

Kuna Indian Access to Kuna Archival Audio Recordings

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ABSTRACT

This paper describes a group project for the course, Understanding and Serving Users, School of Information, The University of Texas at Austin, Fall 2006. The researchers create a user interface for native indigenous speakers of the Kuna language living in Panama enabling them to access and use digital audio materials maintained by the Archive of Indigenous Languages of Latin America (AILLA) in their native language. Based on an initial literature review and interviews with AILLA employees, the researchers select the target user group, define the project goals, and design the prototype Web-based user interface. After developing a plan to evaluate the design's effectiveness, the researchers consider further study needed to make the interface more useful to educators. Ultimately, the project aims to serve as a model for other indigenous communities and contribute to the resolution of issues associated with long-term maintenance of the interface and preservation of the high-quality Kuna digital materials contained within AILLA.

Categories and Subject Descriptors

H.5.2 [Information Interfaces and Presentation]: User Interfaces – *auditory (non-speech) feedback, interaction styles, prototyping, screen design, user-centered design, user interface management systems.*

General Terms

Measurement, Documentation, Performance, Design, Languages, Human Factors.

Keywords

Kuna, Panama, AILLA, native indigenous speakers, preservation, access, Web interface, wiki, blog, endangered languages, audio recording, digitization.

1. INTRODUCTION

Most people would be surprised to learn that a language is considered endangered today even though tens of thousands of people still speak it. In fact, eighty percent of approximately 6,000 languages spoken all over the world could become extinct by 2050 (Flores Farfán, 2002, p. 226). As Flores Farfán further explains, “the set of terms that range[s] from renewal, restoration,

revitalization, and preservation on the one hand, to maintenance and development on the other, can be thought of as a continuum on which endangered languages are categorized: ranging from the almost complete decay of a language to a language of high vitality” (p. 226). Typically, the numbers of fluent native speakers decline where individuals are gradually assimilating themselves into mainstream cultures of their region and are experiencing pressure to adopt other more dominant languages to cope with larger communities in the modern world. If the reader is tempted to wonder whether such a language loss may be inconsequential, consider that indigenous language is not merely a means of communicating among its speakers – it is the key to sustaining their unique culture and its traditions, since no other language can capture so perfectly the meaning of the culture's story and history. A simple sound recording, for example, can express a family history, provide a record of songs not widely documented in the literature, and be an information source of indigenous music history. No matter how interesting the story, how rich the history, how unique the culture, it will only survive if younger generations learn the language and communities actively use the language in their everyday lives.

The Archive of Indigenous Languages of Latin America (AILLA) has been collecting and preserving recordings of indigenous speakers and their languages for decades. It seeks to preserve recorded language materials, make them accessible to all who may benefit from them, and support communities of native speakers (AILLA, n.d.). AILLA makes its collections readily available to academic scholars for their research, but because the AILLA Web site is primarily designed for scholars, the indigenous peoples themselves generally do not attempt to access or use the materials and have not been able to take advantage of the collections in ways that may affirmatively support the living language process. AILLA identified a need to facilitate indigenous use, and, based on meetings with its staff, this group of researchers proposed a Web-based user interface specially tailored for native indigenous speakers of the Kuna language in Panama. The Kuna are indigenous people who live in Panama City and on the Kuna Yala (Kuna-land), a string of hundreds of islands just off the shore of Panama. As indicated above, although their language is spoken by an estimated 57,000 people, it is nevertheless considered endangered (Gordon, n.d.). Johnson (personal communication, November 17, 2006) confirms that oral traditions and forms of verbal art may be in danger of extinction, although the language itself is not in imminent danger. Such cultural losses could significantly weaken the indigenous population.

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This paper focuses on the researchers' response to this challenge: the design of a prototype Web interface that provides opportunities for the Kuna people to access and use AILLA collections. The paper begins with a review of selected literature on the status of analog and digital audio recordings of indigenous languages, and the background of AILLA and its relationship with the Kuna and other indigenous communities. The paper then describes the project's target user group, the project goals, and the design of a prototype Web-based user interface for the Kuna people that will achieve those goals. Next, the researchers illustrate their plan to evaluate the design's effectiveness. Finally, the paper suggests additional study needed to make the interface more useful to educators, to enable it to serve as a model for other indigenous communities, and to address issues associated with long-term maintenance of the interface and preservation of the high-quality Kuna digital materials contained within the Archive.

