Instructional Strategies and Learning Objects for Pacific-Delivered Courses

Curtis P. Ho
University of Hawaii, USA

Introduction

Information technologies have served to challenge traditional norms and ways in which education is delivered. Technology such as computers, email, the Internet, and software applications that enhance educational activities such as research and writing, promotes interactive learner-centered environments, and allows for preparing students for post-graduate employment in a global-driven society.

The use of technology in education is apparent and highly compelling but also has contributed towards creating a social and educational gap between the information-rich and information-poor. Research has shown that the information-poor are often "minorities, low-income, less educated, children of single-parent households . . . are among the groups that lack access to information resources" (Irving & Levy, 1999, p.xiii).

Being "information-poor" and lack of access are also problematic issues for indigenous people such as those in Hawai'i, American Samoa, and other island countries who want to pursue educational opportunities or professional development but whose geographical isolation and limited educational and technological resources serve to limit access for them. This concern was highlighted in a 1997 report released by the Pacific Resources for Education and Learning (PREL) in conjunction with the Office of Educational Research and Improvement (OERI), that surveyed educators in South Pacific states. The report's findings indicated that systematic reform, professional development, and the use of technology were perceived as the three most important education areas while "early childhood education, planning and accountability, and language and cultural diversity were the areas of lowest perceived importance" (Pacific Resources for Education and Learning, 1997, p.15).

Challenges

The geographic isolation of Hawai'i and American Samoa limits educational and professional development opportunities for its populace, however, advancements in technology and Internet communication have created new learning environments that use web technologies that transcend physical and time boundaries to link students with instructors. There is a greater potential for sharing ideas, reflective thinking, and cooperative learning in such networked environments. According to Feasley (1992), "distance education programs have emerged throughout the world to serve new students in

ways that are important to them" (p.334). Van Dusen (1997) also identifies technology as a means for supporting "collaborative learning, heterogeneous groupings, problem-solving and higher order thinking skills—educational processes that a lecture format cannot facilitate" (p.45).

Technology's potential for instruction and learning also poses numerous challenges for students and instructors. Besides learning to use and access technologies within traditional institutional constraints, there are questions about providing viable alternatives to the usual face-to-face delivery of instruction. For example, Schwan (1997) examines the computer conferencing technologies (bulletin board types) that have gained increasing importance in distance learning environments. While there are similarities with face-to-face classroom delivery, the method of delivery in these computer conferencing classes significantly impacts the learning process. Likewise, Warschauer (1998) questions the assumption that the alternative mode of online learning necessarily promotes student-centered communication, collaboration, and inquiry. In Electronic Literacies, Warschauer (1999) notes that while the Internet represents "the most diversified mass medium the world has ever known", it is also dominated by a relatively wealthy, well education, English-speaking elite" (p.17). The contradiction of "the Internet as a medium of exclusion or a voice of pluralism" (p.19) is weighed against whether students in Electronic Literacies (immigrants, indigenous, second language learners and speakers of second dialects) are having their needs met through the use of technology.

Ongoing Issues

In the State of Hawai'i, a single system exists for all state-funded institutions of higher education. The Manoa campus, the flagship of the University of Hawai'i (UH), provides the primary teacher education program for the State. UH has committed substantial resources to meet the needs of individuals throughout Hawai'i and the Pacific who are limited by time and place without easy access to traditional campus-based postsecondary education. In particular, the growing need for new teachers in remote locations has prompted the College of Education (COE) at UH to develop alternative strategies for course delivery. Initial teacher education efforts relied on costly and limited interactive television systems such as the Hawai'i Interactive Television System (HITS), a closed-circuit television network. HITS was designed to deliver interactive TV throughout the State of Hawai'i to receive sites strategically placed at UH campuses. HITS has been the preferred mode for delivering distance education by faculty because of the high image and audio quality, two-way interaction with students, and availability of a professional broadcast support crew (Ho, 2003). Limited channels and receive sites, however, posed problems as a heavier demand for HITS grew. Additionally, students living in remote parts of the islands found it difficult to travel to a receive site for a HITS-delivered course. Also, the HITS network did not extend outside of Hawai'i, thereby excluding students living in other Pacific areas from participating in teacher education courses.

