Ilokano To Go: Development and Usability of an Ilokano Vocabulary Mobile App

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Abstract: About 90% of the Philippine population living in Hawaii today is Ilokano or are descendants of Ilokano immigrants. Considered the language of the Philippine diaspora, Ilokano, or Ilocano, is currently being offered as a language course at several institutions in Hawaii. The courses follow a structured program, using textbooks that offer lessons and exercises based on real-world experiences. Although the students have a variety of resources available to them, the researcher found no mobile applications developed to learn Ilokano vocabulary. To assist students in their efforts, a mobile language learning application titled "Ilokano To Go" was developed and a usability study conducted. The purpose of this usability study was to develop and evaluate the ease of use of a beginner-intermediate Ilokano vocabulary development mobile app for students at a large university in Hawaii. The study included two iterations of usability testing and examined aspects of usability such as aesthetics, navigability, and usefulness. A pre-survey, usability protocol, observation checklist, and a post-survey helped to identify usability issues in the mobile application. The mobile application was well received by study participants, and changes relevant to its ease of use were made after each iteration of testing.

Introduction

Ilokano, also Ilocano, is one of several languages spoken in the Philippines and is considered the language of Philippine diaspora. With the rise of sugar plantations in Hawaii in the early 1900s, the Hawaii Sugar Planters' Association (HSPA) recruited laborers from the Philippines and other countries to work on the plantations. Of the Filipinos recruited, over 60% were Ilokano.

Today, about 90% of the Philippine population living in Hawaii is Ilokano or are descendants of Ilokano immigrants, "giving rise to the need for public, social, medical, juridical, and related services in Ilokano including interpretation and translation for the individuals regarded as limited English proficient" (Ilokano Language and Literature Program, 2014). As such, Ilokano is currently being offered as a language course at several institutions in Hawaii. Students in the Ilokano language program at a large university in Hawaii follow a structured program, using textbooks and learning the

language "in the context of simulated real-world experiences that are acted out in the classroom" (Espiritu, 1984). Lessons in the textbook are broken up by topic, with each lesson including a list of vocabulary, dialog, role-playing activities, grammar exercises, a communication activity, and writing and listening practice. Although the students have a variety of learning activities available to them, there are currently very few mobile applications developed for learning the Ilokano language.

To assist students in their Ilokano language learning efforts, a mobile application titled "Ilokano To Go" was developed and a usability study conducted. The purpose of this usability study was to develop and evaluate the ease of use of a beginner-intermediate Ilokano vocabulary development mobile app for students at a large university in Hawaii.

Literature Review

There have been decades of research into vocabulary acquisition and second language learning, and with the increased availability and use of mobile devices in this last decade, research into mobile assisted language learning (MALL) has also increased. Several studies have shown the effectiveness of mobile devices in language instruction. In one such study, Chinese university students using a smartphone app to assist with English vocabulary acquisition significantly outperformed those students who did not use the smartphone app (Wu, 2015). Similarly in Wong and Looi (2010) and Agca and Ozdemir (2013), mobile devices were successful in not only assisting students in acquiring vocabulary in a second or foreign language, but were also successful in increasing student engagement.

Mobile devices provide several affordances that language learners can take advantage of. Two powerful affordances are mobility and accessibility – learners have almost unlimited access to authentic materials and target language and culture. In *Going Mobile: Language Learning With an iPod Touch in Intermediate French and German Classes*, Ducate and Lomicka (2013) examine the affordances provided by iPod Touches to intermediate learners of French and German. Data collected through surveys indicated that 93% of the students (28/30) "felt that their learning increased as a result of having access to an iPod Touch throughout the semester due to the mobility of the device and accessibility of the apps and other features" (p. 455). The mobility of mobile devices and their ability to connect to the Internet from almost any place allows learners to change their surrounding environments so that places usually not used for learning can assume that role as a learning environment, and available pockets of time, such as time spent waiting between classes, time spent commuting on a bus or train, can become "profitable moments of learning" (Kukulska-Hulme, 2012). Other affordances include ease of use, autonomy, and increased exposure (Ducate & Lomicka, 2013).

The affordances provided by mobile devices to language learners fit into the device usability (DL) and social technology (DS) intersections of the FRAME model (Koole, 2009). The FRAME model consists of three overlapping circles representing three different aspects: the device (D) aspect, learner (L) aspect, and social (S) aspect (Figure 1). These aspects overlap to create three intersections: device usability (DL) from the

device and learner aspects, social technology (DS) from the device and social aspects, and interaction learning (LS) from the social and learner aspects. In the FRAME model, when the device, learner, and social aspects intersect, the learner is provided with enhanced collaboration with other students and their instructor. They are also provided access to authentic materials and a "deeper contextualization of learning" (p. 38, Koole). This model was used as a guideline to create the application.
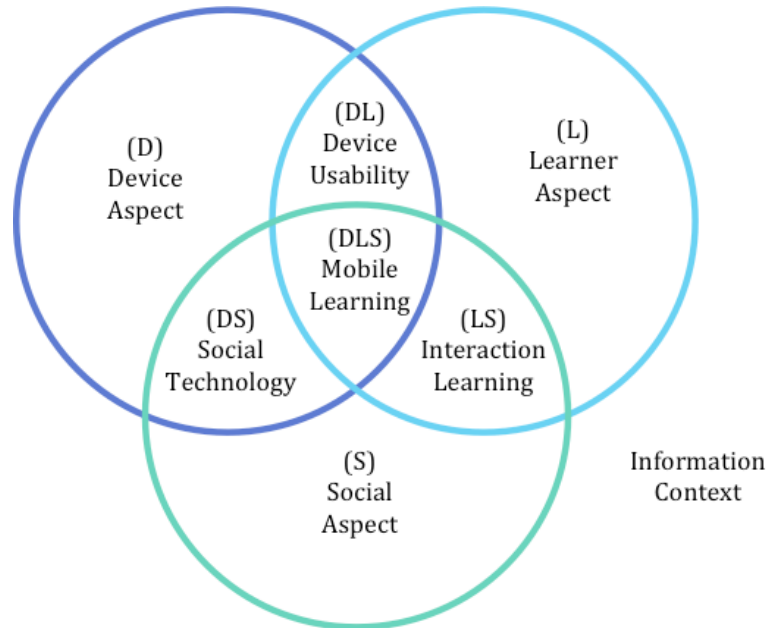

Figure 1. The FRAME Model (Koole, 2009).