2. DIGITIZING ARCHIVAL COLLECTIONS: MAKING AUDIO MATERIALS MORE ACCESSIBLE TO INDIGENOUS POPULATIONS

While it may not be news to anyone that archives are not very easy to access or use, inaccessibility can be significantly ameliorated in the networked digital environment in which we live today. This is true for audio as well as print archives. In general, access to audio collections is difficult because most archive materials are in analog format and often considered highly specialized or ephemeral. Goldman et al. (2004) point out that many spoken word collections have deteriorating audio because of media degradation or imperfect analog recording technology. In fact, all analog materials will likely perish within several decades. As digital systems begin to replace analog systems, access becomes easier. Many digital sources can be found on the Web and in CDs and DVDs. In the networked digital world, information can be maintained and distributed electronically. Digital distribution is becoming both easier and cheaper; collections may be located in a thousand places. As Cohen (2001) states, "distribution is preservation." Well-disclosed audio collections can provide significant value in keeping indigenous audio collections alive.

2.1 The Internet: promises and problems in the effort to improve archival access

On the other hand, highly compressed digital content is often of poor quality and must be regarded as short-lived due to its unpredictable durability. Many audio collections are poorly documented, catalogued, and housed, which makes it harder for interested individuals to find and use them. Librarians and archivists also note that accessibility can be problematic where the rights to use and record have not been clearly documented. It is often the case that intellectual property, moral rights, and privacy concerns of the subject, fieldworker, speaker, or repository are unclear or simply ignored. Developing more systematic approaches to collection development and documentation, as well as standards for sustainable digital repositories, is essential for long-term preservation of digital materials.

The Internet makes preserving indigenous traditions easier by providing a place for diverse voices in an open and equal online society. But, of course, the ability to browse and search an audio collection depends on the ability to discover and gain access to it. Simply placing materials online is not the answer. Participants in the Folk Heritage Collections in Crisis conference held in 2000 sought to address this problem by identifying the many steps needed to truly improve access: (1) develop a Web interface to provide links to resources and reference materials for diverse communities, (2) raise public awareness about endangered heritage collections, (3) develop applicable guidelines and standards, (4) develop further education and training systems, (5) develop partnerships among the technology, business, and entertainment industries, (6) provide expertise and resources to regional and local levels in and beyond the Web interface, (7) establish and fund teams (consultants, workshop leader, expertise, service provider, etc.), and (8) establish district centers for distributed access (*Council on Library and Information Resources*, 2001). Five years later these needs still remain paramount for any group wishing to make digital audio materials documenting indigenous language and culture readily available electronically.

Now, however, a more sophisticated public is placing ever more insistent demands on content providers. Danielson (2001) mentions that many users today expect fast delivery of MP3 files with scanned images of whatever supplementary documentation there may be. The public seeks access to the contents of collections through free and well-maintained Web sites anytime and anywhere. Be that as it may, there seems to be little empirical research addressing the exact needs of indigenous people with respect to access to and use of digital archival materials. Johnson (2002) points out that many native speakers acknowledge that the Internet can facilitate access to their materials and enhance communication among native speakers. Many individuals, particularly those speaking well-established languages, are eager to promote language revitalization and education, cultural preservation and reclamation, and literatures in their languages. Nonetheless, speakers of indigenous languages often have limited opportunity to use the Internet and little, if any, access to digital collections. In Panama, Internet access is largely unavailable in Kuna Yala but becoming increasingly common in Panama City, particularly at Internet cafes. Thus, growing numbers of Kuna speakers, particularly of the younger generation, now have experience in using the Internet for chat, email, browsing, and downloading music.

