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From the editor ..

This issue of *Learning Technology* is an attempt to report what is happening at research front besides having a look back to see how we reached there (and what lessons to learn for future!). I hope you would find this issue of the newsletter both interesting and useful.

I would like to emphasise that your support and involvement is what will make this initiative a success. I would encourage you to browse through LTTF website at <http://lttf.ieee.org/> and to 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](#).

Kinshuk

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Learning Technology Newsletter

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Spotlight on the Collaborative Projects Forum

The Learning Performance Support Laboratory

The number and types of technology used to enhance learning and performance are infinite. The many researchers from diverse disciplines in the Learning Performance Support Laboratory (LPSL) collaborate in research and development projects to find effective combinations of technology and methodology.

The LPSL (<http://lpsl.coe.uga.edu/>) is associated with the College of Education at the University of Georgia and is headed by Dr. Michael Hannafin. Some of its goals are to support research and developments in several areas: interactive learning environments, education supported by emerging technologies, electronic performance support systems, and the impact of technology on performance. In the words of Dr. Hannafin, "The lab is a vehicle to transform educational practices through disciplined inquiry, balancing near-term issues and priorities with longer-term visions and innovations needed to invent new practices."

The LPSL includes a variety of different current projects, ranging from the Digital Weather Station, an interactive exhibit at The Children's Museum of Indianapolis that helps children learn using 3D visualization methods to TOTAL ONE: Tools for Teaching and Learning on Networks, a project to create flexible tools that will allow instructors to more easily design online courses. There are currently nine other projects included at LPSL and a host of completed projects as well.

One of the reasons the LPSL can support so many diverse projects is the partnerships it maintains. The LPSL has active partnerships with the Georgia Research Alliance, the Georgia Center for Advanced Telecommunications Technology, and numerous K-12, university, government, and corporate organizations.

Because of its activity and size, the LPSL hopes to make important contributions to the LTTF Collaborative Projects Forum.

Asynchronous Learning

Traditional classroom education provides a synchronous learning environment; all of the students and the teacher are working on the same time frame. The words that travel from the teacher's mouth reach the students instantaneously, or synchronously. However, this is a growing trend towards using asynchronous learning methods, learning in a "time-free and place-free interactive mode."

The Asynchronous Learning web site (<http://www.enmu.edu/async/asynchronous.htm>), created and

maintained by Ed Kinley of Eastern New Mexico University (ENMU), provides information about the issues involved with asynchronous learning. The web site combines material developed at ENMU with other material found on the Internet.

As a user explores the web site, he quickly finds a variety of resources. The Pedagogical Issues section, for example, provided links to various research papers and guidelines on the subject. Other sections include Asynchronous Tools, Instructional Strategies, and Examples. Each section also contains a brief analysis of the subject by the web site author.

As for the future, Mr. Kinley said, "This fall I plan to expand the material on the site and hope to provide a forum for the discussion of the issues identified in that section. I also hope to include examples of asynchronous courses and the concepts that support these courses."

The Collaborative Projects Forum

These two projects are a part of the IEEE Computer Society Learning Technology Task Force Collaborative Projects Forum (<http://lttf.ieee.org/projects.htm>). This forum contains a variety of ongoing research projects that are exploring learning technology.

If you have a project dealing with learning technology, we invite you to join the forum. There are many benefits to joining the collaborative projects forum. First, the forum will allow you to easily access information about a host of related research projects and to publicize your project to your peers. It will also be a source of expert advice, feedback, and participants. Lastly, you will be part of a growing community of learning technology professionals.

Some services are also available to members of the LTTF collaborative projects forum. We can create and host an email mailing list for your project, which is a great way to build an online project team. We will link to your web site. Also, an LTTF newsletter and access to other publications are available. Membership, including all these services, is free.

To join, email James Schoening at schoenin@mail1.monmouth.army.mil with a short description of your project and the address of the project's web page.

Zeba Wunderlich

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Educational Technologies: A Mythic Quest Beyond Megabytes

Educational technologies transcend the current limitations of computers when the focus is not on the techniques, software or creative pedagogy, but on the student/learner who is engaged in the learning. Almost unwittingly, this shift in focus appears to manifest a mythic pattern and is a story that becomes virtually composed, both digitally and spiritually.

Joseph Campbell spoke of the hero's quest (vision quest) as having three discernable stages: separation, initiation or liminality, and return or reincorporation. This article sees educational technologies as a potential vehicle for carrying the learner on such a vision quest, in which both the learning process and learner are transformed. This idea will be presented through specific examples from my own use of technology in higher education which portray the content, role and passage in each of the three stages.

For example, educational technologies can begin a process of separation by moving away from familiar

theories and practices of education, which are often very unsatisfying. As such, they help us move away from a professor-centered, industrial age, information transfer model of education toward a student/learner-centered model. In this new paradigm, the professor becomes a mentor and resource director as the student uses the Web as a portal to enter a new world of active collaborative and develop greater knowledge, understanding and interpretation skills. Technologies such as discussion lists, web sites, the electronic submission of writings, etc., can take the student out of the familiar geography of education into a seemingly new world of learning, a world of risks, responsibilities, and unknowns.

