

## E-Learning in Endangered Language Documentation and Revitalization

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This paper analyzes the application of e-learning in the revitalization of endangered languages. It outlines the areas in which e-learning is efficacious, the attitudes of the indigenous language teachers to e-learning, the feelings of the Yami community toward this kind of pedagogy, and the reactions of the users, mostly young and adolescent learners of Yami. The findings are based on the results of surveys and in-depth studies in the Yami community and also on surveys made in a nation-wide seminar that enrolled teachers of the majority of the still-spoken aboriginal languages in Taiwan. Both qualitative and quantitative methods were used to gather empirical data to address questions in the following three areas: (1) the contexts of developing e-Learning materials for endangered indigenous languages in Taiwan, (2) the indigenous language teachers' perceptions of e-Learning in Taiwan, and (3) the attitudes of the Yami community on Orchid Island toward e-Learning. This paper provides a model for the many language revitalization projects underway in Taiwan and worldwide to take advantage of e-Learning. It also provides guidelines that enable each project to better understand the kinds of e-Learning that work best and the type of community outreach necessary to make e-Learning acceptable and efficacious.

**1. INTRODUCTION.** Language documentation has long been recognized as an effective means of language preservation. However, very little effort has been made to explore how information and communication technology (ICT) can be used in the promotion of minority language teaching and research in connection with language documentation.

In our previous studies, a conceptual framework has been developed for integrating e-Learning (computer-based instruction) into language documentation (Yang and Rau 2005). In this framework, as shown in Figure 1, language documentation and e-Learning programs are two separate modules. The language documentation module has two phases: preparation and digitalization. The e-Learning program module also has two phases: program development and program deployment. Each phase has two to three conceptual sub-phases representing the work to be completed. Below the two modules are the three groups of participants in this framework. Each group of participants has their own domain of knowledge and assigned tasks. We are using this framework to document and produce e-Learning materials for the Taiwanese aboriginal language Yami.

Rau and Yang (forthcoming 2008) have also identified three groups of participants and illustrated how they could collaborate to develop Yami e-Learning materials. The process of developing e-Learning materials for Yami is described in the framework of nexus analysis. The targeted learners are university students, focusing primarily on graduate students who are interested in Taiwanese local languages and cultures, with the potential of extension to Yami community members who are two or more generations removed.

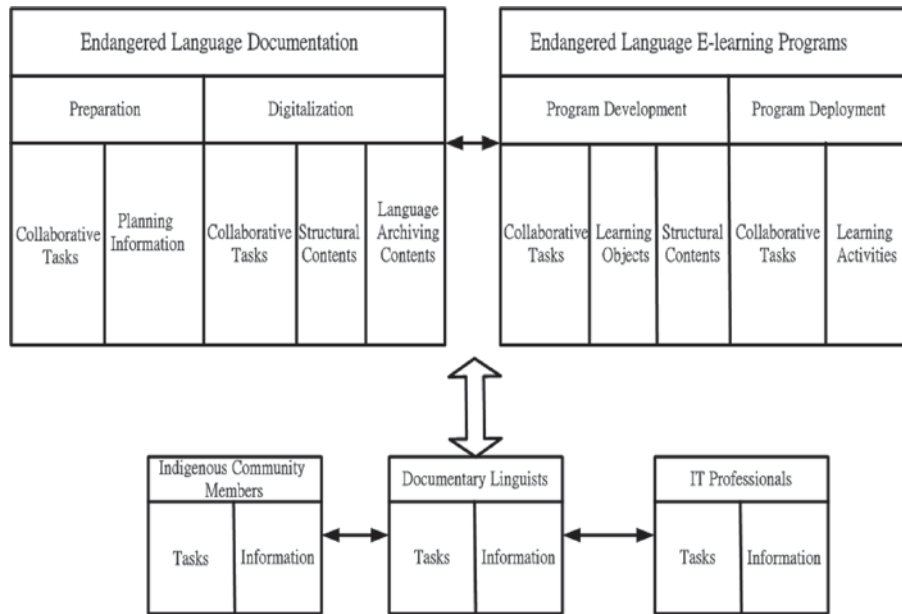


FIGURE 1. Framework for Endangered Language Documentation and e-Learning Development

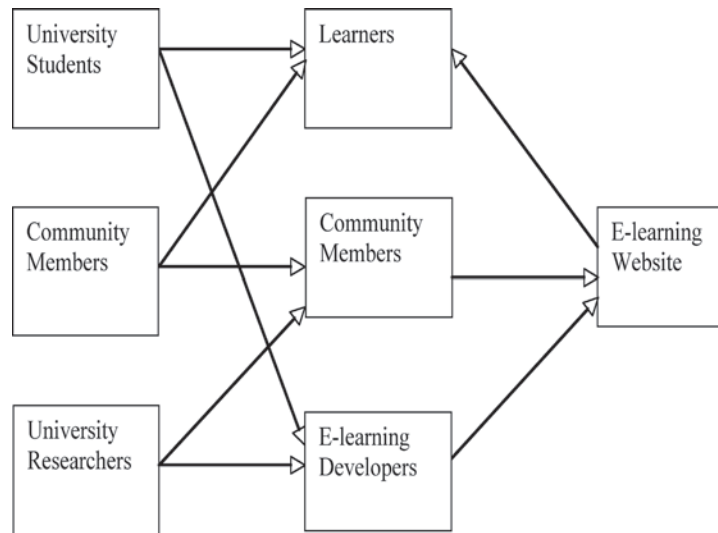


FIGURE 2. Participants in Yami e-Learning (adapted from Ward and van Genabith 2003)

**Yami Language Learning Center**

Providence University

中文 English Home

Beginner Intermediate Advanced Dictionary Learning Grammar

**User's Learning Log**

You have to Log in before using this feature.

Account

Password

**Sub menu**

[Text](#)

[Grammar](#)

[Activities](#)

[Demonstrate](#)

[Exercise](#)

**ipiminaminasi Greetings**

Sompo (So) and Masaray (Ma) are college classmates. After they had just graduated in June, Sompo took Masaray on a trip to Orchid Island. When they get to Sompo's home, they greet her mother.

