

THREE DECADES OF DISTANCE LEARNING: ENRICHMENT AT THE UNIVERSITY OF HAWAII

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INTRODUCTION

This article was composed collaboratively using Nicenet, a computer electronic bulletin board <www.nicenet.org>. The three co-authors collaboratively edited the file and exchanged drafts via e-mail while simultaneously gathering reflections from colleagues online. Our collaboration on authoring this article in some sense closes the circle of similar activities pioneered by the three of us almost thirty years ago. But our aim is not merely to demonstrate innovative writing techniques, it is also to offer a personal history of online learning. We aim to give a personal account of some of the interesting events that have taken place in computer telecommunications over the past three decades. In addition, we'll show how this technology has become more available and therefore more effective as an educational tool.

John Southworth

My story begins on 18 October 2002 in Hong Kong as I met with each student of my Distance Learning-Enrichment class of the Education Laboratory School in Honolulu. The purpose was to review first quarter progress reports. As we spoke, I studied their faces as I passed along their grades, observing their delight (or concern, depending on the grade!). I offered comments and we engaged in the usual discussion, much as I have done for many years. But there was a difference during this traditional, end-of-quarter ritual. My students were sitting in the classroom computer lab in Honolulu, and I was sitting in an Internet cafe in Hong Kong! We were communicating using webcam-based videoconferencing through the Internet.

It strikes me that we have come quite far from the early days of classroom technology. But in other ways the distance is not so great. That day, sitting in an Internet café in Hong Kong, I was reminded of the time when Gerald Knezek, John Flanigan and I used similar teleconferencing techniques to complete a proposal to the 1981 Pacific Telecommunications Council (PTC) Conference in Honolulu.

The idea for that presentation came from a satellite discussion series carried over PEACESAT (Pan Pacific Education and Cultural Experiments by Satellite), an educational satellite program started at the University of Hawaii in the late 1960s using obsolete weather satellites (Kingan, 1990). John Flanigan was teaching in American Samoa and was using PEACESAT to communicate with others around the Pacific. We all shared a common interest in using "Computers in Education" as we called the discussion series.

John Flanigan

I arrived in American Samoa in 1967 to teach math and computer science at American Samoa Community College. Soon after I arrived I learned that NASA had just put up a geosynchronous communications satellite above a point near Samoa, on the equator in the eastern Pacific west of Ecuador. At first it didn't affect our lives much since it was designed for experimental purposes. But when I returned in 1974, ASCC had become a member of the PEACESAT consortium and an ATS-1 receiver/transmitter had been installed on the campus. I was asked by the College president to be the ground terminal manager. The terminal was one of two-dozen around the Pacific that participated in the PEACESAT exchanges. We shared one of the satellite's voice bands with various other users, and participated in schedules on various topics of education, health, and community service. PEACESAT had its beginnings in 1971 when Dr. John Bystrom at the University of Hawaii at Mānoa received permission from NASA to use the ATS-1 satellite to develop a radio link with the Hilo campus. The transmissions were monitored by Tony Handley at Wellington Polytechnic in New Zealand, who asked to be allowed to join the conversation. The number of participants increased, and permission was obtained from NASA to use the satellite for the PEACESAT project. By today's high standards, the ATS-1 was rather primitive, although it stood as an exemplar of then-current technology. It had a broadcast power of 40 watts, which was enough to support a color television channel, or several channels of voice communication.

A perspective from an Australian user is to be found at:
<www.ascilite.org.au/ajet/ajet1/davies.html>

John Southworth

PEACESAT was an invaluable tool for permitting grassroots telecommunications in the Pacific. Ironically, in the early days when communicating by phone even with the neighbor islands in Hawaii was an expensive toll call. In contrast, PEACESAT was free for educational, health and community services. So, some of us were able to employ international distance learning experiences more commonly than we could for even for those taking place within the State of Hawaii. The "Computers in Education" series was a good example involving educators throughout the PEACESAT network.

