Teachers want to use the Internet to improve the education of their students, but many factors constrain their ability to do so. Some of these constraints are: the lack of funds in professional development for teachers; the demand on time to find relevant materials on the Net; the limitations of inadequate resources; the prohibitive cost of multiple accounts, multiple modems or an ISDN line; the burden of time related to policy development; problems associated with engaging corporate sponsorship and the sheer drag speed of the Internet itself. These constraints restrict the ability of teachers to really use the Internet with any educational power.

This paper investigates the use of Internet technology in a way that empowers teachers to overcome some of these constraints allowing for greater interactivity. The paper argues that teachers can be too focused on the Internet itself rather than looking for solutions in their Local Area Network (LAN). The paper suggests that Internet technology can be brought into schools and used effectively through an “Intranet”. An Intranet, as the name suggests, is a network of computers within a local computing environment using the TCP/IP protocol and associated Internet software. An Intranet, which has a local or internal focus, stands in contrast to the Internet which is external to the local network (Howe, 1996). This paper discusses the use of an Intranet at Giralang Primary School in the ACT and argues that an Intranet enables better student access to Internet technology in schools that are financially constrained.

**Internet and Intranet**

The original creator of the World Wide Web (WWW), so it is told (Rotenstein, 1996, p. 47), wanted to use a protocol to manage the internal phone directory of his company over its computer network. The TCP/IP protocol, that supports open client/server networks, is the real power of creating a network. The original computer networks (DarpNet - Defence Advanced Research Projects Agency-Net, ArparNet, NSFNet and MilNet) which were the forerunners of the Internet as we know it, were created with an internal focus. It was the opening up of these networks which led to the development of the Internet. Whilst it is exciting and instructive to be occupied with the Internet and its globalising capabilities, it is the original internal focus of the TCP/IP protocol which offers teachers a way forward in using the Internet in their schools. Exactly the same tools that are used to engage on the Net are just as powerful within a private network or LAN. What is more, it is possible to bring the Internet into the LAN in such a way that gives teachers control of student access to the Web without the expense of elaborate tools or filters. The use of an Intranet can empower teachers to use the technology of the Internet in their teaching in an interactive way, even with quite limited resources. Just as the Internet has revolutionised information sharing between networks and various computer environments, so the Intranet can revolutionise information sharing within networks.

Whilst the last few years have seen an unprecedented fascination with the Internet, the Intranet has become the backbone of the corporate revolution (Rotenstein, 1996, p.48; Withers, 1996). Companies and government departments have realised the corporate power of being able to build communication within their network, either on a LAN or a Wide Area Network (WAN). The software used on Intranets is the same as used on the Internet, but more recently a new type of software has been developed which is known as “groupware”. Groupware includes electronic mail, shared databases and electronic forms handling which is destined to change the way information moves within a company. Whilst it is not the purpose of this paper to demonstrate this corporate revolution, the fever of discussion related to this phenomenon...
Intranets and Schools

Many schools do not have access to the Internet. The schools that have access to the Internet are constrained by limited resources and simply cannot entertain the idea of giving one or two children individual access to the Internet in school time because it is logistically difficult and inequitable. For the purpose of this paper a scenario of a fictitious ACT school will help illustrate the problem. A possible scenario might be a typical ACT school of approximately 400-600 students, a computer lab and one modem. Very few schools in the ACT have ISDN access or multiple modem access to the Internet. Most schools in the ACT which do have a LAN tend not to network the computers for any other purpose than to share a printer.

If a typical ACT school desired to give students access to the Internet in school time in half hour sessions each child would only be on-line for five sessions in a school year. This suggested scenario assumes the following: the smooth running of the school; the possibility of a fail-proof server; time allocation to teach students how to use the Internet; smooth time-tabling and the constant running of a reliable modem. In the normal day-to-day running of such a school it is more than likely that the average student would not get such access and in reality would possibly get access to one half hour session per year.

The whole question of student access to the Internet was the subject of Downes’ study (Bersten, 1996, p. 38) which showed that the Internet is not yet part of the lives of children. In the realities of school life, even in those schools which have good ISDN Internet access, very few children get ready access to the Internet even when it is controlled with filtering software. In a recent comparative study conducted in three ACT schools, supposedly selected for their priority in incorporating the use of the Internet in teaching, it was discovered that there is a significant chasm between the espoused theory of schools regarding their use of the Internet in teaching and their theory-in-use (Long, 1996, http://education.canberra.edu.au/negotiating/home.html). In these schools many of the prohibitive factors listed at the opening of this paper were real constraints on the possibility of incorporating the use of the Internet in teaching. It is the proposal of this paper that some of these constraints can be overcome by the development of an Intranet in a school.

