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Facilitating Exposure to Sign Languages of the World: The Case for Mobile Assisted Language Learning

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Abstract

Foreign sign language instruction is an important, but overlooked area of study. Thus the purpose of this paper was two-fold. First, the researcher sought to determine the level of knowledge and interest in foreign sign language among Deaf teenagers along with their learning preferences. Results from a survey indicated that over a third of the respondents did not realize that American Sign Language was not universally used around the world. Another key finding from the survey is that Deaf students are interested in learning foreign sign languages particularly from the perspective of a potential world traveler and not necessarily from the perspective of someone who wants to formally study the language for college credit. These students further indicated that they would prefer to study a foreign sign language through multimedia formats, including mobile learning, as opposed to a traditional face-to-face class. Thus the second purpose of the study was to design a prototype mobile app to provide foreign sign language learning opportunities for use individually or as part of a high school enrichment program. An emerging technology tool, AppShed, was used to develop the prototype, which is cross-platform. The prototype was designed to feature 25 words and phrases related to travel in four different sign languages. Video clips from native signers were identified for inclusion. In keeping with best practices for mobile language learning, an interactive component was also included in the prototype whereby users could produce their own videos for expressive practice. Further research needs to be conducted on the app's features and potential integration into formal classroom settings.

Keywords: Deaf, Sign Language, Mobile Apps, Educational Technology, Instructional Design.

Introduction

A Czech proverb says, "Learn a new language and get a new soul." That statement speaks to the positive effects that studying foreign languages and cultures can have on people. It is a concept

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that is strongly supported in American high schools and colleges as evidenced by the foreign language offerings available and required of students. However, the study of foreign languages almost universally focuses on the spoken languages of the world. One exception has been the increased acceptance of American Sign Language (ASL) as a 'foreign language'; however, ASL is the language of the Deaf community primarily

in the United States. There are dozens of other sign languages around the world, yet only one known class exist in the United States to discuss sign languages and cultures of other countries (CARLA, n.d.).

Furthermore, Deaf high school and college students are one of the few groups of people that do not typically have the opportunity to learn a foreign language despite the increased frequency of travel abroad among Deaf individuals (Suzuki, Horikoshi, & Kakihana, 2004). Although many Deaf students are bilingual (ASL and English) and a few tackle the challenges of learning a second spoken language (e.g., Spanish), it appears extremely rare for them to learn a second sign language or experience the culture of Deaf persons from another country. That phenomenon is quite the opposite experience of their hearing counterparts who have the opportunity to learn a variety of spoken languages.

Thus the purpose of this study was two-fold. First, the researcher sought to determine the level of knowledge and interest in foreign sign language among Deaf teenagers. Secondly, if an interest was determined to exist, the author wanted to decipher the learning methods that students wished to employ to learn a foreign sign language as a first step toward creating a learning platform for such a purpose. Ultimately, the method chosen was a mobile app. This paper reports both on the survey results and on a mobile app prototype designed to increase the exposure of Deaf students to foreign sign language.

Literature Review

Technology Supported Foreign Language Instruction

In order to provide a framework for looking at the role technology can play in foreign sign language instruction, it is important to first review the broader field of foreign spoken languages for key principles in the learning process. Salaberry (2001) completed a meta-analysis on the use of technology for second language learning using as his source all the articles from 1916 through 2000 that were published by the *Modern Language Journal*. The term ‘technology’, of course, held a different meaning in 1916 than it does today or even in the year 2000, but the conclusion reached by the author was that pedagogy is paramount in choosing and implementing any technology. In fact, he states, “Indeed, a healthy dose of skepticism about the pedagogical effectiveness of many current technological tools appears to be well justified if one considers the perhaps overly enthusiastic reaction to previous technological breakthroughs” (Salaberry, 2001, pg. 52). Therefore, it is incumbent upon current researchers in this field to temper the excitement of emerging technologies and their potential benefits with that guiding principle.

