What is LINK2?

First we should think about what the networks of the future would look like;   The networks of the future will be what the 6-year olds of today want them to be. If we wish to plan for them then perhaps we should think like 6-year olds for a moment.

Let's think about kids and objects and computers.   Children deal with objects.   Toys, books, clothes, dolls, sports equipment can all be worn, torn, broken, and , at the end of the day, be put away.   They are visible, usable, modifiable, and storable. They are Things The Child will   put a ball back in the toybox.   If they cannot find the toybox, they put it somewhere else.   If something interrupts them in their play, well, they   may just drop what they are doing and change game, forgetting perhaps to put away their previous toys.

Envisage a network working along these lines.

In some ways the computer engineers are trying to do precisely this. They are trying to build "lenient" systems, systems even a child can use.
Let me illustrate:

From "byte" magazine, December 1992, page 158 .   A feature article on the Brave New Desktop,   dealing with changes in the operating systems.

"Traditional operating systems force you to distinguish between where data is stored   and where you work on it, and between a file and the application used to manipulate it. ....(In the object-oriented operating systems)... there is no distinction between these locations....Likewise, there is no distinction between a file and the application used to manipulate it--there are only documents. The applicaton and the data it's working with merge and become one.   You just turn a page and start to work."

A child with paper, pencil, and glue would fit right into this style of operating system. When the child looks at the paper he does not think "I need a pencil", but , rather, "I wish to draw".   In most cases he will pick up any utensil at hand, so long as his wish can be fulfilled.   If he has a choice, he may have preferences, but if he has none he may use anything at hand, even a pair of scissors.   But he may also wish to "share" that drawing.   Posting it on the wall, or just placing it on the table may accomplish this.   Not so easy with computers but we are soon approaching this possibility.

From "Byte" magazine, special issue, Spring'93, page 32, "workgroups by the numbers"

"In the never ending quest to increase PC productivity, organisations large and small are moving beyond   file and printer sharing and into the realm of workgroups computing.   Microsoft's Windows for Workgroups is a unique product designed to fit right in with the way most people work today: as groups cooperating on shared tasks."

Let us think about this for a moment.   Both quotes deal with visions of the   future of

computing.   They are   talking about some major innovations in the way we plan to be able to use computers.

They also state the obvious.   Tomorrow computers will enable us to work and think much as we do today. I am talking about our "style" of thinking.   There is no doubt that computers and networks will make distances negligible, or make time constraints irrelevant.   They will not however   affect our style of thinking, rather it will tend to work as we think, to actually think as we think.

From "byte" magazine, December 1992, page 152.   A feature article on the Brave New Desktop, dealing with changes in the operating systems.

"Bill Verplank, one of the designers of the Xerox Star, the first commercial computer with a GUI, recalls, "At Xerox, we never wanted the user to see the workings of application .   With The DOI (document oriented Interface), there would only be documents and folders; you create or get frames and put them into documents.   YOu wouldn't have to deal with seperate applications.""

This "document" will be our network of the future.   It will be comprised of sounds, graphics, text, spreadsheet calculations. It will be searchable via database format, It will include movies and music, and voice annotations.   These various parts will not need to reside on our desktop computers.   They may reside across the continent.   A "document" will have sounds from Texas, text from Toronto, graphics from California, Stock quotes from The Dow Jones, Movies by a training group from North Dakota.   Our document will not actually "contain" these parts.   It will contain "pointers" to these parts.   It will know how to display them when someone reads your document.   It may even know how to footnote itself automatically so that each part retains information about it's location, author, and any copyright information needed.   This document will be a specific subset of our own "knowledge web".   This document may even be included in somebody else's "knowledge web".

What software can you presently use in your schools that will allow your students to start thinking of "documents" in this fashion?

To Plan for working with tomorrow's document based networks entails three things:
A.   We will need the hardware and network software to enable such communication

to take place.
B.   We will need to "train" teachers and children in this new method of computing.

C.   We will need to integrate the work on the network into the school curriculum

In a real sense these three points have haunted us for a few decades now.   We are at the precipice once again, and most everything must be started over again.
The major players ,IBM, Apple, Microsoft are taking care of point A.   But there is still much work to be done. It could be many years before you actually have this type of network in most schools.   It would be normal to assume that point A must be realised before point B.   You must

have the networks available before you can train people to use them?

I propose here to turn that around.   I propose to "train" teachers and students on "document"- based networks BEFORE the networks are in place.

It's easy: It's fun. Let's pretend that we have this futuristic network already set up and working, we'll call it LINK2!
What is LINK2?   An Asynchronous multi-user document-based network.
Asynchronous: only one user may use it at a time, not simultaneously.
Multi-User: As many users may use it as you wish, in turn.
Document based: because it never deals with files, or disks, or applications, and it incorporates objects which are not actually present on the page itself.