Responding to these needs the COE recently began designing and offering online courses using a web-based learning environment called WebCT. This online environment offered a variety of instructional and course management tools to facilitate computer-mediated communication and student learning including electronic bulletin boards, private e-mail, synchronous chat, content pages, online surveys and quizzes, and links to external websites. Although the online distribution makes courses more accessible to students, there were mixed reactions by students and instructors to the effectiveness of such an online system. Preliminary results indicate that online students have performed just as well as campus-based students however; many online students indicated the need for a more individualized learning experience allowing them to explore independently and in depth with the applications they were learning. They liked the convenience of an online course and saw the benefit of collaborative, community-building activities, but many indicated a desire to pursue individual agendas and interests.

The time and effort required to address diverse needs in an online course presents a major challenge for instructors, especially for those teaching at a distance for the first time. Conversion from a face-to-face class, or even from a televised distance-delivered one, is time-consuming and often requires technical support. Adequate professional development workshops in WebCT, presentation software, web authoring programs and other instructional support applications are provided in the COE and campus-wide however; the additional time needed to learn and apply new skills for online course development was a heavy burden to bear for most faculty members. Initial online courses were designed similarly to face-to-face versions. For efficiency, online activities and assignments followed a similar semester-based schedule. Students were asked to move through the designed activities as a group. Providing supplementary materials or enrichment opportunities was beyond the capacity of most faculty members. Faculty therefore, found it difficult to offer their distant students other options for learning.

Support Through LEI Aloha and New Outreach and Technology Office

In a response to a need for more technology proficient teachers in our nation's schools, the US Congress in 1999, established the Department of Education's Preparing Tomorrow's Teachers to Use Technology grant program (PT3). The PT3 program's goal was not to ensure that pre-service teachers understand how to use a computer or access the Internet; rather, they were to understand how to create and deliver high-quality, technology-infused lessons that engage their students and improve learning. By supporting innovation and change, the program started a movement that aimed to break the cycle that leaves new teachers unprepared to use modern ICT because their teacher education professors were not modeling the technology-infused teaching methods needed to effectively teach in the 21st century classroom.

During an initial 1999 PT3 Implementation grant and previous Eisenhower Professional Development grant awards, the Department of Educational Technology (ETEC) created an infrastructure of ICT resources and professional development programs that helped education faculty and pre-service teachers to become proficient at integrating ICT into their teaching (Fulford, Ho, & Eichelberger, 2000). Learning Enhancements through Innovation (LEI) Aloha, as this PT3 project was aptly named, became an integral partner with the College of Education's new Outreach and Technology office. Many of the functions and services initiated by LEI Aloha were continued by Outreach and Technology.

An additional PT3 Catalyst grant in 2001 further expanded the role of LEI Aloha in the COE to include the development of a series of online courses for practicing teachers on sabbatical leave called the Technology Intensive Enhancement Series (TIES), and a mentoring program for teacher education faculty. This mentoring program allowed faculty to receive one-on-one assistance from a graduate student with designing their online courses. Those receiving this assistance have remarked that the consistent and individualized help they have received from mentors have been so much more effective than other professional development activities such as workshops and seminars.

Concurrent with the development of TIES courses, a team of instructional designers from LEI Aloha began developing multimedia modules that would be used to support the online courses. The modules, designed for distribution on CD ROM, provided information normally covered by lectures and demonstrations in a face-to-face course. Flash and Director animations were used to keep the content interesting and engaging. Audio narration minimized the amount of text needed making it suitable for a wider audience. Each topic was comprised of several "chapters" that could either be viewed in sequence or by user preference.

Hybrid Course in American Samoa

One of the TIES courses, Computers in Education (ETEC 442), was piloted as a hybrid online course for pre-service and in-service teachers in American Samoa during Summer 2002. American Samoa is an unincorporated and unorganized territory of the United States and is located in the mid South Pacific approximately 2,600 miles from Honolulu, Hawai'i (Central Intelligence Agency, 2002). The population, as of the year 2000, was estimated at 57,291 with approximately 56% of the population between the ages of 15 to 64 years-old (United States Census Bureau, 2000).

The ETEC 442 course was conducted in a computer lab located at Pava'ia'i Elementary School on the island of Tutuila. The instructor was present for the first two weeks of the course to provide a course orientation and to teach WebCT and software application skills. The remainder of the time was spent observing how students progressed with the online portion of the course and to provide technical support when needed. The instructor taught the remaining two weeks of the course online from

Honolulu.