Reading:

So: ina kong.  
Good morning, mom!

In: ákokay, kagagan mo o ito?  
Hello! Is this your friend?

So: nóhon, sí kavakes ya.  
Yes, she is my female friend.

FIGURE 3. The e-Learning platform for the Yami language

The community members were brought into the picture through many initiatives of the researchers to facilitate continued partnership of the community members with the research team.

The university researchers are primarily content providers and e-Learning developers, with the potential goal of becoming learners. The three major figures consist of an applied linguist who did extensive research on Yami, a computer scientist with an expertise in digital archiving and e-Learning, and a native Yami who had knowledge and experience in linguistic analysis and Yami language teaching.

As shown in Figure 2, each participant serves at least two roles in the process.

In rethinking pedagogical models for e-Learning, Rau, Yang and Dong (2007) provided a historical account of Yami language teaching, from a grammatical syllabus (Dong and Rau 2000) to a communicative syllabus using a multimedia CD as a resource (Rau et al. 2005), to the development of interactive on-line learning based on our digital archiving project, as illustrated in Figure 3.

The technology of e-Learning has dramatically changed the genre of the language textbook, the context of language teaching and learning, and the traditional roles of language teachers and learners. The key benefits of e-Learning, such as the ability to meet individual learning needs, access a wider range of resources, and be exposed to multimedia materials, including both images and sounds, are particularly useful for the design of teaching materials for less commonly taught languages and/or endangered languages, since such textbooks are not readily available and are extremely costly to produce. However, little research has been conducted to explore the potential benefits of e-Learning for the promotion of endangered language revitalization.

Some researchers seem to be optimistic and try to integrate traditional cultural patterns into the development of learning materials (e.g., Csató and Nathan 2003), whereas others tend to have reserved attitudes and reported resistance from the local communities (e.g., Villa 2002). Of course, these studies have different participants from different geographical areas and cultural backgrounds. The attitudes of the indigenous people toward the Internet and e-Learning technology are hard to generalize. Based on our framework, the attitude of the language teachers is critical when developing e-Learning programs for the endangered languages. When an e-Learning development project is initiated in an indigenous community, a mutual understanding should be established. During the development and deployment of the e-Learning program, a retrospective review regarding the effectiveness of the e-Learning program should be obtained. However, very little research has explored indigenous teachers' attitudes towards e-Learning and the results have not been very positive.

Eisenlohr (2004) reported that some researchers faced resistance from the local community, who questioned the appropriateness of creating and distributing digital archives of the endangered languages. The indigenous peoples may think of the creation and online publication of such an archive as a threat to their own language (Villa 2002). In addition, the fact that very few indigenous people have the capability to use and manage the computer software to document their own language is another major obstacle. Researchers could face the difficult situation of not being able to contribute to language revitalization at all after documenting an endangered language.

In contrast with other endangered language communities where a solid Internet infrastructure is usually lacking, Taiwan has the highest number of digital households in the world (PARKS 2005), followed by Korea and the USA, and is ranked thirteenth in the world in individual, business, and government uses of information communication and technology (WEF 2007). In 2002, the Taiwanese government also launched 77 national e-Learning plans to promote e-Learning environments for academic and scientific research, to narrow the gap of the digital divide (less Internet access east of the central mountain range), and to advance the development of mobile learning and industrial markets (Liou 2005).

In indigenous communities in Taiwan, students can access the Internet and surf the web at school. However, the indigenous language speakers and language teachers over 50 years of age have limited knowledge of the Internet and computers. Thus the primary question becomes whether they are willing to use the computer and e-Learning as a tool for language revitalization?

The major focus of this paper is to provide a summative assessment of the impact of our e-Learning materials, funded by the Hans Rausing Endangered Languages Project, for the purpose of endangered language documentation and revitalization. The research questions for this study are as follows:

1. What are the contexts of developing e-Learning materials for endangered indigenous languages in Taiwan?
2. What are the indigenous language teachers' perceptions of e-Learning in Taiwan?
3. What are the attitudes of the Yami community on Orchid Island toward e-Learning?

Both qualitative and quantitative methods were used to present empirical data and interpretations of our assessment of e-Learning. We begin with a general introduction to the Yami community and their languages, followed by a critical evaluation of the continua of biliteracy (Hornberger 2003) in Taiwan as the background for language documentation and e-Learning for endangered languages. The second half of the paper presents two studies on evaluation of our proposed framework and the e-Learning program. The first study is a quantitative analysis of the indigenous teachers' perceptions of e-Learning in Taiwan. The second study is a description of the results of our interviews with Yami community members regarding their attitudes towards e-Learning.

**2. SOCIOLINGUISTIC BACKGROUND ON YAMI.** Yami is a Philippine language, spoken by approximately 3000 speakers on Orchid Island, located at the northern tip of the Batanes Province of the Philippines. Yami is a Batanic language, closely related to Itbayat, Ivatan, and Babuyan. Politically part of the territory of the Republic of China, Mandarin Chinese is the official language.

According to Rau (1995b), Yami constitute 93% of the 3007 residents on Orchid Island. Almost half of the population on the island is either above 50 or below 20 years old. Young adults usually seek employment in Taiwan. Yami people above 60 years of age are mostly monolingual in Yami, whereas those below 20 consider Mandarin Chinese their L1 and Yami their L2 (Chen 1998). Young adults code-switch between Yami and Chinese in communication. Iraralay is the only community of the six villages on the island where children still use Yami for daily interaction (Lin 2007). Two Yami dialects, Iraralay and Imowrod are mutually intelligible with some lexical differences and systematic vowel changes (Rau, Chang and Dong, forthcoming). The more conservative Imowrod dialect is used as the basis for standard orthography.