2.2 Narrowing the choice of indigenous populations for the research project

As stated above, it seems clear that archives are in significant transition, indigenous languages are at a critical juncture, and there is little research focused on the intersection of the two phenomena. Consequently, through interviews with AILLA employees (H. Johnson & D. Smith, personal interviews, September 29 & November 17, 2006), the researchers concluded that the Kuna people living in Panama City would likely constitute an ideal community within which to test a Web-based, user-centered prototype interface to AILLA digital materials. AILLA has a long-established working relationship with the Kuna people and holds a large Kuna digital collection consisting of 190

recordings. The researchers actively communicate with the indigenous population; many researchers frequently visit Panama to conduct their research. The Kuna people are mostly bilingual (Kuna and Spanish), sociable with outsiders, and interested in the Kuna language. As Sherzer (1990) explains, they have tried to keep their distinctive culture within a modern, urban civilization (p. 1). Through a creative combination of old and new, they have constantly adjusted and manipulated traditional patterns to make them fit into new situations. Moreover, they are willing to disclose their materials to the public without imposing copyright barriers to further use. Kuna oral practices are “the locus of many aspects of Kuna life--ecology, political and religious beliefs, curing and medicine, economic concerns, dealings with the outside world, personal relations, and humor” (Sherzer, 1990, p. 2). There exists a rich and dynamic Kuna verbal life, which is all spoken, chanted, sung, shouted, and listened to.

3. DEVELOPMENT OF THE PROJECT GOAL: PROVIDING ARCHIVE ACCESS TO KUNA TEENS

The Kuna people are a very large group of individuals who would likely desire different kinds of access to different types of materials. To create a viable research project, the team had to narrow its focus.

3.1 Defining the primary users

Goldman et al. (2004) suggest that there is a need for focused assessment of teachers and students, who have not yet been fully studied. In general, while teachers show interest in computer-aided language education, they are rarely aware of computer-aided indigenous language learning (McHenry, 2002). Further, many classic language educational methods do not apply to holistic indigenous learning practices. On the other hand, hypermedia may deal with these issues and may become particularly useful to indigenous people, but these developments may be too far off in the future to be of value to the present study.

Today, Kuna children mainly learn Kuna language and culture at home, informally, but Daniel Smith, the Kuna graduate student at UT with whom the research team discussed these matters, indicated that development of educational curriculum to teach Internet use and Kuna language is occurring in Kuna middle schools in Panama City. There are no Kuna cultural studies in local schools at this moment, but apparently there soon will be. Thus, the team concluded that students would make ideal primary users of the prototype interface, and educators would be a good choice as a secondary group, as their efforts continue to develop over the near-term. The researchers further narrowed the user profile to male and female Kuna students between the ages of 14 and 17 who attend middle school in Panama City, speak Kuna and Spanish, and exhibit typical teen use of computer and Internet technology. The project may be doubly beneficial for this group in that it uses information technology to teach the Kuna language and, in turn, uses the language to motivate the learning of computer skills.

3.2 Educators will be increasingly important to language survival

While opportunities to learn and use one’s native language at home cannot be overemphasized, the team believes that collaborations between the Panamanian Ministry of Education and local Panamanian middle schools will be essential to sustain an active learning environment for communication in the Kuna language. The Web interface can only be one part of a more comprehensive effort to revitalize, preserve and protect the Kuna language. For example, as part of future research, the team anticipates that lesson plans emphasizing everyday interaction with the Kuna language could be developed and evaluated. The Web site could be expanded to include student exercises to help students retain and communicate what they hear on the audio recordings. While the initial project described herein is rather limited, the team feels it is important to include within the scope of the project clear indications of where the research might turn in the future.

3.3 Challenges in working with the primary user group

The research team considered focusing on younger children; however, teens’ familiarity with and affinity for computer technology and applications that offer social opportunities suggested that this group would enjoy and benefit more than younger children from a Kuna language Web site. On the other hand, teens are a difficult group for which to design. The team concluded from observing typical teen usage of such applications as chat and music downloading that it should start simply with features likely already familiar to teens. Other challenges quickly became apparent. As indicated above, a majority of the Kuna communities do not have access to the Internet and/or are not familiar with using a computer. These facts dictated that the initial locus of the research project would have to be in Panama City where the most frequent computer users happened to be middle school Kuna students. Finally, the primary languages used in the region are Spanish and Kuna, so the researchers will have to translate the Web interface into languages with which the users will feel comfortable.

