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Surfing the Internet for Teachers

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Introduction

In 1991, the National Computer Board, in response to the government's plan for the future of Singapore, came out with a proposal to make Singapore island technologically an "intelligent" country. In their vision, called "IT2000: Vision of the Intelligent Island" Singapore will be among the first countries in the world with an advanced nationwide information infrastructure that will allow computers in the home, office, school, factory to be interconnected to one another and to other computers located elsewhere in the world (NCB, 1992). When the IT [Information Technology] infrastructure is in place, Singaporeans will be able to tap into huge pool of electronically stored information and services. Data in the form of text, sound, pictures, video and other forms of media will be able to be transmitted through the high capacity and high speed nationwide information infrastructure that connects all homes, factories, schools and offices.

IT2000 and Education

IT2000 is intended to impact teaching and learning in schools. Learning will no longer be confined to only the classroom as students will be involved in "global learning". That is, students through their computers in the classrooms will be able to use the Internet to access many global information sources. For example, users might wish to access the database of satellite pictures made available by NASA, or to check the latest program guide from the BBC *World Service,* or to download digital copies of paintings from the Louvre Museum electronic collection, or to access songs from the huge digital library of Chinese music held by the University of North Carolina (US). There are literally tens of thousands Internet sites potentially accessible by

the internet user, many rich in educational treasures. Additionally, users will be able to access information databases residing in various parts of the world, conference with their counterparts from other regions, and access world wide library systems. With the adoption of the innovative *Student's and Teacher's Workbench* (STW), schools will find such Internet connections integral to a composite computer-based instructional environment. Both students and teachers using the STW will be able to communicate with their counterparts from other regions, read the lastest news from bulletin boards, gain access to vast amount of digital multimedia materials on the system and from worldwide system to prepare their assignment or lessons (Ho, 1994).

Planning by education policy-makers is already beginning intended to expedite school use of this global "information superhighway." A recent article (*Petir*, 1994) presents the views of Dr Aline Wong, Minister of State for Health and Education, on some emerging issues in Singapore education:

> "To prepare for the IT age, students can look forward to SMART classrooms, accessing Internet, a computer global network for worldwide information and knowledge, and doing research and projects. Besides content learning, the curriculum will be constantly reviewed to ensure that pupils have opportunities to build up their analytical and problem-solving skills."

With the inclusion of Internet access in schools, however, there is presented a new demand on teachers to equip themselves with the necessary information technology skills to enable them to tap these resources to be more productive and effective. One recent needs assessment paper which looked at the variety of computer skills required of teachers for IT2000 says that, among other skills teachers should be able to "demonstrate the ability to use communication software to gain access to electronic mail and Internet resources for instructional purposes" (Wong & Williams, 1994).

However, after nearly 20 years of studies in the West of how best to get the newer computer-based technologies in schools used both more and more effectively, it is found that the single biggest obstacle to ready adoption is lack of adequate teacher preparation and support. It should not be surprising, really, that teachers often

feel intimidated or overwhelmed by these new devises, often questioning whether the new technologies are really that necessary to their jobs. These teachers thus are typically not very inclined to expend the effort needed to get past the "learning curve." (US Congress, Office of Technology Assessment, 1988).

The current paper

The question addressed in this paper is, given the inevitable introduction of Internet access in all Singapore schools, what is the best way to help prepare teachers to feel at ease and competent with the world opened up by the Internet? That is, are there some ways of gently introducing the new technology to teachers, so to increase the chances it will be fruitfully used?

This paper offers a four-stage scheme to facilitate the interest of teachers in what the Internet has to offer, and which would eventually provide them with opportunities to hone their skills at actually "navigating" Internet resources and including those resources and other Internet capabilities in their professional work. Specificially, the four stages describe the needs which must be met at different points in the process of teachers acquiring their Internet awareness and skills. The four stages of needs are in the following order: 1) **Needs for Infrastructure Setup;** *2)* **Needs for Teachers' Awareness and Interest; 3) Needs for Teachers' Skills;** and 4) **Integration of Internet Skills into the Curriculum.**

These stages of needs must be addressed in a certain order because the acquisition process is a developmental one. That is, each stage builds upon the satisfactory implementation of the earlier ones. A metaphor for this process is like a river with many tributaries. The first stage of needs (Infrastructure) is the core of the river and presents the basis of the process. Nothing else can flow if Infrastructure is ignored. Stage two (Teachers' Awareness and Interest) and later, stage three (Teachers' Skills) in that order contribute to the process only after Infrastructure issues are addressed. Finally, When the first three stages of needs are properly dealt with, the whole system is prepared for the last stage, namely integrating Internet

capabilities and resources into the curriculum. The following figure gives illustration to the metaphor:

