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From the editor ..

Welcome to the first issue of *Learning Technology* in year 2000, with reports on what is happening in learning technology field worldwide besides documenting the efforts being made in this direction by the Learning Technology Task Force (LTTF)!

I strongly encourage you to browse through LTTF website at http://lttf.ieee.org/ and take active part in various activities. To keep yourself aware with the happenings, please subscribe to LTTF participants list by sending an email to LISTSERV@LISTSERV.READADP.COM with the following in the body of the message (no subject needed):

subscribe LTTF firstname lastname

(Please replace 'firstname' and 'lastname' with your firstname and lastname.)

Besides, I would invite you to contribute your own work in progress, project reports, case studies, and events announcements in this newsletter. For more details, please have a look at author guidelines.

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Call for Proposals to Host the International Conference on Advanced Learning Technologies in 2001

The IEEE Learning Technology Task Force (LTTF) requests proposals to host the International Conference on Advanced Learning Technologies in 2001 (ICALT-2001). ICALT-2001 will be the first in a series of conferences in which the best research in the field of learning technologies will be reported. The Conference will be organized under the auspices of the IEEE Learning Technology Task Force (http://lttf.ieee.org/). The IEEE Computer Society (the parent organisation of LTTF) is expected to be the main sponsor of the conference. **IEEE Computer Society also has specialized staff for managing various conference tasks. Their services can be purchased if required.** Details of IEEE Computer Society sponsorship policies, requirements and conference management related services are available at:
http://www.computer.org/conferences/orgtools.htm

ICALT-2001 will provide opportunities for the cross-fertilization of ideas and information on research and applications in the learning technology field. The technical program will include papers, panels, posters, tutorials, workshops, invited speakers, and possibly other special events.

There will be a two stage submission procedure for proposals to host the conference.

In the stage 1, an informal proposal is requested.

Such informal proposal should contain the following information:

- Proposed organizer(s): name, address, phone number, and e-mail address
- Proposed location: geographic site and proposed conference facilities

- Proposed time: when would the conference be held
- Advantages of the proposed location: a short paragraph
- Strengths of the proposed organizers: a short paragraph

The informal proposal should be submitted to the Executive Committee of IEEE Learning Technology Task Force at the following e-mail address:
lttf-ec-request@listserv.readadp.com

The proposal will be distributed to the LTTF Executive Committee. The Executive Committee will then discuss the informal proposal and will then select one or two proposals to go on to stage 2 where more information will be required. LTTF Executive Committee will then select the final proposal and shall forward it to IEEE Computer Society for sponsorship approval. The detailed stage 2 submission guidelines are provided below so as to give prospective conference organizers an idea of what will be required to put on a successful ICALT conference in 2001.

The deadlines are as follows:

- Stage 1: expression of interest: submit by February 29, 2000
- Executive Committee will indicate finalists: decision by March 15, 2000
- Stage 2: detailed final proposal: submit by April 30, 2000
- Executive Committee will decide final conference site: decision by May 20, 2000

Detailed Final Proposal Guidelines

As the ICALT Conference is aimed at exchange of ideas and research results, preferably the host site should also be actively engaged in learning technology research/implementation. Informality has priority over comfort and low financial thresholds are preferred to elaborate arrangements. Realistic budgeting, which will include funding from IEEE Computer Society (as main sponsor) and other external sources, should target a break-even point of about 100 attendees, but facilities should be able to handle up to 150 attendees.

Detailed Final Proposal Outline

The detailed stage 2 proposal to host ICALT-2001 should include, but not be limited to the following information.

1. Basic factual data

1.1. Conference schedule. The dates for the 2001 conference are not specifically determined but the months between June and September are preferred. Allow two days for conference presentations plus one day for tutorials/workshops. Specify which days/weeks/months are acceptable, preferable, or not available. It is beneficial if the dates are just before or after some other major conference in the educational technology area in the proposed geographical region, so as to maximise the benefits for the attendees.

1.2. Location. The location of the conference should be selected to optimize convenience, costs and local support. Needed is information on:

a. Appropriate working space: 1 large auditorium [100+] for invited lectures, and other plenary sessions; also 3 smaller halls [40] for parallel sessions; spaces for demos and poster sessions.

b. Food arrangements: in particular for coffee and lunch breaks.

c. Lodging: accommodation with a range of (special) prices and at varying distances from the conference facilities. Not only hotels but also student accommodation should be available.

d. Presentation facilities and equipment.

e. Secondary features: such as recreation facilities, travel opportunities, and cultural events.

1.3. Transport. Indicate international and national connections; and local transport to venue.

1.4. Supporting organizations. ICALT-2001 should be hosted and supported by an organization (university/department, research establishment, company, national association) rather than by private persons. This organization should be informed about the proposal and acknowledge its support for the proposal before the final decision is made.

1.5. Local organizing committee (LOC). A (provisional) local organizing committee should be proposed, consisting of at least two people(one of whom will serve as Local Chair) and functions/roles. More members can be appointed later. The General Conference Chair will be the Chair of the LTTF at the time who is responsible for maintaining communication between the LOC, LTTF, IEEE Computer Society and the Program Chair. The Program Chair will be nominated by the Executive Committee of the LTTF in agreement with hosting organisation. Other members of the program committee will be appointed by the Program Chair in consent with LTTF Executive Committee and Local Chair.

1.6. Communication facilities. Specify e-mail, fax, and other facilities for attendees to use to communicate to/from the conference site.

2. Motivation

Specify interests or motives for organizing ICALT-2001 (pleasure in doing it is important - but advancing local interest, reputation etc. are also honourable motives).

3. Planning

A global plan of activities should be drafted spanning one and a quarter years before the Conference date. This initial plan should contain not more than what can be put on half a page. The plan should be fully fleshed out after acceptance of the final proposal by the Executive Committee in cooperation with the General Conference Chair and the Program Chair.

4. Sponsorships

The IEEE Computer Society is expected to be the major sponsor of the conference, but additional sponsorships from private and public institutes are encouraged and should be specified or estimated.

5. Budget

A preliminary budget, that is balanced by the revenues of 100 attendees and very likely sponsors, should accompany the proposal. Costs should include the printing of Proceedings (preferably at IEEE Computer Society Press), conference facilities, extra labour (administrative support), mailings, posters, etc. Except for the Program Chair and at least two invited speakers, travel and lodging expenses are the

responsibility of individual conference attendees. There is normally a reduced rate for IEEE, Computer Society and members of other sponsoring organisation and even much reduced rate for student attendees. Publicity and organizational costs can be kept down by expeditious use of e-mail and other electronic media.

Interested parties can contact LTTF Chair at kinshuk@massey.ac.nz for any informal queries. Information regarding IEEE Computer Society policies for hosting conferences is available at following URL (This includes information on budget preparation, what kind of sponsorship is available, what organisation support can be acquired and what are the main ingredients for hosting a successful conference):
http://www.computer.org/conferences/orgtools.htm

6. Submission details

As in the stage 1 submissions, the final stage 2 proposals should also be submitted to the entire Executive Committee at
lttf-ec-request@listserv.readadp.com

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An evaluation of the use of an intranet-based knowledgebase to support on-line dialogue

The importance of dialogue

One of the most important components in any educational process is dialogue. Dialogue includes instructions from the tutor, guidance and feedback. It includes dialogue with fellow students, and other interested parties e.g. librarians, a partner, and just as importantly it includes dialogue with oneself, reflection, and time to assimilate.

Capturing the dialogue

Observations from teaching I.T. and multimedia subjects to students over a number of years have identified similarities between the learning patterns of student groups. Subsequent cohorts travel over the same ground as previous ones. It is well recognised that individuals have their own personal learning style, but within a group of people there is a broad spectrum of these individual styles. They tend to struggle to comprehend the same aspects of the subject and they ask the same questions. They have similar discussions, the dialogue is in effect repeated. If we could capture the questions, and make them available, with appropriate answers, to subsequent cohorts we should provide a valuable support resource for the future learners.

These questions would act not only as a reference resource but also form the basis for continuing dialogue, in all its forms. This would include dialogue between: the tutor and the student; students in a peer group; and reflective dialogue, where students reflect on their own learning and question their own mental models.

The knowledgebase

To test out these conjectures a prototype intranet based system was built at the University of Teesside.

The system holds teaching material pertaining to the teaching of multimedia, e.g. Macromedia Director, Authorware tutorials etc. and a knowledgebase (KB), which is a growing database of student submitted questions and answers indexed by a system of keyword classification. It gives a user the opportunity to search for questions using selected keywords, to ask questions, which are answered by appropriate experts and to contribute to official answers.

Evaluation

Initial evaluation concentrated on the use of the KB in the multimedia domain. The main focus were approximately 200 first year students who studied an introductory multimedia module. At the start of the semester the KB was seeded with 9 basic multimedia questions.

In the first weeks the students were introduced to the system and were encouraged to explore it more in their own time and to use it as a help resource when a tutor was not available. Initial reactions to the system were divided. Comments received ranged from effusive enthusiasm to "it's boring".

Initial results - Negative

It was anticipated that heavy usage of the system would occur from about the sixth week of the semester, when assessments were given out.

No question had yet been asked by week 4. By week 5 it was apparent that the system was not being used to ask questions. Only one question had been asked. Informal discussions with the students revealed that many had browsed but were reluctant to ask a question.

So what was wrong. Overall student opinion was positive, they liked the idea of the system, but they wouldn't use it, or at least not to ask a question. Yet they were complaining that there were not enough questions available when they browsed. They wanted to browse, they wanted to see the questions asked by fellow students but were unwilling to ask themselves. The obvious next question is why? Why won't the students use the system to ask questions? Students were asked to complete questionnaires on their use of the KB. The following results were obtained.

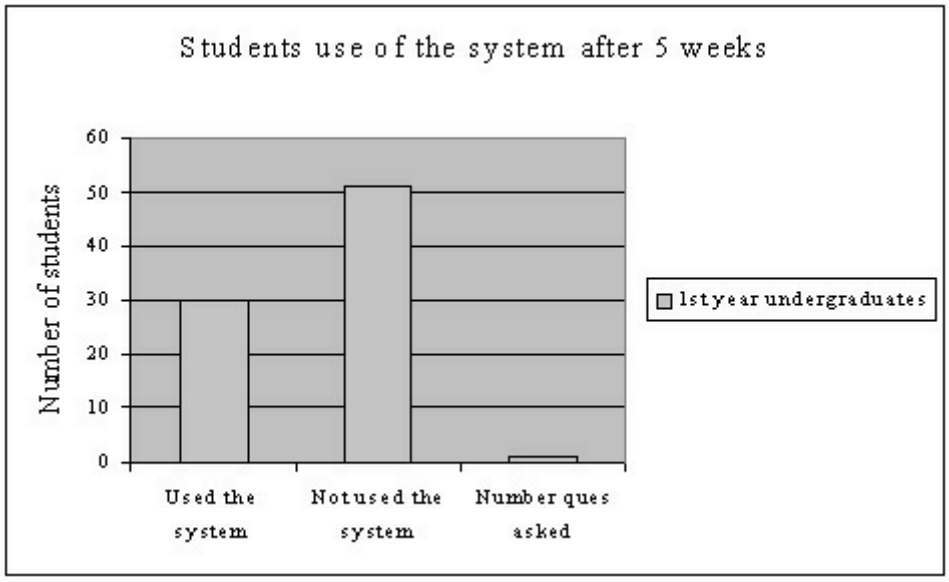

Figure 1

Additional comments received included:
"It's too slow, it's boring";
"I didn't need to, I asked my tutor";
"I looked but the question I had wasn't there";
"I used it, but couldn't find how to ask a question"
"I didn't want to ask a silly question"

Table 1

The results in figure 2 showed however that the majority of students had not attempted to ask a question. Many had used the system to browse but why wouldn't they ask a question when there?

