Partnering with K12:  
A Statewide Approach

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Abstract

Hawaii’s geography makes telecommunications a necessity for the provision of educational opportunities across the islands. The University of Hawaii and State Department of Education began to work together to provide distance education via interactive television, and the relationship has developed to include cooperative programming of educational access cable television channels, Internet deployment, the development of Institutional Networks (I-Nets) using SONET and Ethernet-over-CATV technologies provided by cable companies under their franchise orders and the award of a large NSF grant. This presentation will discuss key milestones in the evolution of casual cooperation into a formal institutional partnership. It will explore the opportunities for benefits to each partner and particularly, why the University chooses to be actively involved.
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Context from Hawaii

With a population of some 1.2 million people spread across 7 islands, the State of Hawaii faces unique challenges in providing its citizenry with access to educational services. About 1 million residents inhabit the island of Oahu, where the capital city of Honolulu is located. The remainder of the populace is scattered on the “neighbor islands,” with populations ranging from about 120,000 on the “Big Island” of Hawaii to less than 2500 on Lanai.

Hawaii is the only state in which both public higher education and public K12 education are centralized on a statewide basis. The University of Hawaii is made up of 10 campuses and 5 education centers on 6 islands. A single Board of Regents governs and a single President administers the 7 community colleges, 2 baccalaureate campuses, and the major research university which collectively make up the University of Hawaii system. Total enrollment of the University system is about 50,000. Similarly, a single Board of Education and a single Superintendent are responsible for the 242 public schools serving 180,000 K12 students.

During its boom years in the 1980s Hawaii developed a strong appreciation for and commitment to funding telecommunications. A number of major projects were implemented including an analog video distance education system, a statewide digital microwave network, governmental videoconferencing centers on the major islands, toll-free telephone access from anywhere in the state to government offices, and the nation’s first on-line legislative information system. A videotex gateway was deployed to stimulate the development of an information industry and to provide a single point of access to government information. Terminals with modems and phone lines were made available in every school and public library in the State to provide access to these information resources.

Natural Cooperation in Educational Technology

The University of Hawaii and Department of Education (DOE) first began to collaborate operationally in educational technology with the construction of the Hawaii Interactive Television System (HITS). Intended to meet the distance education and training needs of the University, DOE and other state agencies, HITS was an initiative of the Hawaii Public Broadcasting Authority, the operator of Hawaii Public Television. Using a combination of microwave and ITFS frequencies, HITS was built with 4 channels of outgoing analog video from Oahu to all islands, and one return channel from each island. The initial origination facilities were all constructed on University campuses, and the University assumed operational responsibility for studio/classroom facilities while Hawaii Public Television was the HITS network owner/operator.
In addition to producing its own distance education programming for delivery via HITS, the University assisted the DOE with the initiation of its distance education program. Until the DOE developed its own facilities and hired its own staff, the University made its facilities and staff available for K12 programming. It turned out that production of some of the DOE programs for Cable TV was more challenging and interesting for the University staff than much of the work being done internally. Most notable was the 1991 production of a special in which Space Shuttle astronauts were linked via audio and video through a NASA satellite with a Polynesian voyaging canoe in the Pacific via audio only and with Hawaii students for a real time discussion of exploration and navigation. As educational cable access became more widely available in Hawaii, the University and DOE developed an ongoing internal mechanism to negotiate a complete statewide instructional television schedule to serve as the basis for the HITS schedule and the educational access channels on all islands.

Both the University and DOE began to implement organizational changes which ultimately resulted in the creation of CIO positions in both institutions, and the partnership which began with distance education moved into other areas of technology. The DOE had been aggressively pursuing site license arrangements with major software vendors including Microsoft, Claris and Novell. It turned out that the DOE and University together were able to qualify for more favorable discount programs than either could obtain on its own.

As the relationship continued to flourish, the partners found other opportunities to collaborate. When the DOE began to investigate how to consolidate and rationalize its multiple and disconnected email systems, the University suggested the use of Internet-based technologies and offered its support in startup and operation. A foundation of K12 Internet use in Hawaii was the resulting inter-institutional agreement which provided that the DOE would purchase and pay hardware maintenance for a DOE Internet host server to be housed, operated and connected to the Internet by the University as part of its own internal server complex.