Needs for
Infrastructure setup

Needs for
Teachers'
Awareness

Needs for
Teachers'skills

Integration into Education
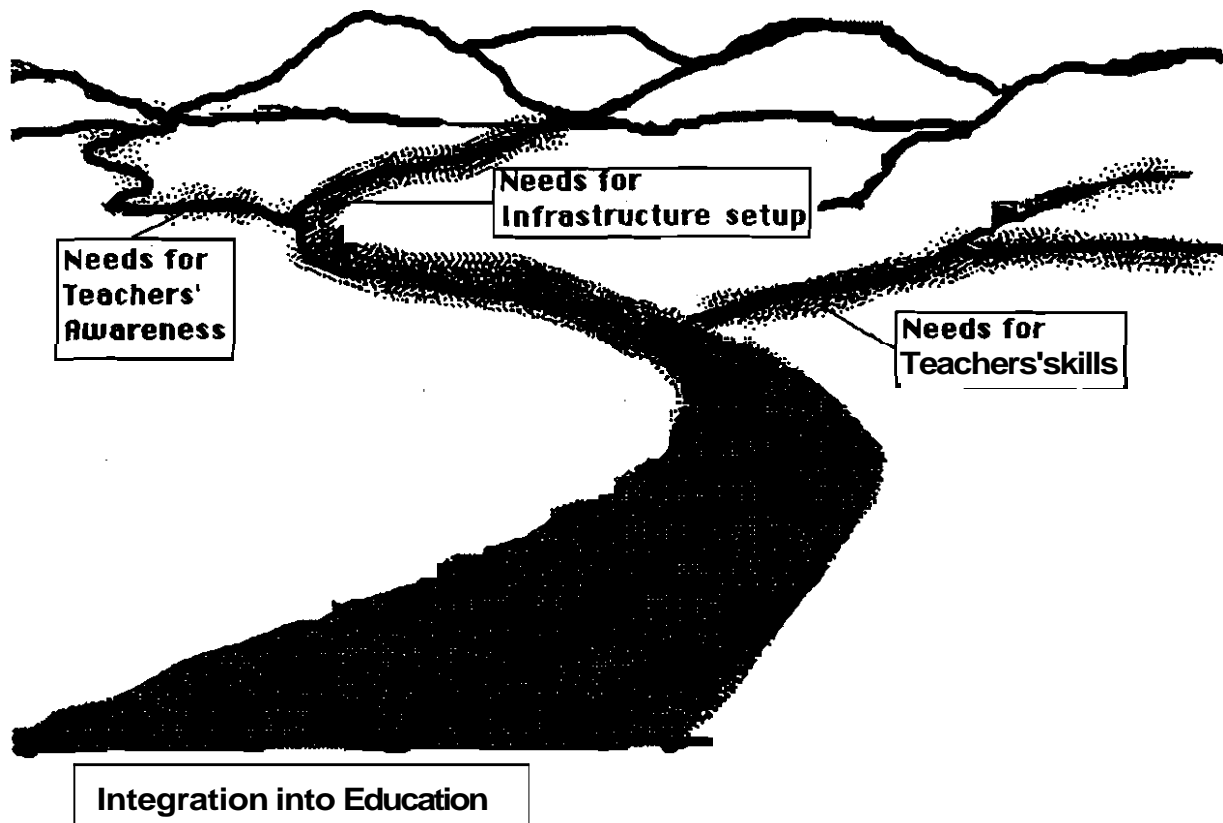
The four stages of needs

Stage 1. **Prepare the infrastructure.** A sure way for teachers to get "burned" trying to learn new educational technologies is to offer tools which are inadequate for the tasks at hand. Transfer of information across Internet sources requires both high-speed computer and communications systems. In addition, software used to navigate the Internet must be easy to use.

It should be obvious that teachers will not be likely to use any innovative educational technology which is unreliable or is technically difficult to manage. Nor should they be expected to. They trained as teachers, not as computer scientists or engineers. It is a school administraror's responsibility to ensure that proper equipment is installed, and just as importantly, is maintained. It is important to note that ANY obstacle or hindrance teachers encounter when using a new technology will reduce the chances they will want to use it at all.

Certain cost-cutting decisions which in the short-term might seen prudent are in the long-term cost-inefficient and will likely result in the equipment sitting idle and ignored by teachers. Computer configurations should be adequate for the Internet tasks of at least the next couple years. These requirements include:

Adequate *network links.* To begin with, this might mean planning to provide enough available phone lines, modem setups, and accounts with Internet providers (such as *SingNet* from Singapore Telecom) to meet the demand by teachers for Internet connections. Eventually, when STW comes on-line (and schools are "hardwired" into the island network), it will mean providing enough network ports in the school to minimise "traffic jams" on the network.