3.4 The project goal

Through the design of a Web interface to AILLA’s Kuna language materials, the researchers plan to create a forum through which Kuna teens and later, their teachers, may interact with each other in relating to Kuna popular oral literature, including myths, traditional stories and songs. This interaction has as its goal that more young people will access and use AILLA materials, in new contexts, in particular, on the Internet. Future phases of the research project may encompass use of AILLA materials by educators and perhaps use by teens in social networks. Overall, the Web interface should contribute to AILLA’s effort to facilitate access to its materials by special groups not currently served.

4. THE DESIGN OF THE INTERFACE

With its stated goals in mind, the research team began the iterative design process by evaluating the current AILLA interface from the perspective of the target user profile. Given the goal to increase use of the Archive by young native speakers, the

research team concluded that to attract and retain native teen speakers of Kuna, the interface should present easy, uncomplicated access to AILLA materials, and inviting functionality that would hold the attention of a teen audience.

4.1 Developing initial design requirements

The research team consulted AILLA stakeholders early in the process to gain a better understanding of their views of an optimal mix of features to encourage use of the Archive’s resources and serve as a realistic starting point for further development.

The team identified Kuna language speakers in general as an additional set of stakeholders, and plans in the future to evaluate the Web site with a broader range of individuals who are interested in the living language process, such as those who have contributed to the Archive or who have identified language survival as an important issue.

As noted below and in the section on further study, the team will consult or recommend that others consult with Panamanian middle and high school teachers and bilingual education curriculum developers to evaluate the usefulness of the prototype to educators in a later phase of design development.

Based on these understandings, the research team went on to consider whether a conceptual model or metaphor would be needed for Kuna teens.

4.2 Choosing a conceptual model

A “jukebox” or other physical manifestation might be an obvious conceptual model for a Web site that provides Kuna teens with access to music and other audio files; however, sound files can be so seamlessly incorporated into Web sites of every type today that a simple Web interface without an underlying conceptual model appears to provide all the framework necessary to help the user identify the purpose of the site and suggest how to use it. Daniel Smith indicated that Kuna teens in Panama have considerable experience with handling access to music on Web sites.

A Web site supports browsing, selecting, and interacting with Web content and others who visit the site, both synchronously and asynchronously. Thus, these are the interaction styles the group decided to utilize.

4.3 Creating a prototype and choosing among interaction genres

The team prepared a rough prototype based on these initial research findings regarding features most likely to meet AILLA’s goals for this particular user group, following the design principles set forth in Norman (2002), Preece, et al. (2002), and Kuniavsky (2003).

4.3.1 Popular interactive genre choices

The design process began with the consideration of a variety of currently popular interactive genres. These options were evaluated according to a number of criteria including how easy they were to use and maintain, whether they were available in open-source software and could be implemented at low cost, and whether they offered engaging opportunities for personal

expression and made it easy to highlight archive content. Table 1 describes each genre’s ranking across these five characteristics.

Table 1. Relative strengths of interactive genres

	Blogs	Wikis	Discussion boards	Chat	Social networks
Ease of use	moderately high	low	medium	very high	medium
Ease of maintenance	low	very low	low	high	very low
Open source available	yes	yes	yes	yes	no
Personal expression	high	low	medium	high	very high
Highlight archive content	high	very high	low	very low	medium

4.3.1.1 Blogs

Blogs are familiar to most Internet users and designed for moderately high ease of use. However, the typical chronological organization of blogs and the associated user expectation that blogs are a place to look for “news” are not necessarily appropriate for an audio archive for which chronology is not a primary organizing principle. This objection can be mitigated in the case of blog software that permits undated entries. Within the context of a blog entry, the chronological arrangement and the individual attribution of comments promotes personal discussion but does not support other modes of collaboration or ways of organizing content other than a chronological series of comments. Blogs have a moderately high need for ongoing maintenance: they are typically vulnerable to spam and abusive content, particularly if they allow comments from unregistered users.