Project Development

This usability study sought to improve the ease-of-use of the application, specifically navigability, aesthetics, and usefulness. Several mobile application development tools were explored at the start of the development process to determine if they met the criteria required by this study. The tool needed to be able to create and package the app to at least Android devices. Access to iOS and Windows devices was not available so it was not required that the tool be able to package to those platforms. The tool also needed to be free or low-cost, as well as have a low learning curve. A low learning curve would keep the development and editing time low, and make it possible to transfer management and updating of the app to another person.

Before creating the Android application, a wireframe and paper prototype were created. The wireframe allowed for planning of the layout and several components of the application such as the buttons, labels, and screens (Figure 2).

The paper prototype was developed electronically and provided a medium to create images, buttons, and the logo (Figure 3). The wireframe and paper prototype allowed for a more streamlined application creation process as app components were simply uploaded into the development tool.
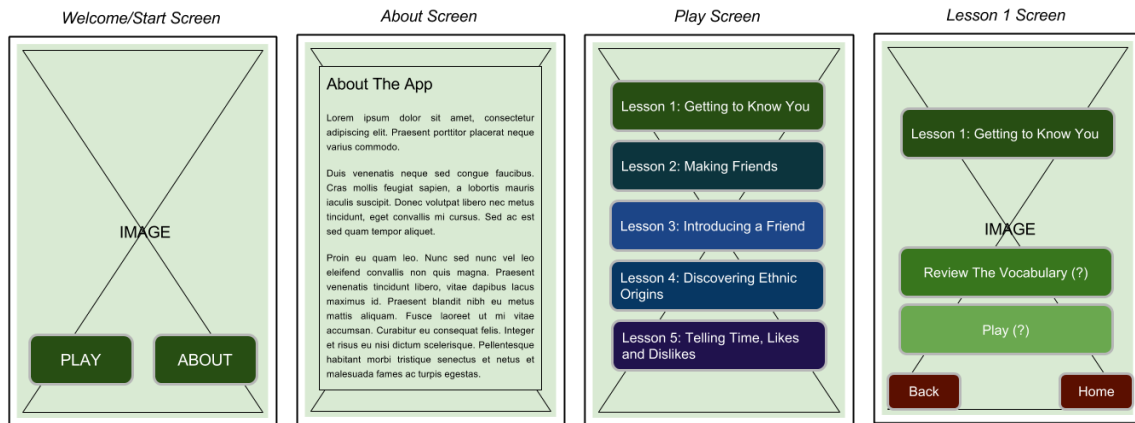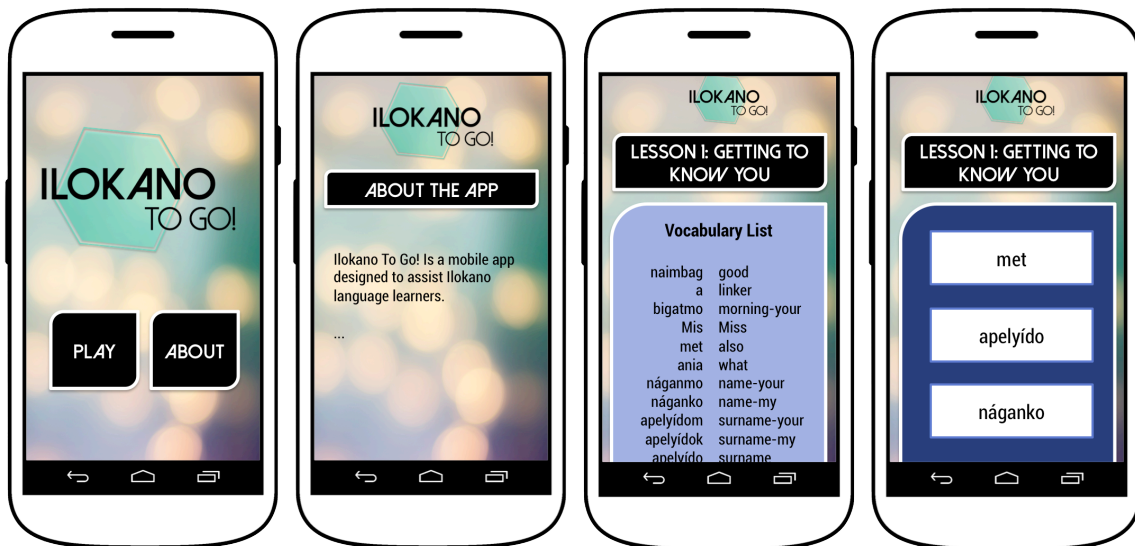
Figure 2. Wireframe of the application.

Figure 3. The paper prototype allowed for the creation of images, buttons, and the logo.

"Ilokano To Go," was created using MIT's App Inventor 2 (http://appinventor.mit.edu/explore/). The online-based tool allows users to create mobile applications for Android devices using a drag-and-drop, block-based programming interface. This tool was chosen because it met the criteria set forth during the tool exploration phase. App Inventor 2 is free, packages applications to Android devices, and has a low learning curve that allows for quick development and transfer of ownership.

