Technology and Indigenous Language Revitalization:
Analyzing the Experience of Hawaiï¿½i
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[Note: all Hawaiian words that appear with umlauts should actually have macrons instead.]

Abstract

Hawaiian educators have made ambitious attempts to use new online technologies in language revitalization programs. These efforts have included the development of one of the first bulletin board systems in the world completely in an indigenous language. This paper reports on two years of ethnographic research on the results of these efforts. Issues addressed include the role of the Internet in promoting or hindering linguistic diversity, the relationship of multimedia computing to non-Western patterns of communication, and the use of the Internet as a medium for exploring cultural and social identity. The results are consistent with a critical theory of technology which emphasizes that technology is neither culturally neutral nor determinist but rather a site of social struggle.

Résumé

Les pédagogues hawaïens ont des projets ambitieux d'appui sur les nouvelles tecnhonologies en ligne dans des programmes de revitalisation de leur langue. Ces efforts ont consisté en particulier à développer l'un des premiers bulletins d'informations électroniques au monde qui soit en langue indigène. Cet article rend compte de deux années de recherche ethnographique sur ces efforts. Les problèmes traités ici incluent l'influence d'Internet dans le développement ou dans la regression des diversités linguistiques, la relation entre le multimédia et les schémas de communication non occidentaux, et l'utilisation d'Internet comme vecteur d'exploration de l'identité cultural et sociale. Les résultats sont cohérents avec un point de vue théorique critique sur la technologie qui insiste sur le fait que la technologie n'est ni culturellement neutre, ni déterminisite mais est au contraire le théâtre d'un combat social.

Indigenous peoples have long faced the conflict between 'La Technique' as the potential solution to educational and economic marginalization and 'La Technique' as the destroyer of native culture. As new telecommunications technologies penetrate every section of the globe, this conflict re-emerges. Can indigenous peoples appropriate new network technologies for their own purposes, or in attempting to do so will they see their own cultures and languages swallowed up in a homogenous whole?

For the last two years, I have had the privilege of investigating uses of new networked technologies for language and culture revitalization in Hawaiï¿½i. My ethnographic research has included participant-observation in a computer-intensive university Hawaiian class of Native Hawaiian students; the teaching of computer workshops for Hawaiian educators and students; visits to primary and secondary Hawaiian immersion schools on the islands of Oï¿½ahu, Hawaiï¿½i, and Kauï¿½i; and interviews with Native Hawaiian teachers, students, parents, curriculum specialists, and programmers. I am not Hawaiian myself; I am a North American researcher who was invited by members of the Hawaiian community to collaborate with them in developing and researching uses of new technology for Hawaiian language learning and use. So though I do not speak for Hawaiians, I am honored to be able to share what I have learned about their experiences, thoughts, and perspectives on using new technologies for language and cultural revitalization. These experiences raise a number of interesting questions?about the role of the Internet in promoting or hindering linguistic diversity, about the relationship of multimedia computing to non-Western patterns of communication, and about issues of cultural and social identity in the new network society. Before examining these issues, I will first provide some brief background on the Hawaiian people and language.

Nä känaka maoli

Na känaka maoli, or Native Hawaiian people, came to the Hawaiian islands from elsewhere in Polynesia about 300-750 ad. Some 300,000 indigenous people lived in Hawaii when the islands were first 'discovered' by Europeans in 1778. Their language, Hawaiian, spoken with minor dialectical variation throughout the islands, supported a rich oral culture which included chants (*ï¿½oli*) and cultural dance (*hula*). In the 19th century, after U.S. missionaries introduced printing presses to Hawaiï¿½i, Hawaiians achieved a high degree of literacy in their language, publishing not only translated religious works but also Hawaiian-language newspapers, epics, and literature (Schütz, 1994). Also in the 19th century, large number of agricultural workers were brought to Hawaiï¿½i from Asia by American plantation owners. Hawaiians eventually became a minority of the population and the American elite started to promote the use of English in the schools.

At the end of the 19th century, wealthy American landowners, backed by the U.S. government, overthrew the sovereign Hawaiian kingdom and forcefully incorporated the Hawaiï¿½i as a U.S. territory. Laws forbidding the use of Hawaiian in the schools were passed and vigorously enforced through beatings of children who dared speak their native tongue (Wilson, in press). By the time Hawaiï¿½i became a state in 1959, Hawaiian was spoken by only a few thousand elders and the language was seriously endangered.