4.3.1.2 Wikis

Wikis, in contrast to blogs, are primarily non-chronological and unattributed. Rather than encouraging personal discussion identified with particular users, wikis support collaborative development of consensus texts, freely structured according to the logical needs of the topic at hand. In the case of an audio archive, a wiki would lend itself well to the accumulation of metadata, transcriptions, translations and other explanatory content surrounding each archived item. However, wikis score low on ease of use and require very high maintenance, both to monitor for abuse and to ensure a logical structure within and among articles.

4.3.1.3 Discussion boards

Discussion boards share with blogs an emphasis on chronology and personal interaction. Unlike blogs, a typically configured discussion board does not distinguish an entry from the replies to it, so as applied to an audio archive it would offer less opportunity to highlight audio content. Discussion boards have an ease of use somewhere between blogs and wikis and a fairly high need for maintenance.

4.3.1.4 Chat features

Chat takes the characteristics of other discussion genres to an extreme. A typical chat feature is entirely chronological and ephemeral, with an emphasis on personal expression and very high ease of use. Chat would offer no way to highlight the content of an audio archive, although there are chat implementations that can be embedded in a web page of another kind. Although chat is highly vulnerable to abuse, the fact that chat sessions are usually not retained makes abuse of less importance than in other environments and permits a simple chat feature to be operated with minimal maintenance.

4.3.1.5 Social networking sites

Social networking sites such as MySpace represent a genre of compelling interest to the teen audience targeted in this study. While multimedia figures heavily in many social networking sites, it appears in the context of personal web pages whose focus is individual expression and the social relationships among users. Thus the MySpace model would not offer a way to present audio content in a neutral space “owned” by the site, to which individual users add commentary. Furthermore, robust open-source software

Figure 1. Page featuring sound files, ch

offering a full MySpace-like social networking experience is not yet available. A better way to appeal to the MySpace audience might be to make audio from the archive available in a way that could be linked to from within MySpace, rather than to attempt to construct a freestanding social networking site.

4.3.2 Our choice: A non-chronological blog

After considering these options, the team chose to implement the prototype in the form of a non-chronological blog, using the undated “page” functionality of WordPress. Figure 1 illustrates one of the blog pages featuring all of the site’s essential features.

Each blog entry corresponds to one or more related audio items from the AILLA archive (e.g., a single story or a set of related songs). The entry consists of titles, audio links, brief metadata about the audio (names of performers, date and place of recording, etc.) and a short set of questions to stimulate discussion.



Three Kuna Lullabies

- 🔊 [Listen to lullaby 1](#)
- 🔊 [Listen to lullaby 2](#)
- 🔊 [Listen to lullaby 3](#)

Sung by Julieta Quijano, Brieta Quijano and Donaldo García and recorded in Mulatuppu, Kuna Yala in 1970.

Did you hear these when you were young? What other Kuna lullabies do you know?

One comment on “Three Kuna Lullabies”

esme says:

November 27th, 2006 at 9:06 am

My favorite lullaby is #3. It reminds me of my grandmother.

Listen

- » [The Turtle Story](#)
- » [Three Kuna Lullabies](#)

Chat in Kuna

Last Message
1 hour, 12 minutes ago
.....
riddle is online.

marisela : hola, daniel, ke honda?

Daniel : na degite

Daniel : hola

marisela : hay alguien aquí?

guest 1948 : Hay que imaginarse que esto no fuera en español

guest 1947 : ffitol

Name:

Guest_1560

Message:

Users are invited to interact with the site in two ways: through blog-style comments on each entry, and a simple “shoutbox” chat feature embedded in a sidebar. Users are required to log in before leaving comments, but may chat freely without registering. It is hoped that by providing this small barrier to entry for leaving a permanent comment on the site, while supporting immediate gratification for more ephemeral interactions, the site will encourage users with frivolous or abusive intent to post it where they will do the least harm.

The context and labeling of the comment feature are intended to underscore these two modes of interaction. While the prototype was constructed in English, it is to be localized before deployment in Spanish with selected features in Kuna. The descriptive text associated with the audio in each entry is designed to encourage substantive discussion of the audio content using the blog comments. The chat box, however, is labeled “Chat in Kuna” and its prompts (“Name,” “Message,” etc.) are to be presented in the Kuna language, with the hope that users will be encouraged to casually interact in Kuna rather than in Spanish or English. Thus the two modes of interaction with the site focus on two complementary educational goals, audio comprehension and active production in Kuna.

