A Conversation about LINK2, some thoughts about the future:

Why LINK2© ?

In the “Information Age” we are finding that data is an easy thing to come by. An hour on the Internet, or even a local BBS will fill disks with reams of “data”. Perhaps some hours will be needed to sort through the received data. More importantly, it will take consummate skill to re-order, link, and make “useful” such data. Our “Information Age” will depend on the individual “knowledge webs” we create at personal levels. It is to the development of the skills necessary for the creation of these “knowledge webs” , by younger students, that LINK2© is dedicated.

When LINK2© ?

The time for LINK2© is now. We are in the midst of new methods of dealing with information. Computer Operating Systems are undergoing rapid transformations. From the File & Directory metaphors we are traversing the Graphical User Interface stage. The “Desktop” is changing again. It is fleeing the File & Folder stage to arrive at the “alias” stage. We can now deal with representations of our files, a further abstraction, rather than the files themselves. We are approaching a “pretend” interface. (Pretend you found the file and work with it). We are fast approaching the use of Object-Oriented Operating Systems.

What will be the difference? Today, you logged onto an information service in Chicago. You find an interesting file on “Discipline problems in Kindergarten: New methods of dealing with problem children.” Standard practice is to download the file to your local computer, open the file, read it, and glean from it what you will. In most cases you will keep a copy of the original on disk, for reference, possibly with reference to it’s origin. Now you must decide what directory to file it under, which disk to store it on, etc. etc. In the process of using the selected data from this file, you may have to re-access it once again, which means you will have to find it. If you copy parts of it, YOU will have to remember to include all references necessary. Should you decide to copy parts of it again, perhaps in another document, you will have to rummage through your own footnotes, find the reference and transfer that to the new document.

Now Imagine this. You find the article, read it, and decide to copy parts of it. You paste them into a document you are creating. The footnote is created automatically for you.

Or imagine this. You find the article, read it, and decide to refer to parts of it in your document. You LINK the relevant sections in it to the document you are creating. The footnote is created automatically for you.

In the latter two scenarios something has changed. YOU DO NOT NEED TO HAVE THE FILE ON HAND. The original file is still in Chicago! In Fact you will never have to even remember how to find the original. Should you wish to re-read the article you have but to select the salient passage, and “find” it. The computer will know how to log onto the service, find the file, and present you with it.

Consider the difference: In the first scenario you would need to copy and paste the section, with references, into, say, 5 revisions of your document.

In the other scenarios you simply paste the parts of the section you wish to use into any revisions you are working on. Simple, clean, and best of all the computer does most of the work for you.

What will be necessary for this transition to take place? Much work, and a new and more sophisticated conception of files to start with. "Data" will have to be treated as an Encapsulated Object. An Encapsulated Object has these important features:

A: It contains a pointer to it's origin. Both location and original author.
B: It "decides" on modification privileges. Only the original author may actually "change" the object itself.
C: It is "displayable" on any system, irregardless of the application which created it.
D: It need exist as only ONE original copy in archives, whereas multiple users can "refer" to it.
E: It can be a "source" for further manipulation

Some work has already been done with OLE® (Object Linking & Embedding). In some programmes it is possible to place a graphic object, a text object, and other types of objects into a single document. If you select the graphic object you immediately have graphic tools with which to work with, if a text object you have text tools, etc.. You would now apply these tools to the object rather than manipulating the object from within another application. (At least that is how it seems)

It is also presently possible to access another person's computer in the same manner. If you select and open a file on their system it will open on your screen, but it may reside and be property of another user on your network. You may perhaps use, or copy from, it, but you might not have the privilege to change it. The administrator of the network must decide that, or the original author themselves will.

Some work is being done on point D in the form of "Publish and Subscribe"with System 7® on the Macintosh®. In this form it is possible to keep only one file on disk, and "subscribe" to it from multiple documents. Updating the original file also updates all documents which "subscribe" to this original.

Unfortunately point A, about a self-contained pointer has not been dealt with successfully yet. (Not that the others don't still have major problems, but this one is further from realisation at this point.)

Point A is pivotal. When it is realised then the whole inter-connectivity of computing will change. We will migrate from the paper-to-disk methods of today, to a new conception of "documents" themselves. Documents will become true "hypertext", and the "page" metaphors of the Book age will give way to the "Knowledge-webs" of the future.

Much must come to pass before the future arrives. Point A is pivotal; point A is far from being resolved. To even imagine it being integrated with points B to E in the very near future is a little wishful. How then can we help prepare the children for this future?