Although Yami has been offered as an elective in elementary school since 1998, Yami is gradually being replaced by Mandarin Chinese in daily use. Among the junior high school students on Orchid Island, 60% either believed Yami would die eventually or were uncertain about the fate of the language (Rau, 1995b)

Adult speakers use both Chinese and Yami in daily communication. The medium of education in schools is exclusively Chinese. Yami is used primarily in Christian church services and traditional ceremonies. Translation of the New Testament of the Bible into Yami was completed in 1995. There is a locally run radio station on the island, managed by a Christian organization, broadcasting programs in Chinese and Yami.

Three different orthographies have been proposed, all based on Roman alphabets with minor differences in the representations of trill vs. flap and glide vs. vowel. One is used in the newly translated Bible, developed in collaboration between SIL missionaries and local pastors. The second was announced by the Council of Indigenous Peoples in 2005 in an effort to standardize the writing systems of all Austronesian languages in Taiwan. The third was jointly developed by Dong and Rau during their collaboration and used in their texts, teaching materials, and Yami dictionary (Rau and Dong, 2006). Except in the teaching of Yami language in primary and secondary school and teacher training workshops, Yami orthography is not in general use by anyone in the speech community. The community has various degrees of literacy in Chinese (95%) while the most educated (less than 1%) are also literate in English (Rau, 1995b).

**2.1. CONTINUA OF BILITERACY.** The factors influencing biliteracy in Taiwanese society, dominated by the Mandarin and Southern Min Chinese dialect speakers, are very different from those in the indigenous communities. In this section, we examine the power relations of the language communities in Taiwan, based on Hornberger and Skilton-Sylvester's (2003: 39) model. To introduce e-Learning into an endangered indigenous language community, we need to be aware of the context, development, content and media of biliteracy in the indigenous communities in Taiwan.

Context of biliteracy: Indigenous communities in Taiwan are oral monolingual in their ethnic tradition but monoliterate in Mandarin Chinese.

Development of biliteracy: Development of indigenous language literacy is considered second language acquisition for teenagers living in their own communities and foreign language acquisition for those living in metropolitan areas.

Content of biliteracy: Textbooks on indigenous languages are mostly decontextualized and not considered authentic.

Media of biliteracy: Successive exposure to the Roman alphabet to access indigenous language literacy is more analogous to learning English as a foreign language than learning Chinese characters as a national language.

**2.1.1 CONTEXT OF BILITERACY.** The most desirable biliteracy in the Taiwanese society for the past two decades has been Chinese and English with the two writing systems, i.e., ideographic vs. alphabetic, clearly distinguished and equally valued. Other local languages are trying to gain status by standardization of scripts. However, the Chinese and Austronesian languages seem to have chosen different paths for orthography planning (Rau 1995a). Since a type of syllabic symbols (*bo-po-mo-fo*) has been used as a phonetic scaffolding for learning Chinese characters in Mandarin for over fifty years and has gained popularity as a major keyboarding system for computer literacy in Taiwan, any attempts to use Roman alphabets for orthography planning experienced tremendous difficulty until the last few years as English gained unprecedented popularity in Taiwan.

Other Chinese dialects (i.e., Southern Min and Hakka) have adopted a dual system with the Roman alphabet serving as phonetic symbols to facilitate language learning while Chinese characters are still used in formal writing. The Austronesian languages, on the other hand, have adopted only the Roman alphabet for orthography.

Compared to the socially dominant Chinese-English biliteracy communities in Taiwan, the Yami society on Orchid Island has only recently adopted the Roman alphabet for their orthography, since the publication of the New Testament in 1995. The older generation, above sixty years of age, tends to associate the Yami language with oral tradition, but is open to the promotion of literacy in Roman alphabets by Christian churches locally, whereas the younger generation is literate in Chinese characters only and is struggling to maintain their Yami language. As mentioned previously, with the exception of the village of Iraralay, the Yami teenagers no longer consider themselves proficient Yami speakers, according to the results of three sociolinguistic surveys over the past ten years by Rau



(1995b), Chen (1998), and Lin (2007). As a result, introduction of the Roman alphabet did not enhance Chinese-Yami biliteracy, although it has been viewed as conducive for English literacy.

While Internet infrastructure is well-established in Taiwanese society to support word processing and information search in Chinese and English, it is restricted to half of the villages on Orchid Island, where the language shift from Yami to Mandarin is most progressive.

In contrast to many other indigenous communities in the world as described in Hornberger (2003), the less “powerful”<sup>1</sup> communities in Taiwan are monolingual in a vernacular, whereas the more “powerful” communities are bi(multi)lingual, with one of them being the official language. As indicated in Rau (1995b), the most desirable language ability on Orchid Island is Chinese-Yami bilingual rather than either Chinese monolingual or Yami monolingual.

**2.2 DEVELOPMENT OF BILITERACY.** Children of the Taiwanese society are instructed to have productive skills in Chinese-English biliteracy. Chinese handwriting and word processing abilities are both necessary to function as an educated person in Taiwan. The development of English literacy (including English computer literacy) has followed the same development pattern of Chinese literacy by introducing the English alphabet early in pre-school and kindergarten. The model of teaching English to children in Taiwan actually parallels an English L1 language arts model. Native English speaking teachers are favored over non-native English teachers. Phonics is used to help children learn to read in English.

In Yami society, on the other hand, Chinese literacy is introduced as L1, whereas Yami literacy is taught in Chinese as an L2 subject for only one period of 40 minutes each week. As most children do not speak Yami as an L1, ethnic language teachers tend to emphasize receptive and oral skills. Yami orthography is downplayed, as authentic reading materials in Yami are lacking. In an Indigenous Language Proficiency Test indigenous junior high and high school students are required to pass in order to receive extra credit to enter the next level of schooling, the beginning level only tests listening and speaking abilities.

The development of biliteracy in Taiwan has the L1 and L2 models reversed for the less powerful and more powerful communities. In other words, instead of following an L2 model in teaching English as a second language to Chinese children in Taiwan, the addition of English literacy in the Taiwanese society tends to follow an L1 model. In addition, instead of teaching Yami or any other Austronesian languages as a first language in the indigenous communities, the addition of Yami literacy on Orchid Island tends to follow an L2 model.