This new world is the liminal realm where the learner is challenged to overcome all sorts of beasts and obstacles. These obstructions take the form of computer illiteracy, comfortable passivity, and unreflected educational experiences. Here, students are also able to contact their peers and virtual guests from around the world at any time and they become responsible for their own learning. For students, constructing their own understanding can be likened to entering a Hypertext CyberTwilightZone where one is both educationally "homeless" and, paradoxically, at home with others who also find themselves in a virtual landscape that challenges their educational self-identity. The ability to mediate collaboration among distant learners can transport and transpose learners among islands of learning on electronic winds of understanding. Being able to share ideas, either synchronously or asynchronously, with others across the street or across the oceans begins to give students new perspectives on the world itself and their places in it and links to it. The liminality is based upon the familiar no longer being familiar, but now appearing new, strange and intriguing.

If and when the monsters of the 2nd stage are overcome, the vision questing students can return to who they were before the separation began and become reincorporated with their understanding of themselves as learners in a community of learners. I explain how this reincorporation can occur and what its consequences are, and reach a conclusion by using a favorite quote from T.S. Eliot. He says "we shall not cease from exploration / and the end of all our exploring / will be to return to the place where we started / and know it for the first time," and from this I conclude that the "place" known for the first time by students/learners immersed in the good use of educational technologies is their own identity as learners and the very nature of the learning process. Thomas Merton said that real learning is not simply learning material or information, but learning about whom it is that is doing the learning, that very mysterious being.... oneself. That educational technologies can be a vehicle for such understanding and personal integration is surprising and paradoxical. But then, any experiments and experiences in learning worth their salt are paradoxical.

By theorizing about the use of educational technologies as following a mythic pattern, I argue that while those technologies have been used simply to cloth the old model of learning in fancy electronics, they can also be used to transform that traditional model into new ones. This new paradigm focuses on both learners and professors/mentors and discovers that, oddly enough, educational technologies can be used to help manifest the very soul and heart of real learning.

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Using Electronic Portfolios to Facilitate Student Reflection

For several years now our k-8 public school in Lone Pine, California has been assembling portfolios of work for each students and forwarding them to their next class. While our staff has had no consistent purpose for these portfolios, slowly the portfolios have become uniform. Occasionally, they are referred to in parent conferences and lately the sixth, seventh and eighth graders have used them as the basis of a required student-led conference in the spring.

Last year we began a pilot program to design and implement an electronic portfolio with three goals in mind. First we wanted the portfolio to be a record of the student's achievement on the newly adopted state standards. Second, we wanted the portfolio to provide an avenue by which students could reflect on their education and their accomplishments as well as a means by which we could facilitate student metacognition (students thinking about their thinking and cognitive skills). Finally, we wanted the students to be more involved in the creation of their individual portfolios and have the portfolios contain the varied electronic and project work students now create. In turn we hoped students would become more enthusiastic about their portfolio creation and maintenance.

Since most of our students are taught Hyperstudio, developed by Roger Wagner, in their lab time or in the multi-media elective classes, we chose this application to create a stack of open frames with which the students could work.

The portfolio contained a menu page with a picture of the student and two buttons, one leading to pages concerned with academics and the other concerned with activities. The Academics Web contained buttons labelled with the normal subject areas (math, writing, reading/literature etc.) as well with special sections that included "Goals/Individual Learning Plans", "Reflections", and "Projects." The student would create as many pages as they wished for each section and connect them to form webs that reflected their individual creative view point. The activities section included, sports, extra-curricular organizations, and more personal topics such as friends and hobbies.

The pilot group consisted of sixth graders taking a half years class that included internet research skills and some web page design as well. An evaluation using DeBono's PMI strategy resulted in pinpointing several difficulties the students were having that were obstacles to achievement of the indicated goals. Students showed increased interest in the process because of the medium and were interested in demonstrating their knowledge and achievements. But "students were unable to analyze their work in deep meaningful ways in most cases." They could describe what it was but not what it meant or demonstrated. Students were also distracted in to spending more time on design factors with Hyperstudio, than presentation of their work.

The PMI Strategy ends with "Interesting" observations and questions which led our staff to wonder if developmental issues affect most sixth graders ability to reflect deeply on what their work shows.

With the second group of sixth graders, several changes were made to facilitate the process. Because the second group had more experience with Hyperstudio, the scanner, and digital still and video cameras, it was easier for them to build the pages which typically went to 12 to 18 pages in number. Projects, tape recordings and video were all digitalized and included in the portfolio now.

By giving the students several California state standards in the three main academic areas, reviewing them with the students and restating them in the language appropriate for children, a focus for reflection was provided. Now the process was more a matching task for the student than an open ended analysis. Students would occasionally engage in analysis when work was only a partial match, what was left out or still incomplete.

To attain closure, a rubric was developed using a five point scale of criteria.

The hyperstudio format was excellent but still storage memory is an issue. The portfolios are stored on the school server now and thus can be accessed from any classroom through the individual student's

folder. We are considering sacrificing the easy continual access and storing part or all of the portfolio on a zip drive or some other similar method.

Clearly the electronic portfolios have facilitated making our students more reflective about their work and more connected to the standards which they now must meet to promote to the next level. Thus they have become more responsible for the quality and completion of their work. But significant challenges remain. Students take time to create these portfolios that time must be taken from other learning activities. They are still more focused on presentation design than what the work they choose shows. Finally, storage will remain an on-going challenge.