Within the past 10 years there have been numerous efforts to do just that – focus on best pedagogical practices while also incorporating the latest technology that is typically mobile in nature. The mostly commonly used term to describe this effort is ‘Mobile Assisted Language Learning’ or MALL (Abdous, Camarena, & Facer, 2009). Many of the early mobile projects revolved around providing authentic speech samples and vocabulary review practice that were convenient to access whether thru a cell phone or iPod (Chinnery, 2006). The author, however, echoes the sentiments of Salaberry, “... technologies, mobile or otherwise, can be instrumental in language instruction. Ultimately, though, they are not in and of themselves instructors; rather, they are instructional tools. And the effective use of any tool in language learning requires the thoughtful application of second language pedagogy” (Chinnery, 2006, pg. 9). For this reason Norbrook and Scott (2003) presented a rationale for adding interactivity as a component of mobile technology initiatives. They theorized that the use of shared mobile experiences such as quiz competitions would increase motivation which they attribute as an important factor in one’s ability to learn a foreign language (Norbrook & Scott, 2003).

Currently, one of the most promising and commonplace techniques within MALL technology especially for this generation of students is podcasting (Abdous et al., 2009; Gale & Kung, 2009). Studies have shown that podcasting does promote second language learning but has been used most often as a supplemental resource to review for exams or other assignments (Abdous et al., 2009). In light of that conclusion, the authors conducted a follow-up study to compare the use of podcasting as a traditional review tool versus the use of podcasting as an integrated classroom experience. In this study, the treatment group used podcasting in a variety of ways including for interviews with classmates, discussions, lectures, video critiques, and more that were linked to specific instructional objectives. Their results showed that students in the control group not only used the podcasts more, but that the students rated the experience higher in terms of usefulness and in their perceived oral and aural skill development (Abdou et al., 2009). Thus the combined focus on pedagogy and 21st century technology tools remains the goal of many.

Language Acquisition for Deaf Individuals

Before a meaningful discussion of foreign sign language acquisition among Deaf persons can occur, it is important to start the conversation with an understanding of general language acquisition for this special population. American Sign Language (ASL) is the primary language for most Deaf adults in the United States and is often referred to as the natural language of the Deaf (Singleton & Tittle, 2000). It is a complete language and not a version of spoken English (Gale, & Kung, 2009). “Deaf children of deaf parents learn ASL as easily as hearing children learn a spoken language” (Dolnick, 1993). In fact, Deaf children, just like hearing children, go through language milestones such as babbling (with their hands), signing words and then sentences (Singleton & Tittle, 2000). Thus learning ASL for a Deaf child is like a hearing child learning spoken English. There can be roadblocks to this natural process if the parents are not fluent signers or the child is not allowed to sign, but that discussion is well beyond the scope of this article.

Deaf persons are usually then faced with learning English (at least in its written form) as a second language. It would be inappropriate to compare that process to the process whereby a hearing person learns a second spoken language. A spoken language is simply not readily accessible to a Deaf individual and requires a unique set of instructional steps to address those challenges. However, a process that is equivalent to hearing people learning a second language would be the process by which a Deaf person learns a second sign language.

Foreign Sign Language Instruction

A review of the literature on the topic of foreign sign language instruction reveals a lack of attention and research in this area. The US Department of Education established the first Language Resource Center (LRC) in 1990 to promote the teaching and learning of foreign languages (Language Resource Center Booklet, n.d.). There are now 15 LRCs at universities across the nation. After examining each of the LRC websites, the investigator confirmed that none of them offered any substantial materials on foreign sign languages. In addition, the Less Commonly Taught Languages (LCTL) Initiative lists over 50 languages, yet no sign languages are included or addressed. The Foreign Language Assessment Database (FLAD) has nearly two hundred tests in over eighty languages but none in any sign language. A review of all articles published in the *Journal of the National Council of Less Commonly Taught Languages* (from 1994 to present), resulted in no mention of foreign sign languages. The National Science Foundation (NSF) states, “The study of sign languages is essential to understanding both the shared and the varied aspects of human language” (National Science Foundation [NSF], 2008). However, the purposes of these studies have not historically been focused on instructing or informing students. For example, the goal of three recently NSF funded studies were 1) To research automatic recognition of ASL, 2) To research language development through a case study of Nicaraguan Sign Language,

