

## **Improving Computer-Based Education in the Pacific Islands: From Coconut Wireless to Wi-Fi**

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### **Abstract**

This paper describes technology issues faced by Pacific Islanders in educational contexts and describes possible solutions. We address the need for consistent and more comprehensive instruction about critical information evaluation, specifically Web site credibility determinations. We also describe the One Laptop Per Child (OLPC) initiative as it is being implemented in the Federated States of Micronesia and Republic of the Marshall Islands. We present the OLPC as an example of facilitating technology use in education not only by sharing technologies, but by creating ongoing instructional partnerships with teachers that ensure that technologies such as laptops will be optimally used by teachers and students.

### **Keywords**

Pacific Islands, computer education, technology, credibility

### **INTRODUCTION: THE PACIFIC ISLANDS**

The Pacific Ocean has been commonly described as the largest geographic feature of our planet, encompassing 20,000-30,000 islands. This paper focuses on the Federated States of Micronesia (FSM) and the Republic of the Marshall Islands (RMI), both of which have Compacts of Free Association with the US providing financial support for infrastructure and enabling persons from FSM and RMI to travel freely in the US, obtain work and education. Additionally, issues facing Hawaii (a US state in the central Pacific) and American Samoa (a US territory in the South Pacific) are described.

### **EDUCATIONAL ISSUES**

In each of the regions mentioned, formal education follows the American system and emphasizes the English language, although each region has its own indigenous home languages.

Dr. Hunkin-Finau (current Director of American Samoa's DOE) and Dr. Hilda Heine (a Marshallese educator and the Marshall Islands Education Minister) both decry detrimental effects of educational colonization. Hunkin-Finau depicts the potential loss of the Samoan language as a result of English-only policies in the schools:

"The assumption that the home environment from which the Pacific Island students come is similar to and reflects the same conditions, values, and practices of middle-class homes in the U.S. is contrary to reality. The home

life of Samoan students is centered around the extended family, the village, and the church. The indigenous language, traditional practices, and social expectations revolve around these three institutions. English is rarely spoken at home or in church, and most certainly not in the village. Traditional roles, ranks, and responsibilities handed down through the generations are still in practice daily in Samoa. The home environment of students in Samoa is completely separate from the schools.” (p. 26).

Dr. Heine describes what she calls a “paradigm shift in local and regional focus of all things Pacific from economics to politics to arts to education. Within education, this is manifested as a call for reform via the rethinking, reclaiming and reimagining of education from its outcomes to curricula, in terms of both epistemological and pedagogical considerations. Quality educational reforms demand a place-based curriculum framework that considers both the historical journey and the future of the people and island communities” (p. 39). She further states, “Conducting inquiry and documenting our knowledge is a critical aspect of the journey to preserve Pacific languages and cultures” (p. 40).

Themes emerging from these perspectives include: respect for native languages, knowledge and culture and incorporating them as central rather than secondary features of the curriculum (Heine, 2010; Hunkin-Finau, 2010); a need to preserve culture, language and knowledge (Heine, 2010), and a call for true partnerships with families and communities (Morris, 2010). Responsible and effective instruction about and with technology can be used to help achieve these goals.

## TECHNOLOGY ISSUES

In 2005, Iding and Skouge described several challenges faced in using computers and the Web in instructional contexts in the Pacific Islands. These include lack of infrastructure to support computers; difficulties with equipment maintenance and replacement parts, which often have to be shipped long distances, hot and humid climates that can be damaging to computers, and lack of training for equipment maintenance. Such problems typify those shared with other developing parts of the world.

Further, Iding and Skouge also described a misconception perpetuated by authors and demographers who often place Pacific Islanders and others in a single demographic category – Asian/Pacific Islander. In doing so, Pacific Islanders (a smaller group) are subsumed into a much larger group and are assumed to be “information wealthy.” For example, they quote Jarboe’s (2001) description of a report from the Athena Alliance:

“The National Telecommunications (NTIA) has been collecting data on the digital divide for a number of years. Their 1999 report documents ‘the persistence of the digital divide between the information rich (such as Whites, Asians/Pacific Islanders, those with higher incomes, those more educated, and dual-parent households) and the information poor (such as those who are younger, those with lower incomes and education levels, certain minorities, and those in rural areas or central cities)’” (p. 2).