The development environment allows the user to preview the app both in the browser and on a mobile device through the accompanying MIT App Inventor 2 mobile app (Figure 4). Users are able to easily add components and change those component properties using the tools provided. To create Ilokano To Go, icons, buttons, and graphics were created and edited with other tools (PowerPoint and GIMP), and then uploaded into the development environment where they were placed into their appropriate screens. (See Appendix C for screenshots of the app.)
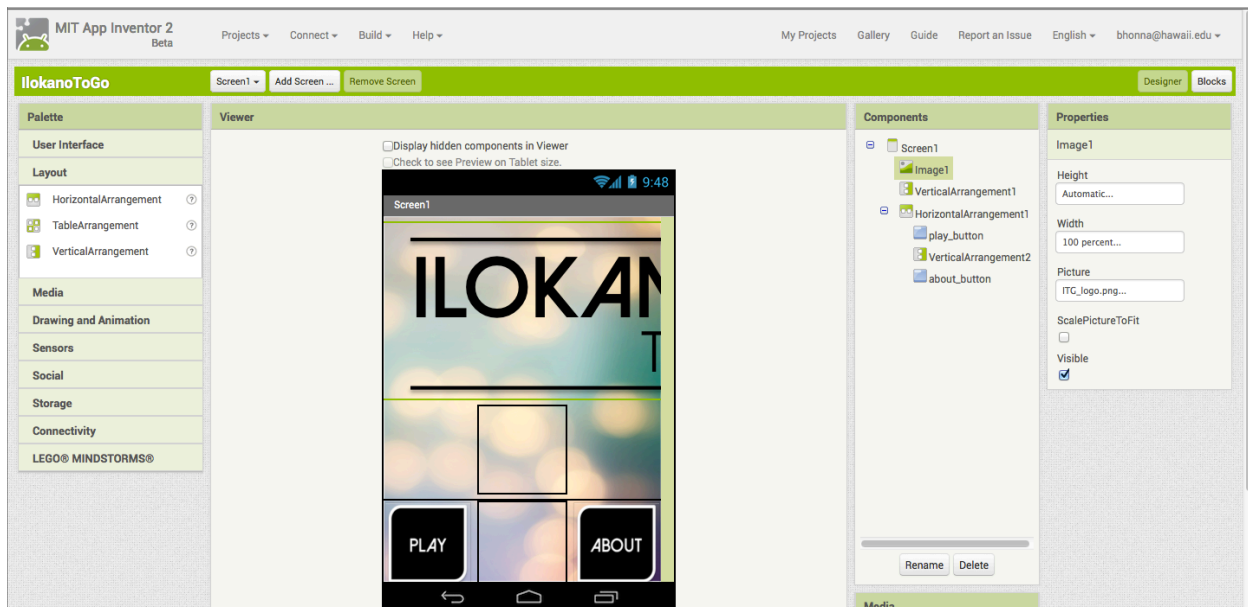
Figure 4. Application development environment of MIT's App Inventor 2.

APP Inventor also uses a drag-and-drop, visual programming approach. Once designed, the user programs the components of each screen through visual segments of code that are placed on the screen (Figure 5). These blocks of code are connected to create actions and procedures that occur as the user interacts with the app.
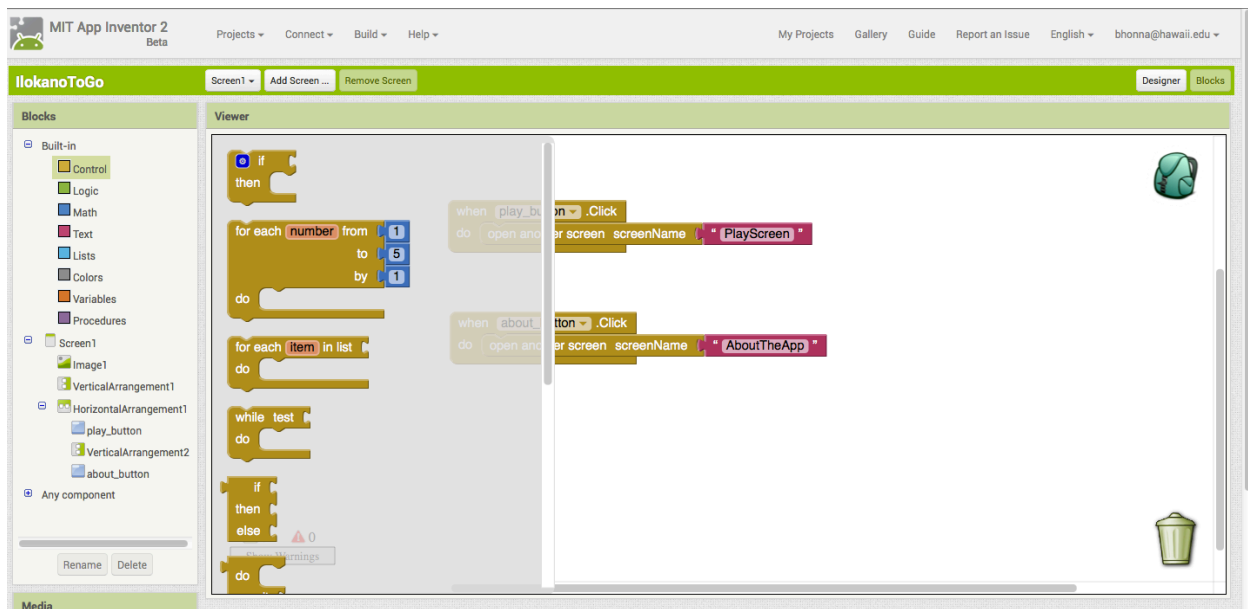

Figure 5. MIT's App Inventor 2 uses visual programming

In addition to the mobile app itself, a Wordpress website was created (http://ilokanotogo.wordpress.com) to provide information to possible participants. (See Appendix A for screenshots of the website.) Also on this website is a form to request more information, and a form to volunteer participation in the usability study.