One conjecture is that they have difficulty formulating the question, which requires proper sentence construction when written compared to a verbal tutorial type, off the cuff question. So students had to think more about the actual question , they had to formalise it.

A second conjecture is that they are reluctant to commit themselves to a 'permanent'medium. If a student asks a 'silly' question verbally it is soon forgotten, a tutor can answer sympathetically so misconceptions can be cleared up. The same question if written takes on a form of permanance which may be off putting to students.

If on-line dialogue is analagous to tutorial based, then it should follow a similar pattern. Experienced lecturers will know that it is sometimes hard to encourage students to participate in class based discussions. They are often well prepared to sit back and listen, to eavesdrop on the discussion, to listen and absorb, but it may take more for them to become actively involved. They need to trust the discussion. They need to feel confident in their opinions and in the reaction they will receive. As a discussion develops more people tend to become involved, the tutor will encourage participation as it gains momentum. These eavesdroppers are the lurkers of the on-line world. For them to move from lurking to participation they need to feel safe in the environment.

How can their behaviour be changed so they accept the system as a normal means of communication? For them to accept the system and want to be part of it, it has got to be seen to be growing. Questions and answers are needed to allow the KB to grow. The supposition being that if it is seen to be growing it will grow more. Once something is seen to be good more people want to be a part of it. But if the students won't do this directly, how can this growth be seeded.

One way to build trust would be to intermediate between the system and the students with the aim of capturing their questions into the KB. The conjecture is that students would accept the questions were valid and the KB was a system worth using. In this way trust motivation to use the system further would grow.

Conclusion

Further experiments need to be carried out to test these conjectures. Can a temporary intermediary act as a change agent to feed the KB with student questions? Will students learn to trust the system and allow the momentum to grow to fully incorporate it into their learning activities? Is the system a valid learning support tool and can it be used effectively in other subject domains?

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Features of online discourse for education

Overview

If education is seen as the receipt of knowledge, then the internet may be seen as a vast additional source of knowledge, and the role of educators is to facilitate navigation of web resources. If education is seen as a process in which a learner grapples alone with new concepts and information, then an educator may be a facilitator but has no duty to participate or to encourage learners to co-operate with each other. However, if education is seen as a discovery process in which talk and collaboration with fellow learners and tutors play an important role, then the role of educators is to facilitate talk.

This paper will take the stance that collaborative learning has sufficient benefits for it to be offered to learners at least as an option, and that educators are duty-bound to arrange it as successfully as possible. Organising collaboration in the traditional classroom is far from simple. Why should the effort be made to organise it by internet?

One answer is that economic pressures are driving universities towards distance education, both on campus and off. Another answer is that there are many ways in which collaboration online has advantages over the classroom:

1. It allows *everyone* to say something
2. It allows everyone to say something *uninterrupted*
3. It retains a record of the discussion
4. It allows people to take time and reflect before sending messages
5. It allows multiple threads to proceed at the same time
6. It makes recycling of issues easy because the original messages are still available for inspection.

But online collaboration requires online "talk", which is itself problematic for various reasons. First, it is in fact writing, and how can *writing* become *talk*? Second, it is new, and what rules are there to guide us? Third, the common suspicion is that there is something lacking in online discourse, that it is cold and impersonal - an activity to be feared because it might deflect people from normal human contacts.

I will suggest in this paper that writing *can* become talk, but by following different conventions from speech, that rules are being by users, and finally that it is as warm and communicative as face-to-face interaction.

One-to-One vs. A Group

When there are two people emailing each other, there does not seem to be a problem of communication. Frequent emails between a pair are rather like frequent letters, but because online, they are able to take

advantages of various computer functions. Reply/subject headers which may, at the user's wish, repeat former message, interleave responses, use fonts, etc. To a large extent one-to-one email conversations are structured very like speech; they are normally reciprocal exchanges in chronological order.

But for a group, spoken talk is in any case more difficult. And a further difficulty for online talk is that two of the key devices that facilitate group conversation are transformed, partly destroyed, by online structures. These are turn-taking and reference to previous or coming parts of the talk. Both are learned by infants in all cultures (though with some different features) and so deeply accepted that they are well below awareness.

It is essential to consider online talk against an understanding of normal speech conventions, in order to understand the differences between the two modes and in order to consider how best to help learners make the transition from one to the other. In what follows, turn-taking and reference will be compared as they occur in speech and online. No distinction is made between email and other forms of electronic messages, (e.g. conferencing systems like FirstClass or web forum software) since all rely on the same underlying messaging principles, with minor variations.

Turntaking

The learned conventions of turn-taking can be seen even in the typical noise exchanges between babies and carers from the first days of life. In principle, conversational turn-taking is universal, but differs in detail from culture to culture, for example in the degree to which overlapping talk between speakers is tolerated.

However, for all cultures, what is possible in turn-taking is severely altered by online restrictions.

In a conventional, spatially synchronous interaction, turn-taking is controlled by the interlocutors, who have to compete for the opportunity to talk, but who for the most part acknowledge each others' right to have a turn. It is characterised by participants making bids for a turn, in a number of ritualised ways, such as eye contact, gesture, pause, and so forth, all dependent on the interlocutors being able to see each other, or at least (by telephone) hear each other. Moreover, since responses are relatively immediate, adjacency pairs have become a major part of turn-taking. These are pairs of utterances which are almost learned routines. Two simple examples are:
How are you?
Very well thanks.

As will become evident in what follows, there are two features of online discourse management that become crucial for satisfactory discussions:
a. the size and behavioural conventions of the group
b. the use of available written signals, principally the headers of messages.

An initial turn

In online discourse turn-taking is technically possible, but in group email situations, anyone can send a message at any time, so the only way in which a bid for a turn can be made is by the use of the subject headers. In email tables of contents as bids to take a turn, ie prompt a reader to open the message. Opening a message is the equivalent of accepting a bid by someone for a turn at speaking online.

Users are pushed towards using the online resources in ways allowed by the software. For example, people learn (or need to learn) to use key words in their Subject Header. On the assumption that their bid for a turn has been successful (ie someone will read their message) they tend to use message openers like:

"I'd like to comment on...", "This seems to be the moment for me to say",
etc.,

which in some way mitigate the boldness of demanding a turn, rather as a smile or a cough or a body movement might in a speech encounter.

Turn changes

Since it is not necessary in online discourse for a "speaker" to be stopped so that another can send a message, it is at least theoretically possible that every member of the group in a free flowing discussion will respond, and then that every member will respond to every response! Many topics may be initiated by different members of the group, and the result can very quickly become a complex web of criss-crossing initiations and responses which even the participants find difficult to negotiate, and may very soon abandon.. Such a situation quickly leads to what is often called "overload" in discussions of online communication.

The lesson for moderators of online discourse educational interactions is to be aware of the consequences of fostering open discussions without setting up some kind of turn-taking roles and conventions, as will be discussed below.

Whereas there is a variety of other **speech turn-change behaviours**, e.g. speaker nomination of the next speaker, or overruling a listener's attempt to take the floor, the standard case in online discourse is that the speaker simply stops. The speaker always loses the floor once his message has been sent. It is indeed questionable to what extent there is indeed a **floor** to be held in online discourse . It would have to be established by some kind of, probably prior, mutual agreement.

More important, because of the prevalence of multiple strands of discussion, the floor in online discourse has to be defined in terms of threads of messages and their content. One can say that in closed online discourse discussion, there is normally a number of "floors", usually called "threads". In other words one of the unique contributions of online discourse is the opportunity for a group of participants to run several sub-discussions at the same "time". And in each such thread, there might be a different speaker holding the floor and a different pattern of turn-taking.

A particular problem for speakers in online discourse is that they cannot know, unless the listeners have overtly said so, whether they ought to continue, or yield the floor to someone else. In speech, **listener feedback** is likely to involve a whole family of behaviours, e.g. attention signals, such as silence, verbal items like "Oh" or "Yes", movements such as leaning forward, adjusting the facial expression, etc.

Online discourse users often report that they feel the lack of these indications that anyone is listening to them, i.e. reading their messages. When they get used to the new factors of this discourse , however, they may come to accept that they have been "heard", ie read, if not replied to. It is useful, nevertheless, to construct a framework within which listener feedback to speakers can readily occur.

In speech there is also considerable **interlistener behaviour**, with or without the speaker noticing, to express their reactions, or compete or prompt each other to take the next turn. This is technically possible in online discourse, since people can normally email each other privately or communicate by other means beyond the online discourse discussion if they are in the appropriate context for this. But since it takes very much longer to accomplish than in speech, and is very rare.

Against the above difficulties, one must remember that a great benefit of online listeners is that they have the opportunity to respond more fully than in speech, and may therefore steer the discussion into a new direction, thus taking over from the speaker - or, at least, the speaker may feel that they have. The initial speaker may sometimes try very hard to regain dominance over the discussion and bring it back

to the line he started.

It is evident that **sequences of turns** have a unique character in online discourse. In speech very common sequences have become ritualised as adjacency pairs like
I think X
So do I.

In our familiar face-to-face contexts, contiguity is sufficient for interlocutors to manage the interaction, so that people move chairs or tables into more congenial positions and/or adjust the distance between themselves. But online discourse does not allow contiguity.

Adjacency pairs can occur online, often signalled in the subject header, but they may not appear next to each other in the table of contents of messages. The software may allow to user to Sort the messages by subject header, and then only will the pairs appear in sequence. What happens in online discourse is that users employ management strategies in order to show that their message is the second part of a pair, starting their subject header or their message with "Response to John" even though the Reply function would have repeated John's subject header. They also use many more overt discourse markers than are needed in speech, such as "I'm sending you this message because...", "What do you think?".

When a participant reads a message and decides to respond to it, he can do so as a Reply, even after a delay for further preparation. The effect, to him, is of taking part in an adjacency pair. This is why users feel as if they are involved in genuine exchanges, even if those exchanges are extended over a longer time span than in a face-to-face interaction.

However, for discussions involving more than two people, we need to distinguish between the participants in an adjacency pair, and other members of the discussion who read these messages. The readers do not always see the adjacency pair as adjacent. Unless they sort messages appropriately, the chronological order of messages may mean that pairs are separated by intervening messages from other participants. And this can create an effect of chaos if there are many messages in a free-ranging discussion. The reader is forced to skip back and forth to find the messages that actually relate to each other.

