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Abstract
This paper relates to some thoughts about the very different access to communication that those living in developing countries have as compared with those living in developed countries. I advocate using information technology in within my own teaching in Australia, yet from my experiences in developing countries, I know how limited access to any modern form of communication is currently in the schools and universities of these countries. In this paper, I will reflect upon technical problems, equity and distribution problems and some possible educational solutions.

Questions that arise are how is the internet is going to effect the knowledge base of children, of working people generally and of academics. Will society be split in developed countries between the computer literate and the non-computer literate? Will the present disparity in wealth between developed and developing countries grow even wider. Will this future change in education and wealth be dependent on the extent to which a country's population is linked to the internet. Thoughts about these issues arise from the author's experience and research.

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COMPUTER MEDIATED COMMUNICATION, THE INTERNET AND EQUITY: DEVELOPMENT IN A POST-COLONIAL WORLD

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ABSTRACT

This paper relates to some thoughts about the very different access to communication that those living in developing countries have as compared with those living in developed countries. I advocate using information technology in within my own teaching in Australia, yet from the experiences in developing countries, I know how limited access to any modern form of communication is currently in these countries. In this paper, I will reflect upon technical problems, equity and distribution problems and some possible solutions.

REFLECTIONS

After teaching for two years in Britain between 1960 and 1962, I went to teach for six years at Gboluji Grammar School, Ile Oluji in the Western Region of Nigeria. The school had no telephone, nor did any of the staff houses, but there was a telephone in the Post Office. I only used it once as far as I remember and I remember turning a handle fast (to generate electricity) and shouting down the instrument in front of an audience of interested spectators in the Post Office. Privacy was an unknown commodity.

Ten years later in Maiduguri, Borno State, Nigeria I had my own telephone, but its purpose was largely decorative. It was almost always quicker to go to see someone in the same town than to try to telephone them. Phoning Lagos, where my Head Office was or telephoning overseas was such a frustrating experience that it was only the most pressing business that ever forced one to make such calls.

In the early to mid 1980s I was in Papua New Guinea and here the Australian administration had left a good basis communication system. However during that time computers became more common for word processing or for spread sheets, but the use of computers for communications was virtually unknown.

It was really only in late 1989/1990, that my addiction to the internet started. I was very slow to start and the computer stayed in its box, under my desk for months until I started to use it, firstly only for word processing and then for an increasing variety of purposes.

Since that time I, and I suspect many other academics in the developed world have become increasingly dependent on the computer. In the developed world in education the salaries of staff are controlled by computers, the provision of timetables, the programs for quantitative research such as *Statsview*, the programs for qualitative research, such as *NUD.IST*, the programs for scanning text and images, programs for producing overhead transparencies, such as *Powerpoint*,, CD-roms for information storage and a host of other uses. One quote from a recent study of NT schools-

> It is possible that without access to this computer or some other similar system VT (vertical timetabling) would not have been introduced in any schools. A Department of Education computer programmer asked one Assistant Principal in a VT school what the school would do if the computer was taken away. The answer was 'close the school!'. (Fowler, 1993)

However the large growth of usages, such as those described above has been matched by an enormous rise in the use of the computer to aid communications. One suspects that there is about to be a rise in the use of computers in some sort of teaching role with a huge multiplicity of ways in which this may happen. In the years 1990 to 1994, I greatly increased my use of e-mail in the form of personal messages to keep in touch. I looked at the news in my areas of interest. In those days there were only 1000 or so Newsgroups, whereas there are now in excess of 4000 Newsgroups.

I joined a number of listservers in my areas of interest and I still keep up with these. I became very interested in the chemical called "buckminsterfullerene" through a discussion on "Sci Chem News". With considerable extra research, I delivered a paper on the teaching of this topic at ICCE 12 (Palmer, 1994a) and published articles (Palmer, 1994b: 1995) in Australia.

I live and work and work at a small Australian university in Darwin, which is probably the most physically isolated of the Australian universities, with no other lecturers working in my area. The point I would make here is that over that period I realised how powerful a tool the various aspects of the internet are to enable isolated researchers to communicate with each other and keep up with their field. In developing countries too teaching staff feel isolated, so information technology appears to be a solution.

I worked as a member of a Darwin-based team as a consultant in science education delivering a program of in-service training to secondary teachers in Western Samoa. What appalled me there was the almost complete absence of communication with the outside world (see Palmer 1994c). Generally there were very low quality libraries in the schools, few and inadequate university or public libraries, few magazines or journals, no computers, and no computer-based communications, very limited teacher professional

organisations and limited examples of teacher professionalism in schools. Change in Western Samoa is very difficult to achieve as change does not really seem to be desired and there are few inputs to a very traditional society. Here is a brief aside about computers in Western Samoa. The program of in-service training also supplied computers and instruction in using computers to the professional staff at the Curriculum Development Centre. When we first arrive staff used to play cards together in the rather lengthy lunch breaks. After learning to use the computers, several staff preferred to play a card game called 'Solitaire' on the computers instead. Perhaps this goes to show that computers may modify behaviour, but they don't change it fundamentally.