In fact, Pacific Islanders in many developing regions do not enjoy high incomes, Internet access, laptops or home computers. In public schools in some US-affiliated states, there are computer laboratories, but often in disrepair and without consistent Internet access. Even university students may lack access to computers, or to reliable Internet connections. Further, computers and related technologies are sometimes donated for educational purposes to developing Pacific Island communities (and other developing regions) by well-wishing sponsors from developed parts of the world such as the U.S. Sufficient training, ongoing partnerships and equipment upkeep, are necessary for preventing equipment from falling into disuse.

On the other hand, when students gain access to computer resources and the Web, they embrace these resources with enthusiasm. Social media are especially popular ways of retaining contact with relatives and friends who have travelled elsewhere to pursue educational and employment opportunities. Maintaining these kinds of connections is especially important in cultures where close familial, village and cultural ties are central (Iding, Skouge, & Peter, 2008).

We also note that in cultures such as the Pacific Islands, where oral traditions are historically dominant and literacy has been relatively recent, books and other literacy materials have been scarce and continue to be so, in comparison with developed regions of the world where family literacy materials at home are abundant. Additionally, although access to the Web may be relatively recent and limited, "the shift from extremely limited reading and research materials to relatively unlimited access to information represents a transition of major proportions" (Iding & Skouge, 2005, p. 15).

This shift to unlimited information for those with Internet access has implications for regarding users' epistemological beliefs about the Web and Web-based information; specifically, the degree to which information on the Web may be accurate or require critical credibility checking on the part of users; and the inclination of users to actually undertake this checking. The need for such an orientation might be even more necessary for students who have not grown up with access to the Web, or even with extensive literary materials. For these students, issues of authors' vested interests or information accuracy in published materials (both online and otherwise) may have not been systematically considered before.

### **Technology interviews with educators/administrators**

To provide a clearer picture of the current needs and accomplishments with respect to technology and computer-based education in the region, the perspectives of two key educators in the region are included. One is a long-time educator and administrator in one of the US affiliated states. The other is a professor at the University of Hawaii who conducts outreach instruction in the US-affiliated states, particularly in American Samoa and Micronesia.

The long-time administrator described his 2-year post secondary institution (junior college) that serves approximately 1000 students per year and is equipped with 100 computers for students in computer lab and the library and 30 more for outreach. Availability is during school hours only (8 hours), and has recently been enhanced through the addition of Wifi, although few students have personal computers.

The main issues in terms of need are connectivity and bandwidth. Because these are limited, students have to limit use to academic work and cannot "surf" or Facebook except during limited hours, between 3-5 pm. In his region, many students live in outer islands without electricity or connectivity. Even providing solar power or generators can be prohibitively expensive, as fuel to power generators can be \$10 per gallon on outer islands.

Maintenance is also an issue, since the campus is at the waterfront, so there is a high turnover of equipment. He also described the complexities of repairs: If a printer breaks down on an outer island, it is put on a ship for repair and might be returned weeks or months later.

Due to limited home computer access (many outer islands do not have electricity), and computers are not part of students' elementary and high school experiences, the community college is the where students are first introduced to computers, and they are encouraged to take a course on computer literacy as part of their first semester course load.

In-services and summer programs are offered for teachers. The administrator explained that computer use involves cultural shifts in ways of thinking. For exam-

ple, an adult is faced by a computer that supposedly should make his life easier, yet he might be intimidated or frightened by the experience.

In sum, for this region major issues are access and connectivity, issues shared in other developing parts of the world. Thus, the community college has an additional role in introducing first-time users to computers and related technologies, and in facilitating basic computer literacy.

In contrast, Dr. James Skouge, a faculty member in Special Education at the University of Hawaii (UH) also teaches and provides outreach in US-affiliated regions. He described his role as "to prepare teachers to ethically use technology in their teaching." In Hawaii, his students are technologically adept due to increased access, but must learn to integrate technology into their teaching, since many have not grown up with teachers as role models of technology integration. In contrast, in the US-affiliated states, his focus is often on introducing technology, a theme that may be similar to that mentioned by the first interviewee.