and 3) To research the impact of gender on usage of Irish Sign Language (NSF, 2008). Although a host of conferences and seminars exist in the field of foreign language instruction, only one specifically addresses sign languages. It is a one day workshop during the international Language Resources and Evaluation conference (LREC, 2010). The audience for the projects, however, is researchers not students and the information is very limited (Sign Language Corpora, 2012).

Using Mobile Technology in Sign Language Instruction

Given the literature does not reveal many opportunities to formally learn a foreign sign language; the question becomes one of how to expose Deaf students to signing in a foreign language. It is necessary to examine this issue thru the lens of spoken foreign languages and ASL since research does exist in these areas. The knowledge can then be extrapolated to the study of foreign sign languages. Specifically, the focus is on the use of technology to facilitate language learning due both to its prevalence today and to the scarcity of local resources (Godwin-Jones, 2013). For LCTLs there are often not enough students to maintain traditional courses at the high school or college level so digital materials become highly important especially for self-instruction (Lai, 2013). Recognition of sign language has long been determined to be as effective via digital media as via in-person renderings (Ohene-Djan & Naqvi, 2005; Slike, Chiavaccik, & Hobbis, 1989). As previously mentioned, the type of digital medium that is growing in popularity is termed mobile assisted language learning (Chen, 2013; Godwin-Jones, 2011). In fact, “The ubiquitous availability of portable devices, including mobile phones, laptops, tablets, and multimedia players has changed foreign language instructional methods ...” (Chen, 2013, p. 20). But while there are dozens of mobile apps for learning basic ASL available, there are few examples of mobile apps that go beyond basic vocabulary review capabilities and capitalize on the more interactive approach that is recommended in the literature. In addition, there are no known apps that provide a multi-lingual look at sign languages at any level.

For individual sign languages, researchers and educators have taken various approaches to delivering mobile content that can include both formal and informal components. These approaches can include any combination of the following: 1) courses with instructor/student interaction, 2) content producing systems whereby Deaf users create the content themselves, and 3) sign language dictionaries and phrase books (El-Soud, Hassan, Kandil, & Shohieb, 2010). Earlier in this article, a case was built for selecting multiple, integrated approaches that are interactive and based on sound learning principles. Similar to the podcasting research project led by Abdous et al. that focused on spoken languages (German, French, Japanese, and Spanish), a video podcasting research study was undertaken for a course teaching ASL (Gale, & Kung, 2009). They found that the video podcasts encouraged engagement with the material, freed up class time for different types of instruction, and improved both expressive and receptive signing skills. Courses in ASL are typically created for hearing students, but the same principles can be used in creating other sign language courses that are intended for a Deaf audience.

Tools for MALL Creation

The creation of mobile content has traditionally been a barrier itself, outside of basic podcasts, since native app development for mobile devices tends to be complex with programming skills required for delivery on multiple platforms (Godwin-Jones, 2011). Godwin-Jones, a spoken language researcher, thus proposed in his paper that hybrid apps should be considered as an alternative (2011). The apps he proposed would be web-based and ported to various mobile platforms through third-party tools such as Phone Gap. This path could lead to quicker deployment and allow more novice users to create mobile content.

An emerging technology tool, AppShed, has the potential to further change the landscape of mobile app creation and delivery (Bradbury, 2013). It uses a drag-and-drop procedure for visually

creating the various pages of an app. In addition, there are pre-built action buttons that allow the interactive components of the app to be generated easier than with previous tools. Video is integrated easily. Although the tool has the capacity to create much more advanced apps by allowing the user to enter JavaScript, it is not necessary to have any programming skills to create a wide-range of educational apps including ones to study language. It is also cross-platform so a developer can create one app and students can access it on any number of devices at no cost. Perhaps the most seamless part of the process is the delivery of the app to students. AppShed creates a 2D barcode that the developer can save as an image and then post on any website. The user then scans the code and the associated app automatically launches and updates as needed. This tool and others like it can provide the means for educators and students themselves to spread foreign sign language awareness and content through mobile delivery.