Gerald Knezek

I arrived on campus as a new graduate student in January 1975. I hoped to find the public access computer terminals to which I had been accustomed at my *alma mater*, Dartmouth College. Instead I was directed to the computing center punch card machines, which were the most common forms of data processing input on university campuses at that time. Fortunately, I learned through associates that there was a fellow teaching general science named John Southworth who had a real, live, interactive terminal of the kind I had become accustomed to during my undergraduate schooling in New Hampshire. I knew I had found a new home in Hawai'i!

Of course, Hawai'i was far from backwards in computing and telecommunications at the time. Wayne Lichtenberger, for example, was at work on Aloha-net, the forerunner of Ethernet. Some of us were able to experiment with remnants of the BCC 500 computer that was designed with a large chunk of taxpayer money to support "500 timesharing terminals." I still have a part of that machine (a 4-foot aluminum hard disk) mounted on the wall in the computer science department at my university. But that was in the School of Engineering. I quickly learned that the really interesting communication activities, the kind that let people talk to others in and through far-away places like Dartmouth College (via timesharing), the University of Illinois (via PLATO), and Fiji, Samoa, Rarotonga, or Wellington New Zealand (via PEACESAT) was centered around John Southworth's computer laboratory activities and PEACESAT terminal communications housed in the University of Hawai'i, Old Engineering Quadrangle.

John Southworth

An early use of PEACESAT supported the high school student exchange American Field Service International Scholarship Program (AFSIS) in Hawai'i. The Pacific American Field Service PEACESAT Educational Communication System (PAFSPECS) was a series of programs that featured travel and living experiences of AFSIS exchange students in Hawai'i, New Zealand and other locations. The multimedia program involved local projection of duplicated 35mm slides that had been sent to each site, with narration and discussion carried live by PEACESAT to all sites (Southworth, 1977).

In 1977 the University of Hawai'i established a system-wide Computer-Based Education Pilot Project to investigate alternative approaches to using computers in education. It was spearheaded by Walter Yee, then Director of the UH Computing Center. As a Co-Director of the CBEPPI I had the chance to work statewide with UH educators as they viewed and tested alternative modes of computer-based education. From the late 1970s until 1985 UH leased lines to the University of Illinois' Computer Based Education network

called PLATO (Programmed Logic for Automated Teaching Operations). UH acquired its own PLATO system which served the University until 1995. Perhaps the most significant result of that early use of PLATO was the hiring of a young University of Illinois graduate student experienced in using PLATO. Dr. David Lassner, is still here serving as the University's first Chief Information Officer. Lassner reflects on these days:

In what is now being hailed by some as the dawn of online learning and communities, it's remarkable to think that twenty-five years ago many of us were working in an internationally networked environment. We used email, threaded asynchronous discussion groups, instant messaging and chat rooms. We had built-in screen sharing and shared terminal control over the network to support distributed problem solving. We developed and widely shared competency-based instructional modules with embedded assessments. Computational and data-based simulations were commonplace. And researchers studied and disseminated results on matters such as instructionally effective screen design strategies, optimal feedback mechanisms and appropriate levels of learner control.

Some UH faculty were developing and sharing their own highly innovative courseware and other UH faculty were using courseware developed around the world that they found could help their students. More remarkably, a community of Hawai'i PLATO users gathered day and night around the terminals, seduced by the ability to participate in a global community, play engaging interactive games in real-time with friends around the world and partake of the ample and diverse learning opportunities. For many people in Hawai'i PLATO was not just their first taste of what online learning could be, but it was their first contact with an online community or any kind of general-purpose computer technology. And when PLATO was retired from UH in 1995, there were still any number of users who could not readily find replacement courseware and services.

During this period I worked at the UH Mānoa General Science Department, where my first venture in educational computing was called Edu-Comp (Educational Use of Computers Unit). In those days, we tried to share experiences with anyone interested in using mainframe computers for educational purposes. A *Frances Davis Award* permitted me some release time and funds to set up a computer on-line in Dean Hall, the original Edu-Comp, which Gerald Knezek was to "stumble" onto early in his days at UH. Edu-Comp was later moved into Sinclair Library, where it was staffed with undergraduate student assistants who helped faculty and staff learn to use technology in offices and classrooms. Later the UH-Mānoa Computing Center established the Computerized Learning and Information Center (CLIC Lab) that continues to operate in Sinclair Library.)