More recently as a part of a project associated with my doctoral thesis, I had a lengthy questionnaire and was seeking ways of finding respondents for it. Apart from those who I was able to approach personally, through conferences etc, I found the listservers, particularly where I had been a member for some time, extremely helpful. By e-mailing individuals I was able to choose those who had given well-reasoned views over a period of time and ask them if they would be kind enough to fill in a questionnaire. The main concentration of respondents were from the USA, followed by Australia, followed by UK. There were a few respondents from Europe, Central and South America, Southern Africa, and South East Asia, and a scattering from the Pacific, though the latter were mainly personal contacts. I noticed that this leaves a huge area of the world with whom I did and could not easily communicate. Central Asia, most of Africa, China and the Indian sub continent over a year or so had virtually no representatives amongst these listservers groups. I looked at the full listserver lists of members to seek opinions in areas that had not answered my survey, but this was only partially successful. The more remote and exotic the area, the less likely it was that there would be a response. Quite possibly the areas that I have mentioned from which I obtained no responses contain about half the world's population. In those areas where I had few responses connection to the internet seems to be the exception rather than the rule.

The brief results that I am quoting are general rather than specific, but I think that they would be true of most subject areas. The question that arises is how the internet is going to effect the knowledge base of children, of working people generally and of academics. Will society be split in developed countries between the computer literate and the non-computer literate? Will the present disparity in wealth between developed and developing countries grow even wider. Will this future change in education and wealth be dependent on the extent to which a country's population is linked to the internet.

> For many experts, the major reason children should be accessing the Internet today lies in the way that work is changing and will continue to change. (Wilson, 1996).

There are several features to look at: these might be equity, language, access to computers, knowledge

SCHOOLS AROUND THE WORLD

Perhaps some model to illustrate what education currently exists, what its characteristics are and how it is distributed, is needed. For a model of schools worldwide, schools might be consider in layers, rather like geological strata as an adaptation of the Beeby model (Beeby, 1956). This has been proposed by Fieter et al (1995) in their classification of teacher and school conditions and has been modified by van de Berg (1996). A simplified description of their model follows.

- Poorly resourced and managed schools with teachers with little mastery of subject content or methodology often with large classes and virtually no textbooks.

NB. I have seen classes of more than 80 students sitting cross legged on the floor in Western Samoa). It is in schools like these that probably the majority of the world's children are taught.

- These schools would still be inadequately resourced, with some fair degree of administrative control. Teachers emphasise rote learning and have only a limited mastery of subject matter. Few students would have textbooks.

- Moderately resourced schools with teachers who may themselves have to have second jobs, but who are generally competent in their subject and are fairly committed to the students they teach, but still emphasise memorisation. Most students would have textbooks.

- A thin layer of top-class schools which are well resourced, with teachers of a high calibre using modern teaching methods. All students would have textbooks and there will be science laboratories, sports facilities and computing laboratories.

A consequence is that children get very different starts in life. Can educational technology make things worse than they now are ? Can things become still more unequal? Have the past twenty years seen a reduced inequality in schooling? I believe it has generally, but this case can be argued either way. I will try to group together the optimists and the pessimists

THE OPTIMISTS

The group called the Consortium for Affordable and Accessible Distance Education (CAADE) seems amongst the most optimistic. as a group they have a project experimenting with sound and vision distance education systems. Amongst their conclusions they state that:

> We believe that electronic distance education can - and must - be made accessible and affordable in rural and undeveloped parts of the world. CAADE (Consortium for Affordable and Accessible Distance Education) is committed to testing a variety of hybrid technologies that are suited for specific needs and conditions in under-served user communities. We believe that we are pursuing options that will provide complete, integrated educational systems for under-served communities at costs low enough to encourage implementation.
>
> (Utsumi, Boston, Klemm, & Miller, 1997)

A political commentator for the Guardian is also positive about the internet. He states:-

> There is a 'socialist' or at least egalitarian strain in the Net that deserves much more study by Labour Party strategists. ...It's amazingly cheap now for what it offers- costing a small monthly fee and telephone charges of about 75 cents an hour- and will get even cheaper... (Keegan, 1996)

Keegan(1996) then goes on to report that the telephone charges will decrease with improved technology and that the capital costs of computers will fall - in particular there are cheap boxes, without hard drives that will allow Internet access about to be marketed. Keegan(1996) does see eventual access to the Internet coming to "the poor, the deprived and the Third World" to their great advantage.

Anon (1996) indicates the way in which Adobe Acrobat may reduce the costs of online journals and books. Current journals and books are one of the areas on which knowledge acquisition in third world countries lack. Improved access to online documents is very important for the third world.