Next year we will be continuing with the program expanding it to seventh and eighth grade students in our AVID study skills and organization classes. Now we are seeing evidence that direct instruction in and coaching of, along with practicing reflection processes helps students develop their metacognition to become responsible lifelong learners.

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How much teachers know about copyright issues for classroom related products?

Most teachers who use multimedia in their classrooms frequently focus on the software and the immediate product that it can produce. They fail to take advantage of some of the broader benefits that are available through multimedia authoring. One of these benefits is to use this activity to establish clearly in the students' mind the value of intellectual property, and the ethical problems associated with ignoring others' rights to their own intellectual property. From anecdotal evidence and personal experience, it appears that many teachers not only fail to require their students to honor the intellectual rights of others, but they also set poor standards by the very nature of the multimedia projects that they, themselves produce.

Copyright laws govern the use of works created by others—an important issue compounded by this popularity of multimedia student projects. Little is known about the knowledge of K-12 teachers about the relevant laws and guidelines relating to copyright and multimedia. This issue has not been examined in an objective manner.

Therefore, as part of the author's doctoral studies in Educational Technology at Pepperdine University, this study was done to objectively assess the knowledge level of K-12 teachers about copyright issues related to their students' multimedia projects. In addition, several demographic factors, relating to experience using technology or multimedia, education, grade level taught, or years of teaching, were examined to determine any relationship to the teachers' knowledge levels.

Data was gathered using two instruments, a multiple choice questionnaire and an e-mail survey. The questionnaire had five demographic questions and 20 content questions about the copyright law and guidelines. These content questions were based on the sections of the Copyright Act of 1976 (as amended) that would apply to multimedia classroom projects, such as fair use, etc., and the Fair Use Guidelines for Educational Multimedia of the Consortium of College and University Media Centers. These guidelines were used because of all the guidelines in existence, they seem to be the most widely followed, and they specifically target educational multimedia projects. The specificity in the rules of

these documents allowed the multiple choice format to gather the necessary information, without taking too much of the participants' time. A prize drawing was held from the returned questionnaires to help motivate completion of the form.

The data source was comprised of attendees at a technology conference in California who met three criteria: (a) they were classroom teachers, (b) they taught at the K-12 level, and (c) they have their students do multimedia authoring projects as part of their classroom activities. Prospective participants were asked if they met the above criteria before being given a copy of the questionnaire. Therefore, participation in this study was based on the individual indicating that they belonged in the data source. This relied on the participant be truthful. The lure of the prize drawing may have tempted some individuals into participating when they really did not belong in the data source. Two hundred six copies of the questionnaire were distributed to teachers indicating that they met the above criteria, and 119 completed forms were returned.

The results of the questionnaire were very disappointing. A score of 75% was considered a demonstration of proficiency, based on earlier studies. Only one individual achieved that level of proficiency, scoring exactly 75%. Only 15 out of the 119 individuals scored 50% or better on the questionnaire. There were 14 questionnaires with no correct answers, receiving a total score of zero. The mean score was 26.77%, with a standard deviation of 18.23. This high standard deviation is indicative of the wide range of scores.

From (>)	To (≤)	Count
0.000	10.000	34
10.000	20.000	12
20.000	30.000	26
30.000	40.000	28
40.000	50.000	8
50.000	60.000	6
60.000	70.000	4
70.000	80.000	1
80.000	90.000	0
90.000	100.000	0
Total		119

Frequency distribution of total percentage scores on questionnaire

Demographic data provided no great insights. Those with five years or more experience with multimedia did better than would have been expected. High school teachers had a higher level of knowledge than middle school teachers. Other demographic factors seemed to have no noticeable effect.

Sixty-seven of those completing the original questionnaire were sent a short answer follow-up e-mail survey to gather additional information. Fifteen surveys were completed and returned. This follow-up e-mail survey indicated that most teachers are not aware of any district policies about copyright. Most of those responding to this survey indicated that their administration had not discussed this topic nor provided any relevant inservices. About half of the respondents said they learned what they know about copyright from word of mouth from colleagues. The vast majority of those returning the survey felt that educators need be concerned about copyright. Their reasons for this concern varied from ethical consideration to threat of lawsuits. This survey indicated that these educators felt that inservice education, backed up with written information was the best way to get copyright information out into the classroom.

This study concluded that the level of knowledge of K-12 teachers about copyright issues is very low. Specific copyright education is not readily available to teachers. This lack of knowledge may be leading to illegal activity in the classroom which would put districts, principals, and teachers at risk for legal

suits for infringement.

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Towards a Time-Efficient Methodology for Asynchronous Mixed-Language Presentations

In 1998 the authors had an opportunity to examine facilities for the presentation of teaching material in more than one language semi-concurrently. This note comments on the methodology finally adopted, for brevity omitting details of the non-preferred alternatives examined.

The Student's Needs

Many students attending University are being educated in a language that is not their mother tongue. Coping with the transition to tertiary education can be a considerable challenge to many first-year first-semester students, but when the notes and lectures are in a language other than the student's first language, the challenge can be even bigger. Both authors of this note are conscious of this situation, having learnt and taught under these conditions themselves.