Methods

In order to first establish the need for foreign sign language learning, an initial collection of data on current beliefs, exposures, and interests was required. A self-reporting survey was determined to be the best measure of these issues. Construction of the survey was discussed and subsequently refined following a conference for researchers in the field of instructional technology for the Deaf (Parton & Hancock, 2010). The author ultimately composed a 15 question survey in written English using an on-line tool. The survey link was made available to the administrators of four residential schools for the Deaf. These schools were chosen due to their previous collaborative arrangement with the researcher and are typical of residential schools for the Deaf across the country. A limitation of the survey was that it was not distributed to Deaf students in other educational settings so the findings are generalizable to other residential school students but not necessarily for all Deaf teenagers.

The administration was asked to distribute the link to their high school teachers who in turn asked for volunteers among their students to participate. Those who expressed an interest were required to obtain a parental permission form and then the link was made available to the students. The students were allowed to request an ASL translation of the questions from the teacher as desired. There were 54 subjects who participated. They ranged in level from 9th grade to college. It is unclear why three subjects marked their grade as ‘college’ – it could have been the result of being enrolled in dual enrollment courses whereby the subject was receiving college credit while still completing high school and thus felt compelled to indicate college as his/her level. Additional demographic data was collected through the survey. Of the subjects who participated, 40 (or 74.1%) identified themselves as ‘Deaf’ while 12 (or 22.2%) identified themselves as ‘hard-of-hearing’. Two respondents identified themselves as hearing, but it was decided that those surveys should remain part of the sample since the students do attend a residential school for the Deaf and use ASL. It is not uncommon for hearing siblings of Deaf children to be granted permission to attend a residential school in a process most often called ‘reverse mainstreaming’.

Findings

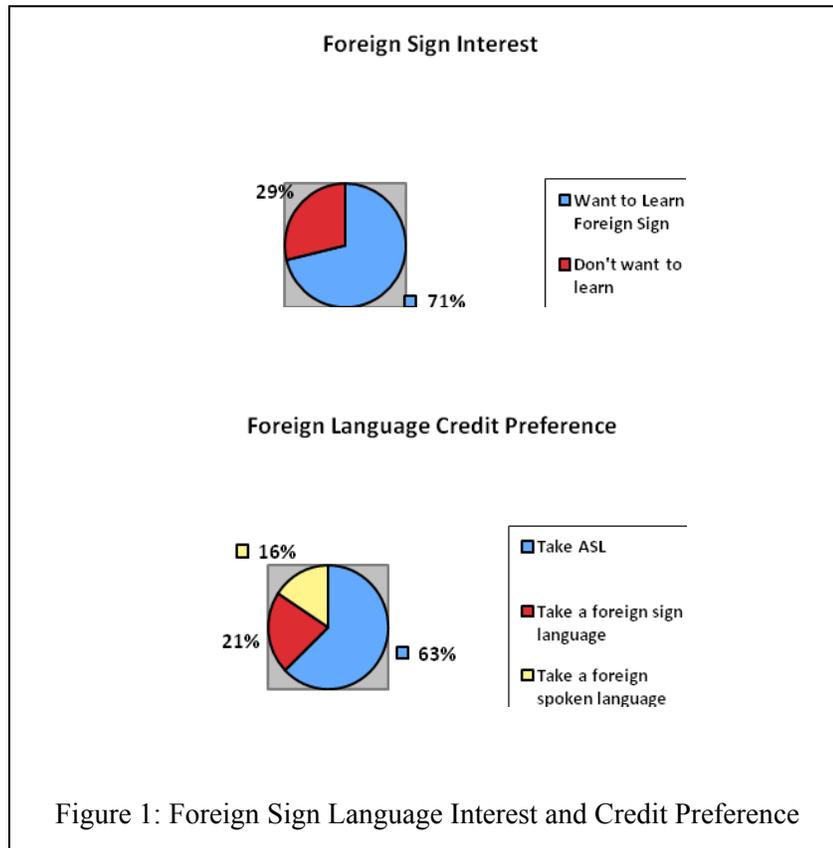
The next set of survey questions sought to establish the knowledge and interest the students had in terms of foreign sign language. A majority of respondents indicated that ASL was their first language (80.8%) and that they formed thoughts in their mind in ASL (72.5%) rather than English. When presented with the statement, ‘Deaf people in most foreign countries use ASL’, only 64.2% correctly labeled it as false as opposed to 35.8% who thought it was a true statement. Interestingly, 21.2% of the subjects marked that they knew a foreign sign language. However, upon examination of the open-ended responses that followed the aforementioned line item it became evident that the answers did not always reflect an accurate understanding of the question. The open-ended question asked ‘If yes, which sign language do you know?’. Several of the responses