Methodology

The goal of this usability study was to improve the usability of a language learning application, Ilokano To Go. The components of usability examined were navigability, aesthetics, and usefulness.

The target audience for this usability study was students at a large university in Hawaii. These students were degree seeking, and most likely have knowledge of and experience with touchscreen mobile devices and applications. They were of varying ethnic backgrounds, but had an interest in learning Ilokano. Professors and instructors of Ilokano at the university were asked to assist in the recruitment of usability study participants. Each round of usability testing required 3-5 participants, with each participant asked to commit 45-60 minutes to complete two surveys and a usability protocol.

Several data collection instruments were created to collect information for this research project. (See Appendix B for data collection instruments.) A pre-survey was created to collect demographic information, background Ilokano language knowledge, and background technology knowledge. A usability protocol, following the example provided by Krug (2010), was developed for observing and documenting participants' reactions to the mobile application. Data collected from this protocol were recorded and analyzed. To accompany the usability protocol, an observation checklist was created and used to collect field notes.

The usability tests took place in-person at various locations on the island of Oahu. Considering the varying schedules of university students, a flexible approach was taken in conducting this study. Participants were first asked to complete a short pre-survey to determine demographics, background language knowledge, and background technology knowledge. The usability test followed. Participants were asked to complete four different tasks using the functional prototype of the application, and were asked to "think aloud" while doing so. After the usability protocol was complete, they were asked to complete a post-survey to collect data regarding their thoughts on navigability, aesthetics, and usefulness of the mobile app.

Both qualitative and quantitative data were collected in this study. Qualitative data was analyzed using content analysis. This involved coding the data, identifying patterns, and interpreting their meanings. For quantitative data, demographics were collected, as well as information pertaining to ease-of-use of the application. Quantitative data was analyzed using descriptive statistics. These statistics included such measurements as mean, median, and mode. Appropriate visualizations of both quantitative and qualitative data were created to display results.

Results

Overall, the application was well received by participants in both rounds of usability testing. There were a total of six participants, with three participating in each round. Of the six participants, two were male and four were female. They aged in range from 22 to 31. All the participants were of Ilokano descent, although their exposure to the Ilokano language ranged from a few days a month to everyday. All participants owned a smartphone, however only two had experience with mobile language learning apps.

Iteration 1

Participants in the first iteration were able to navigate through the app easily as buttons and links were "appropriately labeled" and "self-explanatory." When asked, "On a scale of one through five, with one being very difficult and five being very easy, how easy was the app to navigate?" all three rated the app a five. They did not have any issues concerning aesthetics, although the "font was just a little small on some of the pages." When asked, "On a scale of one through five, with one being very useless and five being very useful, how useful is the content of this application to you?" one participant rated the app a four, and two participants rated the app a five.

When asked how to improve the application, participants provided feedback and suggestions that were used to improve the application for the next iteration. Changes included increasing the font size and including a search field in the vocabulary list page (Figure 6). The flashcards were also changed to include indication of words already studied (Figure 7). The background color changed on those cards that were flipped to English and the font on those cards that had already been flipped became bold.
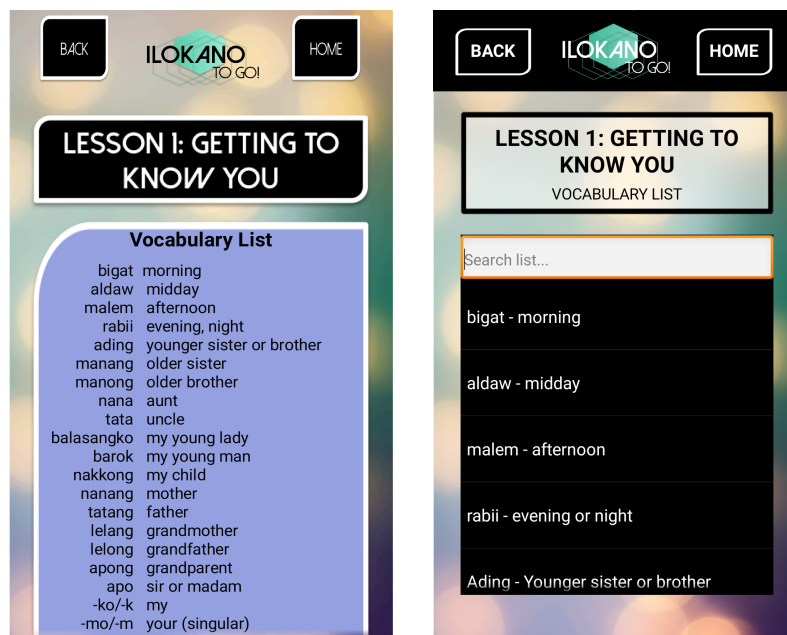

Figure 6. Before and after screenshots of the Vocabulary List screen. A search bar was included at the top of the list, and the font size and spacing was increased.
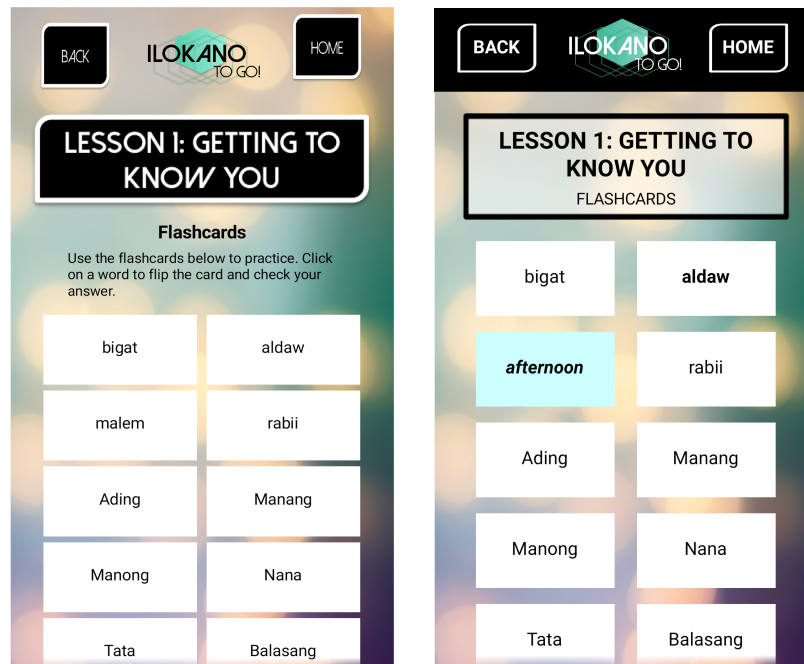
Figure 7. Before and after screenshots of the Flashcards screen.