He emphasized an important distinction between "two competing views of learning" with technology. The first is for students to "access knowledge" and the second for students "to find and use their own voices." He described his own interest in providing tools of voice "to empower people to use [their own] voice[s]." He described people in the Pacific as being "more culturally interested in holding onto the diversity of the region." He mentioned accomplishments at UH including a new required course for pre-service teachers on technology for children with disabilities, as well as the College of Education's general technology and instructional support for faculty members teaching on-line and utilising technologies.

He emphasized his personal goal of fostering ethical models of technology use to preclude students wasting time on non-productive on-line interests. His dream would be to provide all teachers with cutting edge technologies, such as I-pads, and instruction in how to use them in classrooms.

Thus, themes emerging from these experts reinforce basic needs for connectivity and access for many regions of the Pacific, and ethical use of computing for more developed regions, particularly for voice and self-expression. In the next sections we describe two directions for research projects/initiatives that aim to improve instruction with computers in the Pacific islands.

### **Web site credibility instruction**

As one area of instructional focus for relatively new Web users, we propose that instruction in basic information credibility (not just information on the Web) be provided (Iding & Crosby, 2012). As a foundation, students need to know information about epistemology and epistemological beliefs: What does it mean to know something? Who determines what is knowledge and how? Who appraises knowledge? These questions emerged from the work of Braten, Stromso and Samuelstuen (2005) and Hofer and Pintrich (1997).

We have carried out Web site credibility instruction in several contexts including Norway and Singapore (Singh & Iding, 2011; Iding, Nordbotten & Singh, 2006), but for this paper we will focus on research conducted in Hawaii. For example, high school students in biology classes were provided with lessons on 4 consecutive days regarding Web site credibility in science (Iding, Landsman & Nguyen, 2002). After learning characteristics associated with information and Web site credibility, students evaluated science Web sites that varied in degrees of credibility. After instruction, their post-test lists of criteria for evaluating Web sites were more complete than their pre-tests and they reported that they would spend more time making credibility determinations in the future.

In a second instructional intervention, Iding and Klemm (2005) worked with pre-service teachers who read a booklet about aspects of Web site credibility evaluation, worked in pairs to evaluate actual Web sites and developed rubrics for their own students' use in evaluating Web sites.

Although these interventions took place in Hawaii, aspects of these interventions that contributed to their success could be easily implemented in instruction in other Pacific Island regions. These aspects include:

- Discussion of why it is important to determine whether information is credible or not and explanations of how information in different fields is refereed.
- Instructor modelling Web site and information credibility decision-making process.
- Collaborative work with actual Web sites that vary in credibility.
- Work with sites that vary in aspects of information design appeal and credibility, as many credibility decisions are based solely on Web site appearance (Fogg, Soohoo, Danielson, Marable, Stanford, & Tauber, 2002).

Finally, an understanding of what contributes to information credibility and the sources of epistemological beliefs is central to critical thinking, but it is also closely tied to cultural and ethical beliefs in which users decide what information is acceptable and whose account is to be valued. It is thus foundational in knowledge and belief creation.

### **Other issues of representation**

In addition to learning to make sense of information or build knowledge, we argue for deeper epistemological and cultural considerations that are necessary in working with Pacific Islanders from developing regions. These include the following considering users' questions, including: How is my (our) voice being heard or represented on the Web? If Internet and web based instruction is based in English language or excludes representations of users, students are more likely to feel a separation between themselves and the Web, analogous to the representation gap Pacific Islander students felt in NZ schools (Nakhid, 2003). Further, in scenarios where technology initiatives are provided by well-meaning outsiders (e.g., education by television initiatives in the public schools in American Samoa in the 1960's), dominant or colonizing groups can be implicitly positioned as superior and local cultures as inferior. Iding and Crosby (2012) argue for truly equal collaborations in technology endeavours that reject "deficit" perspectives such as these. Further, Thaman (2003) eloquently argues for an incorporation of indigenous knowledge into every aspect of education in Oceania, as she fears that globalization (including the Web) will further push indigenous voices and perspectives aside. We concur and in the following section, we describe efforts to create partnerships in the One Laptop Per Child initiative.