Today Native Hawaiians, defined as those with any Hawaiian ancestry, constitute some 20% of the population. A Hawaiian renaissance movement began in the 1970s, with Native Hawaiians demanding more political and cultural rights. A central part of this movement was an effort to revitalize the Hawaiian language. As a result of this effort, a number of Hawaiian immersion pre-schools and K-12 schools were established in the 1980s, and new undergraduate and graduate programs in Hawaiian studies and Hawaiian language were launched in the state's public universities. Today, the Hawaiian language no longer faces imminent extinction, but it still faces an uphill battle to be re-established as a community language used regularly for social communication, muss less a dominant language used in all spheres of economic and political life.

Challenges of language revitalization and the role of technology

What then are some of the major challenges facing language revitalization today and how are Hawaiians deploying new technologies to meet these challenges? I will address four areas: (1) preservation of and access to authentic Hawaiian, (2) development and dissemination of new materials, (3) connections among isolated groups of speakers, and (4) achieving relevance.

Preservation of Hawaiian

The most immediate and imminent challenge faced by Hawaiian language activists was preservation of Hawaiian language voices and materials. With virtually no print materials published in Hawaiian for most of the 20th century, and with the last group of native speakers rapidly dwindling, new technologies have proven essential for preserving Hawaiian voices of earlier days. Scholars and archivists helped transfer many 19th century Hawaiian newspapers on to microfiche, thus providing an invaluable reference source to scholars and students. More recently, Hawaiian educators have filmed hundreds of hours of video of native-speaking Hawaiian elders, and are now producing 25 two-to-three hour videos for use by school and community groups.

Though microfiche and video have been critical for preserving authentic Hawaiian, there is still the question of accessing these materials. With Native Hawaiians dispersed in urban and rural communities on seven islands, few Hawaiians have access to the University archives where the materials are kept. Hawaiians attempt to take advantage of the mass media, but thus far have lacked the resources to launch any Native-Hawaiian radio stations, television stations, or newspapers. They have thus turned to the Internet to help disseminate authentic language materials, for example, by taking traditional Hawaiian legends and posting them on the World Wide Web. Though only a small minority of Native Hawaiians have Internet access in their homes, all of Hawaii's K-12 and post-secondary schools have online connections, thus providing some level of additional access.

The most ambitious effort in this regard is the creation of the *Leokï* (Powerful Voice) Bulletin Board System, believed to be one of the first BBS's in the world entirely in an indigenous language (Hale, 1995; Warschauer

& Donaghy, 1997). Leokï was created in 1995 by the Hale Kuamoï¿½o Hawaiian language curriculum office at the University of Hawaiï¿½i at Hilo. Its purpose is to provide online support for Hawaiian language use in the immersion schools and the broader community. Among the other features of Leokï (which will be discussed below) is a section called *Noiï¿½i Nowelo* (Search for Knowledge), where traditional Hawaiian stories and songs are published, as well as 19th century newspaper articles.

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Dissemination of new materials

Hawaiians view the Internet as an important medium not only for preserving and disseminating earlier voices of Hawaiian, but also as a potential medium for the development of new language materials (Hale, 1995). The relatively small number of Hawaiian speakers means that the publishing of textbooks in Hawaiï¿½i is usually not economically feasible. Presently, Hawaiian immersion schools often adapt English-language textbooks via an elaborate translate-and-paste operation: the Hawaiian-language translations are photocopied and then pasted page-by-page over the English language of each individual textbook. This is of course an unsatisfactory solution, due not only to the immense time and effort involved. 'The main problem is that this imposes a perspective from outside the islands,' says Laiana Wong, a Hawaiian language instructor and translator. 'We need to develop original materials in Hawaiian that can reflect our own culture, perspective, and reality.'

Hawaiians are beginning to use the Internet as a way of developing and distributing original curriculum materials. Leokï publishes a regular Hawaiian language newspaper by and for the Hawaiian immersion program. In addition, educators at the University of Hawaiï¿½i have begun developing and publishing on the World Wide additional curriculum materials related to Hawaiian culture, language, and community. And language teachers at the University of Hawaiï¿½i are having students publish original research in Hawaiian on the World Wide Web; this serves the dual purpose of giving students authentic writing assignments as well as providing other Hawaiian language learners additional source material.

Closely related to this is the development and expansion of the Hawaiian lexicon. Due to nearly 100 years of suppression, the Hawaiian language lacks many of the words needed for communication in today's world. A lexicon committee meets regularly to address this problem, attempting to ensure the integrity of the language in the process by selecting words that are based on earlier Hawaiian usages, or usages in other Polynesian languages, rather than transliterations from English. (For example, the word for upload, *hoï¿½ouka*, is the same word used for loading gear into a canoe.) Since newly-developed terms are not found in published dictionaries, a searchable bilingual dictionary of new vocabulary has been made available on the Hale Kuamoï¿½o web site and is being developed for Leokï as well.