Rutkowski’s (1996, p. 2) investigation of the importance of Intranets for schooling is instructive, illustrating ways that “Intranets bring new cost-efficiencies to schools and can also bring new opportunities for teaching, learning and managing educational systems”. Intranets can help bring together the limited power of multi-platforms in schools and the limited computer power available. Most of the computer power in schools cannot be upgraded and many believe that the power of the Internet is beyond their school’s reach because a lack of funds in the current political climate. Those schools which are prominent in the media for their use of the Internet are often the well funded exception rather than the rule. Teachers in schools of average resources know such technological “dream stories” are beyond their reach. The school which will be discussed later in this paper is not such a “dream” school and has never received special funding nor is it placed in a socioeconomic locality which might assist special funding through parent community resources.

Typically schools which have a LAN use this to access a common printer or CD stacker. Even in schools with CD stackers the machines in the network need to be quite powerful in order for more than 6 or so terminals to access the CD at once with reasonable speed. The Intranet documented in this paper is not of this variety. Its configuration can support such processes but it is fundamentally designed to bring the Internet into the learning of the children in a more accessible manner.

An Intranet typically uses a host computer to house special programs, databases and files which the other computers can access through the network. The client machines in the network, either in a lab or classroom, do not require as much speed or capacity as they might as stand-alones, without the benefit of a connection to the more powerful host. Intranets are very well suited to run Web browsers because network speeds are up to 100 times faster than the Internet. All the capability of running Internet technology such as Netscape, email, data sharing, Muds (Multi-User Dimensions/Dialogues like interactive role playing and simulation games - Moos, Mucks, Muse, Mush) and chats (online real time conversations) are enhanced on an Intranet because of better...
control and network speed. The use of indexed sites, in-class and inter-class mailing lists, data sharing, Muds and Moos is something the web director helps to create and maintain.

Whilst an Intranet can provide a new means for presenting class materials and curriculum at one level it can also open up new ways of handling administrative matters such as assessment, student records, daily memos, community communications and human relations functions. Whilst these uses of a network are not new the recent capability to download whole Internet sites through a program called “WebWhacker” has brought the possibility for a total change in perspective for resource limited schools.

Intranets, Security and WebWhacker

Intranets provide greater security, through filtering out any unwanted visitors and unwanted web sites. This can be done using such programs as WebWhacker, which allows the Intranet controller to “whack” down whole sites (including links if desired) off the Web and place them on the host computer. The students can then engage those sites from any terminal in the Intranet without any necessity for modems or filtering tools. In affect a teacher can locate a site suitable for their needs, set the computer to pull that site down off the Web have that whole site in one folder on the host computer. Similarly the teacher could set WebWacker overnight to extract large sites. The program is very simple and inexpensive and revolutionises the power of the Intranet as an Internet simulator. At Giralang Primary School, which will be studied shortly in this paper, students are able to access a large number of “whacked” sites which have been selected according to the school curriculum. The students engage Internet information this way in a controlled environment at much faster than Internet speed and get the opportunity to navigate, write and engage the Internet in a realistic way.

This system of bringing down relevant sites off the Internet for use on the Intranet eliminates the need for firewall technology and expensive filtering software. In this way teachers use the school’s modem (or modems) at home or after hours and the software program to work for them whilst they do other things. The students are given the gateway to the Internet without the threat of access to undesirable Web material. WebWhacker is a product of ForeFront Group, Inc. and can be purchased readily at most software outlets.

Learning using Internets

The desire to increase student access to Internet technology through an Intranet demands a shift in focus, first in how one browses the Internet (searching for information to download to the server) usage) and more emphasis on information literacy, that is, the mastering of information problem-solving skills. Information literacy is one of the five essential competencies for solid job performance according to the US Department of Labor Secretary’s Commission on Achieving Necessary Skills (SCANS). Learning which results from the use of multiple resources is often referred to as “resource-based learning”. Resource-based learning requires that students are effective users of information regardless of format. To become effective information users students must have frequent opportunities to handle all kinds of information. Locating, interpreting, analysing, synthesising, evaluating and communicating information should become a part of every subject across the curriculum (WEMA, 1996). In an effective electronic information literacy curriculum, the student’s experience with information moves away from learning traditional library location skills taught in isolation. Rather, the student learns information literacy embedded in the core curriculum. This demands that students have adequate access to Information Technology (IT). The establishment of an Intranet enhances the opportunities for students to develop information literacy skills.