The course was divided into 12 units beginning with an overview of computers in education and subsequently covered a range of topics including: troubleshooting, creating a technology plan, Windows and Mac operating systems, desktop publishing, managing information and numbers, technology integration, standards and assessment, hypermedia and Internet in education, electronic portfolios, ethics, equity and copyright. A computer resource teacher was available to provide technical support and assistance during the online portion of the course.

Course activities consisted of textbook and online readings, online quizzes, research and writing, individual and collaborative team projects and mediated instruction through Flash and Director animation. Interaction occurred by electronic mail and web-based conferencing with assignments transmitted to the instructor by email and WebCT. Most of the content and interaction occurred online while demonstrations and hands-on activities occurred in the iMac lab at the Pava'ia'i site. Videoconferencing between Honolulu and American Samoa was conducted during the final two days of class for the presentation of electronic portfolios.

Although there were many technical challenges to overcome, students in American Samoa remained fairly positive about their initial experiences with an online course. The network connection to their computer lab was extremely slow and intermittent. Only a few students had Internet access at home so many worked into the evenings and weekends in the computer lab to complete their assignments. What helped them through many of these challenges was a learning community that was based on their strong and culturally relevant Samoan community. Supporting each other was what they do well. Comments submitted in their course evaluation are shared below:

> *"The major strength of the course was the collaboration and the assistance that we received from one another in trying to figure out how to utilize the various programs and to complete the PowerPoint project. I think that was a very important factor that contributed to the success of the entire class in getting the project completed".*

> *"...I really did gain great knowledge from this class. I know I will never forget what I have learned. Your (sic) right about us working on our own, it's a great opportunity to struggle knowing that I can do it. It was a great chance for our class to be able to share our knowledge with each other. And I surely did learn much about working on my own".*

> *"...At first I was afraid that my computer skills weren't good enough to take this course. Everyone made it such a great learning experience and the instructor was so helpful that I've learned so much and was able to polish up old skills I had but never used it!"*

A quick analysis of the course evaluation and a debriefing by the course instructor led to subsequent discussions with the instructional faculty, instructional designers and media production staff. While the course generally worked according to plan, TIES faculty were concerned about the need to adjust to diversity issues in technology skills and learning styles. Also at issue was the inconsistency of Internet service in rural areas as well as the lack of access to the Internet at home. The general consensus of the group was that the TIES courses should have a more open design that would allow instructors to adjust to various conditions and needs. In particular, it was felt that modules on the CD ROM were too static and lacked the capacity to be integrated in multiple ways in the course.

From Modules to Learning Objects

It was decided that a more open course architecture would require modifying the static portions of the course. Multimedia modules were deconstructed into smaller components and posted on the web as learning objects. This migration to learning objects accomplished three outcomes. First, the content of all modules were now accessible through the Internet. Second, 21 learning modules were expanded to 135 independent learning objects thus yielding a higher number of usable multimedia. And third, because the learning objects were downsized into smaller pieces of instruction, both instructors and students have more direct access to specific content which then could be used in multiple ways as a teaching and learning resource. Figure 1 illustrates the reorganization of CD ROM modules into 5 content areas and 21 topics. For the topic "portfolios", there are 6 learning objects listed in the middle of the screen and corresponding hyperlinks to external resources on the web are listed at the bottom.