### **One laptop per child initiative**

One challenge noted by the second author while conducting professional development training was that teachers are the key players in whether technology provided will actually translate into beneficial educational experiences for students. A quote by John Hattie sums up the importance, "When we buy a computer, there is often a label proclaiming that it has 'Intel' inside...the Intel refers to the processor, or brain of the computer – and it is the key to the success of the software and other hardware that makes up the 'workings' of the computer." (p. 1, Hattie, 2012) Likewise, teachers' application of the technology toward realizing educational goals becomes key to the success of the educational programs that involve technology aspects (the software and the hardware parts).

The second challenge is the evaluation of the 'intel'. How can we make it visible so we can make continuous improvements? One method is through partnerships, such as soliciting feedback through needs analysis and providing professional development to support teachers.

Therefore, in addition to critical Web and information evaluation skills, efforts are being made to ensure higher levels of access to computers in the Pacific Islands in conjunction with the kinds of ongoing instructional support and partnerships with teachers and schools. One such initiative is the One Laptop Per Child Project

(OLPC). In the Federated States of Micronesia, a partnership has been created between OLPC and the Pacific Resources for Education and Learning (PREL). Efforts to make this initiative successful include setting up servers in schools and providing teachers with lesson plan templates and instruction in how to create effective lessons using computers as tools for learning. Singh (2012) describes a successful plan developed by a teacher in Kosrae, F.S.M. on “rhyming words.” The lesson involved listening to a song with rhyming words, identifying the rhyming words from the song and playing a memory game with rhyming words. In Kosrae and the Republic of the Marshall Islands (R.M.I), PREL personnel worked with teachers to develop ways to use laptops to create, carry out and document interdisciplinary lessons, such as incorporating mathematics concepts into science. Then, teachers, worked with other members of their learning communities to share ideas and outcomes, making optimal use of collaborative cultural elements. Clearly, it is central to this initiative that teachers and students are not just given laptops. Instruction and ongoing partnership are considered essential to the success of this project.

PREL personnel increased the likelihood of successful partnerships by embedding themselves in communities to communicate a genuine interest in collaborative research with the stakeholders regarding OLPC. Stakeholders included administrators, teachers, officials, and also included a core group of village elders in communities.

In Micronesia, researchers needed to be aware of multiple conflicting expectations within villages. A successful negotiation to conducting research within one village may similarly translate at another village. Thus implementing a collaborative network of partnerships among villages is a common challenge. Understanding these complexities can help in getting a “buy-in” from multiple stakeholders. The OLPC project is one example where this situation was made clear in the second author’s experience. Collecting baseline data for the implementation of the project was challenging. Each village had a certain disposition toward their own community schools. Learning from another school or collaborating out of one’s village is not the rule but an exception. Understanding the needs within each village was extremely useful in bringing consensus toward universal needs within the villages that could then be better aligned with the goals of the OLPC project.

Thus efforts toward technology development in educational contexts involve partnerships at many levels; partnerships can be especially effective when entities state their own goals for technology that might differ substantially from current goals in more developed regions.

### **Ideas from other regions**

Technology development in other parts of the world can serve as examples or provide ideas for directions in Oceania. For example, in Kenya and other countries in Africa, Internet access place primarily via cell phones, which can also serve as the basis for educational applications (Oguniesi & Busari, 2012). In Tanzania, the potential of cell phone use in educational contexts has been proposed; a hurdle is working through educators’ aversion to non-course related cell phone use in classrooms (Kafyulilo, 2012). Additionally, as Kassam (2012) describes, Internet access enables democratic participation and citizenship among youth and others in Kenya and other countries; it enables the expression and recognition of diverse perspectives and diverse interpretations of texts. However, educated and responsible teachers are still central to the process of creating an educated and responsible citizenry.

### **CONCLUSION**

In conclusion, we have summarized major issues facing Pacific Islanders as they gain access to computers and the Internet. Beyond these issues, opening the door to the Web also provides users with unlimited information access and for voice and

cultural expression, a tremendous transition for cultures whose traditions have historically been primarily oral. Therefore, we have argued for the need for instruction in critical information and Web site evaluation skills and for commitments to ongoing in-service technology-related education and continuing partnerships with teachers and communities to whom new technologies are given. As one way of meeting the need for computer and Internet access, with ongoing follow-up partnerships with teachers, we have described the One Laptop Per Child initiative in F.S.M. and R.M.I., and how teachers are being trained to create lesson plans to effectively use laptops as instructional tools.

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## Biographies



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