Iteration 2

Participants in the second iteration were able to navigate the app just as easily as those participants in the first iteration. Again, all three participants were asked to rate the ease of navigation on a scale from one through five, with one being very difficult and one being very easy. All three participants rated the app a five, although two suggestions were to include a search bar to search the entire app or ask questions, and include a Frequently Asked Questions screen. Participants also did not have any major issues regarding aesthetics. Suggestions in this category included creating a mascot for improved engagement, and audio or visual feedback when answering questions (green backgrounds for correct answers and red backgrounds for incorrect answers). When asked about the usefulness of the application, all three participants rated the app as very useful.

Improvements to the application after this round of usability testing include visual feedback when answering test questions. The background color of those test item options that were selected, but incorrect were changed to red. Further improvements to the application will include images for the vocabulary words and audio components to assist with vocabulary pronunciation. These additions will also allow the application to cater to more various learning styles.

Generally, the application was well received. The final questions of the survey asked the participants about their likelihood of using and recommending the app. On a scale of one through five with one being very unlikely and five being very likely, all the participants rated it a three or higher (Figure 8). Similarly, when asked how likely they would be to recommend it to a friend, all participants rated the application a four or higher (Figure 9).
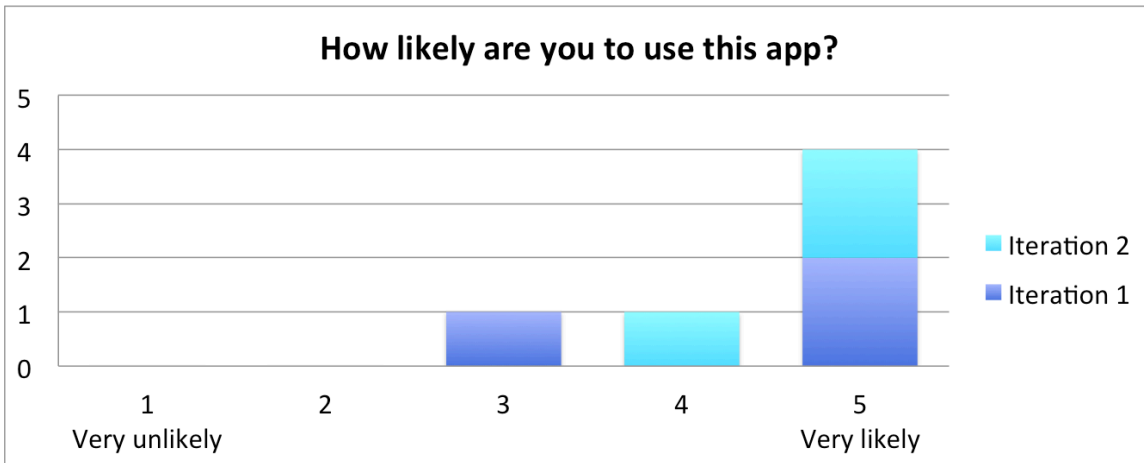
How likely are you to use this app?

Figure 8. Results of the question, "How likely are you to use this app?"

How likely are you to recommend this app to your friends?
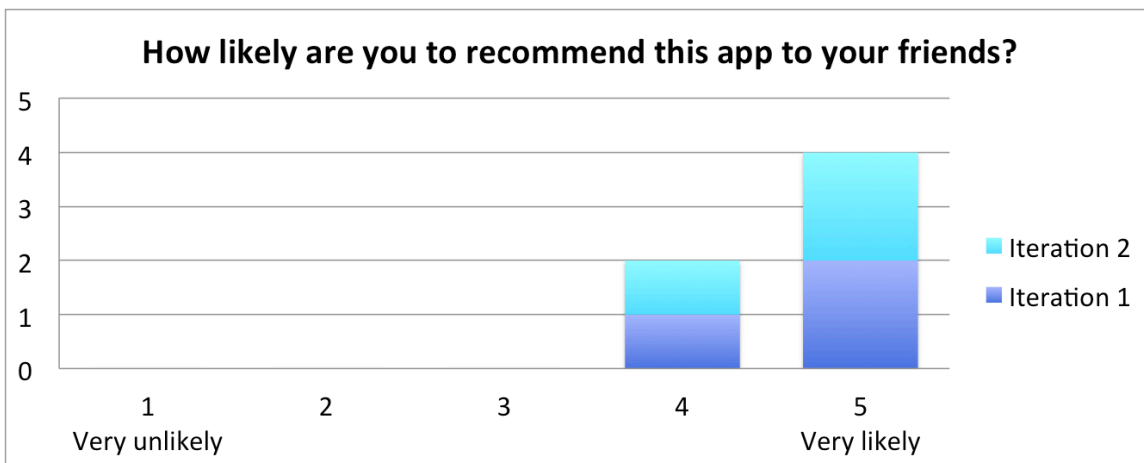
Figure 9. Results of the question, "How likely are you to recommend this app to your friends?"

Discussion

Ilokano To Go was overall well received and supported by participants. Both rounds of usability testing revealed suggestions for improvement regarding aesthetics, navigability, and usefulness, and revealed features that students believed would assist them in their language learning efforts.