By the summer of 1980, Flanigan had left Samoa to do research at Indiana University, and Gerald Knezek was

teaching in Pohnpei, Micronesia for the summer. By then the University of Hawai'i and Indiana University were both linked to PLATO. Although we were thousands of miles apart, we were able to use a common text file on PLATO to compose, both synchronously and asynchronously, our proposal for the PTC 81 paper...much as we are doing for this paper.

In the fall of 1980, we finalized the proposal using PEACESAT and it was accepted for the January 1981 Pacific Telecommunications Conference in Honolulu (Southworth, et al, 1981). We spoke about using "international, multi-mode node electronic conferencing." Our presentation was consistent with our theme as Gerald Knezek and I attended the actual conference while John Flanigan and other PEACESAT colleagues around the Pacific took part via a live PEACESAT link over the ATS-1 satellite.

Early Computer Conferencing through EIES

Professor James Dator of the Department of Political Science and the Hawai'i Research Center for Futures Studies at the University of Hawai'i at Mānoa was an early user of the Electronic Information Exchange System (EIES). This system was begun in 1975 at the New Jersey Institute of Technology (NJIT) (Hiltz and Turoff, 1978, Glauberman, 1980). EIES was used internationally and provided opportunities for a wide-range of collaborative ventures. One example that involved local participation was the International Network for Education in Science and Technology (NEST), a three-year project between the Center for Pre-College Programs, NJIT, and the Curriculum Research & Development Group (CRDG) at the University of Hawai'i (at Mānoa Gullickson-Morfit, et al, 1992). Dator helped formulate the concept of "computer conferencing" for international collaborative discussion, planning and action, which he saw as an alternative to traditional face-to-face conferencing. As Dator writes:

My experience on the experimental computer conferencing system called EIES was a major turning point in my life. Though I was physically in Hawai'i, I had access to people and ideas much sooner than my other colleagues. When the grant money for EIES ran out, continued service was available to me for a fee, but I could not afford it, and UH would not fund it. No one grasped the idea of "conferencing" via "computers" at the time. Computers were used for, well, computing, not communicating with other humans.

For more information about the Curriculum Resource & Development Center, please visit:
<www.hawaii.edu/crdg/>

New Developments at the University of Hawai'i and College of Education in the 1980s and 1990s

John Southworth

In 1980 I became a member of the UH College of Education Curriculum Research & Development Group (CRDG), where I still work. I designed and taught the first College of Education Computers In Education class in 1981 and the first Distance Learning class in 1986. It has been interesting to observe various waves of development as classroom technology integration has moved forward.

Moon Rocks

An early telecommunications pioneer at UH was David Swift of the Sociology Department. He worked collaboratively with Colorado Video Slow Scan Television (SSTV) to link his Sociology 495H students with guest speakers on the mainland (Andrade, 1981, Swift, 1983, Swift, 1984). In the early 1980s, NASA gave educators the opportunity to "borrow" lunar rocks that had been collected by space trips to the moon. The only requirement was participating in a NASA-presented moon rocks training and certification program with California the closest site. David Swift made the SSTV equipment available for a special training and certification program for 50 persons from Hawai'i, the U.S. mainland, and parts of Asia and the Pacific Islands. The program was organized by Barbara Klemm and Marlene Hapai, who were at that time employed in CRDG. Marlene Hapai vividly recalls this workshop: "We not only looked at moon rocks but also at Washington DC as our presenter faced the camera to show us the view outside their presentation room window."

David Swift recalls that he and John Southworth produced many firsts for educational telecommunications:

The first remote tour of the Air and Space Museum in Washington, DC; NASA's first remote workshop certifying teachers for moon rock use and a UH downlink of a science experiment aboard the space shuttle. Attention at that time focused on a U.S. senator in orbit; the astronaut in the Honolulu classroom received little notice. Not until the Challenger disaster a few months later did the name of Ellison Onizuka become widely known (Kimmaman & Swift, 1993), (Swift, 1988).