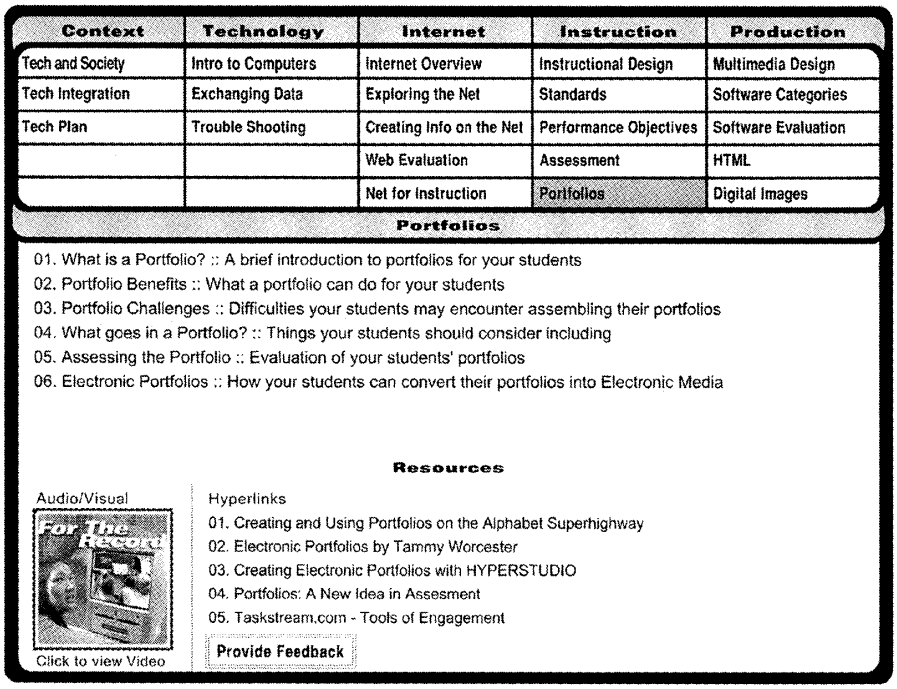

Figure 1. Learning Objects for TIES Courses

There are several definitions for learning objects but in general they represent an application of Internet-based instruction that is based on the concept of reusability and interoperability. David Wiley's (Wiley, 2000) definition that a "learning object is any digital resource that can be reused to support learning" (p.7) is simple and elegant and one that we have adopted.

The interoperability issue has prompted academic and corporate organizations to develop standards for how objects are classified, distributed and reused. Initial standards for learning objects included the Dublin Core Metadata Profile, the Institute of Electrical and Electronics Engineers (IEEE) that formed the Learning Technology Standards Committee (LTSC), Instructional Management Systems (IMS), and Learning Materials Metadata (LOM). Educational consortia such as the Alliance of Remote Instructional Authoring and Distribution Networks for Europe (ARIADNE) and Gateway Educational Materials (GEM) have employed some of these standards, including their own, to provide a network for sharing educational resources. ARIADNE in particular has attempted to address the linguistic and cultural barriers in sharing resources over multiple countries (Miwa, 2003). Another more recent standard used for commercial purposes, Sharable Courseware Object Reference Model (SCORM), was designed primarily for Learning Management Systems (LMS) and learning content authoring tools.

Our digital resources were not initially designed to be learning objects, though according to Wiley's (2000) definition, they are learning objects. We are still plodding through the standards issue since there seem to be many to choose from. Our resources, therefore, have not been coded with the metadata necessary to be found and shared over the Internet. As with the multimedia modules, we are evaluating our other digital resources for possible deconstruction into smaller, reusable learning objects.

Digital Video Objects

Digital video and other instructional resources residing on our ETEC-Connections website (http://www.hawaii.edu/etec) have been an integral component of LEI Aloha since the outset. Efforts are being made to integrate the videos in the TIES courses as learning objects. The provision of relevant concrete examples of quality technology integration in the classroom is an important element of preparing teachers for the digital age. The videos focus on exemplary practices of teachers using technology to address content standards. Short video overviews supplemented with feature videos and applicable instructional resources are made accessible, with examples from various grade levels and subject areas.

The strategy has been to provide an "overview video" that previews a project in an engaging and informative manner, encouraging viewers to pursue more detailed information. Then, a longer "fea-

ture video" provides the details through a teacher explanation of the project design, methodology and application, assessment strategies, community involvement, and the challenges and various elements related to successful implementation. The videos are accompanied with online lesson plans, teacher contact information, student products, as well as the local, national, or international teaching standards that were met. A resource kit is available and includes assessment rubrics, teaching strategies, and links to hardware and software resources related to the project.

Although greatly beneficial, producing high quality videos is a costly endeavor. Hence, it is essential to ensure that the video clips can be used in many ways for multiple audiences to justify their expense. The videos featured on the ETEC Connections website have been incorporated in several different settings from K-12 to higher education classrooms and have targeted multiple parties who are all invested in the outcomes of new student learning initiatives. Further diversification of the how the videos are distributed have increased their likelihood of being seen and used. The video distribution illustration (Figure 2) shows the four major formats: (1) public and cable TV, (2) digital (and analog) videotape sent directly to schools, (3) videos compressed on CDs and DVDs, and (4) video streamed from the ETEC Connections website.