However, for a participant, this need not be the case. As in a face-to-face situation, where there can be an interweaving or overlapping series of exchanges, people involved in the discussion learn how to cope with it. They learn to keep the threads in mind, and follow the exchanges through, even over a longish period of time. Of course there are mental limitations here. We cannot keep too many balls in the air at the same time.

Reference

Referring back to something previously said is a crucial part of normal discourse and involves a large range of special language, such as pronouns, synonyms, special words like "those", and so on. All of the special language for cohesion is available online, but because of the dislocation in time and space that occur in online messaging, users find it necessary to establish more cohesion than in speech. And they encounter numerous problems in doing so.

In an interesting study of reference used by students on one of my online courses using the FirstClass software, it was found that many writers used some form of citation as an overt reference to a previous message, in ways that would not be possible or necessary in speech, and that they very frequently did so *even when* the available software signal (Reply) made it in principle unnecessary if the subject header was left unchanged. They either repeated the entire message at the start or end of their response, or they repeated part(s) of it, or they paraphrased it. In other words, the pressure to be clear pushed online users to reiterate (cite) parts of previous messages, even though the software link made the source of the

reference easily recoverable.

When translating oral referencing conventions to written References, users are faced with two different kinds of choice:
1. How much of the original message to cite or paraphrase
2. How to present the reference graphically.

The various attempts my students made to create effective references fell into two categories. First, they experimented with the presentation. For instance, when they saw that the reply started with "<X> writes:..." they corrected it to "<X> wrote/said:", followed by "me here:" or "<my-name> writes:", and then gave their own response.

Others who had the facility used on-screen colour, while knowing that not all students would be able to see the colours. Two students conducted a long interchange using different colours for cited words. Some students enthusiastically copied this method. Some, however, wrote comments like "When I read the entries with the colored text in scroll, I find it rather distracting."

Many students experimented with abbreviating an original message. Sometimes they just cut it, sometimes they paraphrased it. There is very clearly a skill in this, and students' choice of method became more complex as the discussion grew. After one person had cited and responded, the next person might cite the original plus the first response, before adding his own comment.

They also found that they had to decide whether to respond to each message individually straight after reading it, or to read a series at a time and then respond to all the messages in that series. In the latter case the result can be a very complex web of criss-crossing references. Their methods varied from citing the whole preceding set through citing only part, to giving some paraphrased version or summary.

About half-way through the course, I, as tutor, suggested that the problem might be related to the awkwardness of the software we were using (FirstClass) which - as a default - presents and saves messages in discrete windows and does not allow a series of messages to be read as one continuous prose stream, as is possible, for instance, after "Save as" in the Eudora email system. (See, however, the Summarise function under the Conferencing menu in the latest version of FC.) I proposed that the group try out a way of mimicking what happens in f2f conversation, ie using Reply style only:

1. Everyone should use Reply without any references; subject headers would indicate which message a Reply related to.

2. If people either read their messages chronologically, or sorted their messages by subject, there might be no need for references..

One student used it to conduct a small experiment . He used 17 subjects who were experienced email users. He provided them with three different conversations, A, B, C, each of which was presented in two different ways: one with messages showing citations in colour, and one following the proposed Reply style above. The subjects were asked to
(a) group conversational threads that were signalled in a similar way
(b) join in a conversation if the method of threading appealed to them.

The results for (a) were that all 17 subjects correctly matched similarly threaded messages, showing that there was a marked difference between the two methods. The results for (b) show that the small sample had a clear preference for doing without citations (ie they preferred the Reply style):

	Joined the "reply" style	Joined the colour Reference style	Joined Both
Conversation A	7	2	2
Conversation B	9	0	5
Conversation C	6	1	2

During the course, other solutions were proposed to differentiate voices where references were needed:

a. inserting one's initials before each comment e.g
OB: I don't agree with this at all, sorry.
PW: But, Owen, Anita does have a point.

b. Inserting a picture or cartoon of the speaker at the start of each of his/her comments.

c. Using quotation marks and the full name of each contributor.

But students replied, inter alia, that they could not remember initials and predicted that in any case it was too much to expect everyone in a large group to keep consistently to the same principles of reference. Indeed one student pointed out that she could not even rely on clear use of subject headers, which, in her view were the key to coherence. She gave, as part of her "wish list", that people would make their subject headers regularly reflect what they wrote about, and not "go off at tangents under one subject header".

This is why it would be useful if software producers could improve the functions they offer. It would not be technically difficult to incorporate features to facilitate reference. For example a system in which, among the headers of every message, there was a new kind of header (perhaps called "X-references") which would tell the reader what other messages were linked to to the current one, e.g. by similar words in the text, by common citations, etc. Such a header would have to be automatically up-dated as the discussion progressed. The reader could then opt to view references at will. The danger with this method is that the new header could soon become unusably long.

Better might be a system whereby, if a person used a phrase that linked with a previous message, an automatic hyperlink was created giving the reader the opportunity of "flicking back" as we do with books. Or again, an automatically performed search might find and display similar phrases from previous messages.

Email systems, like EudoraPro, which allow both separate "mailboxes" in different windows, and automatic filtering of email messages into different mailboxes according to user-specified criteria (e.g. by Subject Header, or by Sender), are helpful in maintaining some order in discussions. But computer conferencing systems, (like FirstClass) have two significant advantages over email:

1. Messages are numbered within each topic of the conference. This makes the discussion easier to negotiate: participants can refer back to messages by number, can locate their position within the ongoing series of messages, and can more easily estimate the length of the discussion.

2. Conferences aim to present users with a visible framework of their discussion. Windows are arranged in hierarchies, such that, for instance, the major topic is seen to dominate over sub-topics which in turn dominate over sub-sub-topics.

In these ways, the software supplies some conventions of framing and regulation to compensate for

what is lost in the transition from speech to online talk. They are not sufficient, however, to ensure comfortable referencing, as was seen in the small study referred to.

Online Discourse Management

Educators still need to develop methods of structuring the online talk if they wish to help learners develop comfortable interactions. But research in this area is based on small trials rather than field observations, and much deals with synchronous written communication (text chat). Some attempts have been made to evaluate lay comments that it is "half-way between speech and writing" For instance, statistics for the use of certain linguistic features across corpora of speech, writing, and online discourse chat, did support the observation. But a great deal more work needs to be done.

There is no question, however, that users *can* adapt to the online environment. It is a normal part of conversational ability to do so. All of us, from childhood on, are adjusting to new contexts with such ease, that they are not consciously perceived as a problem. For instance, we no longer feel unnerved by telephoning strangers whom we cannot see, so long as the general situation is a familiar one like calling an information office, where there are rituals for undertaking the conversation with the stranger(s).

In online talk management, we need to behave much more as we do in committee meetings and establish effective conditions for successful interactions. In an asynchronous context, boundaries for the discussion have to be supplied otherwise discourse becomes very difficult. Also important is to provide adequate information for participants to accept not seeing each other.

The potential for satisfactory management of online discourse depends largely on the distinction between open and closed messaging. The former occurs in chat lines, moos and muds, and listserver discussions that anyone can join. In any of these, people do not normally know each other in any concrete reality but nevertheless communicate about a range of topics including their own lives and emotions. Closed messaging is exemplified by online discussions deliberately initiated for a fixed, specified and controlled group of people who may or may not know each other in the "real" face-to-face world, but who at least can *locate* each other by the co-ordinates of that "real" world, ie a name, an occupation, a phone number, a partial address, or simply by all being part of a known group such as students on a course.

There are various strategies to use in closed messaging. First, topics should be fragmented so that discussion will remain relevant. This is difficult, depending closely on the goals of a course, the level and ability of the students, the availability of learning materials, and the modes of assessment. To this end content should always be chunked into the smallest reasonable items.

Second, online conversations have to be regulated. As in a workshop, role play or simulation, people respond to a pattern that sets out to enhance communication. This can be done by assigning roles that are appropriate for the learning context, for instance giving different students different tasks to do, and different responsibilities in relation to the overall course structure.

It is partly a benefit and partly a problem in textual interactions that some cultural differences are not very apparent on-line. Accents, behaviour, race, religion and the other elements that make up cultural diversity are filtered out by the graphic text and have a levelling effect on status. On the other hand, users may be quite unaware of misunderstandings and problems that individuals face because of different perceptions of what are the adjudged norms of discourse, unless they are overtly mentioned.

In my view, the chief aspect in which cross-cultural misunderstandings are likely to persist is in relation to what users across cultures perceive as relevant in any particular discussion . Perceptions of relevance are not universal. Again, careful framing of both topics and discussions is likely to be the best policy.

To a large extent it is the ease and speed of online communication that is determining the nature of online discourse, rather than that it is written. The process does not feel like letter-writing. It feels like message-sending of a very rapid back-and-forth kind. The speed has engendered a feeling of immediacy, and thus of real interaction. How to organise it most successfully within a course is still problematic.

Appendix

An online discussion extract

showing methods of reference and interaction among two online students in different parts of the world, who have never met, but have introduced themselves online and are working collaboratively Some content has been omitted, to highlight the relevant features of the discourse. Names have been changed.

1. From MATO
BCC-4 Task10

The lecturer refers to ...
[Then follows a lengthy comment on the topic, but not a complete reply to the set question.]
I'm sorry I could not touch on rationality and morality.

MATO

2. From JO
B-CC4 10 Comm1

Dear MATO,
Hello, I'd like to make some comments ....
Where have all of these gaps come from? I believe that ...Would you say that this is the case in Japan? I am tentative to say that it is because I've never been there.
... If we do not do this, then aren't we simply "programming" students with the information? ...Let me reveal to you the results of a poll I took with my classes through e-mail. ... The results are interesting. ...
The point to this is that ...

JO

3. From MATO
RE: BCC4-10 Comm2

Dear Jo,
I wrote about my experience in ...
The result of poll you took is very interesting to me, but ...
Thank you for commenting my task. I have become clear about this by grace of you.

Mato

4. From Jo
B-CC 10 Comm3

"The most important attitude that can be formed is ..."(John Dewy).
... I could be assuming too much, but would you also say that this applies to Japan as well? ....
I went on a tirade a little bit. ....It frustrates me sometimes to be in a system where ... Mato - write back and tell me if you think these views also reflect the reality of Japan. Thanks for listening,

Jo

4. From Mato
B-CC 10 Comm4

Some students "lose their soul" after getting into University. To some extent, it may true, but I don't want to generalise too much. ...
I think that ...
However, some universities have realised ... When I work at ...
I would like to know what will happen after ... What do you think will happen? Could you tell me about Canadian entrance exam system and undergraduate students? Are they motivated to learn?

Mato

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The PACE Model: for On-line Teaching and Student Support

A dramatic rift has opened between the traditional process of teaching and learning in the school and the ways of obtaining knowledge in society at large, a rift made obvious by the fact that the process of teaching has not changed substantially, even in the past 100 years (David 1990; Kolderie, 1990). To accomplish student learning and the acquisition of knowledge in an on-line environment, the teacher must assume the role of "guide" not teacher. A supportive environment must be present where students can create their own ideas, both individually and collaboratively, and where the relationship between "teacher" and student(s) and among students themselves is one of mutual sharing, assessment, and constructive criticism.