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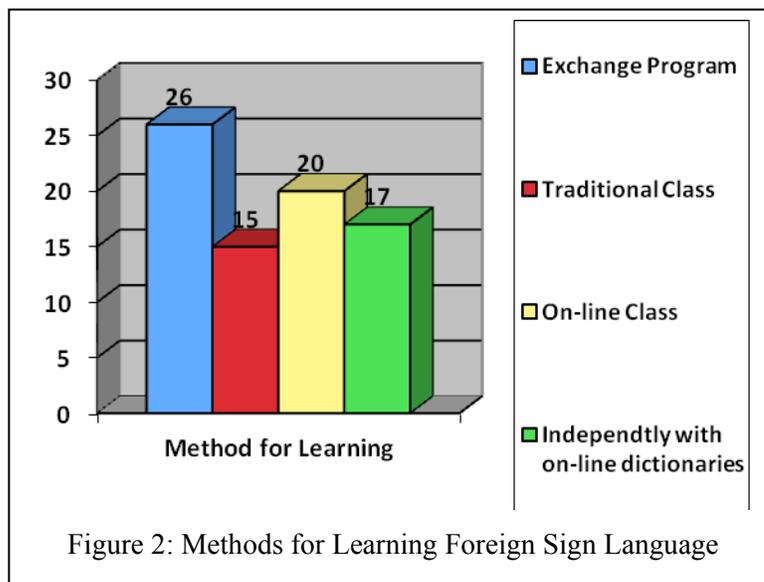
included simply listing words in Spanish which appears to indicate confusion between other spoken foreign languages and other foreign sign languages. There were, however, a couple students who did list Columbian Sign Language and Russian Sign Language in the response and thus most likely did migrate from the respective countries after acquiring a working knowledge of the sign language of their native country.

Subjects were then asked to indicate if they wanted to learn another sign language and explain their choice. A majority of students, 71.2%, marked yes and provided a range of comments which shed light on their motives. Students made the following comments: “To better understand ASL and to have a better experience making friends in another country”; “It would be very interesting to learn many new sign language[s].”; “I want to communicate to people who live in other country.”; “So I can develop new skills in different sign languages.”; “I wanted to know what's [the]difference between American's sign and other countries' signs.”; “Because I want to have the communication [with those] who aren't [fluent in] ASL or aren't from this country.”; “I want to learn and meet new people.”

The next set of survey questions sought to determine the avenues by which students would be interested in learning another sign language. When presented with multiple options for acquiring this knowledge, 56.5% wanted to participate in an exchange program and visit another country to learn the sign language. Following a close second was the option of participating in an on-line course with a teacher and other peers (43.5 %) and third was the option of using a digital dictionary on their own (37%). Both of the multimedia options were favored over a traditional face-to-face class (32.6%). The final question then asked the students what their preference would be in fulfilling a foreign language credit if one was required at the college they chose to attend. Interestingly, 62.7% indicated they would take ASL since it would be an easy class due to their prior knowledge. Another 15.7% preferred to select a spoken foreign language to learn to read/write.