**Hawaii Educational Networking Consortium**

In 1993, at the suggestion of several key legislators, the University and DOE formalized their partnerships relating to technology with the creation of the Hawaii Educational Networking Consortium (HENC). HENC was formed by written agreement of CEOs of the University, DOE and the East-West Center, a federally-funded research and education institute located on the University of Hawaii at Manoa campus. While the language of the Consortium agreement is fairly broad, the formalization of the relationship has significantly elevated the role of education in technology development in the community. Interestingly, the formation of such a Consortium was opposed by a number of key players outside the education sector. HENC now plays some very key roles for the member institutions.
HENC serves as the primary forum in which the education community works together to develop single positions on telecommunications policy issues. Members find that the workload associated with analysis and response to the many telecommunications reform initiatives can be overwhelming, and working together through HENC reduces the amount of reading, writing and testifying that need be done by any individual. HENC works with Congressional staff to ensure that the position of the Hawaii education community is understood in Washington, DC. HENC works with the Hawaii Legislature to draft measures and testify as appropriate. And HENC collectively monitors regulatory dockets and decisions at the FCC and Hawaii Public Utilities Commission. HENC members have not had to compromise their own positions to come to agreement on any issue faced so far. At most, on occasion some members may support issues that might only provide direct benefit to one of the other members. But these positions are strengthened by their identification as HENC positions representing the shared view of education in Hawaii.

HENC also represents the institutions in wide area infrastructure development. This presents more compelling advocacy to funders and providers than would ever be possible with each partner working individually. Key partners in infrastructure development have been the State Information and Communications Services Division, which manages the state’s inter-island digital microwave backbone, the State Department of Commerce of Consumer Affairs, which franchises all cable TV operators in the state, and local telecommunications providers. As hard decisions are made regarding infrastructure funding and management, HENC serves as a unified voice of education. For example, HENC members worked together to support the reassignment of management of the HITS distance education system from Hawaii Public Television to the University of Hawaii, and are now working together with the State’s cable TV franchisers to directly assign responsibility for educational cable access channels and programming resources to the DOE and University. Both of these changes typify significant decisions that support education but face vocal opposition.

Cooperative Infrastructure Agreement

The current educational telecommunications infrastructure consists of a variety of public and private networks utilizing a wide range of technologies. These include:

SkyBridge
One-channel two-way analog microwave-based interactive video network built and operated by Maui Community College to serve the distance education needs of its tri-isle county made up of Maui, Molokai and Lanai.

HITS
4-channel / 1-channel statewide analog microwave and ITFS-based interactive video network designed and built by Hawaii Public Television and now managed by the University of Hawaii.
HAwAIIAN

State government’s DS-3 digital microwave network, built on the same inter-island tower infrastructure as HITS.

Institutional Networks (I-Nets)

On each island the cable TV providers have been ordered to assist in connecting education and government facilities for free or at cost. Most I-Net links are implemented with fiber optic cable which carries video and data services among schools, campuses, government buildings, and inter-island microwave terminal locations. In some cases T1s, ethernet or uncompressed video are carried on the fiber; in other settings SONET technology is required to meet the bandwidth needs. On Oahu HENC is working with the major cable TV provider on the I-Net deployment of a 150-node cable modem network to provide ethernet connectivity to all public schools on the island, and is now pilot-testing cable modems for consumer use within the educational community.

Frame Relay

The dominant carrier (GTE Hawaiian Telephone) provides frame relay services throughout the state. This technology, which is priced in a distance insensitive manner, is used to reach remote and rural locations where none of microwave, fiber, nor Ethernet-over CATV are available.

Cable TV

Hawaii is considered the most heavily cabled state in the country. Educational cable access channels on all islands receive educational programming via HITS. This gives the University and DOE the capability to deliver real-time cable programming statewide, meaning that educational cable programs can be made live and interactive through the use of telephone or computer network technologies.

The Hawaii educational community has leveraged this infrastructure to great advantage. Both the University and DOE have developed distance education programs that are among the leading statewide programs in the country. And Hawaii may be the first state in the country to have every public school connected to the Internet via a wide area network.

Hawaii Education and Research Network

With the development of the physical infrastructure underway, the DOE and University applied together for a Networking Infrastructure for Education grant from the National Science Foundation. The Hawaii Education and Research Network (HERN) project was funded by NSF for 3 years at the $2.1M level. HERN seeks to answer questions regarding the deployment, management, support and use of networking technology to reform public education at all levels on a statewide basis.
While higher education community struggles to come to grips with the technology support crisis on its campuses, K12 faces even greater challenges. The HERN project has taken the approach that the only sustainable solutions to these issues will rely on large doses of self-help and collaboration. HERN seeks to build a vibrant and healthy collaborative statewide community of teachers, learners and support staff who will work together to advance the state-of-the-art of the application of technology in education as well as provide each other with the necessary technical, emotional and administrative support necessary to make a difference.

The heart of the HERN project is a 2-week summer workshop that brings together 200 or more educators from all levels, all disciplines and all islands. An elementary school teacher may work alongside a tenured professor of physics to learn to develop web pages, and community college and high school math teachers might work together on content development issues. The emphasis is less on particular technical skills, although these are of course necessary, and more on developing in teachers the background, concepts, assessment capabilities, collaboration skills, and ability to manage projects that seem to be needed to be able to harness rapidly changing technologies for educational purposes. As teachers have identified administrators as a major barrier to classroom change, HERN has recently taken a more active role in working with educational administrators in the state.