This paper deals with the latter relationship. The focus of the PACE model for the on-line environment is that the student is a self-governed creator of knowledge and as such should be responsible for his or her own learning. The PACE model proves guidelines or practices that are designed to facilitate students' learning by nurturing their own active cognitive abilities.

In order to achieve this end and develop support, a flexible but clear and concise model needs to be constructed for students to understand the complexity and requirements for working and for being

successful in an on-line environment. The PACE model below addresses four important aspects of on-line education: feedback, collaboration, assessment and sharing of knowledge learned.

Most books or courses about on-line learning often feature chapters about or discuss the problems connected with on-line education and whether or not students are actually learning. Problems such as a lack of face to face interaction, anonymity of the students as well as the teacher, shyness about expressing ideas or opinions, time and discipline needed to achieve success in an on-line course, lack of learner participation, problems in communicating clearly and problems in how to assess the knowledge learned by the student are an integral part of this discussion. Teachers are made aware of the dilemmas they face in how to access what was learned and the grade to be designated for acquiring that knowledge. Most of the "solutions" to these problems are too lengthy and too complex for most students to grasp especially the novice who is taking his or her first on-line course. The PACE model is designed to change this.

The Pace Model, created by the authors, is a clear and concise set of guidelines for participants of online classes. The model combines community building practices, anti-isolation measures, positive feedback plans, assessment procedures, and a strategy for publication of online projects.

Many individuals make sense of their worlds by reference to schemas, mental models, and other complex memory structures. Today’s educators know that new knowledge is best learned through authentic interaction with the world and with other people. The PACE model allows the on-line learning environment to resemble the real world of practice and group agreement; thus the knowledge learned in the course will be useful and available.

One of the most important aspects of the PACE model is that it never forgets the learner in the web delivered instructional process. A humanistic and practical approach to learner interaction is provided in the questions from the Peer Review Model interwoven in this article. This session provides the framework for the future of many university course offerings and will be beneficial to both the online student and teacher.

The PACE Model

The letters P.A.C.E. are meant to be a mnemonic device for students to facilitate their remembering and understanding of the concepts involved in feedback, collaboration, sharing and assessment necessary in a typical on-line course.

1. Guidelines for Feedback:

When replying to other students in your learning community or class, use the following PACE MODEL guide to direct your responses:

- **P** is for participation. Feedback should be of such a nature as to ensure participation. The types of "constructive criticism" you produce should ensure that the person who posted a thought is encouraged to participate and feels that his or her ideas are respected by the learning community of which he or she is a member.

  As a reviewer of papers, reflections, etc. posted to the "forum" in the classes, tell the author or student, who posted, about some of the things that attracted your attention. What worked well? What details seemed especially vivid or striking? What will you remember about this paper? As the writer communicating, think about why the reviewer noticed these things, and how you can make all your future writing effective.

All responses should be timely, courteous and confined to the project. Private space, usually done through E-mail, is maintained for individual responses between course members or for guides and TA's to use in individual feedback.

- **A** is for additional commentary. Feedback should encourage additional questions, ideas commentary etc. Feedback should be relevant and specific as well as focused. Ending a question with a question encourages participation. The additional commentary should develop into new threads that will allow students to explore fresh ideas with his or her learning community (group). As a reviewer, first try to summarize what you think the piece was about. This is the easy part. Tell the writer what you saw as the story or the main idea. As a writer, listen to this section, and try to hear whether or not you communicated what you were trying to communicate.

- **C** is for constructive criticism. Nothing is achieved without being positive. There is always something in the materials submitted that is worthwhile. Criticism should always be of a positive nature to avoid turning off students in the learning community or offending them or raising resentment.

- **E** is for Encouraging: If your feedback achieves all of the above, the last word should be one of encouragement. If this model is followed, most students will be validated in their participation, they will ask for additional commentary, and they will accept constructive criticism in order to work toward excellence in the knowledge acquired.

2. Guidelines for collaborative project development

The student will follow the PACE model:

- **P** is for participation in collaborative work through a specific thread and to identify those who contributed. Each student will be able to follow the threads easier that way.

- **A:** Assess and agree on the contributions of other members, and then advertise your project through the web page to be set up in class. The web page should display project ideas and show development.

- **C:** Collaborate through the use of ICQ, E-mail, Mooing, MUVD, AOL instant messaging or any other source identified and agreed upon by your learning community.

- **E** is for E-mail. This would encourage private peer comments, which sometimes carry more weight than that of the instructor's, so feel free to let others know what you think. E-mail may be used to communicate, indicate fixes, edits, additions, deletions, etc.

3. Guidelines for Sharing

The student will follow the PACE method in determining how projects will be shared with others.

- **P:** Students will participate in how to "share" results.

- **A:** Ask participants to take the responsibility for determining how to assess the shared results.

- **C:** All students will collaborate on a database of information as a means of the entire group getting a "present" of information to take with them when the course ends.

- **E:** Ending course project will be made public through a webfolio.

4. Guidelines for how projects will be assessed by others

The student will follow the PACE method:

- **P:** Perfectly clear. Did you as a writer make yourself clear to the learning community? As a reviewer, did you have any questions when you finished reading? Did you not understand what something meant, or why it was included? Did something bother or disturb you? Did you suspect something might have worked better another way? This section is your chance to ask the writer all these questions. As a writer, try to answer the reviewer's questions. Look at your writing again, and see if there is any way to make those points clearer to a reader.

- **A:** students will also assess all projects and give appropriate feedback based on the established rubric.

- **C:** Collaborate on a mutually agreed upon rubric. In some learning communities, instructors will find that their role tends toward the traditional model of teacher as "giver of knowledge," because at that particular time, students require guidance and training in a particular task or content area. In a well-designed rubric, the teacher moves among the group assisting individuals as a whole. The on-line guide (instructor) evaluates the responses and projects in the course in terms of the community-designed rubric. Is the rubric specific to the course content and clear in its explanation? Did it change since it was first posted? Is it an evolving rubric? Will projects be evaluated on their development, organization, resources, implementation, and time-line in addition to student added rubric categories?

- **E:** Students are encouraged to add to the rubric. Ideas shared in the group make an assessment meaningful and valid. The rubric should assess what was learned and be modified as needed.

Summary

This PACE form of assessment, feedback, collaboration and sharing re-conceptualizes new forms of assessment with which to measure the effectiveness of on-line education. It is found promising in that it is a collective effort between students and teacher. It captures the development of ideas and student interactions as they work. It gives evidence of their level of understanding and the procedures of how they work. It shows the evolution of student work as it is created, rather than of a single completed work, or a set of isolated tests. It records the effort made and it captures the qualitative difference and detailed information about students' actual competence and learning achieved.

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The LiNC Project: Learning in Networked Communities

The LiNC project seeks to facilitate and investigate Learning in Networked Communities. The project develops and evaluates software tools and applications, and effective collaborative learning activities. It is a testbed for leading-edge research and development in educational and communications technology (http://linc.cs.vt.edu).

Research over the past decade has compellingly established the importance of learning communities. When learners work together on authentic tasks, they naturally describe, explain, listen, and interpret. They develop language skills, collaboration skills, and self-monitoring, or meta-cognitive skills. Shared knowledge-building allows learners to integrate creation and reception, to negotiate meaning and purpose, to divide and manage collective work, and to come to regard themselves as persons who solve problems and develop conclusions.

We have developed a project-oriented, active learning approach to instruction. We follow John Dewey's dictum that "Wherever an activity is broad in scope (that is, involves the coordinating of a large variety of subactivities), and is constantly and unexpectedly obliged to change direction in its progressive development, general education is bound to result." More specifically, we believe that it is pedagogically valuable to reclaim the problem-solving breadth and the social authenticity of education as it occurs in traditional cultures by means of the community-oriented use of computer networking. Thus, our project vision is about possibilities for using information technology to facilitate learning and collaboration throughout communities of people working together (See Carroll & Rosson, 1996, 1999).

The project originated in 1994 in partnership with Montgomery County Public Schools. A virtual school infrastructure was developed, linking four classrooms (in Blacksburg Middle School, Blacksburg High School, Auburn Middle School, and Auburn High School). We have developed, applied, and evaluated participatory design techniques that span the entire system development lifecycle, engaging teachers and students as co-analysts and co-designers. A key to this is our development of scenario-based design (See Carroll, 1995, 2000; Carroll, Rosson, Chin & Koenemann, 1998; Chin, Rosson & Carroll, 1997).

A significant focus of the LiNC project is the development of science learning activities. Although the project began with a focus on synchronous interactions, we have refined this vision to include an integration of synchronous and asynchronous collaboration. The collaboration centers on group projects that are multi-faceted and extended in time, and in which collaborative episodes are diverse and often ad hoc (See Carroll & Freeman, 1997; Carroll, Mauney & Rencsok, 1997; Carroll & Neale, 1998; Chin & Carroll, 1999; Gibson, Neale, Van Metre & Carroll, 1999; Rencsok, 1997, 1998).

Our major software product is the virtual school, a Java-based networked learning environment,

emphasizing support for the coordination of synchronous and asynchronous collaboration, including planning, note taking, experimentation, data analysis, and report writing. The central tool in the virtual school is a collaborative notebook that allows students to organize projects into shared and personal pages of different types; it can be accessed collaboratively or individually by remote or proximal students. The notebook supports manipulation of formatted text, images, shared whiteboards, and structured bibliographies. We support synchronous and asynchronous collaborative report writing within the notebook (we currently manage floor control through explicit locking/unlocking of particular pages) and a workspace page we are developing allows collaborators to jointly control and analyze simulation experiments in real-time. The virtual school also incorporates email, real-time chat, and videoconferencing communication channels (See Eales, Neale & Carroll, 1999; Isenhour, Begole, Heagy & Shaffer, 1997; Koenemann, Carroll, Shaffer, Rosson & Abrams, 1999).

We are investigating issues in component software by attempting to incorporate existing off-the-shelf components and evaluating the wrapping effort required. The virtual school's shared notebook uses a component architecture to manage heterogeneous page types. It allows viewer or editor components to be mapped to different content types. The content of a notebook page may be represented by a custom Java object, MIME-encoded data, or a raw byte stream. Our testbed provides interesting constraints for component software research: we are attempting to support coordinated synchronous and asynchronous collaborative use of existing software components with little or no modification (See Isenhour, Rosson & Carroll, 1999; Koenemann, Carroll, Shaffer, Rosson & Abrams, 1999).

We are investigating programming needs for teachers creating visual simulation courseware for the virtual school. We have developed self-study tutorial materials for the Agentsheets environment, which includes the visual language Visual AgentTalk (VAT). We have studied a number of experienced teachers as they used these materials to build and reuse simple Agentsheets simulations, for example a food cycle, a volcano and an ocean. We have collected thinking-aloud protocols (narrations of teachers' goals, expectations, and reactions as they work with the system) to better understand the teachers' problems and successes with VAT. For example, the teachers have a difficult time distributing control across individual agents, seeming to prefer a single thread of control. Because of its strict reliance on spatial position, the teachers have had difficulty with relationships that are not based on contiguous objects. We have also seen that teachers seem better able to reuse example simulations that are presented in a relatively generic rather than realistic form.