Currently in New Zealand, most courses are taught in a variety of English, with M?ori and some other languages also being used. The level of English skill required for tertiary study can be measured using the International English Language Test Syndicate (IELTS) measure that ranks skill in bands 1 to 9, with a band 6 average being the minimum for entry into New Zealand Universities. Even with this qualification, new students can initially have trouble understanding. Technical terms can be a problem, as the student's inter-language dictionary often does not cover these. Lecturer's 'regional accents' can also be a problem, where 'regional accents' can (in this case) be regarded as any accent other than the one in which the students has been taught English.

One of the many ways to attempt to deal with these problems is to develop supplementary asynchronously available teaching material, with perhaps some use of the student's original language. We looked at this possibility.

Desirable Facilities and Pragmatic Limitations

When surveying alternatives for development and delivery of this kind of material, we had several desirable attributes in mind. Acceptance of these attributes imposed some pragmatic limitations on our options.

- *Ease of delivery of material to remote sites.* It is a requirement that the courses be available to students situated in other countries. Paper-based materials are appropriate. Since our students are required to have access to e-mail, CD-ROM and Web-based material delivery could also seem appropriate. Postage of a CD-ROM is less expensive than posting paper-based material. 'Chalk & Talk' could be appropriate if the lectures are video-recorded, but currently there is no requirement that students have access to a video-player. Video recording standards also vary between countries.
- *Short response time.* We are in the Information Systems area. In this field changes occur sc

frequently that material often can only be taught twice before needing to be revised. Currently practical requirements mean that provision of paper-based material has a lead time, in practice, of approximately a year. This is inconveniently long. Teaching 'this year's course' internally, and 'last year's course' externally is an option, but not considered a desirable one. Delivery via web-based material would seem to offer the possibility of a shorter lead-time for changes and/or corrections. 'Chalk and Talk' would only be an option if sufficient on-line video bandwidth were available for all our students. With our students having been historically spread from (e.g.) the middle of Russia to the Falkland Islands, this is not an assumption we can safely make.

- *Other-Language facility.* Many of our students come from a CJK (China/Japan/Korea) background. It would be useful to have the facility of these regional languages (even though their written languages use ideographs rather than characters) however this restricts our choice of tools. Since we are in the Business Faculty and most lecturers use PCs, not Macintoshes, use of PC-based tools is considered preferable even though some nice tools are available on Macintosh computers. For paper-based notes, Office 97 (used in some of our first-year exercises) and FrontPage 98 have some largely undocumented CJK features. They also offer some Web and CD-ROM capability as well as providing paper-based facilities. 'Chalk and Talk' is not an option without an interpreter being provided at each lecture.
- *The methodology shouldn't cost much extra.* Both the student and the university administration find this requirement *very* desirable.

With regard to the students, we already require e-mail access. This usually means access to some form of computer. It was felt that to require students to also have access to a video player as well as a computer was not economically desirable. This rules out 'Chalk and Talk' delivery, unless delivered via a CD-ROM. Delivery of student notes via CD-ROM only (no paper notes), is also considered undesirable on the basis of student expense even though this would probably be less expensive for the University. The same applied to Web-only delivery. With Web use reportedly doubling every 3 months, and backbone line capacity doubling every year, we felt that we could not guarantee that future students would have access to adequate Internet bandwidth for Web images or Web video. Since the students currently use components of Office 97 for first-year assignments, something inexpensively compatible with this package seemed desirable on the basis of cost.

With regard to the lecturers, whilst getting a team together to create a Web course is desirable, the likelihood of being able to do this every couple of years for each subject (when a revision of the course may be desirable) seems remote in practice. In practice, the lecturers have to do most of the work themselves. Requirement *Minimal extra demands on Lecturer's time* below means that a minimum extra amount should have to be learnt to achieve these goals. Requirement *The methodology shouldn't cost much extra* means the methodology adopted should be at a minimal extra cost to the University.

- *The delivery methods used should be available whenever needed by the student.* Ideally this means 24 hours a day, 7 days a week. Lesson delivery via paper notes, CD-ROM and videotape all meet this requirement. 'Chalk and Talk' doesn't, unless delivered in recorded mode. Our first year classes have historically varied from 250 to over 1,000 students, and any Web site is likely to be heavily used. Web delivery will only meet this requirement if the Web is 'down' for maintenance infrequently; there being no time of the day when we can assume that all of our international students have no desire to use the site.
- *Minimal extra demands on Lecturer's time.* Currently most of the lesson material is typed in by the lecturers themselves using either Microsoft Word or WordPerfect. A methodology sufficiently compatible with these software packages, and in such a form that the material did not have to be typed in multiple times would be useful. Regarding Web presentation, while it would

be nice for lecturers to have the time to learn the use of HTML, Java, JavaScript, Perl, ActiveX, XML and URLs to produce beautiful and stimulating web sites, in practice it is also nice to have some time to spend with one's family. In the author's experience, for a methodology to be widely accepted by other than enthusiasts, it is *very* important that that methodology require a minimal investment of time by the lecturer concerned. Methodologies such as the ones that allow dumping Web sites onto a CD-ROM without further work are available; these would seem more desirable than those requiring extra work. 'Chalk and Talk' would seem the least-work and most easily revised alternative, but this has remote-site delivery problems.