Forging connections

According to Joshua Fishman (1991), the key to success in language revitalization is to achieve 'the intergenerational and demographically concentrated home-family-neighborhood: the basis of mother tongue transmission' (p. 395). However, this is made very difficult in Hawaiï¿½i by the dispersion of Native Hawaiians over a large territory on several islands, in the midst of larger groups in which they constitute a minority of the population. Even the Hawaiian immersion school programs are themselves small entities located for the most part within larger English-medium school buildings, where children have as many opportunities to speak English on the playground as Hawaiian.

It is perhaps not surprising then that the communication features?an e-mail system and a synchronous chat line?of Leokï are its most popular features, and are in fact the central reason the BBS was created. Keiki Kawaiï¿½aeï¿½a, director of curriculum materials at Hale Kuamoï¿½o, explained to me that she got the idea for Leokï when she first used an English-language chat line eight years ago: 'The first thing I thought was, this would connect us all together.' She further explained,

> The concern is linking the language communities, because there's a small community at Keaukaha, and there's a small community of kindergartners and first graders at Waiamea, and they're all over, there are over 15 schools at the street, but there are pockets of

Hawaiian speaking children, that are all second language, the majority of them are second language speakers, and they need to have more peers to speak with.

Immersion students are beginning to use Lekoï's communication programs for a number of interschool collaborative projects. One example is a *Pähana Haku Mele* (Compose a Song Project) organized among two fourth-grade immersion classes on the islands of Oï¿½ahu and Hawaiï¿½i, in which the children are working in long-distance collaboration to compose and publish a multimedia song about the history and life of their own island and community. The children used both the e-mail and live chat features of Lekoï. Teachers of the University of Hawaiï¿½i are also using these communications programs to conduct distant learning Hawaiian language and curriculum development classes, thus providing access to students throughout the islands. One curriculum development class currently being taught online includes participants from Oï¿½ahu, Maui, Molokai, and Kauai. Molokai is a small island with a relatively high percentage of Hawaiians, but without a college of its own. The Kauai participants in the class include two Hawaiian immersion teachers from Niï¿½ihau, a tiny island off the coast of Kauai of some 200 people. Niï¿½ihau (including the Niï¿½ihau community on nearby Kauai) represents the only continuous community of multi-generational native speakers in Hawaiï¿½i. By participating in the online class, the Niï¿½ihau teachers are able to share their native use of the language, while at the same time developing their own writing skills (since they attended school themselves in English and thus lack written fluency in Hawaiian).

Achieving relevance

A final challenge facing the Hawaiian revitalization movement, and one which underlies all the others, is the issue of achieving relevance. This is an issue facing all language revitalization efforts, as community members will only make the commitment to learn and use a language if they see if as not just part of their past but also an important part of their . As Nancy Hornberger (1997) explained, 'Language revitalization is not about bringing a language back, but bringing it forward' (n.p.).

Native Hawaiians, who for the most part face difficult social and economic conditions (Takenaka, 1995), have strong pragmatic pressures to devote their energies toward achieving their goals in English, rather than in Hawaiian. In this situation, Hawaiian educators have viewed developing a Hawaiian presence online as essential toward the effort to bring Hawaiian forward.

Keiki Kawaiï¿½aeï¿½a, who first conceived and planned Lekoï, explained the importance of developing that and other computer programs in Hawaiian:

> Without changing the language and having the programs in Hawaiian, they wouldn't be able to have computer education *through* Hawaiian, which is really a major hook for kids in our program. They get the traditional content like science and math, and now they are able to utilize this ï¿½ono (really delicious) media called computers! Computer education is just so exciting for our children. In order for Hawaiian to feel like a real living language, like English, it needs to be seen, heard and utilized everywhere, and that includes the use of computers.

The goal of Hawaiian educators to bring their language forward through technology seemed to be having the desired effect. The sentiments expressed by Kamahele, a Hawaiian language student who was involved in Internet-based activities, were typical of many I heard:

> It's like a double advantage for us, we're learning how to use new tools, like new technology and new tools, at the same time we're doing it in Hawaiian language, and so we get to learn two things at once. We learn new technology, and implementing it with Hawaiian language, which I think is really, really good. It looks almost as if it's a thing of the future for Hawaiian, because if you think about it, maybe there's [only] a few Hawaiian language papers. But instead of maybe having a Hawaiian language newspaper, you have something that might be just a little bit better, like the World Wide Web.