In parallel with the empirical studies of teacher-programmers, we are carrying out a comprehensive intrinsic analysis of a number of modern visual programming systems. For example, we have carefully analyzed the differential support for reuse provided by VAT and Stagecast Creator (a similar language that also uses visual re-write rules to program simulations). The empirical and analytic work are being combined to develop a framework for comparing and contrasting simulation environments, and to produce requirements for a new environment targeted specifically at teachers and students building science simulations (Seals, 2000).

We are investigating the establishment and maintenance of collaborative awareness. The ability to effectively use shared computer tools in distributed groups requires understanding who else is working, what activities are occurring, and who is communicating with whom. Many mechanisms in the virtual school support awareness. Several tools allow for explicit, user-initiated awareness information such as comments, email, chat, and video. Implicit information generated by users is supported through a planner for division of labor, work annotations, and changes to the shared work itself. Through a notice board, the system keeps users apprised of changes to the work, the coming and going of others, and present users' location within the system. Within the notebook, users can access a view of shared content in which each author's contributions are color-coded. User lists identify group affiliation and user presence. Various system states and audio and visual cues provide awareness information as well. These features are intended to provide general awareness that allow fluid transitions between proximal and remote groups when moving between individual site work and focussed collaboration between all sites.

We are investigating design rationale and design history as approaches to sharing information among stakeholders in a project, and to managing project goals. The LiNC project directly involves about two dozen people with varied backgrounds. We are investigating the use of a repository for projects documents and communications as a management tool for distributed work. We are interested in the how the relationships among project stakeholders can be mediated by sharing perspectives on project history and rationale (See Carroll, 2000; Moran & Carroll, 1996).

We have developed a multifaceted evaluation measurement framework for human performance in groupware contexts. Most evaluation methodology is developed for traditional single user, single workstation, single time and place usage situations. There are a number of hidden simplifications in such methodology that become apparent when one considers its extension to computer-support cooperative work usage situations. For example, various event streams are transparently synchronized (actions the user takes via the keyboard, echoing and consequences of these actions, comments uttered aloud, manipulation of physical objects in the work context, and so forth. Our framework incorporates qualitative and quantitative methods spanning different disciplines, philosophies, and traditions. It is field-oriented: We believe that significant usability evaluation of CSCW applications must be carried out in authentic organizational work contexts. It is also process-oriented: Different types of evaluation questions are addressed with different methods at different points in the evaluation-design cycle that satisfy differing evaluation goals (See Helms, Neale & Carroll, 2000; Neale & Carroll, 1999; Neale, Dunlap, Isenhour & Carroll, 2000).

There are two current extensions of the project. We are integrating the virtual school with the Blacksburg Electronic Village through a framework provided by the community multiuser domain MOOsburg . A person's capacity to learn and motivation to engage in learning are fundamentally shaped by family and peers, by community values and expectations. A classroom community, no matter how well-engineered, is but a part of this more significant social matrix. We believe that direct guidance, participation, and feedback from the community can be keys to more motivating and effective school instruction. Computer networks can allow members of the community, who otherwise would not be able to visit the school, to participate in the community's educational function. Our project will specify how a community network infrastructure could be used to support a real community as a learning community. We are trying to develop MOOsburg as a model for enhancing the integration of communities and their schools through technology. A second extension, now being planned, will explore the application of the virtual school framework to managing a large distributed research project (See Carroll, Rosson, Isenhour, VanMetre, Schafer & Ganoe, 2000; Kies, Amento, Mellott & Struble, 1996).

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The Biotechnology Project: Using Argumentation Skills Enriched by Technology to Improve Decision Making

The Biotechnology Project, implemented in a Brazilian private High School, was designed as an extra-curricular project to provide a space for students to study more deeply how Biology was very much a part of their lives. By looking at the advanced techniques used today, and how these are affecting our lives in different areas, students were encouraged to apply what they were learning in the classroom, and discuss how decisions were being made. One of the major goals of the project was to help students develop decision making skills related to very polemic and delicate issues, looking at different problems from new perspectives, going beyond their own prejudices and many times selfish points of view. By looking at the complexity of different issues, they could learn to appreciate the difficulty of decision making when right and wrong were not obvious.

We worked with students from the 11^{th} grade, from all areas (Exact Sciences, Biological Sciences and Humanities). All had a common background of Cell Biology and Molecular Biology (which they studied in the 10^{th} grade). Students were chosen by giving out a survey that evaluated their interest in such a project and willingness to put in a lot of extra time outside of normal school activities. 30 students were selected out of 600 in all.

I. The Format

According to Deanna Kuhn (1999), the way to develop argument skills is using the following steps:

a. Treat thinking as a social activity.

b. Provide a social context in which argument is a valued activity carried out in the service of a meaningful goal.

c. Affirm and reinforce students' sense of their own efficacy and value as thinkers in collaborative cognitive activity.

d. Practice and more practice.

e. Externalize normally unobservable mental processes through dialogue and physical representations of ideas.

f. Provide external, social support for developing skills by means of adult and peer scaffolding.

Our project used this method, enhanced by the use of technology to help students follow metacognitively the process they were going through. This was done by having them post their answers to an issue, before and after discussion, to an on-line forum created especially for the project. That way, we could all have a record of how our opinions were affected by discussion and looking at different perspectives, as other people and specialists would contribute.

The basic format for implementing the discussion was as follows:

- *First meeting:* Introduction of an issue. Using a real case study for students to analyze and help decide, acting as counselors and doctors, giving them the opportunity to work in a situated based learning environment. For example: the first case we studied was that of a father who had just lost a son in a car accident, and wanted his son's fiancé to become pregnant using his son's semen, so that his line of heritage could go on. The cases studied were always only made possible because of the advances in biotechnological techniques. The students then would write down their advice to the father and fiancé, first individually, then they would debate it as a group. After discussing, they would revisit their answer and see if they had changed their mind. They would then write down the group answer, and in the end put down if their opinion had changed or not, and why.

- *Second meeting:* A guest speaker would be invited to teach students about the techniques involved in the case they were studying, and students could then have more information and ask questions on which to base a more informed decision.

- *Third meeting:* Students would search the Internet, magazines, journals, books (library resources) to find more information on which to base their advice. They would then make their texts to put up on the website, to show the results of their efforts, so others who were interested in debating in the forum, and weren't participating in the meetings, could have access to the information they had.

- *Fourth meeting:* Finish research and texts. Most texts produced were a collaborative effort. Students would be divided into groups of 4 or 5, and work on a specific perspective related to the case. The final result would be published on the web, after all group members agreed and contributed. If any student still disagreed, they had room in the forum to voice their individual

ideas, and challenge more debate.

Looking back at the format we used, I see it follows the steps suggested by Deanna Kuhn (1999). By having students work both individually, then as a group, and finally producing a product together, we treated thinking as a social activity, as suggested in step a.

Step b was to provide a social context in which argument is a valued activity carried out in the service of a meaningful goal. That's exactly what we had in mind when we chose the topic of Biotechnology. We wanted the students to discuss relevant and real issues, to start applying what they were learning in the classroom to a real situation. Something they might have to face personally in their own future, or in the future of someone they know and can help. We brought up issues that were real stories that brought a lot of controversy, so that students would be aware that there were major differences of opinions, even amongst experts. The final goal was to make them more aware of all the aspects involved in decision-making, and not to rush into something without checking out all the facts, and taking into consideration family beliefs and morals as well. Ethics was always taken into consideration.

Affirm and reinforce students' sense of their own efficacy and value as thinkers in collaborative cognitive activity, as mentioned in step c, was done by having students write and research together, debate the issues both verbally and in a written form, and produce a final product that would reflect the group effort. Technology enhanced this by making their product available to a larger public, making them feel more keenly the responsibility for their work, and also boosting up their ego, as they knew they would be seen and heard worldwide.

Step d talks about practice and more practice. As in all educational activities, the more the skills are practiced, the better they become. In this project, we would have the students practice by having them repeat the use of the skills and methodology in different contexts. In one year we worked with approximately five difficult cases, in depth (and touched superficially on others). This allowed the students to use their new skills, broadening their horizons as they learned to not make any rash decisions, and respect other people's perspectives, as well as their own. They became self-confident, even in dealing with experts, learning not to take anyone's words for granted, but to investigate themselves. By the end of the year, they were quite the experts themselves, and ready and willing to pass on their knowledge to future students who would also like to participate in the project.

Step e involves externalizing normally unobservable mental processes through dialogue and physical representations of ideas. This step was particularly interesting to me, because it was something we had the students do instinctively, so they could see their own growth, and it was very gratifying to see the cognitive theories backing us up in this aspect. In implementing the forum, I was very particular about choosing a format that would allow students to see their old answers, and allowed them to revisit any question, exactly so they could see their progress (even if it meant maintaining the same opinion, before and after information). And having the students talk out the issues and listen to each other was also an important part of that process.

And finally, step f was to provide external, social support for developing skills by means of adult and peer scaffolding. We also gave that to students. They had not only our help as project "coaches", but also we gave them access to specialists in several fields. And when working independently, they could rely on each other to help either in technology, research, or any other area they needed. Sometimes they would also use parents as resources, which was very enriching to the project.

Conclusion

In this paper, I have only lightly touched one of the aspects of the Biotechnology Project, started by me last year (1998). I came to study at Teachers College exactly to get a better theoretical background related to the types of activities I was beginning to implement at our school. I feel there is much to

improve, and students did make suggestions in our final evaluation of the project. But overall, students were very happy, felt they had matured and learned a lot, and that Biology was not a "classroom subject" anymore, but a real part of their lives and the news. Most students stayed on this year as monitors, to help out with the new students who were chosen. This fact in itself shows how satisfied they were.

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A Report on the Impact of Advanced Media and Emerging Technology on Schools and Society

Part 2 of 3

John Brishcar, an 8th grade science teacher in a public school in New Jersey, USA challenges us all in the use of advanced media and its acceptance in several areas of school and society. In his article, he looks at that new medium of information – the printed book! Several different viewpoints are represented that are directly affected by this new means of inexpensively publishing new thought and distributing this information in mere weeks!

The teacher continued, "The danger is someone writing wildly, off on some tangent, being taken for the truth without anyone questioning the sources of the material. Anyone can now write a book full of nonsense and have it published without critical review these days. The students will think that it is true - just because it is printed. I heard that someone is even going to endorse Copernicus in a book! Nonsense. We will have to unteach the wrong science of that heretic.

There is even talk of something called the Scientific Method. Just wait until someone writes a book about that and everything we know as the truth will be in question."

"The positive side to the whole issue is that we may get more teachers in the system. Parents will want their children to be able to read. We may even have a library of our own in our home town because books are getting cheaper and cheaper."

The teacher went on to caution, "We need to censor what books are made available to our students - we wouldn't want them to learn the wrong things on their own, now would we? Our job is to teach the curriculum, the subject material, not the child."

Another issue reported by the teaching committee was one of logistics. Who could afford to purchase

the books? Would more teachers be needed to teach reading? Should all students be required to read for graduation? Is reading really necessary for their station in life?