Water Quality

Project MENTOR (Marine Educators Network To Organize Resources) also used PLATO, EIES, and PEACESAT (Southworth and Klemm, 1985). Students took part in water quality monitoring of fresh water sites (US mainland and Hawaii) and salt-water sites in Samoa and New Zealand. After exchanging data via EIES and PLATO, a live

PEACESAT teleconference was held at the East-West Center where students discussed and compared the results. For example, they discussed such findings as significant differences in temperatures and salinity.

Medical Technology

In my early years teaching chemistry at the UH Lab School, I worked collaboratively with Patricia Taylor and Dick Teshima of the Medical Technology Division of the UH Medical School. The field of medical technology was ideal for providing my students with an example of a career that used chemistry. Both asynchronous and synchronous telecommunication methods were used to connect students with medical technology educators at UH via computer e-mail or bulletin board forum. A live teleconference for questions and answers was followed up with e-mail or bulletin board postings and, finally, thank you notes. Dick Teshima, Associate Professor of Medical Technology writes:

I gained the ability to utilize various means of distance learning and communications technologies such as tele/video-conference, computer assisted instructions, internet, web conference. The EFT approach is a convenient way to tell students about our profession which is not very well known. Nationwide, we face a critical shortage of med technologists. I think that telling high school students, particularly those in science classes, about our profession is an important thing to do.

Electronic Field Trips

The Electronic Field Trip (EFT) is a technique that can be easily integrated into any course. It is based on the concept of Computer-Based Educational Telecommunication (Southworth, 1982). My students have found the use of EFTs to be an interesting way to bring relevance to classroom instruction. A video clip of an EFT can be seen at: www.hawaii.edu/etec/vr/videos/medtech/video_medtech_ovsms.htm

An important aspect of Electronic Field Trips is the practice of using available technology. In the early years we rarely had inter-island EFTs because of high long-distance telephone costs. However, we did have international EFTs thanks to the availability of PEACESAT and its free educational and community service satellite exchanges. Our first EFTs at the UH Lab School involved inexpensive (voice only) speakerphones. Later, during the days of the TELEclass Project, we discovered a videophone (Lumaphone) that allowed for the addition of still, black and white pictures to be exchanged by EFT participants. Nowadays, videoconferencing technologies come in color with full-motion pictures that give almost a live presence to EFT programs. Yet, I think that sometimes a simple, still SSTV photo is better than full-motion in that it stays on the screen so users can focus on what is being said.

Launching the 21st Century with Student Ambassadors

A valuable way for teachers to learn about classroom technology integration has been for them to participate in professional organizations in education and in educational technology as well as to review the Internet for ideas and opportunities to collaborate. The UH Mānoa College of Education Department of Educational Technology and its LEI Aloha (Learning Enhancement through Innovation) has provided a professional development connection on the web for teachers anywhere in the world. Their on-line video features examples of teachers using technology in the classroom and in some cases teaching tips and lesson plans.

During the 2001-2002 academic year the UH College of Tropical Agriculture and Human Resources (CTAHR) began a collaborative venture that initially involved the UH Laboratory School, Kamehameha Schools, and the Hawai'i Science Teachers Association (HaSTA). The idea was to send undergraduate students to local high schools to describe college programs and careers in the various disciplines covered by CTAHR.

Since the spring of 2002 we have been working to develop a "value added" component using EFTs to allow CTAHR to impact a greater number of classrooms that are more remote from urban centers. The activity is called the "Student Ambassador Program" (StAmP Net).