Most attempts take the form of setting up local networks, or BBS's , or trying to link some computers in a lab in our schools. Without extraordinary resources at your disposal this may seem like an impossible task. To actually "network" efficiently requires much hardware, much administrator dedication, and many a time, heartaches upon seeing the results. To efficiently work on networks, children must learn much about files. Too much! Perhaps if we just pretend everything is easy then it will be: But we must PRETEND in a

very special way.

Let's PRETEND we have a network. Let's call it LINK2!

What LINK2© ?

LINK2 is a model, an idea, a simulation. It is an attempt to tackle as much of points A to E as possible given the limits of today. It is an attempt to show the children what the future may look like, TODAY.

Most importantly, it is an attempt to make the computer think like the child.

Consider this: Imagine an Art Catalogue Database. It contains a series of pictures. You need a picture of a car. You flip through the pages, or search on keywords, for a picture of a car. You see one you wish to use in your document, you copy it, return to your work, and paste it in. You "find" a technical description of this automobile and include this with the picture.
You proceed with your document, finish it and present it to your class as a project on "automobiles in motion". Well done. But what have you actually done. It sort of depends on what you "think" you've done.

Two perspectives exist: the childs' and the adults'. The child saw exactly what we described. The adult may be cognizant of the fact that the student actually accessed a database from Texas for the picture, got the text description of the car from the Ferrari Archives in Modena, Italy, and built a presentation based upon this "data".

If you had to evaluate this presentation what would you base it on? Would it be on the presentation as given in class, or on the methods used to gather information? If the latter is given much weight, then we must consider some objections. Do all students have access in the same manner? Could differences in computers result in a difference of ease of gathering information? Could some of the work be done at home, where some students have what is necessary and some don't? In the best of worlds all students have access to all information all the time. In the best of worlds students would have to be rated on their discrimination in "using" the information which is readily available. In the best of worlds the students would actually be able to contribute to that collection of information, which would then be available to all who follow. In the best of worlds students would constantly build and enlarge their "knowledge webs" throughout their careers as students, and perhaps retain these in their adult years.

We are not yet in the best of worlds. But we can PRETEND WE ARE!

First of all let me get one problem out of the way. What can we lose by pretending to have a world-wide network already built. If you set up a computer, with a dummy modem, and have it dial out to a dummy line, pretend to connect, what do you get. You have the impression of logging into Texas ! If you open up a clip art catalogue now, look at some graphics, copy them and put them into your document, now return to your work, you are left with a distinct impression of having gone a long distance to get them. Digital distances are negligible. Whether you dial in to the house next door, or Texas really matters little, or at least should matter little. The important thing is grabbing the information you need. So what is lost if we pretend in this case? But then much is gained, for now we have the

possibility of organising our network, locally, in a manner that is impossible over real network links.

LINK2 does exactly this. It simulates access to a far-distance network on ONE COMPUTER. It does not simulate access to the typical library catalogue. It gives access to something much more complex and rich, to an Object-Oriented Network.

(This network attempts to deal with all our above points A to E. Only point C needs a minor adjustment. LINK2 is built for the Macintosh Computer, and uses HyperCard as base. Thus it is limited to this platform. However within this platform it follows point C as well. Point A has a few problems as well, but a valid attempt is made here.)

How LINK2©?

A simulated network requires rules:
Most of the regular log-on procedures apply, A user must state his name, leave a small resume about themselves, choose a password. You are now on the net. What to do next!

Remember that we are speaking about students, in grades 4 - 7.

Recent work in Cognitive Psychology indicates that most children start at a “narrative” stage and develop into more mature research techniques. They tend to start with what they know, and only later learn to ask questions about what they do not know, and use these questions to build on their knowledge. The trick here is to make explicit and communicable that child’s own thought processes. Children also “play” with ideas. An interesting thought may carry it’s own momentum and lead a child into research through playfulness rather than by “intentional” design. The interplay of these two approaches approximates what we can call “curiosity”. There is no standard for eliciting a “curious” response from children. Many methods exist. One among them is that of the story-game.

A “story-game” is nothing new. It has existed for ages. Much of it’s vitality resides in the oral tradition of story-telling. In oral story-telling the rhythm, exuberance, facial expressions, audience response, and cultural cohesiveness all play an important part. The story also changes a little with each new audience, with each new telling. Thus it is “owned” by that specific recipient in a particular manner. A History evolves It is a “game” because it involves the recipient as much as the teller. It is unpredictable. We have seen a major shift to this type of story in even the “pick your own adventure” books now available. Some video games, especially the adventure games, follow this same model.

A story, or game, gives children somewhere to start. It is easier to search databases for information to include in a story you are writing, then to search specifically for “space information”. If you ask a child to write a story about space exploration the chances they come up with more information for the story then a presentation are good, albeit not guaranteed.

LINK2, then, has been built, in this incarnation, as a story-building network. Let us call this the “hook”.