What about those children that cannot afford books to read? Should we teach them anyway in case they become an apprentice in a vocation where reading is necessary? What do we do with the gap between the information 'haves' and 'have-nots'? Why purchase books when new ones are coming out every few months? Do we wait for the information boom to end and things to settle down before we develop a plan for handling the explosion of information? How much could possibly be written?

The teaching committee voted overwhelmingly to wait for the book and reading fad to pass.

Governmental Officials

"The language of this technology will overshadow the international language of diplomacy, French. We envision a day when our own language, the one we use in each of our own countries, will be abandoned in favor of that language most published. This is most dangerous," the representative reported.

Other issues dealt with local acceptability of the information. "We cannot allow some material to come across our boarders that is offensive. We must not allow that material to be published. There is other material, military material, which could be dangerous if revolutionaries or even children had access. We could have everyone making gunpowder - then where would we be?"

With this new technology, it is possible to take an image and reproduce it on paper. Government officials showed the press samples which included clearly visible images of women with their legs showing, and even worse. These woodcarvings cannot even be reported in respectable journals, as they are so vile. "This filth must be eliminated from our society!" exclaimed a governmental official. "We must maintain local control of what is available to our community."

Parents

"What do we need this bile for anyway?" was the response from several parents." I never needed it and I own fourteen pigs and a bull - Look how successful I am!"

"I'm not going to put out good money for my kid to buy a book full of strange scribbling and weird ideas which fill their heads and take the place of sound thoughts. How much do you need to know anyway? The sun goes around the earth, the earth is flat and that is that!

Kids should help on the farm and provide for me in my old age - do something useful besides wasting all that time just reading. If my son get's some crazy idea in his head because of what he reads in a book, and goes off to some foreign land, I need to pay someone else to work my farm."

Students

"This is the best thing since the wheel!" exclaimed several students. "We can't wait to publish our own work! When I use this new vehicle for information, I feel that I am sitting across from the person. I have access to explorers, architects, painters and paintings, great thinkers; I even heard that there is an entire book devoted to humor. Imagine going to some far off land and having an adventure without leaving home? Our parents don't understand why this is so exciting for us, but some of our teachers do, and even let us use their own books.

Some teachers understand and are publishing their own material for us to use. Very cool!"

"We don't have to sit and take notes from some boring teacher. We can simply read the material and then ask the teacher questions if we don't understand something or have lost direction.

Andreas Vesalius, an anatomist and physician whose pioneering dissections of human cadavers and careful descriptions of human anatomy helped establish modern observational science is now available to students all over the world. He published just a few short years ago "On the Structure of the Human Body", a beautifully illustrated text of human anatomy. We can now share what was only limited to a few before."

"I like it because if I need to write a report, I can copy right out of a book and the teacher thinks that I thought of it myself!" one student said on the condition he could remain anonymous. "I don't have to think anymore! There are so many books out there that the teacher cannot have read them all and I just copy that stuff down. I don't know what half of it means, but if it is in a book, it must be true."

Students agreed to endorse the use of books, if it was not going to be on the test.

Overall, the vote was in favor of advancing and utilizing the new technology, be that a by a slim margin. Throughout the conference, there were three major areas of concern - a paradigm shift in learning, the vehicle for the delivery of the information and the infrastructure for supporting the new media.

> ***Next issue:*** In part 3 of 3 - The intrinsic paradigm shift and the loss of the teaching exchange. The rapid rate of change - of change. Dead trees or petrified minds…

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Teaching Virtual Reality Using Internet Distance Delivery

Abstract: Teaching classes over the Internet can be an effective distance-delivery method in many subject areas. This paper describes how several courses on virtual reality are delivered "virtually." The importance of course planning, including the use of interactive feedback, is stressed. Also, some of the problems encountered in distance-delivery are discussed.

Distance delivery of instruction is not new. As each new communications medium has appeared, educators have used it to reach beyond the classroom. Postal service, telephones, radio, and TV in its many forms are prime examples. One of the newest is the Internet, incorporating such features as Web pages, email, chat rooms, and conferencing facilities.

In 1992, we created the Virtual Reality and Education Laboratory (VREL, http://soe.eastnet.ecu.edu/vr/vrel.htm), recognizing the potential impact of virtual reality on educational practice. In conjunction with VREL, we offer several undergraduate- and graduate-level courses on virtual reality. (See the list of courses at the end of this article.) Since early 1997, we have converted these courses from face to face to Internet-based instruction. Some of our experiences and observations may be useful to others, as they prepare for distance delivery of their courses. We have outlined a few in this article. See also Pantelidis (1999) for other lessons learned.

Unlike a face to face class in which the instructor can extemporize following an outline, and ad-lib to meet specific questions and circumstances, the Internet-based, distance-delivered course must be fully and carefully scripted in advance. In fact, preparing an Internet-based course is much like writing a textbook, complete with exercises, projects, papers, other homework, and examinations. (Some have likened it to writing a programmed text.) In effect, the course is being published, albeit electronically and for a specific audience. Any course details that are not scripted in advance become points of confusion for the students, requiring extra effort by the instructor if they are to be resolved.

Student attention and interest is best maintained with short paragraphs, interspersed with interactive exercises, projects, and other assignments. Based on our experience, we prefer asynchronous interaction (email and conferencing facility) to synchronous interaction (chat room, sometimes supplemented with two-way CU-see-me type cameras). We use asynchronous as the primary means of interacting with students, since each person (instructor or student) can work at times that are personally convenient. This is especially important for students in different time zones, particularly those several time zones removed from North Carolina.

When designing an Internet-based course, each page should be simple and free of extraneous elements, facilitating rapid downloading. The inclusion of backgrounds, gratuitous graphics, and frames may satisfy one's hacker instincts, but at the cost of clarity and quick downloading.

We have found chat rooms less useful. It is difficult to identify a time when all of the students in one locale can be online at the same. Finding a time when students from different time zones can be online at the same time is nearly impossible. Dividing the students into groups may help, but the available times may not all be practical for the instructor.

A more significant problem can be the productivity of a chat room session. The content of a chat room needs to be carefully guided and directed if it is to be relevant and productive. Keeping the group session on task is difficult at times, requiring continual instructor intervention. Otherwise, both time and valuable resources are wasted.

An online conferencing facility is a good substitute for a chat room. A separate thread for each topic can be established, providing automatic organization of the content. Each student can access the facility at convenient times, while comments and responses can be thoughtfully prepared in response to specific questions and issues. Responses to a thread can be printed out, providing a record of participation and input.

When using email, we ask our students always to include text in the body of their messages, not as attachments. Text saved in .txt or .rtf and placed in the body of an email message is always readable, while an attachment requires an extra step and cannot be read if your word processor and the file are incompatible. Downloading and opening files also increases the risk of a virus attack.

As the instructor of an Internet-based course, you should expect to have lots of email. The minimum will be the number of assignments asking for an email response times the number of students in the class -- just twelve assignments for a class of twenty students will generate 240 email messages. In addition, there will be all sorts of procedural questions, responses to emails, announcements, and the like. Be prepared to handle a lot of email!

The traditional classroom presentation tends to be linear, progressing through the course from beginning to end, more or less in a straight line. In an Internet environment, the presentation can be linear, random, or a combination. Some of our students tell us that they much prefer a linear presentation. Certainly, managing a linear presentation is much easier than a random presentation. Even if modules of a course do not depend on a particular sequence, it is still a good idea to provide an artificial one for structure.

While it is nice to meet each student face to face and to get to know them, this will not happen when students live in other communities, states, or, even, countries. Although the majority of the students in our distance-delivered courses live in the eastern part of North Carolina, many live at some distance. The furthest away student lives in Singapore on the opposite side of the earth.

In place of face to face contact, other forms of interaction can be built into a course, creating the opportunity to build a more viable instructor-student relationship than one based solely on the submission of a term paper and a final examination. It is not unusual for students to tell us that they feel they became better acquainted with instructors in online courses than they ever did in face to face classes.

Internet resources to enrich a class are becoming available in many subject areas. In teaching virtual reality, we relied on one or two textbooks until about two years ago. Since then, we have relied on Internet resources, and we are able to include much more, and much more current information, than we could with a printed textbook. In fact, we no longer assign a textbook for any of the virtual reality courses.

The assessment of instructional quality is always an issue, regardless of instructional mode. Basically, the same criteria apply, regardless of mode. Is the content rich in detail and well organized and presented? Are the expectations of what the students are to do clearly and concisely presented? Are the factors for grading explicit? Electronic versions of student opinion questionnaires can reflect how students feel about the quality of online instruction and how they respond to it.

In summary, we have found teaching Internet-based virtual reality courses to be an excellent format. It is convenient for the students, particularly those that live at some distance from campus or who have full-time jobs. At the same time, teaching in this format is demanding of instructor time. Course preparation must be much more detailed than for face to face instruction, and keeping up with the voluminous email and other electronic communications with students can be quite burdensome. All-in-all, however, the advantages outweigh the disadvantages in our opinion.

A presentation reflecting how we go about teaching virtual reality online is available at http://soe.eastnet.ecu.edu/vr/techdemo.htm

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Appendix

Virtual reality courses offered by East Carolina University *via* the Internet

More information about these courses can be found at VREL's homepage at http://soe.eastnet.ecu.edu/vr/vrel.htm

Undergraduate:

EDTC 2240 – Virtual Reality: Introduction and Basic Applications

EDTC 3242 – Graphics-Based Virtual Environments I
EDTC 3243 – Graphics-Based Virtual Environments II
EDTC 3244 – Virtual Reality in Education
EDTC 3245 – Text-Based Virtual Environments
EDTC 3903 – Special Topics: Virtual Reality Hardware and Software

EDTC 4900 – Seminar on Virtual Reality

Graduate:

EDTC 6240 – Virtual Reality: Principles and Applications
EDTC 6242 – Building and Using Graphics-Based Virtual Environments for Education
EDTC 6244 – Building and Using Text-Based Virtual Reality Environments for Education
EDTC 6858 – Seminar on Virtual Reality and Education

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Exercising Your Options with Computer Delivered Instruction for Physical Education Classes

Computer Delivered Instruction (CDI) is a powerful solution to many of the issues that confront teachers in higher education. As an Assistant Professor in the Physical Education Health Dance (PHED) Department, my responsibilities include providing students an alternate mode of instruction from the traditional classroom setting. Alternate modes of instructions include an arranged instructional design of instruction to be accomplished at the college and/or computer delivered design of instruction that can be done via the computer at home or school. Arrangement instruction is provided to the students with assembled packets of weekly objectives to be accomplished over the semester. The computer delivered instructional format includes providing students self guided interactive web pages, interactive software, text and videos.

There are several situations for which the CDI is viable over the traditional teaching option. Students with alternating work schedules may need the extra flexibility and assistance to graduate. Those with physical limitations due to aging and students with alternating work schedules may have great difficulty attending classes and completing course work. With computer assisted instruction, students will take advantage of a flexible course design that will prepare them for a lifetime of Health and Fitness readiness. Although the course is designed to allow the student to work independently, the student will interact with distance learning sites on the World Wide Web (WWW) to obtain information on Health related topics. In addition, Physical Education Instructors will benefit from using teaching resources available on the WWW to produce user-friendly and interactive fitness and wellness computer courses.

