communication of the printed page, radio or television. The passive reader of the printed page is no longer passive when presented with an electronic text:

> Electronic readers can do all the things that are claimed for them – or choose not to do them. They can genuflect before the text or spit on its altar, add to a text or subtract from it, rearrange it, revise it, suffuse it with commentary (Lanham 1993, p. 6).

For Indigenous Australians this means they are no longer obliged to accept the mainstream Australian view. In the classroom interactive approaches which incorporate community interests and needs have been found to motivate Indigenous students (McLoughlin and Oliver 1999).

5.7 Non-Hierarchical

Computer technology works against the traditional hierarchies. At the level of the classroom, computers level off the power hierarchy between teacher and student and allow students to take more control of their learning. Fryer (1987, p. 55) notes that the whole structure of the classroom and the way in which the teacher and student relate are 'dramatically different' in computer-assisted learning situations. The teacher (often non-Indigenous) becomes more of a helper, the amount of teacher-to-whole-class talk declines, the lessons become more activity-based rather than teacher-centred presentations. By placing the student in control of the keyboard and mouse, and relegating the teacher to the role of facilitator, it is the student's culture which has the opportunity of affirming itself.

The most obvious example of a non-hierarchical computer technology is the World Wide Web:

> On the web, everything is on the same plane. … There is no absolute hierarchy, but each site acts as a vehicle for selection, guidance or partial hierarchization. Far from being an amorphous mass, the web links together an open-ended multitude of viewpoints, but this linkage operates transversely, like rootstock, without being subject to any 'supreme vision', without a unifying force from above (Lévy 1997, p. 251).

Hypertext is an inclusive medium since each web page is an open document connected via hyperlinks to a vast mass of other documents. These pages could potentially be authored by Indigenous Australians (a few of them already are) since on the Web anyone can publish. This contrasts to the printed page, an exclusive medium controlled largely by Western publishing elites. The Web most importantly offers Indigenous people the opportunity to have their say without it being filtered through Western anthropologists, missionaries, editors or other intermediaries:

> Spirally backwards, as it were, to the oral culture of a bygone age, knowledge might again be placed in the hands of *living human groups*, rather than being conveyed on various types of material support through interpreters or scientists (Lévy 1997, p. 254).

6. Conclusion

In conclusion, evidence from the literature suggests that the main factors limiting Indigenous adoption of IT are *not* rejection of Western values imbedded in the technology. Rather, issues of access and lack of awareness represent the greatest barriers. Access issues include the high cost of the technology, lack of adequate telecommunications links to remote communities and poor computer literacy. With continuing high levels of unemployment in the Indigenous community, as well as concerns over possible privatization of the main telecommunications carrier and fears of further cuts to country services, overcoming this Digital Divide presents a significant challenge, despite increased computerization in schools and community technology centres.

These access issues, as well as a general lack of awareness of IT as a possible career path, have severely limited the number of Indigenous Australians choosing IT courses at the university level and therefore choosing IT as a profession. At present this lack of trained Indigenous programmers, web designers, systems analysts, networkers, computer educationalists and IT managers is placing its own limitations on the Indigenous community's ability to use the technology. Most importantly it is not allowing communities to 'get away from the "white colonialism" that dominates access to IT facilities' (*ATSIC News* 2002, p. 28).

Despite concerns over the lack of neutrality of IT by some authors, qualities inherent in the medium seemed to have overcome reticence by Indigenous users. Apart from its cost, Information Technology is an inclusive medium, one which allows users to achieve their own personal and group goals, and impose their own values and culture on the technology. The World Wide Web, in particular, has remained a democratic domain, in which any individual or community can have their say.

Before accepting the warnings of the technological pessimists, one must question where these theorists are coming from. Are they perhaps trying to protect the existing power hierarchies, which have served *them* well but have largely excluded Indigenous Australians? All tools bring with them their own set of ideologies, the tools of the past no less than the new tool of IT. Print, for example, came with the authority of the author and, because of publishing costs, not many people acquired that status (Bolter 2001, p. 163). Before the 1970s almost no Indigenous Australians were published authors and even today the number is relatively few.

Against the exclusion of the print elites, computer technology and the Web offer the prospect of a genuine, unmediated, unedited Indigenous Australian voice to be heard across Australia and across the world. For Indigenous communities isolated by vast distance, it offers communication and Indigenous cultural exchange. In a country where IT dominates the workplace, it offers good, well-paid and interesting jobs rather than unemployment. In the Information Age, with IT affecting almost every aspect of life, it offers Indigenous Australians the chance of achieving their goals and dreams. In the words of Earle Maroney (2001, pp. 112-113), an Indigenous networker from the Northern Territory unworried by concerns of ideological bias:

> There are so many streams in Aboriginal lifestyles that IT affects, from intellectual property to knowing what services are out there. … My philosophy is to get information

technology in the communities. Let's get a voice and get some IT specialists in remote communities who are Aboriginal people.

The analysis of the literature undertaken here supports the Faculty of IT's new initiative to train more of these Indigenous IT specialists that Maroney and others are calling for. To underpin the current project more research will obviously be needed: as stated previously, this area remains much under-researched. The lack of data derives from ethical issues surrounding research on Indigenous Australians who, in the past, had little say in studies performed on them, and against whom poor research was often used to control their lives, oppress and denigrate them. It is expected that work undertaken by the Faculty, sustained by the University's commitment to serve the Indigenous community and supported by our Indigenous staff members, will avoid these problems.

Future research needs to focus on the reasons behind the low adoption of IT by Indigenous Australians. In particular, it needs to show whether the enthusiasm and competence demonstrated by school students, who provide the strongest evidence so far, can be extrapolated to students at the university level. The Faculty's present efforts to overcome economic barriers to Indigenous students' access to IT will need to be assessed, and further investigation of the attributes of IT will also assist our understanding of these issues. From such work the Faculty will be in a better position to assist Indigenous Australians as they move into the Information Age.

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