WorkGroups and a “story building network” have much in common. WorkGroups computing is, however, directed at the more sophisticated task-oriented users of the business world, or

the students of the higher grades. What is available for the Elementary grade children? WorkGroups should be... but many problems arise. Scheduling, access to computers, hardware requirements , to name a few. But more importantly the child's own ability to focus on the work he is undertaking. Most children would be able to focus on the work if it is treated as a special occasion, say, a cross country linkup with other kids from across Canada to work on a composition for a school play. (What would that cost?). Simultaneous conferencing would be ideal, but.... What about simply having the kids in the same school work together. Now some of the focus may be lost, the children may prefer to work on pencil and paper, a method at which they may excel, and get things done faster than learning all sorts of techniques for working on the computers themselves. Imagine a computer lab filled with 10 children working together on a presentation, each at their own terminal. Would most of the work be done via the computer's screen or via voice? At the Group table, or at separate terminals? If you take away the long-distance aspect, much of the reason for computer use also withers away with WorkGroups.

It withers away unless, of course, they are doing something radically different from what could be done with pencil and paper!

Let us be clear here. RADICALLY DIFFERENT means a higher order of difference in the PRESENTATION of material then a simple shift from paper to videotape. Or from a simple video player to a computer controlled video player sequence. Albeit there is a difference in the flexibility of the materials they still follow one simple rule. The "Presenter" of information and the "Receivers" of information lie on two sides of a wall. The wall is created by the immutability of the information being passed.

Most "interactive" CD-ROM databases are of this type. Multi-Media presentations are still simple presentations. Although the user may choose his own path through the information, in most cases the level of interactivity is already predetermined by the database itself. A child can no more change the digital story than he can the book. He may take different paths through the story, look at different sequences of objects, try out different tools at different points. An imaginative reading can also accomplish this with a typical 20 page booklet!

In most cases Multi-Media is a decided effort to replace the ABSENCE OF THE OTHER PERSON WITH WHOM TO INTERACT. If Dad cannot read you the story, then the computer will?
If the Personnel officer cannot train you then the computer will. This may work well in the second case, but, personally, I would rather have Dad read me my stories....and I wouldn't mind it if he changes it a little now and then...
With Dad I could be bored and he may change something to get me "hooked" again. I may ask "what if" and he could answer. We could, together, make up a whole new chapter and see how it goes. My questions could actually change the story itself. We would now have our "own" story to tell. We would have made History! Some expert systems already exist whereby you can train the computer to handle story-telling. It could even re-write a story for you. But alas, you must first train the computer, and set the rules, before it can do that. (Of course even Dad must be trained, and some rules set, but, that's different.)

History and the Oral Tradition have been linked since time immemorial. History and the Written Word have a vital, albeit younger link. They are linked by Interpretation.

The modern Multi-Media model is a poor cousin by comparison. It tends to force and overwhelm the recipient into submission by technical wizardry. By locking itself from further change, save by the producers themselves, it disconnects itself from the possibility

of the “what if” question, from the very basis of historical decision-making. In the end it is simply another incarnation of the “Presentation” model of information. Nicely engineered Multi-Media relies heavily on the interaction of different media. The more integral and smooth the linking of the media the better the presentation quality. You get your point across more quickly, easily, and more convincingly. But the same goes for Video Games. The more impressive the graphics, the levels of difficulty, the more engrossing, and more profitable, is that game. It is interesting that both Multi-Media and Video-game machines are starting to rely on the same CD-ROM disks. It is a medium which is safe, and it’s contents do not change.

A conversation I had with a Librarian at a school once pointed out an interesting fact. When they installed a CD-ROM based encyclopaedia they found that the children were content with what they found there, and no longer felt the need to refer to the actual books on the shelf! They tended to assume they would get no more that way. As a child I used to leaf through the Book of Knowledge, looking up something in particular, and find, to my surprise, something interesting on an adjacent page. This had nothing to do with my research topic, but…..I spent a joyful hour reading about Johnny Appleseed anyway! Then I got back to work. Until each child has his own personal computer this will not be possible. Something is lost this way. Because of time constraints (mostly due to hardware) this happenstance type of interaction with the medium is almost impossible. Computers are very good at giving you what you asked for. The world, alas, does not always behave that way.

Only one thing is necessary to change all this. THE FINAL PRODUCT MUST BE OPEN-ENDED. This is the only true point where the “radically different” approach can take hold. This is what the paper, or videotape, or videodisc mediums cannot challenge. If you create an open-ended presentation of information, then that information base can change in the actual reception. In a book, page 2 comes before page 3. So too in an open-ended digital story. But in the digital story, there is no guarantee that ONLY page 3 comes after page 2. What if we have Thirty page 3’s? What if, depending on the part of page 2 we focus on, we can have 30 different outcomes? This is much as the “make your own adventure” books are written. The digital story differs from these because even these are already predetermined. What if we could add another page 3 whenever we want, and thus rewrite a portion of the story at whim?