Intranets do require some strategic planning. They will require new personnel, new support structures and some organisational change. In this regard a bold and new sense of leadership is essential. The principal of a school need not be a “techno geek” but must be willing to empower others and not walk away from its decentralising power. The principal ought to be able to embrace the technology without fear and must be able to consult others regarding the wisest options in IT expenditure. This last point is crucial because changes in technology are so
rapid and commitments to expenditure in projected budgets can be outdated and on the wrong track by the time the equipment is purchased. It is sad to see some school bodies work very hard for funds to buy IT equipment only to see the investment gather cobwebs in 12 months time.

**Giralang Primary School, ACT - A Case Study**

Giralang Primary School is a small primary school with approximately 380 students in the northern suburbs of Canberra. It has not received special funding for IT and has a declining enrolment due to demographic constraints. Greg Smith is a teacher at Giralang who was appointed as IT coordinator in 1995. Previously Smith had been a teacher at nearby Hall Primary School. Whilst at Hall Smith had taken an interest in Bulletin Board Systems (BBS) and had used that particular technology with his students using the First Class Communication Protocol (FCCP). When he moved to Giralang Smith developed the use of BBS technology to establish an Intranet of sorts using FCCP. The Giralang BBS was used as an internal mail service for staff and students and some access made to wider BBS outside through the use of a modem.

When Smith first went to Giralang the school had 22 Mac LC II (4/40) computers, 2 Mac Classics and a small lab of Apple IIe computers (which were later sold). The Macs were networked as a LAN using Local Talk, having common access to a printer. It was in early 1995 that the principal of Giralang on return from a conference, became enthused about the possibility of establishing an internal BBS at the school. Smith’s previous experience at Hall enabled this to happen and a Classic computer was set up as a BBS server. The use of FCCP enabled low level technology, low cost, low bandwidth equipment to link the computers together exchanging mail, graphics and live chats. It also enabled students and staff to download from other FCCP sites throughout the world through BBS archives, and to upload student’s work. The evolution of the TCP/IP revolution and the introduction of Mosaic and later Netscape led to the adaptation of that system to the Giralang network and hence the beginning of the Giralang Primary School Intranet.

In 1996 Giralang had moved from using HTTP freeware to manage the Intranet with both TCP/IP protocol and FCCP operating as an internal network. In the early part of 1996 the network was managed through WebStar using a FileMaker Pro interface for the exchanging of forms, database information, database research, data collation, image mapping, Netscaped sites and site searching. The school does not have an ethernet based network as yet but has made the most of the limited in-built Macintosh Local Talk system. The host (server) computer is a small Macintosh Classic which has numerous “whacked” sites on it which the students access. At Giralang, staff and students currently: exchange email using Apple Internet Mail Server 1.1(AIMS 1.1); communicate with each other and submit work using email; exchange work and data using CGI scripted forms and browse whacked sites using Netscape. At a staff only level the following have become integral to the running of the school: a behaviour management database; a daily news sheet and a professional development area. All of these operations are enhanced by the use of data bases and CGI scripts which convert Netscape into a powerful interactive educational tool.

The majority of the computers on the Giralang Intranet are located in the library which provides an information literacy context for the physical structure of the Intranet. Some computers are also located in hubs in class units. The location of the Intranet in the library completes the electronic aspect of a total information literacy program in the school.

The outcomes of the program are as follows:

1. Students have increased access to Internet tools and information.
2. Staff have increased their interest and use of Internet technology in their teaching.
3. Students personal relationships and support structures have been strengthened.
4. Students have developed skills in Web page construction.
5. Staff relationships, administration and communications have been enhanced.
6. Behaviour management implementation has been improved.

The Intranet allows the students to interact at a variety of levels: students are able to become Webmasters as they manipulate the Intranet using Nestscape; they are able to research and enter data in a multi-user data base and collaborate in research; gather and interact with data as they use forms and exchange images and establish personal home pages on the Intranet Web using HTML. In this way the possibilities for the enhancement of information literacy skills are encouraged.

The power of this learning tool is currently being used with undergraduate students in Studies of Society and Environment in the Faculty of Education at the University of Canberra in an IT module which forms part of the unit. The Faculty Intranet site can be experienced at http://137.92.29.130/intranet/default.html (a “snapshot” of the Giralang site is also available at this address).

**REFERENCES**

Bersten, R. (1996) Internet for eight year olds Internet.au August

**ELECTRONIC REFERENCES**