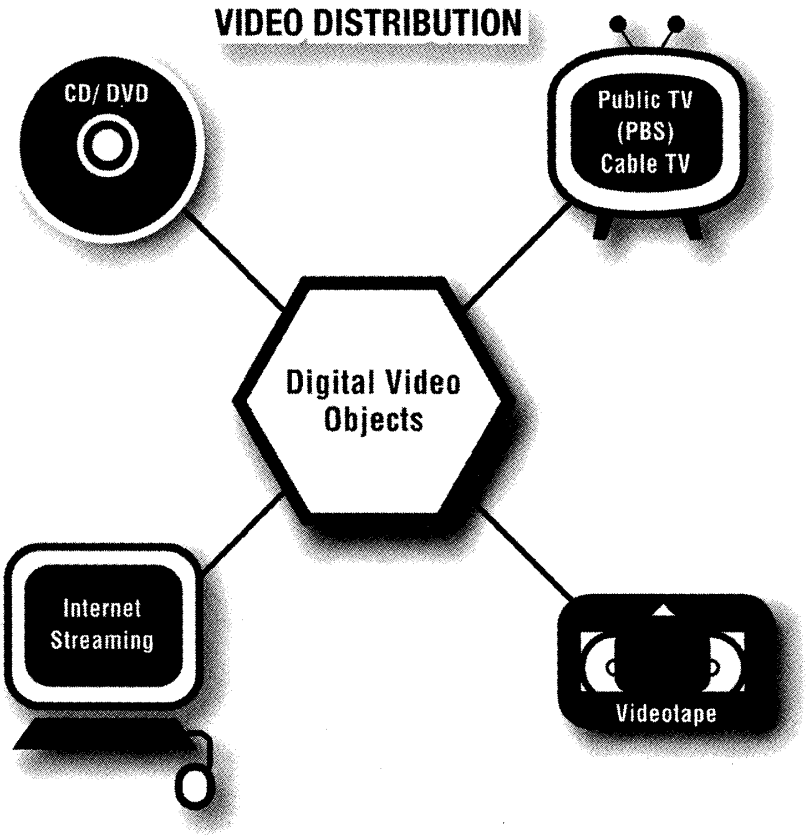

Figure 2. Video Distribution

(1) The videos are being used as a marketing tool. The 90-second to two-minute overview videos are being broadcast, in partnership with Hawai'i Public Television KHET, and cable television through Hawaii Department of Education's Teleschool and the University's ITV network, 26+ times per week to motivate teachers to incorporate technology and visit the website. These short versions are used much like a commercial to first engage and then entice the viewer to visit the website. This is achieved by a combination of up-tempo music, quick edits and an animated cast of teachers and students excited about sharing their experiences about the project. Once at the website, a teacher will find all the resources necessary to duplicate the project entirely for their classroom. There, a longer feature-length video provides an in-depth explanation by the teacher and students about the project. The ETEC Connections spotlight videos on public television are reaching an estimated 36,000+ viewers and on educational channels, 1081 teachers and 30,268 students across Hawai'i. The website had an average of 22,000+ hits per month before the KHET broadcasts began and gained an average of 10,000 additional hits a month since the broadcasts began (numbers based on the 4 months prior to and after the first broadcast release in Jan. 2002). A more recent agreement with a local commercial cable company has increased the number of broadcasts tremendously. We don't have data to measure the impact yet however the videos are broadcast multiple times per week locally on 3 commercial cable channels including ESPN.

(2) An agreement with Teleschool provides all public schools with copies of the videos upon request. There is a growing group of users of the videos that testify to the residual value of producing quality videos. The teachers and schools featured in the videos are displaying the videos at school assemblies, parent exhibition nights, as well as in class for their own K-12 students. The pride of these teachers encourages them to exhibit the videos giving extra exposure to the school, the technology issues, and subsequently the university-related project. The videos can also be used as part of their own professional portfolio demonstrating their hard work and philosophy in action. The ripple effect on students, parents, other teachers, and administrators, is building a synergy that will further support educational efforts to maximize the appropriate infusion of technology into curriculum programs.

(3) The instructors of traditional teacher education courses are using the videos as a means to discuss various teaching practices with their students. CDs and DVDs have been made available upon request. The overview and feature videos provide real and complete examples for on-line group or class discussion and evaluation. The resulting interactions create valuable opportunities for brainstorming, problem solving, and stimulation to inspire further exploration. The videos also provide concrete examples of standards-based, project learning and foster dialogue about the advantages and disadvantages of using various technologies to accomplish unique goals for students.