Rethinking the culture of computing

Hawaiian language educators are clearly placing important emphasis on the use of new technologies in order to teach and revitalize their language. This is consistent with reports that have been made of technology use

by other indigenous communities (Benton, 1996; Bernard, 1992; Office of Technology Assessment, 1995). What does this tell us about broader issues of the relationship of educational computing and culture? Is the Internet inherently friendly to democratic use by a variety of cultural groups? Or are Native Hawaiians and others entering a dangerous path by allowing a Trojan Horse of western technology to influence how they communicate?

To discuss this I will first examine theoretical perspectives on the relationship of technology to culture, and then analyze more closely particular characteristics of the design and use of online technologies.

Theories of technology and culture

Roughly put, there are three main positions on the cultural aspects of technology. One position, deemed the *substantive* (also called determinist, see Ebersole, 1995) view, argues that 'technology constitutes a new type of cultural system that restructures the entire social world as an object of control' (Pacey, 1992, p. 7). Many proponents of this view point out what they view to be the negative consequences of technological development for cultural pluralism, with diverse cultures and languages destroyed in the wake of the inexorable march of technology (Ellul, 1990; Heidegger, 1977).

A second position, deemed the *instrumental* (or neutralist, see Ebersole, 1995) view, considers technology to be devoid of any particular content or values and thus 'indifferent to the variety of ends it can be employed to achieve' (Feenberg, 1991, p. 5) In this view, it is not technology per se which creates problems or solutions, but rather how technologies are put to use.

Feenberg (1991)has criticized both of these positions and put forward an alternate view, which he calls the *critical* theory of technology. Feenberg views technology as neither completely deterministic nor as completely neutral, but rather 'ambivalent' (p. 14). The ambivalence of technology is distinguished from neutrality 'by the role it attributes to value in the *design*, not merely the *use*, of technical systems' (p. 14, emphasis added). Yet the values inherent in particular technologies do not mean that their impact is pre-determined; technology is 'not a destiny but a scene of struggle' (p. 14).

I believe that this perspective is useful for interpreting the uses of new online technologies by indigenous and other non-Western peoples, particularly when we bear in mind that 'machines require a social organization to become technologies' (Hodas, 1993, n.p.). What must be evaluated then, for its neutrality or non-neutrality, is not merely the bytes and bits of the Internet but rather its social organization.

Particular features of the Internet

In this regard, then, I will look at four contradictory features of the Internet, related to (1) access, (2) language, (3) culture, and (4) identity.

Access

As Castells (1996) points out, the Internet is both the most democratic and the least democratic of all mass media. On the one hand, the Internet necessitates access to, and knowledge of, expensive computer equipment. It also demands a high degree of language and literacy skills in order to use well. Thus the Internet is accessible to a relatively small percentage of the population of the world compared to other media such as television, radio, or newspapers?and that population tends to be disproportionally affluent and educated. Even in the industrialized countries, only a minority of the population uses the Internet on a regular basis.

On the other hand, the Internet is a highly interactive medium, which for skilled users provides unparalleled access to information from around the world. It also allows users to initiate their own communications both to individuals and to groups of people, as well as to publish their own textual or multimedia documents for others to access. In this sense, the Internet is, at least potentially, a democratic medium.

The rapid growth of the Internet means that it will likely soon be ubiquitous in the industrial countries. However, this alone does not guarantee its full democratization. There will still be on ongoing struggle over who shapes the content of the Internet, with one likely outcome that the majority of people become passive users (perhaps on new web televisions) with only a small minority controlling most of the content. This

contradiction?between democratic potential and potentially undemocratic control?is particularly important for marginalized groups to consider. An aboriginal spokesperson in Australia noted that aboriginal communities 'had been endlessly falsely interpreted,' and the Internet now allowed them 'to cut out the middle people and...to speak directly to their audiences' (Jopson, 1997, n.p.) Yet the same leader complained that 85% of the information on the Internet described as Aboriginal had no input from the indigenous community and 'should be pulled down' (n.p.).

For the Hawaiian community, gaining successful access to the Internet means not only getting individuals online, but also bringing people together in online communities and networks that Hawaiians themselves control. In this way, Hawaiians can work together to shape the development of their language and culture online. The Leokï BBS has proven an important tool toward this end. As a proprietary system, its development has entailed a certain amount of social organization. New users have to be granted access to the software and taught how to use it. There is a strong collective sentiment among Leokï users that communication should be in the Hawaiian language. The development and promotion of Leoki has helped guarantee the steady growth of an online community under the self-control of Hawaiians.