**Board Level Partnership**

During Summer, 1996 the Board of Education and Board of Regents actively renewed a long-standing partnership that had been dormant for a number of years. Three issues were identified as appropriate for joint activities: teacher preparation, student preparation and educational technologies. Rather than creating a completely new task force to address this third area, the DOE and University CIOs mobilized the existing HENC consortium along with the state’s head librarians to develop on short notice a shared vision and recommendations for the two governing boards.

Both institutions envision a lifelong learning environment for the state in which the tools of technology support education at all levels and in all geographic areas. This will require that the entire community be interconnected with full access to instructional services (e.g. distance learning and support services) and libraries and information resources located anywhere in the state, the nation or the world on public networks. Five recommendations were developed to address primary areas of concern that included: the provision of adequate technology in the schools, interconnection of the educational community within the State, adequate external connectivity between Hawaii and the rest of the world, access to educational opportunities by learners in their homes, and provision of a safety net through publicly funded libraries for those who would not otherwise be served. More specifically, these state-level recommendations which set the tone for a shared University/DOE agenda are:
1) School Server Initiative  
Ensure the availability of at least one server at every school in the State. (The implementation of school LANs and classroom computers is considered to be a school responsibility.)

2) Digitize Hawaii Interactive Television System  
Replace the aging analog HITS technology with modern digital microwave to provide increased video and data capacity to serve the education community on all islands.

3) Increase Capacity of External Internet Connectivity  
Upgrade the T1 circuits now in use to provide a DS-3 (45Mbps) connection to the Internet for the statewide education community.

4) Improve Telecommunications Services to the Home, including:  
   4a) Issue a joint RFP to leverage collective buying power to identify a preferred dialup Internet Service Provider committed to providing high quality equitable access to teachers and learners on all islands.  
   4b) Continue to serve as a pilot test partner for the deployment of new technologies including Ethernet-over-CATV to the home and ISDN.  
   4c) Restructure cable franchise agreements to provide additional resources for and greater control of the use of Cable TV for education.

5) Position the Libraries as a Safety Net  
Develop a plan for the systematic upgrade of technology in the State’s public, school and campus libraries to ensure access for the have-nots in less affluent communities.

Funding requests addressing the first three areas have been included in the current Board of Education and Board of Regents budgets prepared for submission to the 1997 Legislature. The fourth recommendation requires no new institutional funding, and the last area requires further planning before a budget request can be prepared.

A Higher Ed Perspective on K12 Issues

Although the visions may be similar, it would be a mistake to think that K12 technology implementation and support issues are the same as those faced by colleges and universities. As a community, K12 generally has fewer technology resources available, and what hardware is available may be unsupported. K12 teachers are even less accustomed to collaboration than higher education faculty, and often have less self-confidence. In addition, K12 teachers have almost no free time for any significant ongoing professional development other than in the summer. Many teacher pre-service and in-service training programs are oriented solely to the transmittal of certain specific knowledge and skills and treat the participating teachers as empty vessels -- the very way we say students should no longer be taught. Curriculum
decisions are not necessarily made by K12 classroom teacher, and most curricula predate the availability of technology. Administrative control over the K12 classroom is stronger and generally more rigid than in most colleges and universities. Many K12 parents are seriously concerned about their children’s network access in terms of content accessibility and the potential for harassment. And as an institution, K12 education is considered to be far more “at risk” than higher education.

Technology itself can obviously play a role in overcoming some of these obstacles, and the experience already available in most colleges and universities can be a powerful catalyst for change in K12. In addition to the value of concrete assistance, the visibility of support from higher education may itself be a big help in some settings. And of course, colleges of education have the greatest potential of any institution to change the entire K12 teaching profession and education system over the long term.

**Why Should Higher Ed Partner with K12**

There are many reasons beyond pure altruism that institutions of higher education become involved in K12 technology projects. From a systems perspective, the K12 education system can be considered the most important input to colleges and universities; all things being equal, the better qualified the K12 students who enter a campus, the higher the quality of its graduates. For public universities, there is an expectation from the community that higher education will help address pressing social and economic problems, and K12 education is considered to be a major issue in most communities. There are many economies of scale in appropriate joint projects, most obviously those that address infrastructure requirements. And shared projects are generally more attractive and fundable. Many members of the higher education community are parents with children in the local K12 system and want very much to improve the availability of technology and quality of education in those schools.

University of Hawaii faculty and staff who have worked with the K12 community have found that there is much they can learn about teaching and learning from their activities. And such work tends to be personally and professionally rewarding. Whether from a genuine concern for K12 education, or enlightened self-interest, it seems that higher education has much to gain from K12 partnerships.