Computer Delivered Instruction provides perhaps the best opportunity for student self-guided learning. It is self-paced and self-planned, with the students themselves choosing their own paths through the mass of information encompassed by the packets of instructional materials provided on the web pages. Successful use of such delivery modes will not only increase students' knowledge, but will require them

to develop other important skills, including self-assessment and planning of studies, information technology skills, creativity, and self-motivation (See note 1).

The web instructional site listed provides the student with an interactive computer assisted courseware. The student is directed toward active learning though self-guided instructions. Students are requested to complete chapter questions and individual labs obtained at the web site. Students complete web based quizzes after viewing videos and analyzes their diet from software obtained in the course. The particular advantage of the web-based courseware is of constant availability to students anywhere, on any computer; however, access to instructional student documents can be easily controlled, as required, by password protection. Students can set their own pace, with no direct staff involvement. Students are given assignment due dates to follow in assisting their progress and are encouraged to maintain steady progress and complete the class by the last day of the semester. This flexibility provides students with the benefit of working on course assignments at times they are most likely to have success. Students may select the assignments enabling them to concentrate on a particular topic or to browse through the subject. The student may choose the topics to be investigated. The web pages provide the instructor and to the student a platform to present updated information that can be easily reviewed and revised.

This program has its roots in a similar course offered by arranged delivery. There was a comparable level of flexibility, but the students were given paper copies of all materials, rendering it much more costly than CDI. The students were also required to submit and complete physical labs on campus reducing the optimum level of flexibility offered by CDI (See note 2).

The CDI process, now in its third year, is currently in use and being expanded for strength training instruction. Students like both the use of Netscape and the e-mail or on-line submission of assignments. Comments from 40 students in a recent survey have listed the following concerns: Confused with software incompatibilities, hardware failures and long download times. Some students have limited understanding of computer operations and seek answers to expedite computer delivery processes. Coping with the complexities of computer delivery modes is necessary and students are expected to manage and complete instructional web page assignments established by the instructor. Student's computer readiness is important to the success of computer delivered instruction. In my opinion a computer delivered readiness survey is necessary to better prepare the students for the expectations of CDI instruction (See note 3).

Meeting student's expectations of multimedia has also been a consideration. I often ask myself: Is the information enough for the students to conduct fitness activities safely and efficiently? Students with limited understanding sometimes need further assistance than what is available on a video player. Assistance for students is offered on a one-on-one basis to meet the student's needs on campus. Students unable to receive assistance on campus are e-mailed additional text and graphics to assist success.

Additional assistance is given to the students with weekly newsletters sent via the internet (e-mail) and periodic phone calls. Health topics may vary with emphasis on fitness safety, diet advise, computer news and personal trainer compliance. Students maintain weekly contact with information related to their fitness progress. They send weekly exercise records for my appraisal and are requested to make replies to my fitness recommendations. The student, with the aid of computer software programs prepares all student exercise and diet programs. Modifications to assist or better adapt the student are made by e-mail or shared in newsletters for the entire class to read.

The students are evaluated on the following activities listed in categories of instruction: Getting Started, Session One, Session Two and Session Three. The Getting Started assignments are designed to assist the students with early assessments and for directing course administration requests. Points are earned as the student completes, in sequence, the assignments. The students must confirm textbook purchase, a PHED information sheet, exercise assessments, food diary, fitness appraisals, max lift practical test and a two-video written test. Eight weeks into this semester, two students out of 47 have not completed any

assignments; eleven students have partially completed the assignments.

The Session One student activities are: Chapter objective assignments, chapter lab assignments, development of a exercise program with emphasis on aerobic, strength and flexibility components of fitness and completing the first exam. Eight weeks into the semester, 19 of 47 students have completed the assignments; 13 have partially completed assignments and 15 students have not yet completed any work.

The Session Two assignments provide exercise records for my review, three completed diet analysis assignments, chapter objective assignments, chapter lab assignments and exam two. Session Three requires students to complete three ideal diet analyses, exercise records, the development of a six-month exercise program, completing objective assignments for health safety issues and a third exam. One student has completed all the assignments with the exception of maintaining weekly fitness correspondence for the remainder of the semester.

The web page course seems to attract more dedicated students or students with a specific goal and time frame. The number of sections for traditional classes has decreased, but this is reflective of the decline in student enrollment. We are expanding our student base, increasing enrollment from locations previously not served by TCC. Those students, because of time and/or distance would have taken a traditional class elsewhere or not have taken it at all. I have learned that web based delivery provides opportunities for the students to achieve the goals in class. Software programs for diet analysis assignments, text with graphics, and instructional examples to clarify student expectations can be easily shared. Web based instruction offers the most interaction between student and instructor. I recommend that instructors further expand the interaction within their web sites and bridge CD-ROM text and graphics materials. Instructional modes of delivery need to provide the students easy access to instructional goals and outcomes.

Notes

1. For a comprehensive look at a web instructional plan you may visit the following web address: http://www.tcjc.cc.tx.us/campus_nw/hpe/rmorgan/webcours/acdirron.htm

2. A complete description of the arranged model may be reviewed at the following address: details of the differences?
http://leahi.kcc.hawaii.edu/org/tcc_conf97/pres/morgan.html

3. A computer delivered readiness survey is necessary to better prepare the students for the expectations of CDI instruction.
http://dl.tccd.net/academic/icquiz.htm

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Developing Online Courses in the Two-Year Institution

Abstract: In 1997, our college provided $2,000.00 mini grants for faculty to develop online courses; this met with minimal success. In February of 1999, I was hired on as the Instructional Technologist to help faculty develop online courses. My focus narrowed to five major areas of concern: the scope of the program, our available human resources, what computing hardware we needed, the financial expectations of the college, and the support infrastructure needed for online students. After three months of planning, we offered two pilot courses in the Summer 1999 term; their success led to ten online courses for Fall 1999, and a projected thirty courses currently in development for Spring 2000. In order to further refine our program, we will be attentive to those issues which our faculty and students raise. Between February and August 1999, we have been able to plan, develop, and implement 12 online courses from a number of disciplines, laying a solid foundation for future growth.

Although you might want to set up your online program as soon as possible, I've found that even under great pressure from one's administration to "show results quickly," and squeezing time constraints, it helps to proceed cautiously. Our first attempt at creating online courses was to offer a USD $2,000.00 grant to any full-time faculty members who were interested in creating online courses. Two faculty members, one from Computer Science, and one from Accounting, applied for and received grants in the 1997-1998 school year. The Computer Science professor quickly did her research, saw that our Information Resources folks were already swamped, and chose to build her online course using ClassNet software. Her course ran in the Fall 1998 semester, and again in Spring 1999. Our Accounting fellow, on the other hand, began investigating different sorts of course-building software, and soon became lost in the technical jargon and requirements of the competing products. He never developed any course.

In February of 1999, I was hired on as WCCC's Instructional Technologist; my sole purpose is to assist faculty who would like to develop online courses. Before I approached any faculty members, however, I sat down with some of the key stake-holders in the college to figure out what resources our college had:

· Scope: Who are the learners? In our case, we have an entirely commuter population, with evenly mixed demographics; we have many traditional students who attend class full-time, and many adult learners with jobs and families. What services do we expect to provide and to whom? Our online program should, we reasoned, provide equal access for all online students to all services, including the library, academic counseling, and tutoring.

· Human resources: Who are willing to be front-runners? Instead of waiting for faculty to volunteer (see the low volunteer rate for the grants, above), we asked our division chairpeople who among their faculty would make good online teachers. Armed with this information, it was much easier to say "You know, your chair thinks you'd make a good online prof; can we talk about it some time," rather than "Hey, would you like to teach online?"

· Computing resources: What capacities do we need? Since our college is small, the staff of our Information Resources department are already taxed to provide just basic care and service for an ever-expanding physical network. We found that contracting with an outside company for space on their servers made sense: we didn't have to maintain any machines, and we wouldn't have to worry about software upgrades or technical service.

· Financial resources: How can we promote these courses? We decided that our student body comes from a relatively small geographical area, and advertised in local newspapers initially.

· Infrastructure: How do online students get their course schedules, register, get books, receive counseling, and utilize library services? We should have looked at these questions right off the bat, but

we didn't. In our haste to get the course themselves created, we neglected much of the infrastructure needed to support our online students.

In order to see how our planning held up, we started with two pilot courses over the Summer 1999 term-not surprisingly, the Computer Science course that had been taught using ClassNet was simply transitioned over to Blackboard, our course software provider of choice. The surprise came when our Accounting fellow of some paragraphs back wanted to develop a financial-recordkeeping course online. I worked with both of these faculty members, but in differing ways. Our Computer Science professor needed little but a few hints as to how Blackboard worked, and she was off. The Accounting prof and I worked closely toward defining what his course was meant to provide for his students, and then we worked together on preparing and posting a set of lecture notes and study guides for his students to follow. Both of these instructors were well prepared by the time the courses "went live," and in class bulletin-board discussion, students often complimented them on their knowledge and sense of humor.

Meanwhile, I set about implementing student support services. My primary advice to anyone undertaking an online program is to make sure everyone is a team player! Not including the Information Resource staff and bookstore folks from the very beginning made for rough going in this area; fortunately, our support staff in the bookstore, student services, registration, accounting, and the library were interested enough in the project that they pitched in to help find solutions; for example, our bookstore had no policy on shipping books, something it had done infrequently in the past. I worked with the bookstore director to publish a policy about online-course book shipping to out-of-county residents.

While our pilot faculty were teaching in the summer, we started to recruit faculty who became interested in the project. The main incentive, we found, was not grant money or release time, but the assurance that I would work with faculty one-on-one to develop their courses; many faculty who developed courses for Fall 1999 learned as they went along how to post documents and make changes online, but there was always the assurance that a professor could, if need, be, drop off a disk with lecture notes on it, and I would perform the "magic" (as one prof called it) of putting the course documents online.

When our Fall semester started on August 19, 1999, we had ten courses online, many of which filled up (we had to provide a second online section for one course). Student support services and library services, although not offered wholly online just yet, were in place, and online students were encouraged to browse through a sample course in order to familiarize themselves with the way in which our courses operate.

In order to refine our online program, we will reply on our evaluation procedures; our students and faculty are the best sounding-boards we have for gauging the effectiveness of our program. Students are asked at the end of every online course about their experiences, and are asked whether their expectations have been met. We ask our faculty to rate their experiences, as well, and ask them to provide specific responses to the level and quality of support and training we provide for them: were they adequately prepared to Teac online? When technical problems occurred, were they resolved quickly?

We will pay special attention to the feedback we get from our students and faculty this semester. For instance, many online students have indicated that one initial face-to-face meeting with their professors would be helpful. We have also found that first-time online students probably ought to be required to complete an orientation course before they can begin an online course; too many seem to have questions that are easily answered by referring to our online student guide.