Language

Closely connected to the issues of access is the issue of language. The Internet developed and still remains in an overwhelmingly English environment. This is due both to its origin in the United States as well as the role of English as the most common *lingua franca* of international communication. For these reasons, as recently as June 1997, it was reported that some 82% of the Web sites in the world were in English (Cyberspeech, 1997).

The dominance of English was also strengthened by the difficulties of multilingual computing. This is an excellent example of the interplay of machine and social context. There is nothing inherently difficult about computing in a variety of alphabets and scripts, and a number of world-script systems are potentially available, but the original (U.S.) designers of personal computers and the Internet did not see multilingual computing as a priority. Thus the 'American Standard Code for Information Exchange' (ASCII) code, which has limited ability to handle non-Latin scripts or diacritical marks, became the international standard.

At the same time, there are countervailing forces at play. A number of reports suggest that Internet use in other languages is increasing, and the development of a world script will probably replace ASCII in coming years. This does not suggest that other languages are competing with English as a world language (though such a development is not impossible in the future), but rather that there are other uses of the Internet besides global cross-linguistic communication. Speakers of Chinese, Japanese, French, and Spanish and other national and international languages will certainly prefer to use their own language for Internet communications within their own country. And speakers of many minority and indigenous languages have shown an inclination to take advantage of the 'narrowcasting' multi-channel feature of the Internet to open up their own forums of discussion. This is seen for example in USENET, where discussion groups flourish in scores of minority languages (Paolilo, 1997).

Joseph Lo Bianco of The National Languages and Literacy Institute of Australia President of Language offered these comments on the interrelationship of languages on the Internet (personal communication, January 1997):

> People might choose to use English for instrumental reasons, but what about the other reasons for using language, social and cultural reasons and reasons of group solidarity? The Internet facilitates cross-cultural communication in English, but it also allows users of Tigrina scattered around the world to communicate in their own language. The Internet could end up expanding the use of other languages.

The experiences of Hawaiians, though, reaffirms that the Internet is a site of struggle in this regard as well. Since Hawaiian diacritical marks are not handled by ASCII, educators wanting to compute in Hawaiian have had to install special fonts, programs, and system software in order to carry out the full range of online computing activities in the Hawaiian language. This has sometimes met resistance from administrators of computer laboratories, who for pragmatic reasons have preferred to maintain their computers so that they are simplest and most stable to use for the majority of English-language users. This has not been a problem in the immersion schools, where all the users are speakers of Hawaiian, but rather in computer laboratories on

other (K-12 and college) campuses, where learners of Hawaiian intermingle with other users. Thus even in the state of Hawaiï¿½i, it has been necessary to carry out a struggle to ensure that Hawaiian language computing is facilitated.

Culture

The next issue I will address is what might be termed, the 'culture of computing,' in other words, the ways of communicating, interacting, and knowing which are encouraged as a result of working with computers and the Internet. Roy Bowers (1988), in his book on the cultural non-neutrality of educational computing, warned that non-Western cultures are threatened not by lack of access to computers, but rather by access, since the new forms of knowledge they encounter may often lead to unanticipated consequences. He asserts:

> Traditional practices, beliefs, technologies, and architectural forms that have evolved over time may simply be replaced by a new technology that is disconnected from context, including implicit forms of knowledge that sustain both the everyday lives of people and a sense of historical continuity. In effect, the technicist mind-set privileges experiment over substantive traditions, abstract and theoretical ways of thinking over implicit forms of understanding, the autonomous individual over the collective memory and interdependence of the cultural group, and a reductionist materialistic view of reality that denigrates the forms of spiritual discipline necessary for living harmoniously with other forms of life (p. 9).

Though published in 1988, when the Internet had already started to emerge, Bowers does not discuss the Internet but rather more general uses of computers. However, the writings of Bowers and other media critics (e.g., Postman, 1993) make it clear that they believe the entire computer culture, which the Internet has only accelerated, represents a threat to traditional ways of life.

Whether this ends up being true or not as regards Hawaiians is impossible to determine. However, what is interesting to me is how the community has seized on aspects of the Internet which they believe are most compatible with their own traditional patterns of communication and knowledge. These involve (a) the importance of social networks, and (b) interactive, multimedia learning.