Several technical issues arose throughout the development process. Although MIT's App Inventor provided many features that aided in the development process, applications were limited to ten different screens. This posed a problem as there were more than ten screens planned. To resolve this issue, screens such as the "About" screen were turned into "Notifiers," or alert windows that appeared over the current screen. Lesson test questions were also moved onto one screen, although visibility settings allowed questions to be hidden until after the current question was answered correctly.

Further App Inventor issues and limitations hindered the development process. One issue was the discrepancy between what was seen on the interface preview on the computer versus the actual interface on an Android device. Because of this discrepancy, component margins and text size had to be fixed multiple times (Figure 10). Adding to the development time were other various programming limitations. Entire screens and individual visual components could not be copied from screen to screen so each component that was the same from one screen to another, for example the "Back" and "Home" buttons at the top of all screens had to be inserted into each screen, then have its properties modified to match. Furthermore, although App Inventor included an easy way to view live previews on any Android device, the app that accompanied the tool would frequently crash and a "Companion Connection Error" would be shown on the screen.
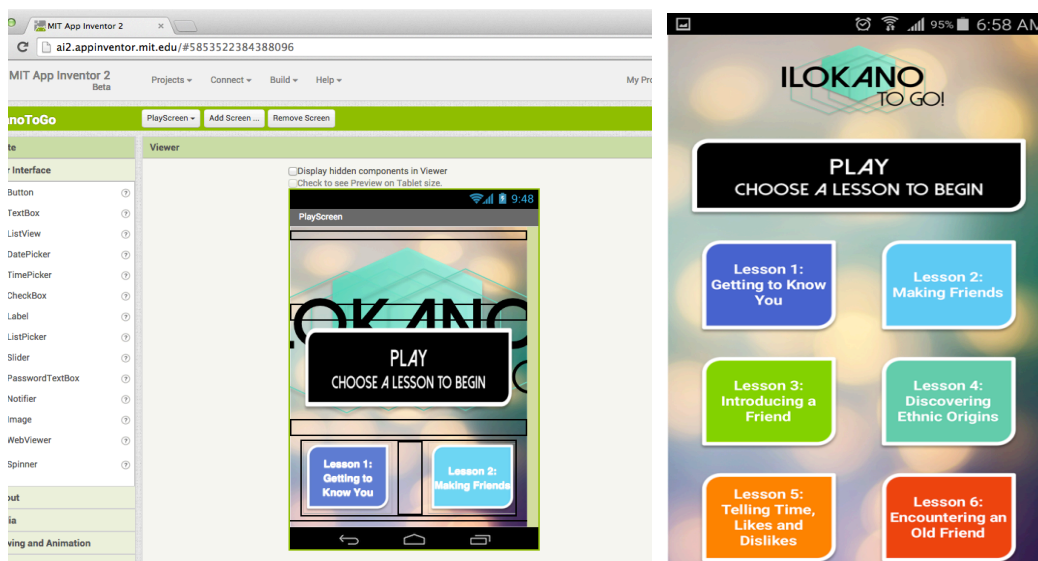

Figure 10. Interface preview on computer versus actual interface on Android device.

In examining the application and its adherence to the FRAME model, a few observations were made. Navigational and aesthetic components had to be considered carefully as the specific device used in testing was an Android smartphone, and learners who were used to iPhone or Windows application conventions had to be taken into account. In the FRAME model, the device and aesthetics of the interface play a role in user satisfaction and psychological comfort (Koole). Because the Android was the only available device, the application had to be designed in such a way that it did not have to rely on specific smartphone conventions or hardware, such as the "Home" button on an iPhone or the "Back" button on an Android, so that users who were used to the aesthetic and functional components of iPhone, Windows, and other smartphones could navigate the application successfully. It should be noted that all six participants of the usability study were iPhone users, however, all six rated the navigability of the application as "very easy."

In addition to improvements suggested by usability study participants, the criteria set forth in the social aspect and social technology intersection of the FRAME model was also examined so that the application could be further improved and provide a more ideal learning experience. This aspect and intersection involve ways in which the learner can

use the app to learn and connect with other learners and other resources. Improvements to the app could include the integration of collaborative tools and activities such as messaging, chatting, or open forum.