Together, these choices should meet young users’ needs and desires for ease of use and intrinsically appealing opportunities for self-expression, while also fulfilling the requirements of Kuna educators and AILLA that the site be capable of serving educational goals at a low cost for construction and maintenance.

5. EVALUATING THE DESIGN’S EFFECTIVENESS

The research team identified functional ease of use and user satisfaction with the Web interface for formative evaluation and increase in use of AILLA materials by indigenous speakers for summative evaluation.

Formative evaluation has thus far included user profiling and informal interviews (H. Johnson & D. Smith, personal interviews, September 29 & November 17, 2006), to establish initial design specifications, as discussed above in Section 4.

In the next phase of formative evaluation the team will carry out usability studies in Panama to assess user success with and reaction to a high fidelity, broadly functional prototype interface.

After modifying the interface design in accordance with the results of the usability study, the team envisions classroom field studies, surveys of a representative sample of bilingual education teachers, and interviews of a small number of teachers and curriculum developers in Panama to evaluate the educational potential of the site. For example, the goals of the bilingual education program in Panama City may inform the interface design to some degree, but should clearly be reflected in the contents of AILLA materials made available through the interface. Educational use of the interface would more likely increase overall use, AILLA’s ultimate goal.

Finally, summative evaluation will focus on server log statistics to determine quantitatively whether native speakers are making

more use of AILLA materials than they were before the introduction of the new interface.

5.1 Usability study

The research team developed a usability test to determine the ease with which a user can navigate the site, find desired materials, and carry out the primary site functions of downloading audio files, engaging in chat and registering with the site in order to leave comments regarding AILLA materials. The test will also allow the researchers to evaluate participants’ opinions as to whether various features are enjoyable, interesting or attractive.

The procedure will include three components:

- A preliminary structured interview about the participant’s knowledge and use of the Web and the Kuna language, in order to provide context for understanding his or her responses to the site.
- Observation of the participant performing a series of representative tasks and interactions with the site.
- An unstructured interview exploring the participant’s subjective experience of the site.

By including both the observation of tasks and eliciting participants’ opinions, the research study supports gathering objective data about usability as well as users’ subjective impressions of its usability.

The researchers will conduct the test with between five and 20 participants, depending on time and the availability of participants meeting the user profile. Because this sample size is too small to be statistically significant, the analysis is to be qualitative, not quantitative in nature. No statistical analysis will be performed beyond noting simple ranges or counts of particular observations and responses, for example, noting which tasks were easy or difficult for all participants as compared to those on which participants’ performance was mixed.

The tests are to be conducted as part of an iterative design process. Depending on the number of participants and the time available, the researchers may make changes to the site between tests so that preliminary conclusions learned from initial sessions may be tested during later sessions.

5.2 Teacher survey

As part of a second phase of research, the research team would recommend fielding a short survey to determine how teachers describe the overall goals of bilingual education in Panama City, and what role access to and use of traditional language samples might play in their program. The survey should help to establish the initial criteria for interface design features tailored to this stakeholder subgroup’s needs.

5.3 Field study

The research team further envisions two different field studies in Panama City, one providing an opportunity to observe bilingual education classes and the other affording experience of an Internet cafe frequented by the typical teen user group member. These

studies would yield contextual analysis to aid in further refinement of the interface.

5.4 Teacher interviews

After the results of the teacher survey and classroom field study are analyzed, and the prototype modified in accordance with those results, the team would recommend identify two or three teachers to interview in more depth about the usefulness of the design for achieving educational goals of the bilingual language program.

5.5 Usage log statistical analysis

After the prototype has been in use for several months, the team believes that server log statistics maintained by the Archive should be examined to determine whether the AILLA materials are being accessed more frequently from computers suggesting access by native speakers. Regardless of whether there is an increase in access, it may not be clear that the increase is attributable to the design of the interface. Thus, members of both the user group and the teacher stakeholder group should be interviewed and asked their opinions regarding whether the interface design is meeting its goal of providing easy use and an intrinsically enjoyable experience. Design modifications should be implemented based on the results of the follow-up interviews.