Social networks. Research by social scientists and educators have demonstrated importance of social relations in Hawaiian learning. On the one hand, this involves close communication with the people around them, a tradition often referred to in Hawaiï¿½i as *talking story* (Au, 1980). On the other hand, this involves striving toward helping the broader family and community. According to David Sing, director of Nä Puä Noeï¿½au (Center for Gifted and Talented Native Hawaiian Children:

> Hawaiians will work on a task with more vigor and longer if the task involves social interaction. Studies have shown that Hawaiians are motivated to achieve in order to have access to and sustain contact with people. The achievement of personal goals and success provide only secondary motivation....Hawaiians have been found to achieve less when they are expected to strive toward individualistic and competitive oriented goals....Another affiliation-oriented behavior of Hawaiians is that they perform better in class when the activity has direct benefit to their family or to a group of which they are part (1986, p. 26-27).

From my observations, Hawaiian educators have been using the Internet in ways that build from these perspectives. Rather, for example, than just having students use the Internet for their own research, Hawaiian educators have emphasized the social and collaborative aspects of the Internet. These have included collaborative long-distance projects, such as the Compose a Song Project I described earlier, as well as publishing for fellow students. Teachers in these projects built from the collaborative atmosphere which existed within class to promote successful work across classes. This was well received by students, as indicated by this typical comment by a college student:

> In Hawaiian classes everybody works together...'Cause everybody's trying to work together, like try and bring the language back alive, so everybody's helping each other, if you don't know nothing, they'll just help you. The other classes, I don't know. In Hawaiian, everybody's trying really hard to get their work done and help each other...

It's really good to put our papers on the Web. Maybe now if other Hawaiian classes need research, maybe they can look on the Web for research that they need and they can learn how to read it in Hawaiian and get the information in Hawaiian. 'Cause we got all ours from English books and we translated it, and so maybe now instead of looking at English books they can look at our Web pages and they can add on their own, so they can like read in Hawaiian, and then write in Hawaiian, and put their own Hawaiian stuff on the Web page, along with whatever they got from English textbooks, and that can be like texts for other Hawaiian classes.

Multimedia learning. Though, as noted earlier, Hawaiians achieved a high degree of literacy in the 19th century, their culture is largely based on communication and education in oral and visual media. This is illustrated, for example, by the Hawaiian arts of ï¿½oli (chanting) and *hula* (dance), used for passing down knowledge and cultural traditions from generation to generation. In every Hawaiian immersion or language classroom I have visited, including university classes, there has been an emphasis on interactive learning with a variety of media, through activities such as drawing pictures to illustrate essays.

This blending of communication modes is obviously well-suited to a medium such as the Internet. And, once again, all the Internet projects that I observed in Hawaiian language classes placed a strong emphasis on integration of different media. For example, whereas many university language teachers would be content to have their students publish text-only papers on the World Wide Web?and some might even see the inclusion of complex graphics and other visual devices as a 'distraction' from a desired focus on language?Hawaiian teachers I have observed have encouraged language students to develop sophisticated multimedia presentations. In some cases, students put up their own chants on the pages. One Native Hawaiian student, who at first was very intimidated by working with computers, but in the end produced a beautifully-designed and well-written web page (in Hawaiian) about Hawaiian wetlands, explained the result of multimedia authoring thusly, commenting on her own work and on the work of a classmate:

It was very fascinating to me because suddenly this paper became another kind of medium. And you couldn't just do the same thing, it didn't look good if you just did the same thing....If you've got a book in front of you, you can put it down anytime, it's kind of right there. But if you have a Web thing, it's different. You're not holding it, you have to kind of look at the screen, and the screen experience to me is, it's hard for me to sit and read that stuff, I can't stand just sitting there reading like that, you gotta keep 'em occupied, with some sort of other interesting thing, and those things can really pull a person into the flavor.

Kamahele's [a classmate's] page was unbelievable! I mean the fact that he could get, first of all, you know the chants are just SO good, and anybody, whether they speak Hawaiian or not, if they understand that they can click a Hawaiian chant, I'm sure they're gonna wanna hear it. Cause it's beautiful chanting. But I love how he made his page. The colors were just so powerful in the Web. And the *kiï¿½i* [pictures] that he had, just outrageous, and you FEEL something and you WANT to read about it. And even if you don't speak the language, you want to press down and go further because something is happening on that page, you know it's some kind of *mana* [spirit] is coming out of that page. And so, the people in the class wanting to put their stuff on there, that's part of their expression, it's part of their *mana*, so it makes the page even much more interesting and inviting. It says in other words, it says not in words, but it says in a different way what they're supposedly trying to convey in a piece. You know, you would think, or at least who wrote it, you know, and you know, so it becomes more interesting. So I think that the graphics are a very integral part, it's very creative.

You know, Hawaiians they weren't a written culture, and I think there's a reason for that, you know they were very alive with everything, so if they're gonna be writing I think this is a great medium because they can be alive here. They can kind of be artistic and do something creative, so, I think it's very good, and very, a lot of *haï¿½aheo*, a lot of pride can come through there.