Furthermore, the researcher does recognize the limitations of this usability study. Only two iterations of usability testing were conducted, and only three participants were involved in each round of testing. Quantitative and qualitative data was limited as a result.
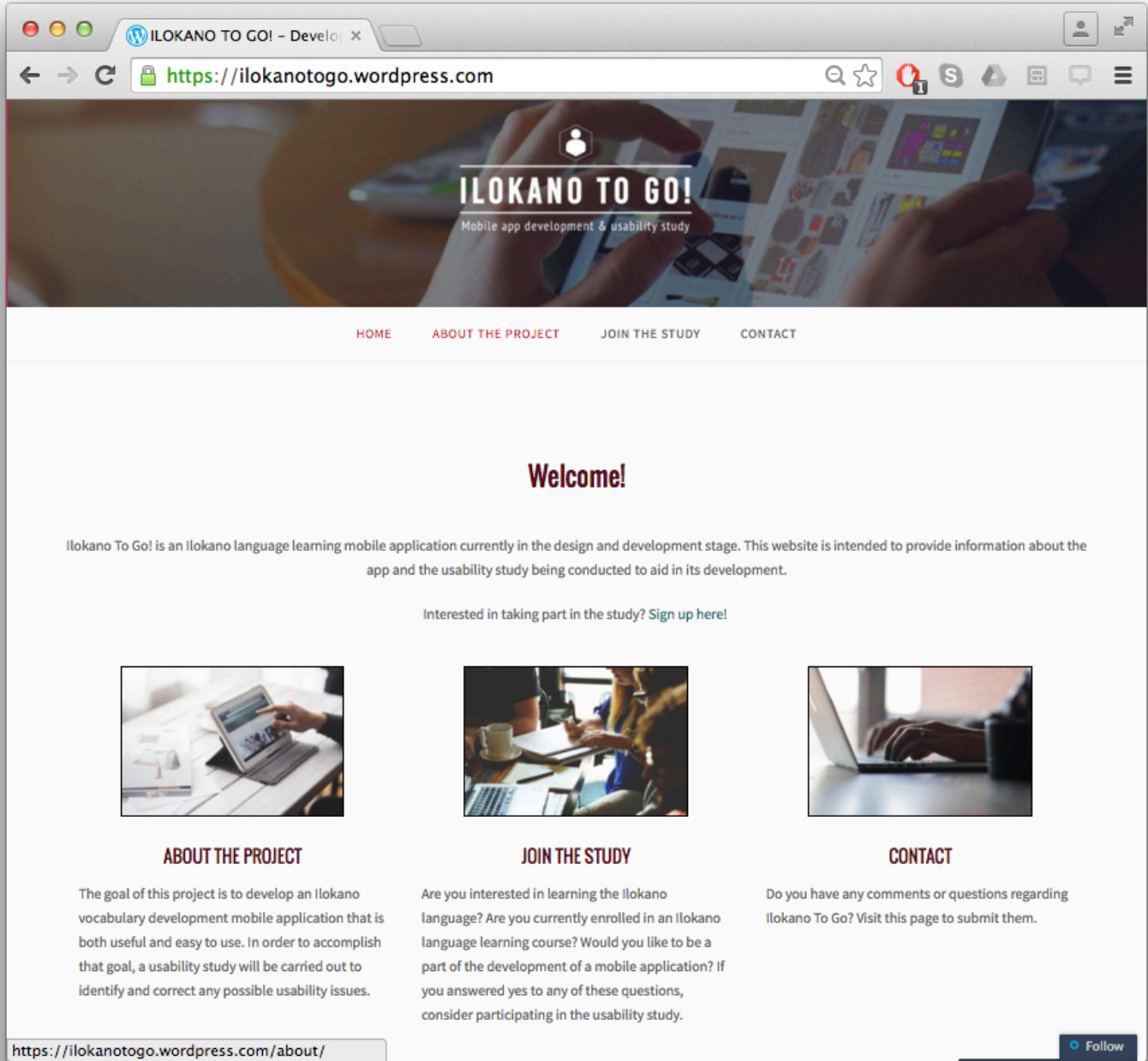
Conclusion

The affordances offered by smartphones and other mobile devices give them the potential to be powerful language learning tools. The idea behind this usability project is to provide Ilokano language learners with a tool that they can utilize to assist them with their vocabulary development. Utilizing feedback from each iteration of usability testing helped to redesign and improve the app's ease of use.

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Appendix A

Ilokano To Go Website Screenshots

About the Project

Ilokano To Go!

Ilokano To Go! is an Ilokano vocabulary development mobile application designed for those learning Ilokano at the beginner-intermediate levels. It provides users with a way to review and test themselves on varying vocabulary and phrases.

The goal of this project is to develop an application that is both useful and easy to use. In order to accomplish that goal, a usability study will be carried out to identify and correct any possible usability issues.

What is a usability study?

In a usability study, A participant is asked to provide feedback for a website, application, or other product. There are usually a few tasks the participant is asked to complete, and the participant is asked to think out loud while performing these tasks. How the participant accomplishes these tasks and what they say during these tasks can help product developers improve their products.

Appendix B

Usability Study Data Collection Instruments

Ilokano To Go! Pre-test Survey

This pre-survey is designed to gather background information regarding demographics, Ilokano language background, and technology use for research purposes only, and is not meant to assess your individual performance. This pre-survey is to be completed before participating in the usability test.

Participant Number:

Age (if you prefer not to answer, please type in "prefer not to answer"):

Race/Ethnicity:
- o African American/Black
- o Asian/Pacific Islander
- o Hispanic/Latino
- o Multiracial
- o Native American/American Indian
- o White
- o Not listed (please specify)
- o Prefer not to answer

Sex/Gender:
- o Female
- o Male
- o Transgender
- o Prefer not to answer

Demographic Questions

Are you of Ilokano descent?
- o Yes
- o No

Does anyone in your family speak Ilokano?
- o Yes
- o No

How often do you hear Ilokano being spoken?
- o   Every day
- o   A few days a week
- o   A few days a month
- o   Never
- o   Other:

Where do you hear Ilokano being spoken? Please select all that apply.
- o   At home
- o   At school
- o   At work
- o   I do not hear it being spoken.
- o   Other:

Ilokano Language Questions

Are you currently enrolled in an Ilokano language class?
- o   Yes
- o   No

If you are currently enrolled in an Ilokano language course, which course are you enrolled in?
- o   Ilokano 101
- o   Ilokano 102
- o   Ilokano 107
- o   Ilokano 201
- o   Ilokano 202
- o   Other:

How would you rate your current level of Ilokano vocabulary knowledge?
- o   Very unknowledgeable
- o   Unknowledgeable
- o   Neutral
- o   Knowledgeable
- o   Very knowledgeable

How would you rate your ability to learn Ilokano vocabulary?
- o   I have a very hard time learning it.

o   I have a hard time learning it.
o   Neutral
o   I can learn it easily.
o   I can learn it very easily.

How would you rate your ability to retain Ilokano vocabulary?
o   I have a very hard time retaining it.
o   I have a hard time retaining it.
o   Neutral
o   I have an easy time retaining it.
o   I have a very easy time retaining it.

Technology Questions

Which mobile devices do you use the most? Please select all that apply.
o   Smartphone
o   Tablet

Do you own a smartphone or tablet that allows you to download applications?
o   Yes
o   No

If you do own a smartphone or tablet, what model do you own and which operation system does it use?
(e.g. Samsung Galaxy 5 - Android, iPhone 6 - iOS, etc.)