Only 21.6% of the subjects wanted to take a foreign sign language to fulfill the requirement. Clearly there is a disconnect between the number of Deaf students who want to learn a foreign language (71.2%) and those who want to do so through a formal credit system (21.6%). Figure 1 graphically depicts the responses related to foreign sign language interest and credit preference while Figure 2 shows the methods by which students would like to learn a foreign sign language.



Discussion

The results of the survey confirmed what many Deaf educators and researchers know intuitively – that Deaf students have minimal knowledge or exposure to foreign sign language. There were, however, some interesting and perhaps unexpected outcomes as well. A majority of the respondents were aware that sign language is not universal, but a full third were not aware. Presumably that number would increase if the question were asked of the general hearing population or even Deaf students who do not attend residential schools, but even within the survey sample it is apparent that this topic is one which has traditionally been omitted from instructional time.

A key finding from the survey is that Deaf students are interested in learning foreign sign languages especially from the perspective of a potential world traveler not necessarily from the perspective of someone who wants to formally study the language for college credit. So even though a Deaf student may choose to fulfill a foreign language requirement at college by taking the easiest path (i.e., enrolling in an ASL class when they are already proficient), that does not preclude the student from wanting to learn the basics of a foreign sign language for personal reasons. For this reason, the author believes that an informal approach to foreign language exposure may be beneficial for a majority of Deaf students.

This informal approach is also aligned with the preferred delivery method for language learning indicated by the participants. Although the most desired learning technique was to visit another country and learn by immersion, that option is not readily available for Deaf high school students due to financial and time constraints. Of the remaining options both on-line courses and self-study through digital dictionaries ranked higher than enrolling in a traditional face-to-face class. Thus, although there are limitations of the current study in terms of sample size, there appears to be a need for mobile assisted language learning tools to be developed for the study of foreign sign language.

Implication: Sign Languages of the World App

The practical implication of these survey results coupled with the literature review is the need for technology-based tools, especially ones that support mobile delivery of interactive content, to facilitate exposure to foreign sign language as a starting point to expanding the opportunities for Deaf students to become multi-lingual. In order to have the greatest impact, these tools must be relatively easy to create and share. To that end, a prototype app was developed using the newly available AppShed tool.

The ‘Sign Languages of the World’ App was intentionally designed to address a diverse audience of both formal and informal language learners. First, in light of the remarks students made concerning their rationale for learning a foreign language (i.e., to communicate when overseas), it was decided that the initial prototype would focus on common words and phrases that one might need while traveling abroad. Second, based upon the literature review, it was decided that the initial prototype needed to have interactive components that could optionally be fully integrated into a course. To that end, the app was designed with the ability to let users create and share video clips designed to address both receptive and expressive skills.

Figure 3 shows a series of screen shots from an iPhone 5 displaying the initial design for the app. An explanation for each feature follows. The first tab is simply the ‘Home button’ that returns a user to the logo screen. When one selects the second tab, labeled ‘Words’, images depicting the travel concepts are shown along with the name in all of the spoken languages of the representative countries. By selecting an image the user is then presented with a list of foreign sign languages from which to select. Choosing one results in the showing of an appropriate video. For the prototype, twenty five travel related nouns were identified from a travel unit within an existing ASL course. The user can search by using the images rather than a written word; however, the written words for the respective spoken languages for each country were added for clarity. In order to obtain the vocabulary video for each of the sign languages represented in the prototype, the researcher contacted Deaf professors from abroad using a database of collaborators that she met during previous International Symposiums on Deaf Education and Instructional Technology held at the National Technical Institute for the Deaf and requested the media files.