(4) The videos are being used in TIES courses as linked resources through their WebCT course site. Students are given an opportunity of viewing a small, medium or large movie, depending on the

speed of their connection. Almost all public school teachers have T1 connectivity from their campuses but many are still using 56K dial-up modems from home. The videos so far have not been fully integrated into the TIES courses as learning objects. One of the courses, Technology for Teachers, is being revised to incorporate video directly in instructional activities. The shorter overview videos were primarily designed to gain attention and motivate the viewer to find out more about the topic. The 8 to 10 minute feature videos are content rich but were not designed to provide direct instruction. The challenge for LEI Aloha is to re-edit the longer videos into smaller learning objects that can be related more directly to the instruction. All videos have been closed-captioned so we are also looking into the possibility of translating the captions into multiple languages for a wider, international use.

The next step for LEI Aloha is to expand this database of video objects to include case-based "trigger videos", which provide students with the challenge of finding viable solutions to unanswered or incomplete scenarios. It is important for them to gain real experience in solving problems related to technology integration. The open-ended approach demonstrated by these productions provides students with a context in which to apply their own strategies and debate them with other students. It stimulates creativity and vision for resolving of potential dilemmas that ultimately arise in a complex mix of curriculum objectives, technology, and the individual and team dynamics of a classroom.

Video and Motivation

The emotional impact of video is one of the strengths of this medium and the effect can often transcend language and cultural barriers. The feedback we have received from viewers throughout our State and from American Samoa have been positive. However, we needed to collect data to confirm our observations. We were interested in finding out how well the videos functioned as a motivational tool. We were particularly curious in discovering if there were any differences in motivational effect between the two audiences for which the videos were produced: education majors (pre-service teachers) and classroom teachers (in-service teachers).

Motivation typically does not receive much attention in instructional design yet it is perhaps the most vital aspect in distance learning. A student not motivated to learn in an online class will be less likely to succeed in spite of great interactive activities and projects. The standard motivating factors found in face-to-face classes such as peer pressure, instructor presence, and other social forces are not present in an online course. Designers of online courses should build in motivational strategies to provide the optimum conditions for student learning.
John Keller's work in psychological motivation identified four conditions for a learner to be motivated (Keller, 1983). His ARCS model was proposed as a sequence of four conditions: Attention, Relevance, Confidence, and Satisfaction (Figure 3).

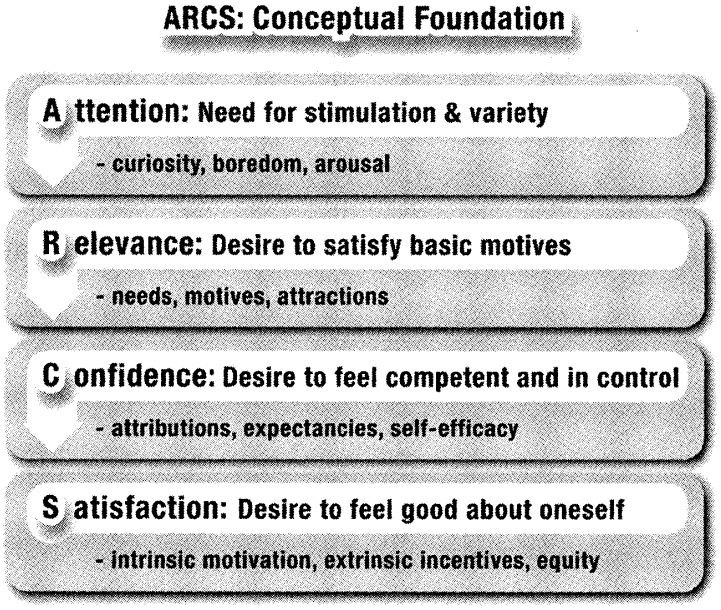

Figure 3. ARCS Conceptual Foundation

Attention: Gaining the learner's attention is first and foremost in the ARCS model. Strategies to stimulate and arouse can lead to curiosity and avoid boredom. Variety and interaction through multimedia also help to gain attention.

Relevance: Satisfying one's basic needs or motives are accomplished through relevancy. Information that is clearly fulfilling and worthwhile to a student gives them more ownership of the learning experience. Relevance is especially critical in motivating adult learners who are already busy with careers, families and other grown-up commitments.

Confidence: Strategies that allow students to feel competent and in control are helpful in building confidence. Students who are given ample opportunity to be successful will feel good about themselves to the point of having higher expectations in their own learning.