This is the challenge of the digital medium. It is no different if we think in terms of stories, or databases, or information networks. In all cases the links that can be generated between their parts, and the creation of new parts is only limited by the creativity and interactivity of the members themselves. The digital medium will, if used in conjunction with an “open-ended” model, will actually revolutionise the ways we think of documents.
It will challenge the “Presentation” model of Multi-Media and direct our attention towards a more “collaborative” model of access to information.

Apple® has named one of their new environments the “Open Collaboration Environment” (O.C.E.). It will, in effect, begin to confront some of these challenges. It will, however require newer, and more powerful, and expensive, hardware. It will require further training of personnel before it can be used. It will require a complete set of rules for access and user privileges. It will arrive, but it is not here now.

It is possible to have some of this now, even on a lowly Macintosh Plus©.

LINK2© has been designed to enable your students to begin to work with such a model. It requires minimal administrative supervision, and minimal hardware. It does, however, require a dedication to envisioning the use of computers in a creative manner. Really, it requires that we simply look at the computer from the child’s perspective. The Kids are

ready for O.C.E. They are ready to show us some innovative and interesting uses for collaborative efforts incorporating technology. We must not let our own technical unpreparedness get in the way.

The choice is quite clear. Either we “simulate” the future today, or else we continue to teach the children the skills of yesterday. Remember that much of the technology in your classrooms will not be there when your elementary students graduate from High School. It will have been superseded by faster, better computers. Computers which will be capable of much more than we can do today. But the Kids, well, they’ll still be there. We must give them a chance to “think” in open-ended terms, the way they naturally do, rather than constrain them to adapt their mental processes to the technological restrictions of today. The way to that future is not precise, it is not exact. Our own visions may be clouded and obscure. Some ideas may never be realised. Only one thing is sure;

THE WAY TO THAT FUTURE IS OPEN-ENDED!

Requirements for LINK2©

LINK2 is designed to run on any Macintosh Computer with the following specifications.

A. Macintosh OS system versions 6.05 or greater (Available from

Apple)

B. A copy of HyperCard, version 2.1, or HyperCard Player. (Available

from Apple)

C. Sufficient memory to run the system and HyperCard software.

D. A printer.

E. Macintalk installed in System folder. (Available from Apple)

F. An internal Speaker, or external if necessary.

G. A Hard disk (minimum 20 megs) attached to the computer

H. A copy of LINK2 .

If your school already has a Macintosh computer chances are you already have parts A through G. Otherwise parts A, B, E are available free from Apple, and parts C and D and F are considered basic to any Macintosh system. Part G, the Hard disk is also fairly basic, and inexpensive. The entire “network” can thus be set up using the parts already on hand, without having to spend a single cent, other than for LINK2 itself. Setting up the network is as simple as dragging the files onto the hard disk. The only knowledge necessary is to simply know that all the LINK2 files must be placed into a single folder. You click on the stack called “LINK2©” and you have a working “simulated” network immediately.

Perhaps now it should be noted some of the things you do not need!

You do not need:

A. Extra phone lines or any other sort of extra cabling.

B. Any additional hardware other than what would normally be the typical Macintosh personal computer home system.

C. You do not need other computers. Only one is necessary. As many users can have access to it as you wish.

D. You do not need to know anything about files or folders for LINK2.

The entire environment is self-contained, All work is

automatically saved, and available to the user at next log on.

E. You do not need to set access privileges to any parts of the

environment. LINK2 automatically traces an object to it’s creator, and only their authors may modify or delete the original object.

F. You do not need to worry if all computers are properly linked, kinked cables, or unplugged terminators.

G. You do not need to worry about users forgetting to save their work.

H. In the best of senses, you are no longer needed. The system runs itself, and you, now liberated from the administrator's functions, can concentrate on participating with the children on the network itself.

The only skills the children need bring to LINK2 is that of a basic understanding of "selecting, dragging, dropping" objects. The basics of using the text and graphic tools in programmes like MacWrite or Macpaint are also useful, although these may be learned in LINK2 itself.

LINK2 provides a learning environment rich enough for a thoughtful months' work. Or it can be extended for years. The choice is up to the users themselves. Users can log on daily, hourly, or even yearly, if that is their wish. The system requirements are low enough to be accessible to everyone, and the learning environment rich enough to be put to any use the students and teachers negotiate on. The skills the children come away from LINK2 with will certainly reward their time spent on it well.