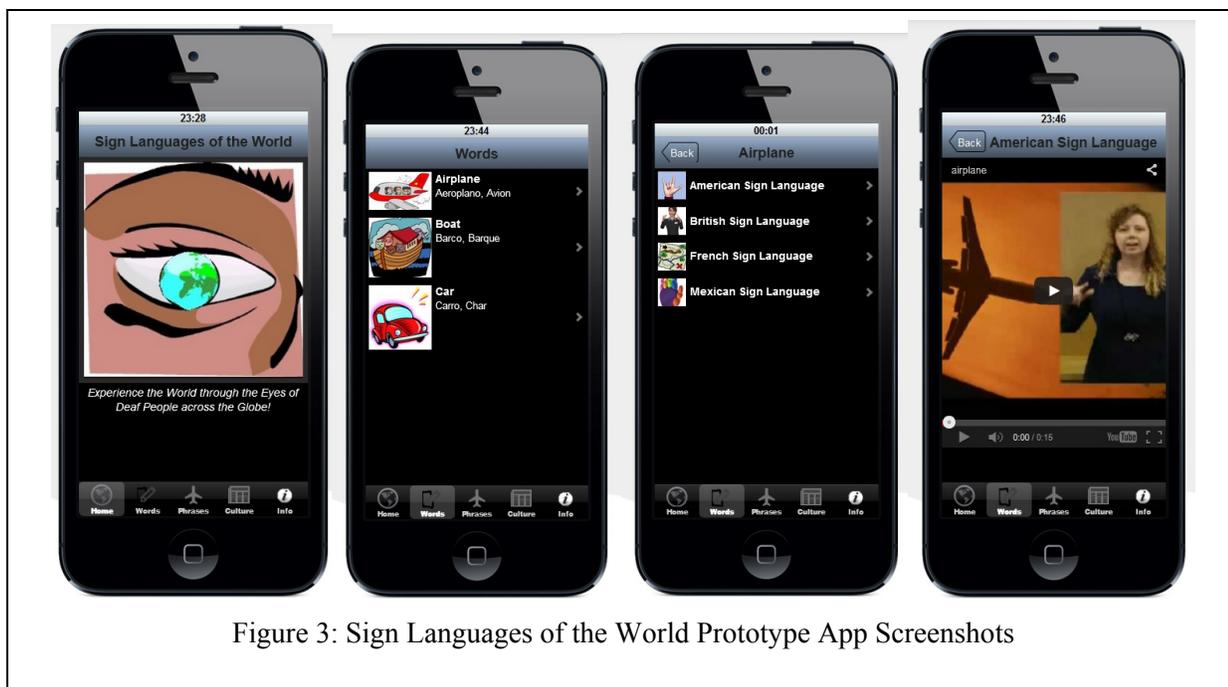


Figure 3: Sign Languages of the World Prototype App Screenshots

The third tab, labeled ‘Phrases’, is similar in nature to the ‘Words’ tab except that there are no image prompts since it was not practical for this section – the phrase is presented only in the various written languages. However, it is possible for a Deaf individual who has difficulty reading the phrases to just select one and then select the ASL video (or whichever sign language in which they have proficiency) in order to verify the meaning of the phrase. At that point, the individual would just back up a screen and now select the other sign language of interest. The video clips were obtained in the same manner as previously outlined for the individual words. These 25 phrases were gleaned from a travel website and modified slightly (Fodor’s Travel, n.d.). Table 1 identifies the words and phrases from the prototype.

Together the words and phrases tabs represent the less integrated approach to using technology to support language learning in that they are primarily used for vocabulary review. However, for individuals not involved in a formal class these tabs are essential to the ability to begin communicating in a foreign sign language. In addition, the design process mirrors that of projects from the field of spoken foreign language mobile learning in that those early projects focused on providing samples and review practice. Since foreign sign language instruction is in its infancy, it was a logical place to begin.