The combination of interactive learning, and multimedia learning, was spoken to by another student, himself a chanter and hula dancer:

> If you look at Hawaiian culture, they weren't one to sit down in a classroom and read something. Ours was more of a, was a spoken language, and so what that means is that you interchange, you speak to each other, you work with ideas, you look at pictures, you look at, and feel different things. And so that the more dimensions that we can get it to, the easier it was for Hawaiians to learn. That's why I think, I don't know, it's just a guess, this is my own opinion, there's no documentation, no fact or anything, but I think maybe that's why Hawaiians are having a little bit of a hard time in the classroom, it's because that's not the ï¿½ano [way] for thought for maybe 2000 years, they've been learning through teaching and learning from somebody else, and through visually doing things and working with things instead of just reading out of a book. And so when we add in pictures and colors and voice and everything like that, it's not just a page, words on a page, but actually like jumps at you, and it comes, it, you can feel it more, more in your brain, everywhere, just in your body, I don't know.

I do not want to suggest that Hawaiians have a unique propensity for learning well through social interaction and through uses of a variety of media. Indeed, many educators might consider these aspects of learning common to students of many cultures. What I do want to point out, though, is that Hawaiian educators have attempted to make use of the Internet in ways that they feel build from the best learning traditions of their students.

The Internet is a rapidly-changing medium, and it is unclear what forms it might take in a few years. In its current forms, though, the Internet incorporates interactive, multimedia ways of presenting and sharing information which seem to be more congruent with non-Western and oral cultures than does the print medium. Once again, though, the nature and design of the Internet interacts with the social context of its use. These features were well-used by Hawaiian educators who worked together with their students to take full advantage of them.

Identity

The final issue I would like to discuss is the relationship between the Internet and identity formation. The negotiation and development of cultural identity has been noted as an important factor in language revitalization (Spicer, 1980). This is certainly the case in a multi-ethnic state such as Hawaiï¿½i, in which most people (and virtually all Native Hawaiians) come from a variety of ethnic backgrounds and thus have many cultural identities to choose from.

Turkle (1995) suggests that the Internet provides a powerful place for people to explore their identity, since it allows them to try on fantasy selves. Tobin & Tobin (1997), in response to Turkle, point out that for many young people, what they are exploring online is not their fantasy identity but their real sense of self.

This last observation is consistent with what I noted during my observations of this study. Working in an online environment provided students an excellent opportunity to explore and invest in their cultural identity by discussing issues of Hawaiian culture with other students near and far, and by publishing their own work related to Hawaiian life online for others to share. A number of students who went through this process came out with a stronger sense of being Hawaiian and a deeper commitment to the language and culture. For example, one college student of Portuguese, German, and Hawaiian ancestry had been planning on going to New York to work in a television studio before she began taking computer-intensive Hawaiian. A shy woman in face-to-face discussion, she thrived in computer-mediated Hawaiian discussion as well as in Hawaiian web authoring. She ended up producing two quite sophisticated Hawaiian-language multimedia web sites, the first about a 19th century Hawaiian princess and the second about Hawaiian Creole English. By the end of the year, she had developed a very strong sense of personal investment in Hawaiian, as indicated by these excerpts of an e-mail message she sent me:

> As for the summer, I'm taking a few classes...Hawaiian 301 & 302 :) I've thought of continuing before, but just for fun...[But] lately I've been thinking that I would like to continue speaking Hawaiian for years to come...I don't want to wake up one day and not able to remember how to do that. I finally decided that in teaching Hawaiian (hopefully) I would be able to do this and also aide in my fluency and mastery of Hawaiian.

> If you would have told me two years ago I would consider being a teacher, I would have told you were crazy...It's so weird how taking one class can alter your plans so greatly for the future.

> Actually it was last semester when I began tinkering with the idea (of becoming a teacher) but it wasn't until this semester when I actually said HEY I really wanna do this. I'm still trying to figure out a way to merge my television production background, journalism experience and Hawaiian. To get a career that utilizes all three...I think would be my dream job.

There is growing recognition that identity is a central issue not only in language revitalization but in the broader learning and use of second languages (e.g., Peirce, 1993, 1995). Educators would do well to consider the potential role of the Internet in facilitating students' investment in social identities that involve expanded use of and expertise in second languages.