What do we need to set up this network?

One computer.   Specifically a Mac Plus (or better) with a hard disk, and   a printer.

If you can afford this equipment, then you can start planning for tomorrow's networks today. When those networks become active,   you, and your students, can then make the transition easier.

The strength of the LINK2 simulation is that it does not simulate any specific network.   LINK2 is aimed at instilling in the children a "sense" of networking.   The culture of "sharing of work" and "contribution" of each individual to permanent data structures is what must be fostered. Many a time the networking capabilities are created without this culture evolving at the same time.   Many a time the difficulties in the "network-ing" interface interferes with the "sharing" of information.

One can have an Internet connection in a school, and yet find that it is seldom used as it is too difficult for the children to navigate.   To have 100,000 files   accessible for sharing, and a million messages to read, may be a daunting tunnel of horrors for children who have no refined database search skills yet.   Until they develop these skills the costs of the connect-time may not be optimally used.   One solution to this could be to create simulated "network connections" for the children to use before connecting to the real-time network.   This would train them for using that specific network.   This may solve time and money in the long run.

One of the problems with this solution is that it may be too specific.   A child who learns to navigate the Internet conferences, may find himself at a disadvantage when he moves to a new school that has a connection to some other type of service.   He will now have to learn the new interface and command structure of this new network.   Unfortunately this would be the case whenever the connections are not the same across all schools, across all boards, across the province, and country.   This problem is further exacerbated by having different computer platforms available in different school districts.

Let me present the problem this way.   If you wish children to leave messages and share

information with others then you must give them a tool which enables and empowers them to do this in as simple a manner as possible.   If this tool was to look the same across all systems, and all networks, then this tool, and the skills related to it, would be totally transferable.   The student would retain this tool wherever they end up.   Unfortunately this tool does not yet exist,   it has yet to be conceived, planned for, and created.   Only the transition to a document-based operating system will allow for this.

A document-based network will allow us to apply the same tool to a "document" across different networks.   LINK2 was designed to closely approximate this type of operating system and teach the children to recognize the presence of the same general tools across different points of a network.   They will then learn that applying a type of tool to a message, a document, a story, a project, a keyword index in a database, will have different results, but that it functions in the same manner.   The end result   will look like this: The child learns what "finding" something may mean.   They will learn how to optimize their search techniques to make the search less time consuming.   Once this skill is learned, it is a simple matter to see what the "find" technique is on a different system.   In this way we have concentrated on the "find" process as a thought process, rather than a "machine- or system-specific" process. The thought process remains even after we have changed the networks as a series of connected computers running network software on shared operating systems, whereby the users can share information, files, messages and perhaps work simultaneously on shared tasks.   One of the basic problems with many of the file-sharing systems of today is that it asks too much of the user.   Whether it is Workgroup for Windows, or the AppleShare model, there are too many decisions for the user to make in terms of access priveleges. Compare these to the description of the document-oriented-Interface described above.   If you think of all objects as containing their own access priveleges automatically upon creation then you have bypassed most of this problem at the outset. This is the manner in which LINK2 deals with access priveleges.   It is a transparent model following only one simple rule.

If it is visible and exists on the network then it is "sharable".
A "sharable" object can be copied, pasted, used over and over,   modified and referenced. However a second rule comes into play here:

Only You can   modify, or delete, what you have created.
All objects are "protected", i.e. the author is the only one who can do something to the object itself.   All others may only work with copies of that object.   Once the second user has "created" this copy of an object then this new object is "theirs".

Two simple rules to set up a network with.   It should be noted that all this is taken care of without any administrator intervention at all.   The administrator is needed only for the set-up, and censorship of the system itself.   In this way the teacher is freed from administrative duties and allowed to concentrate on the pedagogical objetives involved in "networking" the students together.

What makes LINK2 even better then some true "networks" in use today.?

A few features of LINK2 should be noted here.

LINK2 does not need much in terms of Hardware. (Cost)

LINK2 does not need much in terms of administrator control or training.(Cost & time)
LINK2 functions as a "document-based" network operating system TODAY,   while most of the computer world is still deciding upon the standards to follow in creating these types of operating systems, and is still debating on how to envision these "documents".
LINK2 allows for an entire spectrum of objects.   Sounds, graphics, text, databases, libraries, messaging, BBS services, Many of these objects are present in an "Alias" form.   They are not present on the actual document, but are simply pointed to.   This enables the creation of documents which, when within the LINK2 environment, take up ridiculously small amounts of disk and memory space.
LINK2 has been specifically designed to run on the most basic of Macintosh systems in operation today, and is thus available for use in any school which has a simple (Mac) home computer system available.
LINK2 can even be used in a site where a network is presently installed.   It could function as an introduction to what the networks of the future may look like, and what "cooperative brainstorming and document creation" would be like without the constraints of present systems.