**2.3. CONTENT OF BILITERACY.** The content of biliteracy in the Taiwanese society is geared toward the Chinese and increasingly American English majority literary culture, transmitted in multimedia on the Internet, whereas the Yami content of biliteracy focuses

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<sup>1</sup> The term “powerful” follows Hornberger (2003), referring to politically, socially or linguistically dominant groups.

on the minority vernacular, which is highly influenced by Chinese and Japanese cultures. Children on Orchid Island primarily use the Internet for playing computer games rather than for building Yami literacy.

Once again, in contrast to Hornberger's model in which the content of biliteracy in the less powerful society is contextualized while it is decontextualized in the more powerful society, the Taiwanese case demonstrates the opposite. In other words, in the acquisition of English, the content is required to be "contextualized" and "authentic" for communicative needs. On the other hand, the content of online indigenous language textbooks for both elementary and junior high school students ([http://www.alcd.nccu.edu.tw/index\\_0.html%20](http://www.alcd.nccu.edu.tw/index_0.html%20)) is mostly "decontextualized," with direct translation from Chinese.

**2.4 MEDIA OF BILITERACY.** The media of biliteracy in the Taiwanese society have become increasingly similar and convergent in terms of their language structures and scripts, respectively, due to early exposure, or in many cases, simultaneous exposure to English. On the other hand, the successive exposure to Yami literacy is viewed as dissimilar and divergent from the Chinese structures and character writing to which they are exposed very early in life.

So far we have presented a critical evaluation of biliteracy continua of Chinese majority and Austronesian minority languages in Taiwan. This description has provided the context in which the e-Learning materials for the indigenous people in Taiwan are being developed.

One thing that is worth mentioning is that although the speakers of minority languages are not always positive towards the revitalization of their languages, nor are they always interested in participating in such activities, revitalization of the aboriginal cultural and linguistic inheritance of Taiwan is well supported by the Taiwanese governments, central and local.

**3. E-LEARNING PERCEPTIONS OF INDIGENOUS LANGUAGE TEACHERS IN TAIWAN.** In previous studies, the effectiveness of the e-Learning materials in Yami has been tested in a university classroom setting and assessed by Rau et al. (2007) and Yang (2007). However, no data were collected to reflect the attitudes of the indigenous people on the applicability of such a program to their individual community.

**3.1. CAN E-LEARNING CONTRIBUTE TO LANGUAGE REVITALIZATION?** In this section, we present data from a survey we conducted after a training workshop on literacy for indigenous language teachers in Taiwan to answer the question of local teachers' perceptions of the usefulness of e-Learning for language revitalization. Could the digital archiving of the endangered language be transformed into a useful tool for language revitalization? What are the indigenous teachers' impressions of the digital archive and e-Learning materials?

We conducted a pilot study consisting of informal interviews with several Yami participants at the Seminar on Language Revitalization on Orchid Island that we organized in April 2006. In that seminar, we asked a Yami tribal elder whether it is appropriate to use the web pages and animations to teach the Yami language. We received a very positive response from him. Therefore, the second author began to work with his students to produce



four episodes of Yami animation for our documentation project, the results of which will be discussed in Section 4. The opinions gathered from the Yami participants were further incorporated into the questionnaire on perceptions of e-Learning for indigenous languages that we designed for the current survey to explore if other indigenous groups have similar needs.

**3.2. INSTRUMENT AND PARTICIPANTS.** Our questionnaire (see Appendix 1) consists of ten question items, divided into four sections. The first section deals with the participants' attitudes toward the usefulness of computerized materials in language learning and the participants' knowledge of the Internet and e-Learning. The second section aims to determine their willingness to produce e-Learning materials with suitable assistance, and the type of materials they could produce. In the third section, the participants were asked if they would be willing to use e-Learning programs to teach their native languages. At the end of the third section, there was an open-ended question to discover potential problems of using e-Learning as teaching materials. The fourth section contains demographic information and self-evaluation of their native language ability.

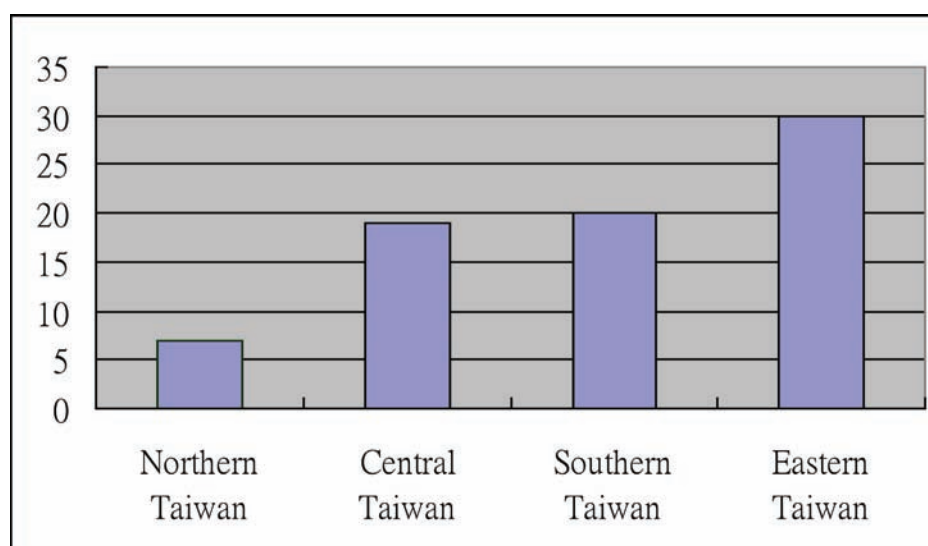


FIGURE 4. Geographic distribution of the participants

The questionnaire was administered to a group of 80 participating indigenous language teachers who were selected by the Council of Indigenous Peoples to represent all the indigenous language groups at a Training Workshop on literacy held at National Taiwan Normal University from November 22-24, 2006.