Satisfaction: The final condition of the ARCS model requires strategies in intrinsic and extrinsic motivation. Feeling adequate in completing a goal or task is intrinsically rewarding. Positive reinforcement and feedback are extrinsically motivating. Consistency and equity in providing rewards are important in maintaining level of satisfaction.

To test the motivational effect of our ETEC Connections video, students in two sections of a TIES course, Media in Education, were asked to view an overview (short) and feature (long) of two different videos. Section One viewed Bookends of War (short) and Project Pollution (long) while section Two viewed Project Pollution (short) and Bookends of War (long). The combined sections were comprised of 53 pre-service teachers and 19 in-service teachers. Students viewed the videos during the

first week of class.

A survey instrument was designed based on Keller's ARCS work in motivation assessment (Keller, 1987). A 20-item survey, comprised of 5 items for each of the ARCS components was given to students immediately after viewing the video. The survey items were based on a 6-point Likert type scale. Table 1 illustrates the results of the survey.

Table 1. Summary of pre-service and in-service ARCS responses to overview and feature videos

	Overview		Feature	
	Pre-Service N = 53	In-Service N = 18	Pre-Service N = 51	In-Service N = 19
Attention	4.14	4.65	4.45	4.62
Relevance	3.97	4.48	4.41	4.65
Confidence	4.07	4.25	4.67	4.71
Satisfaction	3.96	4.33	4.50	4.68
Overall	4.03	4.42	4.50	4.66

A preliminary look at the data shows that overall, in-service teachers were more highly motivated by the videos than were pre-service teachers. It is interesting to note that the differences were larger for the shorter overview video (4.03 vs. 4.42) than for the longer overview video (4.50 vs. 4.66). It is possible that pre-service teachers lack the context for what is shown in the overview video and are consequently less motivated than the in-service teachers who have years of classroom experience and have more context for viewing the shorter video. Whereas, the longer feature video provides more information and context thus minimizing classroom experience as a factor in motivation. Data analysis will be conducted to determine if the differences seen are significant. Overall though, the videos seemed to have made a positive impact on motivation. We will continue our research in this area.

Conclusion and Recommendations

It is a foregone conclusion that distance learning will play a major role in the future of the College of Education at the University of Hawai'i. The demands for teacher education outreach programs are immense and costly. The idea of investing in instructional materials that can be shared and reused across multiple programs makes good fiscal sense. Teacher education faculty do not have the time nor expertise to develop their own learning objects. It will be worth their time, however, to provide their content expertise to projects such as LEI Aloha that can produce effective learning objects.

There were some valuable lessons learned in designing and offering the TIES courses online. Expectations of adult online students are different from younger students in face-to-face courses. Older

online students are typically busy with their careers and families and expect the independence that comes with a course that supposedly allows them to learn "anytime, anywhere". Yet research has shown the benefits of collaborative learning and learning community in an online environment. Instructors also feel more comfortable teaching an online course based on a traditional academic calendar. In our attempt to modify the TIES courses to satisfy both types of strategies, we have designed a course framework (Figure 4).