Adequate computer hardware. Since the most useful areas of the Internet for teachers involve accessing multimedia data sources (pictures, sounds, videos), the computers which will be available to teachers need to have the capacity to handle such data. This means planning for fully configured multimedia computers (sound and video capabilities) with at LEAST 8 Mb of RAM, preferably 16 Mb. Some PC-type computers may need to be bundled with a variety of sound and video "cards" in order to handle multimedia data, and have their RAM capacity increased. Other machines such as Macintosh are designed with multimedia capabilities built-in and need little extra hardware to handle these data types.

Technical Support. A common response among teachers who are asked why they do not use certain high-tech educational technologies is that too often when they try to use them in their teaching something goes wrong with the system. "I tried to use the new technologies, but when they don't work properly I get really nervous about using them at all. It is not worth the worry or the effort," is a frequent and legitimate complaint. Most teachers are willing to learn, but are not willing to stick their necks out, particularly when they are faced with a room full of expectant students. This highlights perhaps the most crucial requirement for engaging the enthusiasm of teachers toward the new technologies: technical support. But technicians are not always readily available for troubleshooting problems with the hardware or software. Alternatives for addressing this problem include: making sure teachers have enough time to

"practice" with the technologies; encouraging members of staff who have a particular interest in computers to become available for occasional troubleshooting; purchasing hardware and software which required extremely low maintenance, such as Macintosh computers.

When teachers attempt to use Internet for their own use away from the classroom, technical problems might be inconvenient or annoying. But when teachers encounter technical difficulties using Internet live in the classroom, technical problems might spell disaster.

Unfortunately, though, no amount of rehearsal or technical support can solve some of the rather common problems which may occur when teachers use the Internet in their classrooms. Some of the typical problems which might occur include: 1) network traffic jams - that is, at certain peak times the network is painfully slow to operate resulting in frustrating delays in obtaining information over the net; 2) sites disappearing - that is, occasionally an Internet site a teacher visited last week may have disappeared this week, potentially leaving the teacher with no where to go during a carefully planned lesson; 3) system fragility - that is, once in a while (particularly when visiting overseas sites) network connections will break or browser software will lock up at the wrong times, requiring perhaps several restarts at a connection until one is finally made.

Teachers cannot usually prevent these types of problems. However, being aware that such problems may occur during any "live" Internet session might encourage teachers to provide contingency plans should things not go as intended. If these types of activities are to be used in classrooms it is imperative that teachers plan and provide for stand-by classroom activities which can be pulled out and implemented should these problems occur.

Stage 2. **Teacher awareness.** This is a phase during which teachers are "sold" the capabilities of Internet. That is, unless teachers can see the usefulness of connecting to Internet resources, they will be unlikely to invest any effort in developing the skills required.

It is a truism that unless teachers are motivated to learn about a new area, they will be disinclined to spend the time and energy to

acquire the new skills. Even if they are required to do so, their learning will probably not be as thorough as if they had a personal or professional interest in new information. Just because Internet is in the press so frequently these days does not automatically mean a teacher will want to learn how to use it. Jumping on the Internet bandwagon may not be a satisfactory reason for many to invest time and effort. Frankly, the notion that students need to learn about IT to prepare them for the world of the 21st century will not be nearly as big a factor in teachers' willingness to learn how to use Internet, as will be arguments about how Internet can improve their work or personal lives. Teachers need to be convinced that it is beneficial for them to take the time necessary to become Internet literate.

In order for their interest to be piqued, attention should be paid to the *relevance* of Internet to their jobs, to how it will enhance their teaching effectiveness and efficiency, to how it will make their classroom duties more enjoyable, and to how the learning of a new educational technology will NOT make their jobs more difficult, but will instead help them to become better teachers.

As a starting point, teachers need a simple exposure to what the Internet is. An in-service workshop where the presenter can demonstrate how easy it is to browse the Internet to locate resources would go a long way to overcome any initial anxieties of the teacher.

Additionally, testimonials from other teachers who use the Internet will perhaps be as or more effective at "selling" the system than would outside "experts." Experts can be very useful during skills training, but to engage the enthusiasm of the staff in such a project and to help allay their fears, a peer teacher with personal experiences which other teachers can identify with might be more effective.

The benefits of using the Internet need to be clearly explained. The ability to access global resources on a huge array of topics, to communicate directly with colleagues around the world and share information with them, to add an international perspective to student learning, all need to be demonstrated clearly to the teacher. Perhaps books and videos on Internet might be made available for teachers to peruse.