Before the survey, we gave an introduction to the Yami e-Learning program developed by our team at Providence University. In addition, a printed copy of our e-Learning program was distributed to each participant. We also asked permission and received consent from each to fill out the questionnaire.

All of the participants identified themselves as language teachers of their tribes. Seventy-nine participants turned in their questionnaires and 76 participants completed all questions. We used these 76 completed forms for data analysis.

The participants represented 14 language groups from 57 different villages. Five participants were living in cities away from home. The geographic distribution of their villages is shown in Figure 4, with the majority from Eastern Taiwan, followed by Southern and Central Taiwan. Less than 10% came from the Northern area. Over 60% of the participants responded that they were fluent in their native languages and had chances to speak daily.

### 3.3 SURVEY RESULTS.

**3.3.1 ATTITUDES TOWARD USEFULNESS OF COMPUTERIZED LEARNING MATERIALS IN LANGUAGE LEARNING.** Over 77% (N=59) of the teachers indicated that they agreed or strongly agreed that computerized learning materials are helpful in learning their native languages (Figure 5 and Table 1), while 17% (N=13) disagreed or strongly disagreed. Based on a cross-tabulation analysis, the teachers who expressed negative attitudes toward e-Learning also indicated that they had a problem with computer literacy.

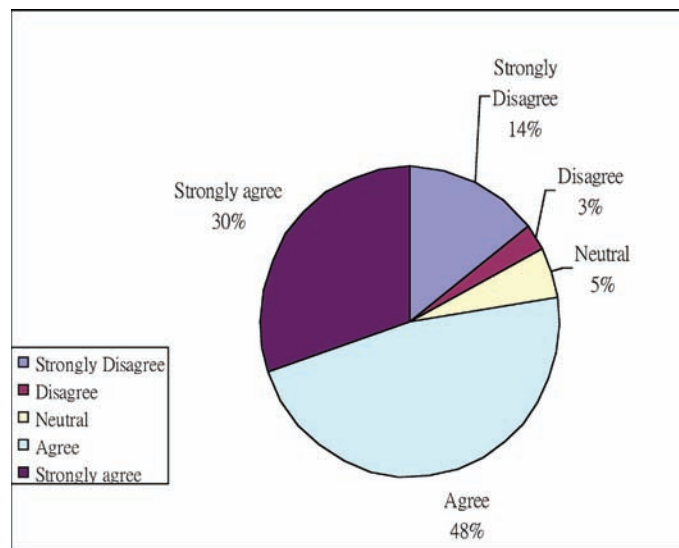


FIGURE 5. Distribution of categories from Table 1

TABLE 1. Computerized learning materials are helpful in learning the native language

Indicator	Number of Participants	Percentage
Strongly Agree	23	30%
Agree	36	47%
Neutral	4	5%
Disagree	2	3%
Strongly Disagree	11	15%
Total	76	100%

The majority of the participants (94%) also responded that computerized learning materials would be helpful for the young people to understand the traditional tribal cultures. Even members of the group which disagreed with the usefulness of e-Learning in language learning agreed that it is helpful for young people, as shown in Table 2.

TABLE 2 Computerized materials are helpful for the young people

Groups in Table 1	# of Participants/Total Participants in the group	Percentage
Strongly Agree	23/23	100%
Agree	34/36	94%
Neutral	2/4	50%
Disagree	2/2	100%
Strongly Disagree	11/11	100%

**3.3.2 TYPE OF MATERIALS THAT COULD ATTRACT YOUNG PEOPLE'S ATTENTION.** This section reports the participants' perception of the type of computerized learning materials that could attract their young people's attention. Among the five types of

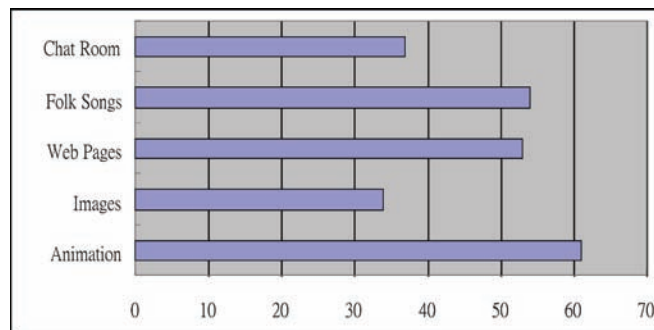


FIGURE 6: Type of learning materials that attract young people's attention

e-Learning materials listed (i.e., images, animation, web pages [text]<sup>2</sup>, folk songs and chat room), participants could choose any and all relevant types of learning materials which they considered could increase the interest in learning for their language. As shown in Figure 6, most participants picked animation, followed by folk songs and web pages. This result reveals that animation is an important topic in teaching young people to learn the indigenous languages.

**3.3.3 CONTENTS OF E-LEARNING.** When the indigenous language teachers were asked if they would be willing to try to create the contents of their own e-Learning programs with the help of the research team at Providence University, 90% (N=69) said yes, they would like to try to do this. Of the five categories of contents listed as choices to put in their future e-Learning programs (i.e., daily conversations, indigenous knowledge, ceremonies, legends, and basic skills), the top two selected by the most participants were

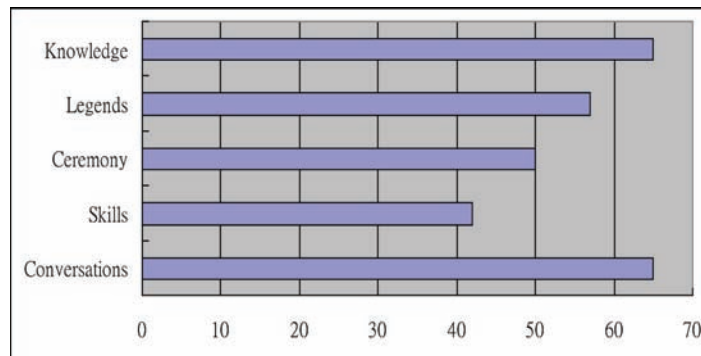


FIGURE 7: Favorite Contents of the e-Learning programs

indigenous knowledge and daily conversations, although the other three were also considered important by the majority of the participants. As illustrated in Figure 7, the majority of the tribal teachers consider that indigenous knowledge and daily conversations should be included in developing their own e-Learning programs.