What We Found

All in all, satisfying these requirements seemed a tall order.

The methodology finally adopted actually met most of these requirements, and worked well in practice, but was more restricted in generality than we would have initially desired. Cognisant of the restrictions above, we mostly used variations or additions to the Office 97 products already in use by students and lecturers for lecture and assignment production. The presence of these on the student's and Laboratory computers, plus the use of Internet Explorer, allowed a solution to be developed quickly and with much less effort than would have been the case for a more generally applicable solution.

- *Second language input facility.* The first challenge to be overcome was the input and use of languages other than English. European languages would not have been a big problem, but CJK languages posed more of a challenge. The original 7-bit ASCII standard enshrined the needs of the 'American' variant of English (those speaking the 'English' variant of English pointed out there was a \$ symbol but no £ symbol). Use of the 8th bit of a byte allowed a doubling of the number of characters, and these were used for local variants, e.g. to represent Thai or Hindi characters, or the extra characters needed for European languages such as ç, ê, ö etc.. These regional uses were mostly mutually incompatible. In an effort to overcome these incompatibilities, Unicode was specified. Unicode aimed to allow the characters/glyphs used in all of the world's main human languages to be represented. Both the Macintosh and Microsoft computers have Unicode as a basic part of their operating systems (we have been told Linux is still anglophilic (private communication)). Glyphs for use in about 25 language groups have already been defined, (e.g. see 'The Unicode Standard', ISBN 0-201-48345-9). The defined glyphs include several thousand for use with the CJK languages. So CJK facilities were theoretically available for our use.
- *Second language fonts.* We found several free CJK fonts on the Internet. The ones that initially worked best for us were the ones downloaded from the Microsoft web-site. We still needed a method of getting the Mandarin into the computer. There are several methodologies for specifying Mandarin glyphs. The method in which one of us (CY) was most skilled involved typing pin-yin (roughly a phonetic form of Mandarin). We located and downloaded a free Global IME (Input Method Editor) from the Microsoft web-site, and found this worked at an 'acceptable' rather than a 'good' level. We initially used this, and later used NJ Star whose input methodology was easier to use; its output being optionally compatible with Word 97. NJ Star also seemed to have access to a greater vocabulary. The Global IME editor could also be used with Outlook Express in HTML mode to send and receive e-mail that used a mixture of English and Mandarin glyphs. A CJK e-mail facility was not what we had been looking for, but it was a nice extra.
- *Voice input facility.* The ability to record voice was obtained by use of free software from the Internet (Microsoft web-site). This was used to add English and Mandarin voice annotations to the Web slides.

What We Did

Producing documentation for some lectures in a first-year first-semester Information Systems course tested the facilities listed above.

- *Conversion to Lecture Overheads.* Using Word's 'Outline' facility carefully, Word 97 documents using both English and Mandarin fonts were automatically converted into PowerPoint slides. The Word 97/PowerPoint 97 conversion had the restriction that, while we used roman fonts and two Mandarin fonts in Word 97 documents, only one Mandarin font could be added to the roman fonts in PowerPoint 97. The English and their Mandarin slide translations were cross-linked at this stage. The result worked nicely.
- *Adding Voice annotations.* English and Mandarin voice annotation were then added to the Web slides. The free software had the limitation of allowing only one minute of narration to be recorded at a time. Initially this was annoying, but one of the authors (EGF) found himself to be needlessly garrulous, and the limitation resulted in a more concise lecture presentation which, when combined with a greater number of slides than we usually used, resulted in a presentation which students rated as preferable. The short time limitation per slide also allowed one of the authors (CY) to use unscripted translation for the Mandarin versions of the English voice narrations. This resulted in a considerable saving of time. The voice files produced by the free software have the disadvantage of being large. We are currently looking at the usability of various compression methods.
- *Conversion to a Web site.* Next came the attempted Web conversion. A Web site was produced using a FrontPage menu option. Theoretically both Word 97 and PowerPoint 97 documents can be saved in HTML format, ready for use in a Web site. In practice, if the HTML produced by Word 97 was produced by a human, we would probably doubt that human's sobriety. The HTML produced by PowerPoint 97 eliminated both the voice annotations and the Mandarin fonts; so we had problems.

We had previously obtained an estimate for the time to 'clean up' a 16-page Word document's HTML conversion ready for web use; two WebCT users independently estimating 3-5 hours. However in our environment all users had Office on their computers. In this case we could link the original Word document to the web directly using FrontPage. This had the advantage that the word document could be pulled up directly via the Web, side-stepping HTML's limitations (e.g. allowing the use of facilities like multiple columns, headers, footers, formulae, fine font control etc. that are usually used for formal academic publications). The main disadvantage was that, while Internet Explorer accepted this format, we could not get the Netscape browser to work well with this web. Given that this method of making the document available via the web took not 3-5 hours but half a minute, we pragmatically, but regretfully, accepted this limitation.

The same linking method worked well for the PowerPoint slides, facilitating (with similar time savings) the use of both voice annotations and Mandarin ideographs from the Web site without any further conversion work being required.