Conclusion

Andrew Feenberg's critical theory of technology is matched in the realm of education by Brian Street's (1993; 1984) *ideological model of literacy*. Street claims that literacy, which both makes use of technology and can be considered a technology in its own right, is neither deterministic nor neutral. Rather, Street suggests that 'Literacy practices are aspects not only of 'culture' but also of power structures' (1993, p. 7), involving 'fundamental aspects of epistemology, power, and politics' (p. 9). The acquisition of literacy involves 'challenges to dominant discourses, shifts in what constitutes the agenda of proper literacy, and struggles for power and position' (p. 9).

Applying a similar outlook to electronic literacy practices, Kaplan (1995, p. 28) argues that

> The proclivities of electronic texts?at least to the extent that we can determine what they are?manifest themselves only as fully as human beings and their institutions allow, that they are in fact sites of struggle among competing interests and ideological forces. Or, to put the matter another way, social, political, and economic elites try to shape the technologies we have so as to preserve, insofar as possible, their own social, political, and economic status. They try to suppress or seek to control those elements of electronic technologies uncongenial to that purpose. The degree to which they are successful in controlling the development and use of electronic texts will define the nature and the problems of literacy in the future (p. 28).

My research on the use of Internet for Hawaiian language revitalization is congruent with these perspectives. When Hawaiian language educators first began thinking about using the Internet, they confronted an unfriendly terrain. There was virtually no information in the Hawaiian language on the Internet, and web sites devoted to Hawaiian culture had mostly been developed by tourist agencies. Few Native Hawaiians had Internet access in the home nor in their schools. The Internet and the computers it was developed on did not readily support the use of Hawaiian language diacritical marks.

In response to this situation, the Hawaiian educational community developed their own Bulletin Board System in Hawaiian, they worked to get their schools online, and they developed software solutions to modify computer operating systems to allow full Hawaiian-language operation, including Hawaiian language menus. Most importantly, they designed and implemented educational uses of the Internet which built off of the social and cultural strengths of the Hawaiian community, emphasizing Hawaiian cultural traditions such as 'talking story' and encouraging student development of multimedia online content which critically interpreted the Hawaiian experience. Though they have much more work to do, they have taken important steps towards creating a Hawaiian presence on the Internet which is congruent with their culture and which furthers their aims of language and culture revitalization.

Phil Agre (1997) wisely noted that, 'Machinery does not reform society, repair institutions, build social networks, or produce a democratic culture. People must do those things, and the Internet is simply one tool among many' (n.p.) . In order to make the best use of the Internet, Agre adds that groups should 'identify existing practices for sharing information and building social networks and experiment using the Internet and allied technologies to amplify them' (n.p.). In my view, the work of Hawaiians represents an excellent model of a group of people working to positively amplify existing cultural practices in an online environment. I believe their achievements include some important lessons that may be beneficial for language educators working with a variety of culturally and linguistically diverse learners.

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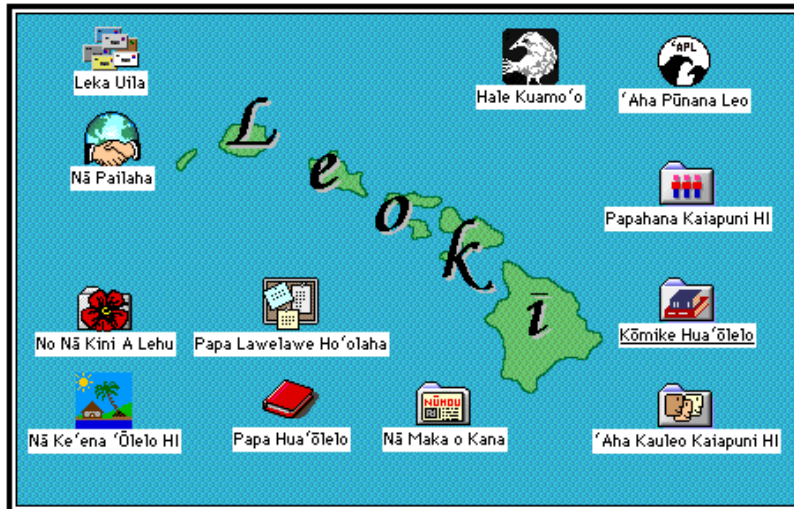
Acknowledgments

Notes

Figure 1

Leokï Welcome Screen

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Biographical Notice

Mark Warschauer is based in Cairo where he is consulting with Egyptian schools, universities, and the Ministry of Education on effective and culturally-appropriate uses of new information technologies. Previously he was a researcher at the University of Hawaiï¿½i National Foreign Language Resource Center. He is the editor of the international online journal, *Language Learning & Technology*. His most recent book is *Electronic Literacies: Language, Culture, and Power in Online Education* (Lawrence Erlbaum Associates).