**3.3.4 TEACHING INDIGENOUS LANGUAGES WITH E-LEARNING PROGRAMS.** When the participants were asked if they would be willing to use e-Learning programs to teach the indigenous languages should there be suitable e-Learning materials, 92% (N=70) responded “yes.” Furthermore, we asked them to indicate the types of content to be included in the e-learning programs that would be helpful for teaching. Among the five listed functions (i.e., grammar, online dictionary, demonstration of language use, online test, and online practices), the majority of teachers chose online dictionary and demonstration of language use, as shown in Figure 8.

<sup>2</sup> The original survey used the Chinese term for ‘web pages,’ which could include all the other categories, but our intent was to indicate text, which would have been clear to the respondents.

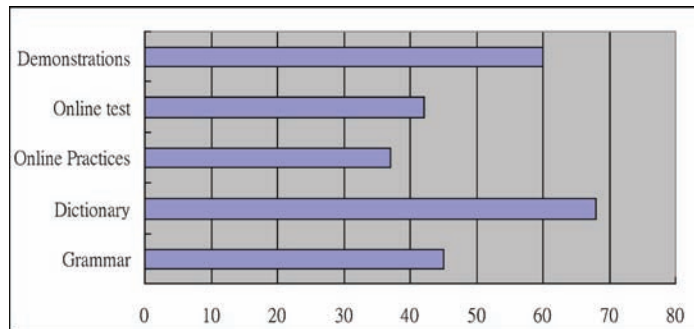


FIGURE 8: Type of e-Learning functions useful for language teaching

**3.3.5 TYPE OF SCHOOL MOST SUITABLE TO IMPLEMENT E-LEARNING.** Finally, we also asked what schools were most suitable to use the e-Learning materials. The majority responded that e-Learning could be implemented at all levels of schools in Taiwan, as shown in Figure 9.

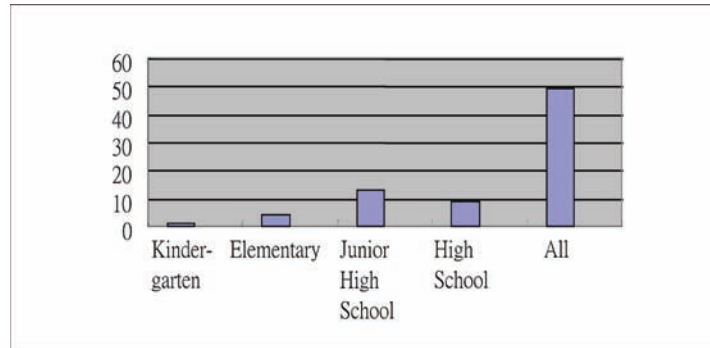


FIGURE 9: Which schools are suitable for use of the e-Learning materials?

**3.4 GEOGRAPHICAL DIFFERENCES.** To further analyze if geographical differences in Taiwan might contribute to different attitudes toward e-Learning, we used the following variables to build a correlation table:

- a. The value for geographic distribution of the indigenous teachers ranges from 1.1 to 4.4 based on living area, with weights for different townships. For example, if the teacher lives in northern Taiwan, s/he could have a weighted factor ranging from 1.1 to 1.4. This value was assigned the label ‘a’ for correlation analysis.
- b. The value assigned to the four statements “E-learning materials are helpful for learning indigenous languages,” “E-learning materials are interesting to the young people,” “I would like to try to create the e-learning materials with the assistance

from the research team at Providence University,” and “I would like to try to use e-learning materials for teaching” ranged from 0 to 1 depending on their answer; a positive answer being 1.0 and a negative answer 0, with the weight adjusted according to their self-description of language fluency. These values were assigned the labels b-e, respectively, for correlation analysis.

The correlation table (Pearson  $r$ ) is shown in Table 3. We found that the  $r$  of a\*d is much weaker than the others. This indicates that indigenous teachers in different areas have different attitudes toward creating their own e-learning materials. This can be attributed to the sign of ‘digital divide’ in eastern Taiwan, where access to the Internet is far more limited than in other sections of Taiwan.

TABLE 3 Correlations based on the geographic distribution

Variables	Pearson correlation coefficient	df
a*b	0.403	76
a*c	0.560	74
a*d	0.082	76
a*e	0.608	75

**3.5 DISCUSSION.** The results of the survey indicate that developing e-Learning materials for indigenous language teaching and learning is highly acceptable and strongly supported by the indigenous language teachers in Taiwan. It can be implemented at all levels of schools in Taiwan. However, the problem of the digital divide in eastern Taiwan needs to be addressed before e-Learning programs can be launched in all indigenous communities.

The majority of teachers still perceived e-Learning as most useful for providing resources, e.g., providing texts, dictionary, and grammar rather than using it for online practice and online tests. This attitude indicates that training workshops on how to use e-Learning materials should be conducted before the advantages of e-Learning can be fully realized. Furthermore, it is important to publish indigenous language dictionaries online and transform traditional textbooks containing conversations, grammatical explanations, and cultural information into multimedia format online. This indicates the importance of building a team consisting of a linguist, an IT professional and an indigenous language teacher to establish such a program, as proposed by Yang and Rau (2005) and Rau and Yang (forthcoming 2008).

Finally, animation based on indigenous languages and cultures should be widely exploited for language revitalization as it is considered the best tool to attract the attention of young indigenous people to learn their own languages. This will be discussed further in Section 4.

#### 4. ATTITUDES OF THE YAMI COMMUNITY ON ORCHID ISLAND TOWARD E-LEARNING.

**4.1 FEEDBACK FROM YAMI TEENAGERS.** In this section, we summarize results from two recent MA theses supervised by the authors. The results of a qualitative study



on the Yami teenagers' attitudes toward the animation productions will be discussed in the next section. First, a word on Yami teenagers' use of Internet is in order.