- *CD-ROM Production.* One of the authors (CY) dumped a major portion of the Web site on to a CD-ROM to allow lecturers who gave this course at other sites to see the material early. While it took some time to 'burn' the CD-ROMs, only a few minutes of lecturer time was spent starting the process, the rest was automatic.
- *The results.* The resultant Web was implemented in such a way that the student could click on a Web page button to get the English web page quickly replaced by a Mandarin version of that page. Clicking on a similar button on the Mandarin page would take the student back to the

English version. If the slide or page (e.g. a graph) had voice narration, clicking on a button on the left of the screen produced an English commentary, clicking on a button on the right produced a commentary in Mandarin.

Material produced using this methodology was also used experimentally in several lectures where the main slide was projected via a video projector on to a screen at the front of the lecture theatre, while a Mandarin version was projected via an overhead projector on to a side screen. While this method of presentation was faced with considerable trepidation by the presenter (EGF) for whom Mandarin remains a vast mystery, apparently we got it right, and the relevant students really appreciated the fact that the effort was being made.

Advantages of the development methodology adopted

The methodology adopted had the serendipitous effect of offering advantages to all students, as well as the ones who did not have English as their first language. Looking at the advantages: -

- Mixed-language presentation is possible using Microsoft Office 97/FrontPage 9
- Technical terms could be defined and explained in both the student's original language and in English. This aided understanding, and the students concerned commented it also helped their grasp of English.
- The methodology, if followed, involves only one entry of material by the lecturer for each language used. Since some of the other methodologies involve either re-entry of material, or substantial subsequent text editing, lecturers particularly appreciated this feature.
- Even if no second language is used, use of this methodology is beneficial compared with some of the other available methodologies. It makes it possible for an interested lecturer to make paper, lecture overheads, CD-ROM and Web facilities available without the lecturer having to work 'heroic' hours, and without the lecturer having to edit language files, (or even to know what terms like URL, XML, or HTML mean).
- The lecture material can be made available for student use asynchronously with the lectures, via paper, CD-ROM or the Web.
- A variety of delivery methods was available for use in sending material to international students.
- The FrontPage Web template used for this web also automatically includes the ability to search the web site (resulting in a list of clickable web pages); submit a bug report; submit a suggestion; contribute to a threaded discussion; and to be able to download files and documents automatically.
- The resultant Web offers a high availability. The FrontPage methodology involves the lecturer editing the Web site on the lecturer's own computer via FrontPage's Word-like editor, and checking that the revised web site is satisfactory before using a menu option to 'publish' the corrected and checked web to a server. 'Publishing' in our experience takes only a minute or two, whereas editing and checking the web site 'on-line' (e.g. modifying text and HTML) could make a web site effectively unavailable for an hour or more. Editing the web on the lecturer's computer also means that, apart from the contents of the threaded discussion groups, there is always an on-line backup of the web site available for use if there are problems. All this is done without the lecturer having a need to know a computer language.
- If Internet Explorer 4 or 5 is used, Office documents can be pulled up directly from the Web site,

allowing the considerable layout limitations of HTML to be bypassed.

- Corrections or changes can be promulgated easily. Students can 'subscribe' to a "what's new" web page, and be automatically notified when a change is made. This obviates the need for a lecturer to have to send e-mail notifications of changes to students.
- Since the methodology uses mainly extensions of presently used facilities, the extra cost to both the students and University was minimised.
- The methodology had the serendipitous result of allowing multi-language e-mail.
- The fact that Unicode underlies the PC's operating system makes it theoretically possible to use any of the presently defined 25 or so languages as the primary teaching language, mixing and matching with any of the others for second-language presentations. In practice this versatility is limited by the fonts and input methodologies available.

After-Thoughts

The authors found this an interesting project. The methodology adopted proved practical, producing results that were rated by the Chinese students in an informal poll as being very useful. The students commented that understanding and learning the material was much easier in this subject than their other first-year subjects.

Interestingly, when asked if the provision of help in Mandarin beyond the first year was preferable, the Chinese students commented that part of their purpose here was to learn English, and so in years beyond first year they hoped that provision of this sort of help would not be necessary.

Application of the methodology also produced results that were of use to the other students in the class, in that lecture material in several forms suitable for asynchronous learning became available. Students who, for a variety of reasons, could not attend all the lectures valued this.

It was a disappointment that the Web site could not be made accessible by a Netscape browser. However the time savings obtained were so considerable that we felt justified in using the approach adopted. We have subsequently also had access to Adobe Distiller. This proved able to handle the Mandarin Word files well. It could not handle the sound facility.

Theoretically, this methodology is not restricted to English-first-language applications. It is available for all of the languages supported by Unicode, and could be useful for language classes.

After the formal project had ended, a beta evaluation copy of Office 2000 and FrontPage 2000 became available. Many of the restrictions noted above have been removed in this newer version. The Word 97/PowerPoint 97 conversion restriction that limited PowerPoint 97 to one Mandarin font (plus roman fonts) has been removed in the Word 2000 to PowerPoint 2000 conversion. The Word 2000 to HTML conversion is a big improvement, but is still not perfect. The PowerPoint 2000 to HTML automatic conversion now handles Mandarin, but not sound. Although we did not use it in this particular application, it may be of interest that Access 2000 (unlike Access 97) also has the relatively unusual ability for a database of being able to use Unicode, thus allowing multi-language databases that include CJK glyphs. The main improvement however, which would have been a real boon to us, is that multi-language use in Office 2000/FrontPage 2000 is now well documented. This should considerably ease the initial load of any implementor who wishes to take a similar path to the one discussed above.