StAmP Net adapted the Electronic Field Trip model by developing a four-phase program of synchronous and asynchronous techniques. The first step in that direction was the start of a computer bulletin board topic called "Where in the World is CTAHR?" This features CTAHR Alumni Ambassadors, CTAHR graduates and former students located anywhere in the world, who are willing to share information about their academic education at CTAHR as well as life and career paths in subsequent years. Each student benefits by gaining contacts around the world and having their horizons broadened as they move toward college, career, and life choices. For more details see: www.ctahr.hawaii.edu/ctahr2001/CTAHRInAction/Oct_02/FASTTrack.asp

The ambassador program made use of what Marlene Hapai, the Associate Dean of Academic and Student Affairs at CTAHR, termed Distance Learning-Enrichment (DL-E). DL-E suggests that distance learning is not simply something one takes as a formal course from a distance but also includes enrichment activities that teachers can introduce into the classroom to involve students. In that sense, the goal of the distance learning activity is not to be the primary content delivery medium, but rather to provide for enrichment (increased interest, deeper understanding) of the content that is the focus of the lesson. In Dr. Hapai's view the Distance Learning Enrichment concept is a powerful one. Teachers by nature are creative and often like to pick and choose and build their curriculum. Often curricula are fixed as well, and there is little room for bringing in another full

curriculum. Thus, the short-term experiences give them an opportunity to quickly bring experts into their classrooms without ever leaving their schools, whether through electronic field trips or links to "Ask the Expert" on our college website.

Future Prospects

Can DLE be made easier? As increased bandwidth has become available and affordable, and educational institutions are becoming fully wired at the university and K-12 levels, the kinds of activities that have been proposed for up to three decades have suddenly become practical and can be implemented in just-in-time scenarios. It appears that a simple Distance Learning-Enrichment Tool Kit (DL-ETK) could be assembled in a transportable case and used to support these types of activities in a wide variety of educational environments.

Researchers have been able to show that a large percentage of a teacher's level of technology integration into teaching and learning is attributable to the following three parameters:

- Educator's will to carry out the activity,
- Educator's skill in making the connections and carrying on the dialog, and
- Access to the necessary tools, such as telecommunications connections, end-to-end access devices, and policy/administrative endorsement/support (Knezek & Christensen, 2001; Christensen & Knezek, 2002).

In addition, the model hypothesizes that meaningful technology integration into daily classroom activities eventually leads to increased student learning and achievement. Researchers have found that a non-trivial portion (10-11%) of achievement is attributable to level of technology integration, in selected cases. The implication of these findings is that teachers promoting DLE activities may in fact some day be able to show that they directly contribute to measurable achievement gains.

Gerald Knezek

I am sitting with my wireless laptop in an upstairs family room in northern Texas watching the first snow of the season fall outside. I am thankful that just last week my 'slow' 56K modem connection was upgraded to DSL. I reflect on the recent on-the-road link to Honolulu and how similar it was to one (also to Hawai'i) 15 years ago, via ATS-3. In some ways the technology has vastly improved, but in others, the search for better tools to make human connections over the barriers of distance and time remain the same. In fact, the NiceNet system into which I am entering this text bears a strong resemblance to the Electronic Information Exchange

System (EIES) from the New Jersey Institute of Technology, that John Southworth had many of us use not long after I arrived in Hawai'i for graduate school in 1975.

What have we learned? Well, for one thing, collaborative relationships forged through combinations of in-person and at-a-distance contexts last a long time. They have resilience that transcends the ephemeral 'virtual-only' connections that today's communicating public and scholarly professionals encounter so often. A 'sense of place' was one of the favorite expressions espoused by my mentors at Dartmouth College, in New Hampshire. Hawai'i is a beautiful place as well. I never write to, or for, or with Southworth or Flanigan without an image of the person in my mind. I am sure the communication is richer because of it. We are never anonymous to each other.

Another thing we have learned is that the type of technology is not nearly as important as the will to use it. It really is true that in a world of 6-cent-per-minute trans-hemisphere phone cards, and Internet-based voice-data-video communications that are practically free, the major barrier is the lack of effort in reaching out. I am reminded how when I first went to Micronesia, a ship made its rounds to deliver mail to the outer islands only once every six weeks, and a crude E-mail system that delivered messages via Satellite (or HF radio or CB) was a major step forward. Somehow I fear that we have become spoiled by instantaneous communications and it's occurred in an unbelievably short time. We have also learned that combinations of technologies are almost always better (richer, more flexible and more affordable) than even the most sophisticated communication device that operates in a single mode alone.

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