When we visited Orchid Island in April 2006, we found that Yami students on the island are just as attracted to the Internet as are Chinese students in Taiwan. However, most of the web pages they visited are in Chinese. There are very few Yami websites. This observation inspired us to investigate the teenagers' attitudes toward the Yami language websites we developed, when they finally had a chance to view them. This specific question was investigated in the two MA theses by Lin (2007) and Yang (2007) in their studies on Yami language vitality and Yami e-Learning, respectively.

According to Lin (2007), setting up a Yami documentation website was ranked by 117 Yami teenagers as the third most efficient way for maintaining Yami language, preceded by encouraging Yami people to speak the language and promotion of ethnic language education at school. They expressed equally high positive attitudes toward our Yami documentation and e-Learning websites regardless of their Yami language proficiency. In general, they were more interested in the Yami e-Learning websites than the documentation one because they found the former useful for learning Yami following the easy-to-difficult materials.

Yang (2007) in her needs analysis of our e-Learning program found that the third year junior high school students on Orchid Island had more positive evaluation of our websites than did younger students. She claimed that the reason might be that they had pressure to pass the test of "certification of indigenous languages" so that they could get the 35% bonus points in the Basic Competence Test, a High School Entrance Examination. Beyond the current online indigenous language textbooks for both elementary and junior high school students, endorsed by the Ministry of Education,<sup>3</sup> our websites are probably the only resources available for test preparation covering all four language skills in Yami (listening, speaking, reading and writing). Furthermore, Iraralay teenagers, the only competent young Yami speakers on the island, expressed more willingness to use the e-Learning materials to study after school than those in other villages. Overall, the teenagers suggested that animation, films, and pictures would be the three elements on a website most likely to attract their attention. They expressed that the greatest learning difficulties they have are Yami vocabulary and spelling and suggested that our website add two sections, (1) introducing vocabulary with pictures and (2) providing dictation and typing games to practice spelling.

Since animation was mentioned by both indigenous language teachers and Yami teenagers as the most desirable component in e-Learning, we instructed a group of undergraduate computer-science majors to develop a set of animations to accompany each lesson and exercise of our e-Learning program. They were created under the instruction of the authors. The students were first given information about the Yami language and culture before they were asked to design six cartoon-style characters for the animation. All the characters speak Yami. The animations were made using Flash MX and ranged in duration from 30

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<sup>3</sup> The online indigenous language textbooks for both elementary and junior high school students are available from ([http://www.alcd.nccu.edu.tw/index\\_0.html%20](http://www.alcd.nccu.edu.tw/index_0.html%20)), the contents of which are mostly "decontextualized" with direct translation from Chinese

seconds to 1 minute and 30 seconds. These animation productions were taken to the high school on Orchid Island by two project team members in January 2007. Six Yami students were interviewed and asked to express their opinions.

The two authors also instructed a second group of computer science majors to create four animated stories based on the famous Yami legends of Mr. Paloy and organized two animation dubbing contests, in Yami and English. The following sections describe the feedback of these initiatives.

#### **4.2 FEEDBACK ON ANIMATION AND ITS USE IN LANGUAGE LEARNING.**

The interviews with six high school Yami students were conducted in two stages. First, they were instructed to watch at least three of the four Yami animation productions (<http://yamiproject.cs.pu.edu.tw/yami/corpus7.htm>). After they finished, each student was asked to fill out a questionnaire with six questions (see Appendix 2) related to their impressions of these animated characters and the usefulness of animation in Yami language learning.

The results indicate that most students agreed that animation would be helpful for them to learn the Yami language. Four students responded that they fully accepted the style of presentation in the animation while the other two responded that although the animation did not match the local style, they could still accept it. However, when the students were asked if Yami living and cultural items could be transformed to animation to reflect authentic Yami lifestyle, their opinions were divided. Three said yes but the other three had reservations, saying that they needed to see the film production first before they could judge.

Overall, these students expressed positive attitudes towards the animation. We asked them to choose one character that they liked and one that they disliked in the animation. These students picked out two characters that they disliked. One character had darker skin than the Yami people and the other had a timid voice. In addition, two students said they hoped the characters in future animations could speak more naturally, like real conversations.

#### **4.3 FEEDBACK ON ANIMATION DUBBING CONTEST ON THE LEGENDS OF**

**MR. PALOY.** The second set of animations was used as a tool for language revitalization and raising visibility of an endangered language. In response to the Yami elders' call for developing animated stories about their culture, we organized an animation dubbing contest on April 28, 2007 on Orchid Island. Although our intention was to attract teenagers to form teams to compete in this event, we actually succeeded in scaring everyone away from this because the adults were afraid of advanced technology and the youngsters were afraid of speaking Yami. We finally decided to invite the four judges, a friend of a judge and our Yami project consultant Maa-neu Dong to form two teams, with three people in each group dubbing two stories in Yami. One judge at the beginning was reluctant to try it and insisted that the legends of Mr. Paloy were only told by the Iratay and Imowrod villages, so she could not even make up the story lines. However, after she joined a team and tried a few times, she completely changed her mind.

They first watched the animated stories several times. One chose to read the Chinese translations of the Yami scripts that Dong had written for the four stories. After practicing a few times with their own team, they gradually realized it was only a simple role-play of a locally familiar theme. Finally, each team finished recording two trials of each of the two

animated legends within half an hour. When they finished the task, they sat around to reflect on their impressions. They were surprised by their positive attitudes toward this creative effort. One of the judges, who had been in charge of implementing language revitalization initiatives in Iraralay, decided to incorporate this tool into future Yami speech contests.