Now that we have offered individual courses in a number of disciplines, our next goal is to build certificate and then degree programs entirely at a distance (using online and telecourse modes). Some of the issues we plan to address are the large percentage of adjunct faculty at our college and their role in

the online program, and the issue of creative control of materials: does a faculty member hold copyright for online course materials, or are such materials "work for hire" and thus the intellectual property of the college? We come down in favor of creator's rights, by the way.

Although it is difficult to go into great depth about the means by which to get an online program off the ground quickly, I hope that I have been able to give a good idea about some of the dos and don'ts of the process. One strong conclusion that I have reached as a result of implementing this development process is that it is much more important to bring together a team of stake holders in the process early on, and to address the issues of student and faculty needs before an institution offers its faculty the opportunity to develop online courses. This said, we are proud to have been able to plan, develop, and implement 12 online courses in six months, thus laying a solid foundation for the creation of distance-education certificate and degree programs in the future. I would be happy to discuss any aspects of our program. Please feel free to contact me at tobint@westmoreland.cc.pa.us, and to log in as a guest to our sample online course at http://www.blackboard.com/courses/WCCC.

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coMentor - a collaborative virtual learning environment

http://comentor.hud.ac.uk/

coMentor is a computer-supported learning environment accessed through the World Wide Web. It is specifically designed to support discussion and debate in text-based and discursive subjects. No special software is required - only a Web browser that supports Java.

coMentor supports both synchronous and asynchronous communication. A virtual learning environment is created in which students can discuss issues in groups they have set up and where each learning area has a dedicated set of tools, such as threaded discussion, annotation, concept mapping, role playing, email and WWW resources. coMentor encourages students to be the main contributors to the system and supports student mentoring through the establishment of a collection of student contributions available to fellow and future students.

coMentor has been used in Social Sciences courses at the University since 1997, and has proved popular with the students. Evaluation of the system (1997-8) by second year Social Science undergraduates showed that 94% of the students recommend it be used on future students. It has also found that coMentor facilitates quality discussion and thoughtful collaboration, and that students consciously learn from each other.

coMentor is available FREE to UK Higher Education Institutions.

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IEEE Forms Online Distance Learning Alliance With Stevens

Taking a giant step in exploiting the Internet as a significant force in professional development, the Institute of Electrical and Electronics Engineers (IEEE)--the world's largest technical society--early this month linked arms with Stevens Institute of Technology's service, WebCampus.Stevens, to offer distance learning graduate programs to IEEE's 330,000 plus members online.

In its first agreement with a graduate school, IEEE will co-sponsor WebCampus programs in telecommunications management, wireless communications, and technology-based teacher education. IEEE will promote Stevens' online program with direct mail, catalogs, ads, and exhibits. The joint venture calls for IEEE members to enroll on the society's Website and take courses delivered by Stevens faculty using the WebCampus courseware platform.

"We plan to extend educational content to IEEE members and others," remarked WebCampus director Robert Ubell. "Our aim is to offer quality professional advancement in every medium that makes sense--face-to-face, online, CD-ROM, interactive video--whatever style suits student educational needs." Later on, after the first "classes" go online in January, Stevens will generate modular versions of its graduate programs as IEEE short courses.

Stevens already delivers video courses to graduate students in six states, using interactive videoconferencing technologies in collaboration with such giant companies as Bell Atlantic and Lucent. Next semester, some 250 graduate students will be in classes conducted using interactive video.

Many WebCampus faculty hold prominent positions in IEEE. Stuart Tewksbury, for example, director of the online Wireless Communications course sequence, is senior editor of Microelectronic Systems, an IEEE Press series. He has also served as symposium and general chair of a number of the society's conferences. M.T. Fatehi, who teaches a course in the WebCampus Telecommunications Management program, is a senior IEEE member.

Publisher of IEEE Spectrum and more than 60 technical periodicals, the powerful organization generates 30 percent of the world's literature in electrical engineering, computers, and control technology, many of which are now available online. IEEE holds more than 300 major conferences annually and produces more than 800 standards, with 700 currently under development. Composed of 36 societies in all branches of electrical engineering, including communications, signal processing, and engineering management, its 300 local groups are in every part of the globe. In addition to the US and Canada, regional sections are in Europe, the Middle East, Africa, Latin America, and Asia. Stevens is also home to an IEEE Student Chapter.

The IEEE-Stevens agreement was concluded with IEEE's Educational Activities group, publisher of more than 200 books, CD-ROMs, self-study courses, videos, and videos on demand. While WebCampus is the first Internet education program to be offered to IEEE members, the society now

provides more than 15 other Internet services in other areas.

WebCampus students from all over the US and abroad participate in "threaded" e-mail discussions and chatrooms, use online bulletin boards, file-sharing, and "whiteboards." Web-based classes are held using the most widely adopted distance learning courseware, now installed in nearly 800 colleges and universities in 40 countries.

The WebCampus site, which went "live" in November, is under the direction of Robert Ubell, long associated with science and engineering publishing and education. A former publisher of Nature, the noted weekly British journal of science, editor of the National Magazine Award-winning monthly, The Sciences, and former President of BioMedNet, the giant life science Website, Ubell is the first Web-based Distance Learning Director at Stevens.

Established in 1870, Stevens offers baccalaureate, masters, and doctoral degrees in engineering, science, computer science, management, and technology management, as well as a baccalaureate in the humanities and liberal arts. The university has a total enrollment of more than 1,550 undergraduates and 2,250 graduate students.

For additional information and interviews, contact the author.

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Marketing CDs Get Better

The Mulimedia Marketing Consortium's teaching and learning resources have been updated and upgraded. All ten Marketing CDs have been revised (in content and design) and upgraded into a network friendly version. The complete collection now comprises ten networkable Marketing CDs, workbooks, audio-active series (ten audio cassettes) and a new marketing planning software package for SMEs.

An eleventh module covering eMarketing is in production and will be released during Spring 2000. The multi-platform delvery means it can be delivered via web, network cd or free standing cd.

The Multimedia Marketing Consortium is dedicated to finding new ways to improve marketing education and training and, as always, welcome any suggestions.

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NetTech Educational Technology Coordinator Website

http://www.nettech.org/tc/

The NetTech Educational Technology Coordinator Website is designed **by and for** individuals who serve in the challenging task of coordinating technology initiatives in schools. The title may be "Technology Specialist", "Technology Coordinator", and "Instructional Technology Team Leader", "Educational Technology Resource Specialist", or even "Technology Evangelist" but, in any case, you know one when you see one! This is a difficult position; educational technology specialists and coordinators must be all things to all people, including computer, network, and web page expert; software installer and teacher; and a resource for educators to help design technology-enhanced curriculum. Unfortunately, the position is so new, it is impossible to be an expert in everything.

The goal of the site is simple: to help educational technology specialists and coordinators in the many tasks they face in this ever-evolving job. Specifically, we hope the site will

- support them in their diverse roles,
- assist them in their daily work, and
- guide them in long term planning to facilitate the integration of appropriate technologies in the improvement of teaching and learning.

The Website seeks to provide links to a wide variety of resources, including annotated links to professional development programs and opportunities; latest products and applications; proven skills and strategies, lesson planning guides, and resources; relevant research papers, government documents, funding opportunities, and articles; and opportunities for discussion and sharing of ideas and concerns. The site has four key areas: professional development issues; curriculum integration issues; technical issues; and technology in context.

Content for each of the sites is supplied by a three-person content development team of technology specialists from the NetTech region. The site is hosted by the Eisenhower National Clearinghouse, and overall site development is coordinated by the Center for Learning and Educational Technology at the University of Maryland. We hope this web site will provide the support all technology coordinators need in their daily struggle to upgrade the technology proficiency of all administrators and classroom teachers.

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Call for participation: Distance Education Association of New Zealand (DEANZ) conference

Dates: 27-29 April 2000
Venue: St. Margaret's College Dunedin, New Zealand

Conference theme:

Supporting the Learner through open, flexible and distance strategies: Issues for Pacific Rim Countries

Main Issues for presenters to address:

Infrastructure for open, distance and flexible learning:
* Establishment issues for ODF in traditional settings
* Convergence of on and off site teaching
* Quality Assurance
* Information literacy
* Support issues for learners, teachers, tutors, librarians, technicians and providers

Global issues for open, distance and flexible learning:
* Equity and access issues
* Teaching for diversity
* Expansion of the knowledge economy
* Internationalisation and globalisation

Theories of open, distance and flexible learning:
* Changing paradigms
* Re-conceptualising teaching and learning
* Changing student learning outcomes through ODF

For further information, please contact the programme coordinator:

Dr Claire McLachlan-Smith
University of Auckland, New Zealand
c.mclachlansmith@auckland.ac.nz
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Call for papers: Special Issue of Interactive Learning Environments on Metadata

We are pleased to announce a special issue of the journal on Interactive Learning Environments (http://www.swets.nl/sps/journals/ile1.html) to be dedicated to the topic of metadata. We are seeking research papers on:

- Applications of metadata: how metadata have been used in an educational context, e.g. tc information retrieval, adaptive learning, learning profiling, learning management systems, digital libraries, etc.

- Implementations of metadata: how an infrastructure was designed and implemented to make use of metadata in an educational context.

- Theoretical aspects of metadata: structural and other characteristics of educational metadata

- Metadata efforts and specific types of metadata: applications in specific contexts of educational metadata, organised efforts to exploit metadata in education or training, etc.

Papers should be of high academic quality and consistent with the general aims and scope of ILE, which are "to provide an archival repository of research and a forum for all individuals working towards changing education through learner-centred use of information technology." For more detail, please see:
http://www.swets.nl/sps/journals/ile2.html#aimsandscope

Deadline and Submission of Manuscripts

Manuscripts must be submitted by April 14, 2000. Earlier submissions are appreciated. Submissions should conform to the guidelines of the journal (http://www.swets.nl/sps/journals/ile2.html#submis) but should be submitted directly to one of the guest editors:

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Announcement: Study via Internet - MEd in ICT for TESOL

An exciting new opportunity for Masters level study via the Internet is available from January 2000, using Merlin, the award-winning environment developed here at the University of Hull.

The MEd in ICT for TESOL, offered by the Institute for Learning of the University of Hull, provides experienced English Language Teaching professionals with the chance to study for a UK Masters degree alongside their work as teachers and trainers, communicating and collaborating with tutors and fellow students via the Internet. The course offers an advanced programme of study focussing on Information and Communication Technology for the Teaching of English to Speakers of Other Languages, and aims to provide participants with vital understanding and skills to enable pedagogically motivated effective implementation of ICT in language teaching and in the training and development of language teachers.

Further information about the MEd in ICT for TESOL can be found be following the link from the following website:
http://www.hull.ac.uk/ifl/

An application form for the course can be downloaded from:
http://www.hull.ac.uk/prospectus/forms/PGApplicationForm.html

The Merlin environment used for the delivery of the course is universally available on the World Wide Web. It is accessed via the Internet and therefore accessible 24 hours a day, 7 days a week. This makes it attractive to users anywhere in the world who appreciate the fact that the environment is adaptable for use by individuals in accordance with their own learning styles and subject to their own time constraints.

Information about Merlin can be found at:
http://www.hull.ac.uk/merlin/

Contact: Shirley Bennett, Programme Leader at s.bennett@ifl.hull.ac.uk

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