Summary

Even though the requirements fairly severely limited the author's options, a solution was found that, while not completely ideal, was reasonably satisfactory, useful, and met most of the requirements specified before the project started. This methodology shows encouraging signs of being a useful low-cost low-effort method for developing multi-language lessons in environments similar to ours.

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Impact of Advanced Media and Emerging Technology on Schools and Society

Part 1 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!

Dateline December 27, 1557, BERLIN GERMANY: The committee on the Impact of Advanced Media and Emerging Technology met for the second straight week and issued its findings to large gathering at the local town meeting hall today.

The Representatives of major factions: university Professors, and educators, industry executives, clergy, governmental officials, parents and students met to discuss the impact of this new technology and to plan the integration of its usage in this modern era.

"Many of the old ways of looking at information, and the way it was doled out have to be looked at in a whole new light due to the recent advances in technology" said one member of the clergy, "I can now actually have access to original material to study at a moments notice. That process of movable type that Mr. Gutenberg invented has made printed material available to thousands where only a select few could have access before! Not only the availability of the information, but the speed at which we can have access to it has shrunk from months and years to just weeks because many more copies of information are spread out all over the countryside."

Many would believe that the invention of movable type, allowing mass distribution of printed material at an insignificant cost is generally a good thing.

This may not be the case.

There are Bibles, printed by Mr. Gutenberg, in which children are employed to color in some of the artwork and wood block letters by hand. A printer, representing the emerging industry stated "It has taken many years for the public to trust that mechanically reproduced material was 'real'. Our marketing people suggested that having the drop caps and wood carved pictures colored by hand, even if we used children, would help with the acceptance. It worked!"

"There is a mistrust of mass produced material as being false, full of errors and removed or different

from the original, but as a publisher myself, I can tell you that just the opposite is true," the publisher went on to say.

When a new book was made the traditional way, someone would simply copy the original manuscript, word-by-word, page-by-page. This process took much time and expense and after all was done, a single production was made. "With movable type, we set the words once. After the page is proofed, untold copies may be made IDENTICAL to the first. This has in fact, cut down on the number of clerical errors," the printer reported. "As far as being removed from the original, in some cases now it **is** the original material. We even have people writing **for** printing."

This is why the committee was formed - to study the impact of this new technology on society. "We believe that we should move cautiously, slowly and deliberately in the use of this technology until we can forecast exactly how it will affect our world. We cannot rush headlong into the use of this material without thought. Everything that we know will need to change. This very report itself will become available to those who would not have seen it before," said one Government official.

The following is a digest of the principal committees' reports. All committees were asked to use a similar format for their report covering three main areas: the advantages, disadvantages, and what the future might hold if the technology were incorporated into the mainstream of everyday life. Finally, each committee must vote to accept or deny the integration of the advanced media in their area.

Universities and institutes of higher learning

"We at the University cannot think of a better vehicle for the advancement of learning. We have embraced this new medium with open arms and strongly encourage its use. In fact, we are demanding our professors to publish or perish as educators." The university official added, "with such easy access to information, we can now have visiting experts contribute to our classes, even if they are hundreds of miles away. It has let in some interesting ideas from far places that have stirred up our students, so all in all, we are in favor of using books in our classes."

Leading publishers "We have been watching the emergence of the printed word for quite some time now. We like the fact that the per unit cost is low and the incremental cost of production is almost insignificant," reported a leading industrial consultant. "We see this new technology as advantageous in the areas of mass distribution of information in a cost efficient manner. What is great is that if an error is found, it can be corrected on the original typeset and the new copies are all correct, this saves many law suits."

He went on to say "We published a book on tides and navigation with mathematical flaws. With the second printing, the errors were removed and sailors navigated to the right places again. Now, every time we print a copy, we don't have to proofread it! What would be nice is to find a way that we could keep the information in one place, keep it updated and deliver only the information needed, when it was needed. That would be great - but I can't imagine that ever happening."

The down side to this printing business is that with the ease of making copies, identical to the original, someone will steal the original and claim the work as his own. We need to know who owns the right to copy - the copyright to the material.

Mr. Gutenberg's process is putting the hand copying industry out of business. There is still the novelty of owning a hand made original, but many consumers are strictly looking for the old three standards, price, availability and utility. Production printing, the advanced media of this century fills the bill in all these areas.

"We see a tremendous market for all kinds of information - all kinds of books. We heartily endorse the

adaptation of this new technology and strongly support and invest in it."

Clergy

There are some people who believe that it is correct for persons to actually read silently! Imagine that, silent reading! We read for others, to let them in on the thoughts behind the cryptic symbols of the written word. To read for our own pleasure is to misuse the gift.

The only materials necessary for scholarly reading are the Bible and printed copies of sermons to be read to others. Printed material is nice to have if it is of the right "kind" of material. The danger of this new technology is that soon, everyone will have his own copy of the Bible, and will wander aimlessly in the writings, making up his own mind as to what the interpretation should be. These commoners are not trained in Biblical study and could easily come to wrong and maybe dangerous conclusions."