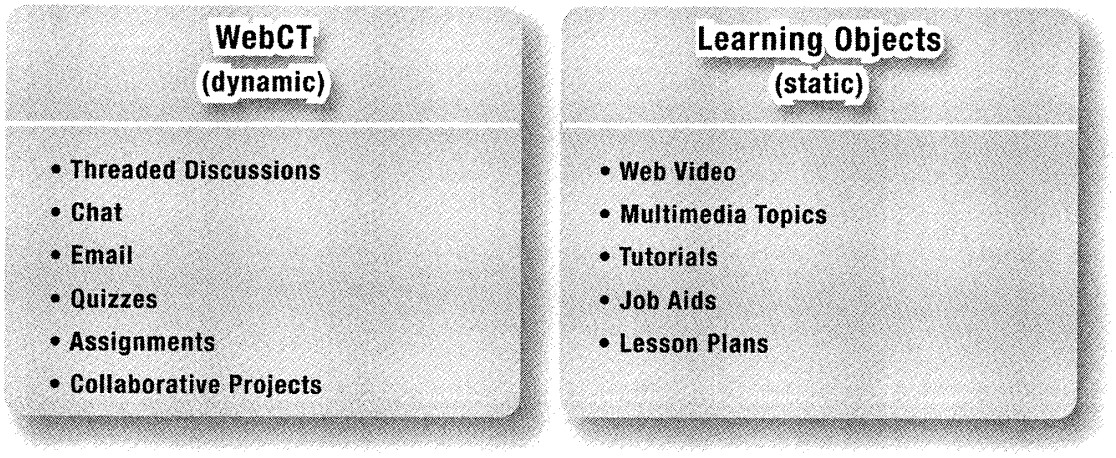

Figure 4. Dynamic and Static TIES Course Framework

The dynamic part of the course is conducted through WebCT. Threaded discussions, synchronous chat, email, quizzes, assignments and collaborative projects are framed in a learning community that can support each other's learning needs. Much of the activities found in a face-to-face classroom can occur in WebCT. Student-to-student and student-to-teacher interaction via email, discussions, and synchronous chat can simulate interaction in a traditional classroom. The static part of the course relies on learning objects that can be explored independently. Web video, interactive multimedia, online tutorials, job aids and lesson plans are objects that can provide direct instruction and motivation. Course designers need to plan activities that allow students to create their own knowledge using the learning objects. Instructional strategies that integrate both static and dynamic parts of the course need to address age, culture and language differences, especially when employed in a Pacific-wide course.

Digital video appears to have the most potential for resource sharing. The medium is compelling, motivating and is more ubiquitous and universally acceptable. The closed-caption capability makes it possible to offer a video in multiple languages. Improvements in compression and streaming may allow for even the slowest of connections to view decent quality video. It remains to be seen how soon video equipment gets into the hands of those who can really make a difference. The learners. It seems that many learners, even young ones, are already capable of producing video. Where are the instructional strategies that challenge learners to apply this medium?

References

Central Intelligence Agency. (2002). *American Samoa: The World Factbook*. Retrieved August 15, 2003, from http://www.cia.gov/cia/publications/factbook/print/aq.html

Dusen, G.C.V. (1997). *The virtual campus: Technology and reform in higher education*. Washington, DC: The George Washington University Graduate School of Education and Human Development.

Feasley, C.E. (1992). Distance education. In M. C. Alkin (Ed.), *Encyclopedia of Educational Research* (6th ed., pp.334-342). New York, NY: Macmillan.

Fulford, C., Ho, C.P., & Eichelberger, A. (2000). *Technology Intensive Courses: Preparing Faculty and Future Teachers to use Technology*. Paper presented at the 16th World Computer Congress (WCC), Beijing, China.

Ho, C.P. (2003). Distance Learning and Online Instruction at the University of Hawaii. *Supplement to the Bulletin of the Research Institute of Bukkyo University* (Comparative Study on School-Based Teacher Education Curriculum in Japan and U.S.A.), 25-34.

Irving, L., & Levy, K.K. (1999). *Falling through the net: Defining the digital divide*. Washington, DC: National Telecommunications and Information Administration and the U.S. Department of Commerce.

Keller, J.M. (1983). Motivational design of instruction. In C.M. Reigeluth (Ed.), *Instructional design theories and models: An overview of their current status*. Hillsdale, NJ: Erlbaum.

Keller, J.M. (1987). IMMS: Instructional materials motivtion survey. *Florida State University*.

Miwa, M. (2003). Key issues for educational / learning resource sharing networks: Standardization, globalization and localization in the ICT environments. *E-learning beyond Cultural and Linguistic Barriers: Co-existence and Collaboration*, 37, 153-164.

Pacific Resources for Education and Learning. (1997). *Educational needs assessment report for the Pacific Region*, 1997. Honolulu, HI: Office of Educational Research and Improvement.

Preece, J.J. (1999). What happens after you get online? Usability and sociability: Like the twentieth-century architects and town panners, software designers and community developers can together profoundly shape the online community landscape., *IMP* (pp.1-12).

Schwan, S. (1997). Media characteristics and knowledge acquisition in computer conferencing. *European-Psychologist, 2(3)*, 227-285.

United States Census Bureau. (2000). *American Samoa: United States Census 2000*. Retrieved September 12, 2003, from http://www.census.gov/prod.cen200/island/ASprofile.pdf

Warschauer, M. (1998). Online learning in sociocultural context. *Anthropology & Education Quarterly, 29(1)*, 68-88.

Wiley, D.A. (2000). *Connecting learning objects to instructional design theory: A definition, a metaphor, and a taxonomy. In D.A. Wiley (Ed.), The Instructional Use of Learning Objects: Online Version*. Retrieved August 15, 2003, from http://reusability.org/read/chapters/wiley.doc