5.6 Practical issues

All of the individuals with whom the research team must interact to effectively evaluate the interface design are located in Panama City and speak Spanish. These facts have an obvious effect on every aspect of the research process from recruiting and interviewing to budgets, schedules, and arranging facilities for conducting tests, field studies and interviews (Kuniavsky, 2003, p. 83-116). The project participants must seek appropriate sources of funding to be able to hire a translator and to pay for accommodations and transportation to and from Panama for at least one researcher and an assistant, for one, and possibly a second trip over the next six months.

To economize, the research team will use Internet communications media and depend on existing relationships between AILLA employees and educators in Panama City to the greatest extent possible. Given the problems of language and distance, the researchers plan to engage teachers as volunteers to screen students between the ages of 14 and 17 for those who otherwise fit the user profile, distribute recruitment surveys and distribute and collect signed consent forms from the students identified as potential participants in the study, schedule the students and facilitate the reservation of appropriate space, computer equipment and Internet access. One researcher from the team would have to fly to Panama when the test participants had been scheduled and confirmed. The study would be conducted over several days during the upcoming school semester.

Neither the educator surveys nor their interviews will require a trip to Panama, but the field studies will. These evaluative phases will not be scheduled until preliminary analysis in conjunction with AILLA employees indicates that the interface design project should go forward and that there are adequate sources of funding.

5.7 Ethical issues

Because the primary user group consists of minors, the user consent form for the usability study has been carefully designed to emphasize that the research studies the interface, not the students, and that there is no likelihood of any harm to a participant. The study will be supervised by teachers, parents and the research team member who conducts the study and follow-up interview.

6. FURTHER STUDY NEEDED

The current phase of this project only encompasses the usability study referenced above in Section 5.1. Continuing with the other types of research described herein depends on analysis, in consultation with AILLA, of the initial results from the usability study to determine whether the project merits further study. The formative research proposals described above, including the teacher surveys, contextual analyses of classroom bilingual education classes and Internet cafes, and interviews with selected teachers, would enable the research team or other researchers to further refine user characteristics and their and other stakeholders' needs leading to appropriate adjustments to the prototype. The proposed summative research would evaluate whether the prototype achieves the ultimate goal set forth above.

If the project is pursued beyond initial usability testing, the researchers have identified two possible directions for enhancing functionality: (1) educational and (2) social networking uses. The curriculum of bilingual Kuna education in schools is in its initial planning stages and incorporating the Web site into some of the lessons is probably optimistic. On the other hand, social networking is very popular among teens using the Internet. Additional research could suggest a model for incorporating into the interface a means for Kuna teens to interact socially using chatting, blogging and creating personal profiles to promote learning more about Kuna culture while increasing language use.

The researchers have also identified a need to gather more information, if any is available, about the effects of indigenous Web-based access to and use of archival materials on the survival of endangered languages. There appears to be little written on the question of whether or to what extent such access and use enhances the language learning process.

Further research will need to be conducted to determine the optimal delivery method for the digital audio recordings on the Web site. For example, and assuming that the project is successful and becomes a model for other indigenous groups, should AILLA materials be served locally from each language Web site, or pulled from a central AILLA database? Depending on how files are served and whether Web site usage translates into increased usage of the original AILLA site, AILLA may need to maintain statistics reflecting any increased usage of their recordings referred from the Web site in order to plan for such continued use and any necessary support.

7. CONCLUSIONS

This paper has discussed the process of designing a research project and its goals, the creation and iterative development of a Web-based user interface enabling the Kuna people to take advantage of AILLA materials. The researchers actually design a

prototype and evaluate its effectiveness in relation to accessibility and usability. While the research project is designed to demonstrate the validity of the prototype, it will require further refinement and research to be useful in actual indigenous settings.

The impending loss of an indigenous language creates a challenge that many believe can and must be addressed. In this regard, by focusing on students and their everyday use of their indigenous language in a simple Web interface, this prototype may be a part of a successful effort that other indigenous peoples can build upon in the future.

8. ACKNOWLEDGMENTS

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