"We have that radical, Martin Luther, writing propaganda out there. He is writing specifically for this new vehicle in German, knowing full well that it will be read by the masses. How can we compete with that in the church? We must enforce limits and controls on this instrument of rebellion!

"Our saving grace is that many of the people still do not know how to read. These still will listen to reason and not engage in the mind-altering persuasion of this devil's tool. Besides, we all know that only in Latin is the truth revealed." It doesn't matter how many copies of the Bible are printed in Latin, as not many read Latin anyway. We must guard against anyone printing the Bible in the tongue of the common man."

"We cannot, in good conscience, endorse the use of this technology. The dangers for the common man, untrained in religious matters, coming to conclusions by himself must be squelched. We cannot permit access to original documents and religious materials to the untrained reader. We are the experts. We have a sacred mission to interpret spiritual matters and guide the masses."

"The next thing that will happen is that women will want to be ordained, people will challenge our God given authority, and there will come a group of protestants hanging signs on our doors."

The clergy, by unanimous decision voted not to endorse the use of this technology.

Educators

"The only thing needed, is a piece of chalk in the hand of a good teacher," said one leading schoolteacher. "I have been teaching for the same material, the same way twenty five years. I lecture and those that want to learn - learn. Those that do not want to learn become toilers of the land. My students copy down my words exactly. We have no need for books for everyone. Who will pay for all those books? We simply do not need this technology."

"If the students have access to all this information, they will become more educated than their parents. Some children will even be better at finding things out (newer things!), than we teachers, just because they will know how to use this technology more effectively than we teachers."

This educator then put forth many other points. According to his group, there would be major changes in the delivery of information, the makeup of the classes and Guild issues to contend with if educators endorsed this advanced media.

If some child could simply read information in a book, why would we need teachers? Once someone was able to read, couldn't he or she then self learn the material? Women will want to learn to read! We

need to keep classrooms teacher centered, with the teacher handing out the information to all the children at the same pace, at the same time. You can't have a class with 20 children all reading different chapters at one time.

"We must be the guardians of information, standing at the flood gates turning away inappropriate material and only allowing in what is necessary for the children to know. We know what they need," the teacher confided. "We can not let these unverified sources of information into the classrooms. We must insure that all information is correct before the children have access to it. We need to keep reminding our children that travel faster than 38 miles per hour is impossible, and that the Earth is the center of the universe, not what that crazed Copernicus is spouting out."

Next issue: In part 2 of 3 - A continuation of educators report on this new technology. How does mass publication affect teaching and learning? How can we make sure that the kids are not exposed to the 'wrong kind' of information? Who do we teach how to use this new medium?

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Announcement: Mathematics Metadata Working Group

A group of American mathematicians is working on defining LOM compliant standards for mathematics. The request to form this group came from the IMS project and the impetus to do the work has come from digital libraries such as the Eisenhower National Clearinghouse (ENC), the Math Forum, and NEEDS. The group is reporting to various professional societies within the discipline of mathematics (AMS, MAA, SIAM, and NCTM) as well as the W3C Mathematics Working group, which has some members in common.

The project is concentrating on defining vocabulary taxonomies (under *Classification*) and a few other key elements that require specific attention for mathematics. The role-out date for a document for public review by the mathematics community is the end of 1999, in time for dissemination at the annual joint mathematics meetings in January, 2000, taking place in Washington DC. By then we should also have a prototype in the SMETE portal hosted by NEEDS.

Information, reports, and comments may be found at

http://forum.swarthmore.edu/discussions/math_metadata/ (note: there is an underscore between math and metadata in the URL.) This is an open group and participation is welcome. For more information please send email to the address below.

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Call for papers: Journal of Women and Minorities in Science and Engineering

Volume 6, 2000

Carol J. Burger, Ph.D., Editor-in-Chief
Center for Interdisciplinary Studies
Virginia Polytechnic Institute and State University

Now welcoming submissions for Volume 6, the Journal of Women and Minorities in Science and Engineering publishes original, peer-reviewed papers that report innovative ideas and programs, scientific studies, and formulation of concepts related to the education, recruitment, and retention of underrepresented groups in science and engineering. Issues related to women and minorities in science and engineering are consolidated to address the entire professional and educational environment.

Subjects for papers submitted can include:

- empirical studies of current qualitative or quantitative research;
- historical investigations of how minority status impacts science and engineering
- original theoretical or conceptual analyses of science from feminist, racial, and ethnic perspectives
- reviews of literature to help develop new ideas and directions for future research
- explorations of feminist teaching methods, minority student/white teacher interactions; and
- cultural phenomena that affect the classroom climate.

To receive guidelines for manuscript preparation or to submit a curriculum vita if you are interested in reviewing papers for the journal contact:

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Notes regarding previous issue

- The author of article [The Student Instructional Technology Corps \(SITC\)](#) acknowledged that Dr. Ed Nuhfer's name was left out from author list by mistake.
- The author of article [SouthEast Partnership to Share Computational Resources \(SEPSCoR\)](#) mentions that the contact person for SEPSCoR project is Dr. Paul G. Huray, (+1)-803-777-9520 huray@sc.edu

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