Stage 3. **Development of user skills.** Internet software applications ("browsers") are quite easy to learn and use from a technical point of view, certainly much easier to learn than common word processor or graphic programs. If a teacher is generally computer literate, even minimally so, with a very short session at the computer a teacher will be able to master 90 percent of the features of most browsers. These software features include assistance in answering such questions as "How do I find places on the Internet which have useful information?" "Once I locate the information, what do I do with it? (Read it?, Download it?)"

Other kinds of questions, however, are a little bit more complicated to answer, such as "What kinds of strategies can I use to track down specific information?" "How do I keep from getting lost?" These are questions of *strategy* in using the Internet. And it is these questions which prove the thorniest in terms of users developing skills. to address them.

Some of the most common problems with developing Internet skills are not with learning the basics of the software; rather, more frequent problems have to do with the fact that the Internet provides so many (some might say too many) choices. This results in what is called the problem of "learner-control."

Most tools for using the Internet are designed for maximum freedom of navigation by the users, and thus pose severe problems of learner-control for both teachers and students. Instead of feeling "in charge" of their Internet explorations, it is not unusual for users not experienced in browsing these information systems to feel lost, frustrated, anxious, even angry at not being able to intuit how the whole thing is supposed to help them. Fortunately, given a little perserverance by the user, this type of problem usually goes away when the user gets some experience with the Internet. Unfortunately, in our experience, their is little than can be done to circumvent the problem in beginning skills training courses. However, it is important to be aware that the phenomenon exists and is fairly common. Then learing situations may be constructed for both teachers and their students to at least minimise problems of "learner-control".

So how can teachers develop these Internet basic skills and browsing strategies? For beginning teachers in Singapore, Internet skills are now taught as a formal part of their preparation in the use of educational technologies. As of the 1995-96 academic year all teacher trainees at NIE will be given basic instruction in using a browser to "surf" the Internet. They will leave NIE with simple competencies in locating Internet sites, in downloading files, and in conducting general searches of the net.

Current teachers, however, will need to acquire their Internet skills in a different fashion. Certainly, some teachers will be subscribing to an Internet provider for use with their home computers. In this way, they will develop Internet surfing skills on their own during their personal time. Other teachers, however, will need to develop their skills through another means. One effective way is to engage an outside expert, for example from CDIS, to come into the school to conduct an in-service workshop for the teachers. .

Another way a school can promote Internet skill development is through what might be called the "multiplier effect." That is, in a school one or two teachers might volunteer or be selected to be the school's designated "Internet Guru". This person would be encouraged and trained in Internet skills in order to propagate them to other staff in the school, perhaps informally, perhaps in structured in-service workshops. In this way, training of one teacher might in the end have the effect of training many staff in the school.

Stage **4. Integration of Internet into the curriculum.** Once the hardware and software resources are in place, and a teacher has both the interest and the skills to access and use the Internet, they need to be helped to bring their ideas for integrating Internet capabilities and resources into their lesson planning and delivery. This is, of course, the overall goal in the first place of introducing teachers to the Internet.

At this point teachers should know the technical system is functional and reliable, have an interest and awareness of what the Internet can offer, and have the basic skills and strategies to effectively

navigate the Internet. The integration of Internet into the curriculum should be, in theory, quite easy at this point.

But sometimes traditional teaching habits have a way of persisting even in the face of demonstrably effective educatinal innovations. So here too, one should not automatically assume teachers will be clever enough to quickly see the possible applications of the Internet to their own classrooms and their own lessons. Essentially, they need more *ideas.* This brings up the philosophy behind so much of the creation enduring life of the internet: the idea of *sharing.*

The Internet is premised on the idea that knowledge is (or at least should be) free. A quick perusal of some key educational sites on the net will give teachers a tremendous amount of ideas, much of it generated by other teachers around the world. Repositories of lesson plans and multimedia resources, postings and notices by teacher-oriented newsgroups, sites containing projects and correspondences from school children from around the world, and of course, personal e-mail with other teachers in other cities and countries, all should spark the imaginations of any teacher looking to do something different in their classrooms.

However, there is another aspect the Internet philosophy. That is that users are *obligated* to share their own ideas and resources with other users. Tht is, don't just take from the internet; give, also. The Internet is a sharing community and for it to sustain, teachers who use the net need to adopt the attitude that they will contribute their own ideas and resources to the net in the spirit of maintaining the Internet community among teachers.

Conclusion

Attention to the four stages of needs presented here is viewed as crucial if a school is to be able to position itself to take advantage of the information revolution occurring in Singapore and around the world. School administrators would be advised not to simply hope that teachers will somehow generate the proper interest in the Internet or to attain Internet skills all by themselves and on their own. Much research has been done to show that administrative support is a

critical element in teachers willingness to adopt educational innovations. The model presented here intended to assist administrators who are thinking about the future of technology implementation in their schools.

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