Meanwhile, we also organized an English animation dubbing contest in the Department of English Language, Literature, and Linguistics at Providence University as a special part of the annual English festival, this year featuring endangered language revitalization. Using the same animation of Mr. Paloy and applying the same regulations, we attracted five teams to sign up, mostly freshmen and sophomores. The participants prepared the English script for their assigned animation ahead of time, either individually or as a group. The contest was held on campus on May 17, 2007. The participants role-played in English to the animation with Chinese subtitles by reading their own scripts and playing their sound effects in front of the audience and three judges. Two awards were given based on their performance in English. This event has stimulated great interest within the department and has become integrated into the program of future English festivals.

**4.4 DISCUSSION.** The animation dubbing contest was found to be a potentially useful tool for language revitalization because it fits the models of biliteracy in both communities. Dubbing in Yami matches the monolingual oral tradition of the Yami community and thus will attract attention from both adults and children, while reading the English script to dub the animation with Chinese subtitles matches the biliteracy in the Taiwanese community and also increases visibility of the language and culture of an endangered language.

An effective way to develop useful animation for indigenous language revitalization is for indigenous language teachers to collaborate with computer science teachers. After a set of animations are created to fit the script of a popular indigenous legend, a dubbing contest can be held in the community to select the best version or versions to go online.

We expect a polished product of animation in an indigenous language with subtitles in either Chinese or English will attract not only indigenous children who spend long hours playing computer games in their villages but also Taiwanese children who are eager to learn English by watching cartoons. The increasing visibility of an indigenous language on the Internet will lead indirectly to language revitalization.

**5. CONCLUSION AND SUGGESTIONS FOR DEVELOPMENT OF E-LEARNING PROGRAMS.** This study is a summative assessment of the usefulness of e-Learning in language documentation and revitalization. We began with an analysis of the power relations according to the continua model in Taiwan and Yami communities. We found Yami literacy was analogous to foreign language acquisition for Yami teenagers. The only impetus for them to use our e-Learning materials currently is for test preparation.

Although the attitudes among the indigenous language teachers toward creating e-Learning materials with the help of an experienced team were generally positive, a digital divide is still apparent on the east coast of Taiwan. Overall, most indigenous language teachers were not familiar with new technology and required technical assistance.

We also found that the existing e-Learning tools can be useful for technology-integrated teaching programs. Of all the available tools, the indigenous language teachers showed most interest in using the (1) online dictionary, (2) online audio or video clips on daily conversations and indigenous knowledge, and (3) online animation in developing their own course materials.

The online dictionary should have a Chinese interface, a dynamic visual presentation with rich sounds and images of phonetic and text explanations for each vocabulary item, and intelligent search functions that can assist teachers and students to find the correct words or phrases. Furthermore, in addition to being a collection of the most frequently used words, suitable for a general audience, the online dictionary can also be customized to fit the needs of individual teachers, as described in Yang et al. (2007).

The online audio and video clips in the archives can be edited for language documentation. A multimedia database system makes it possible to search for suitable topics in the clips, thus allowing language teachers to create their own teaching materials and conduct online teaching.

Finally, the online animations can provide a virtual classroom, and are an effective way of presenting stories with sound tracks. It is necessary to develop a user-friendly computer platform to allow indigenous language teachers to transform their own texts into animation. Animation was identified by both indigenous language teachers and Yami teenagers as the most desirable element in e-Learning. Attempts to use animation dubbing contests as a tool for language revitalization were found to be promising, as they match the models of continua of biliteracy.

**APPENDIX 1**

Questionnaire on e-Learning and Creating Digital Materials for Teaching Austronesian Languages in Taiwan

1. E-learning materials are helpful for learning indigenous languages.  
 Strongly Agree.  Agree.  Neutral.  Disagree.  Strongly Disagree.
  2. Which digital format is most suitable to attract the attention of the younger generation of your people?  
 CD Titles.  Web Pages.
  3. E-learning materials are interesting to the younger generation of your people.  
 Yes, they are helpful.  No, they are irrelevant.
  4. What type of e-learning materials can attract your young people's attention? (Choose all that apply)  
 Images.  Animation.  Web pages.  Folk Songs.  Chat Room.
  5. I would like to try to create e-learning materials with assistance from the research team at Providence University.  
 Yes, I am willing to try.  No, it is probably too difficult for me.
  6. What contents should be put in the indigenous language e-learning programs? (Choose all that apply)  
 Daily conversations.  Basic skills.  Ceremonies.  Legends.  Indigenous knowledge.
  7. In what schools is it most suitable to use e-Learning materials? (Choose all that apply)  
 Kindergarten.  Elementary school.  Junior high school.  Senior high school.
  8. Which functions should be added in the e-learning programs for indigenous language teaching and learning? (Choose all that apply)  
 Grammar.  Dictionary.  Demonstration of language use.  Online tests.  
 Online practice.
  9. I would be willing to use e-Learning programs to teach the indigenous language, should there be suitable e-Learning materials.  
 Yes.  No.
  10. What are potential problems of using e-Learning materials?
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Background Information

1. What is your ethnicity? \_\_\_\_\_ In what county, township, and village do you live?  
\_\_\_\_\_ Do you live in an urban area? \_\_\_\_\_
2. Are you an indigenous language teacher? \_\_\_\_ Yes \_\_\_\_ No
3. Do you use your indigenous language everyday? Please explain your language use.  
\_\_\_\_\_



**APPENDIX 2**

Questionnaire on the use of animation for Yami language learning

Please watch at least three animation productions and answer the following questions.

1. Could animation help you learn the Yami language?

No.  Yes, It is helpful.  Yes, It can increase my motivation to learn Yami.

2. Is the style of presentation in the animation appropriate for the Yami language learning materials?

It is appropriate.  It is not appropriate.

3. Do you like the characters in the animation productions?

Yes, I do.  No, I do not.

4. Who is your favorite character?

I like \_\_\_\_\_. The reason is \_\_\_\_\_.

5. Which characters do you dislike?

I don't like \_\_\_\_\_. The reason is \_\_\_\_\_.

6. How can these animation productions be improved? Can Yami living and cultural items be transformed to animation to reflect authentic Yami lifestyle?

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