Table 1: Words and Phrases

Travel Words	Travel Phrases
Airplane	Are you ready?
Ambulance	Do you accept credit cards?
Beach	How are you?
Bike	How much does it cost?
Boat	I am hungry.
Car	I am on vacation.
Church	I am sick.
Clothes	I am tired.
Elevator	I don’t understand.
Gas station	I have to leave now.
Hotel	I need help.
Luggage	I want to go shopping.
Map	Is it safe?
Money	Is there an interpreter available?
Photo	It is beautiful.
Police	It is nice to meet you.
Restaurant	Please call a taxi for me.
Restroom	Please stop.
Road	See you later.
School	Thank you.
Store	The like the food.
Swimming Pool	This is my family.
Tickets	What is the best thing to see here?
Train	What’s your name?
Water	Where is a restroom?

Likewise, the next tab, “Culture” is presented as basic, static information. Each Deaf professor supplying video clips was also asked to provide a few important elements of their respective Deaf cultures which are currently shown in the written language of the country. As the app develops, it is the researcher’s intention to replace the text with videos.

Flexibility was a key concern of the developer so that the tool could be expanded and modified easily by other developers including classroom level teachers and Deaf educators in countries not yet represented on the app. Therefore, the app has the flexibility to integrate an infinite number of sign languages into the tool. Using this prototype, the only items required to add an additional language are videos for the pre-determined list of words and phrases. The language option can then be added with minimal effort to the app which is automatically updated.

The final tab, originally labeled 'Info', provides an avenue for more interactive content to be particularly beneficial in more formal classes. It is anticipated that future versions of the app will incorporate video podcasts and other instructor-generated content. Currently, the tab directs the user to create a video clip in-app and send it via email or messaging to a recipient of his/her choosing. The idea behind this design is to provide a path for users to increase their expressive and receptive skills by interacting with another user which could include the course instructor or peers.

It was important during the design phase to address the issue of awareness of the app in order to maximize its potential. As a first step, the barcodes for the beta app will be distributed through Deafed.net, a well-known site for Deaf educators, for the purpose of sharing with their students (Deaf Education, n.d.). Further study will be needed to test the app and its use among students. The researcher intends to present the project and solicit feedback at the upcoming International Congress on the Education of Deaf event as well.

Conclusions

“Foreign language study can and should play a key role in empowering students in a variety of different ways”, according to Reagan (2000, p.12). Foreign language can be a sign language and is often the most logical choice to pursue for a person who is Deaf. But access to foreign sign language instruction, whether formally or informally, is lacking despite a strong interest among Deaf high school students to be exposed to it. Mobile assisted language learning has become a primary avenue for increasing access to spoken foreign languages and holds potential for foreign sign language as well.

In response, a prototype was developed using a recently released app building tool that reduces the time and technical knowledge required for creating content for mobile platforms. This prototype entitled “Sign Languages of the World” contains words and phrases in four different sign languages related to travel and also incorporates interactive components. More research is needed to determine if this prototype is an appropriate response to the needs which surfaced in this study. With a successful feasibility study, the next step in the project would be to expand out the content and add additional features that are dynamically displayed based upon the audience or particular course use.

Of equal consideration is whether educators will embrace the inclusion of foreign sign language and this technology-based delivery method within their curriculum at the high school level, perhaps as an enrichment type activity. One thing is evident though – we live in a global world and in order to participate fully we are increasingly called upon to experience other languages and cultures which includes the rich heritage of people who are Deaf throughout the nations.

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Biography



Dr. Becky Sue Parton has a PhD in Educational Computing and a Masters in Deaf education. She was previously a professional programmer for 10 years. She is well published in the field and has given over 50 international conference presentations. Along with Dr. Hancock, she was honored to receive the National Center for Technology Innovation 2010 Bright Idea Award. She was also selected as the Technology Educator of the Year for 2011 by the Louisiana Association of Computer Using Educators. Dr. Parton enjoys developing instructional technology tools for the Deaf and has received over \$500,000 in grant funding. She is currently an Associate Professor in Educational Technology at Morehead State University in Kentucky and an on-line instructor for Walden University.