THE PESSIMISTS

Surprisingly, it is difficult to find pessimists in this area: there are many who are enthusiastically spreading their belief in virtues of the computer in educating the world's poor. The views expressed in this area are largely those of optimists, technophiles who believe that technology has the capacity to alleviate all human folly. It is a wonderful dream, but for those who have actually travelled and seen third world poverty the idea that all the world's

children could be given the knowledge of the world's best minds seems further away than the enthusiasts hope.

In thinking about this one make a start by looking at Maslow's Hierarchy of Needs in any standard educational psychology textbook (Eg Gage and Berliner, 1984, p.383). At the very bottom of the hierarchy of needs to become a fully functioning student are the needs for food, air and water. One could look at all the other needs in Maslow's Hierarchy and see each of them as being progressively more difficult to provide. To these needs, one might add other physical needs, in order to use the computer, for electricity, some space and light to study and some quiet to allow concentration. If one pictures the hovels in the back streets of Bombay, then the difficulty of large scale computer aided learning for the very poor becomes apparent. For me *The New Internationalist* provides the realism often lacking elsewhere on these issues and often manages to report inequity and human misery wherever it can be found: it is interesting to note that they plan to discuss this area again in December 1996. The particular article quoted both the arguments for and against information technology and here I have quoted the negative arguments.

> And what about direct human contact? What about maintaining real, physical communities? Are we all going to be E-dropping, E-mail swapping computer nerds, surfing in cyberspace instead of spending time on our real relationships in our real communities? And is everyone going to have equal access to this information? Pull the other one! (Anon, 1995)

THE DIFFICULTIES: COSTS.

The arguments about equity often centre on the question of costs. The optimists assert that if the costs associated with information technology are lowered sufficiently, then the system will automatically become more equitable, but many would suspect that this is an over-simplistic model.

There are also financial constraints simply in the costs of providing an information technology infrastructure as Elliott states:

> Moreover the sheer cost of the physical infrastructure necessary for the computer age- terminals, software, fibre-optic networks and so on- is likely to widen the gulf between rich and poor. (Elliott, 1996)

Durham reported from a Singapore conference held in August 1996 on higher education in a borderless world that there has been an enormous growth in distance education.

> Suddenly teaching the billions begins to look possible. A stunning repertoire of technologies is at hand: the Internet, satellites, video conferencing, digital libraries. (Durham, 1996)

Durham further pointed out the high rates of expansion of distance education and its low costs. For example, at the Indira Gandhi National Open University in India runs sessions at less than 5 cents per session per student and students may access a masters of Business Administration degree for about $160.

In higher education the demise of the lecture may not be so far away: so says Ian Reinecke.

> But service strategies that rely on the demise of the lecture to free up resources for investment in electronic substitutes may take far too long to mature. (Reinecke, 1996)

THE DIFFICULTIES: ACCESS.

Currently only 2% of the world's population has access to computers and presumably only a fraction of those computers have internet access. However where access is available even young and inexperienced students can learn using them.

A mother says that her 12 year old son helps her find information she needs for her masters degree in special education (Wilson, 1996, p.2). In other words access to a computer has given this child information finding skills at a level well beyond his years.

Alison Norris (1993) gives an example of how children at a rural primary school in Tanzania can e-mail messages to children in a UK school. This is a small scale example of the ways in which both rich and poor can access computer skills.

Access to books and journals can be greatly improved using modern information technology. I am involved in a project to put classical chemistry research and old chemistry textbooks online. However there is a large number of classical plays and novels are available online from a variety of sources including Project Gutenberg (1997) with more than 1000 English language books online, Bibliomania (1997), Books on-line (1997) and many others. These allow the online reader a representative range of works in the English language. There are large numbers of magazines and journals online, so that the size of the offerings available exceed what is available in most smaller university libraries.

Richard Hart (1995) points to the inequality of access to the internet.

> The Information Age Is Being Ruled By The Information Rich As Surely as the Transcontinental Railroads Were Ruled For Decades By The Robber Barons. The Information Rich had a free ride on the Superhighways, about 25 years worth of free ride, and now the Information Poor want a ride so the Information Rich are shutting down the free rides and are selling tickets... (Richard Hart, 1995)

THE DIFFICULTIES: LANGUAGE

The understanding of concepts and ideas depends on understanding the language in which these concepts and ideas are explained. English is the most common language on the internet, but any language can be used. However even for major non-English language groupings, the amount of information is much less than that which is available to English language speakers. The internet is now one of the major factors in the spread of English and perhaps the demise of smaller language groupings.

CONCLUSION

I would like to return to the adaptation of the Beeby model, that I introduced earlier. It is likely that costs of accessing education will fall considerably using information technology, but it is doubtful that it will fall sufficiently to provide all strata of society with a basic education. What can be hoped for is that more people will be able to access more education than has been possible in the past. Inequalities will remain and will probably increase.

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