Have you ever used a mobile app to learn another language?
o   Yes
o   No

If you have used a mobile app to learn another language, what apps have you used?

How comfortable are you using a touchscreen interface?
o   Very uncomfortable
o   Uncomfortable
o   Neutral
o   Comfortable

- Very comfortable

Usability Protocol

Protocol modified from Usability Script - Rocket Surgery Made Easy © 2010 Steve Krug

Technology Set-Up Checklist (Facilitator)
1. Facilitator should set up his/her mobile device
2. Plug in to a power outlet (don't trust the battery)
3. Prepare screen-casting software and other recording equipment and do a brief test to ensure that video of screen is captured, video of fingers/hand is captured, and audio is captured

After mobile device is set up:
1. Load the app
2. Start the recording software

Facilitator Script

Hi, *[insert participant's name]*. My name is Bhonna Gaspar and I'm going to be walking you through this session today. First I'd like to thank you for participating in this research project.

The purpose of this usability study will be to evaluate the ease of use of an Ilokano vocabulary development mobile app for students here at the University. Before we begin, I have some information for you, and I'm going to read it to make sure that I cover everything.

I am asking people to take a look at a mobile app that I designed. I would like to see what you think of it and how you think you would complete a few tasks with an interface like this. The session should take no more than 45 minutes.

The first thing I want to make clear right away is that we're testing the app, not you. You can't do anything wrong here. In fact, this is probably the one place today where you don't have to worry about making mistakes.

As you complete the tasks, I'm going to ask you as much as possible to try to *think out loud*: to say what you're looking at, what you're trying to do, and what you're thinking. This will be a big help to me. Also, please don't worry that you're going to hurt my feelings. I'm doing this to improve my designs, so I need to hear your honest reactions.

If you have any questions as we go along, just ask them. I may not be able to answer them right away, since we're interested in how people do when they don't have someone who can help. But if you still have any questions when we're done I'll try to answer them then.

And if you need to take a break at any point, just let me know. You can also choose not to do a task, and you can withdraw from this study at any time. Do you have any questions so far?

Ask participant a few preliminary questions:

OK. Before we look at the site, I'd like to ask you just a few quick questions about your experiences with mobile apps.

1. Have you ever built or helped edit an app?
2. If so, what program or software did you use?

OK, great. We're done with the questions, and we can start testing out the app.

Task One: Initial Reactions and Navigating the App

I'm going to ask you to look at the start screen and tell me what you make of it:
- Is there anything that strikes you about it?
- What do you think this app does?
- What options are available to you from this screen?
- Is there anything else that stands out to you? Just look around and do a little narrative.

Please let me know when you feel as if you've finished the task.

Thanks for doing that. You did a great job. Now I'm going to ask you to try doing some specific tasks. I'm going to read out a scenario and I would like you to try and complete the task given in that scenario. Again, as much as possible, it will help us if you can try to think out loud as you go along.

Task Two: Scenario -- Reviewing a Lesson's Vocabulary

Imagine that you are currently studying the very first lesson of your Ilokano language class. The topic of the lesson is "Getting to Know You," and although you are motivated to learn, you find yourself struggling with the vocabulary of the lesson.
- How would you see all the vocabulary presented in that lesson?
- Which buttons do you select to get there?
- How do you feel about the presentation of the vocabulary?
- What do you think about the choice of font?
- Is anything distracting you from focusing on the vocabulary?
- If you could change anything here, what would you change?

Please let me know when you feel as if you've finished the task.

Great! We're almost finished, so let's keep going from here.

Task Three: Scenario -- Testing Your Vocabulary Knowledge

Now that you've reviewed the vocabulary of that lesson, you feel confident enough to test yourself on those words.
- How do you test your vocabulary knowledge?
- Which buttons do you select to get there?
- What kinds of activities do you expect to find to test your knowledge?

Please let me know when you feel as if you've finished the task.
- What did you think of the exercises?
- Did you find the text or images distracting?
- If you could change anything here, what would you change?

Thank you for answering those questions! We're on the last task.

Task Four: Scenario -- Navigating to Find Help and Other Resources

You were able to learn the vocabulary presented in lesson one, but now you find yourself struggling to keep up the lessons.
- Where on the app would you go to find other resources that may help you? Why?
- Which buttons do you push to get there?
- What types of resources do you expect to find?
- What types of resources would you like to include?

We are done with the main questions, but I have a few more general questions to ask you.

1. On a scale of 1 to 5, with 1 representing very difficult and 5 representing very easy, how would you rate your experience during today's testing?
2. Did you find the app aesthetically pleasing? If no, how could it be improved upon?
3. After participating in this study, would you recommend this app to any of your peers? Why?
4. Do you have any suggestions that would improve the experience of this usability test? If so, please tell me.

That's the last question. Do you have any questions for me, now that we're done?

I want to thank you for your time and willingness to be a participant in this study.

Stop the screen-casting software and camera.

After the Session:

1. Save the recordings

2. Quickly scrub through the video to ensure the integrity of the audio and video

Thank you for your time!

For use by Researcher only

Usability Test Observation Guide

Test Date: Round:
Test Location: Participant Number:

Task	Notes
1	
2	
3	
4	
Other Notes	

Abbreviations:

P – Participant   V – Verbal Comment   TS – Touchscreen

Others:

Ilokano To Go! Post-test Survey

This post-test questionnaire is not meant to assess your individual performance. It is designed to gather information regarding overall satisfaction and feedback about the mobile application. This information is to be used for the research purposes only. Your responses are anonymous. This post questionnaire is to be completed after the usability test.

Because your responses will help make improvements to the usability of this website and instructional modules, please respond in as much detail as possible. Thanks!

* Required

Navigability

How easy was the app to navigate? *
- o   Very difficult
- o   Difficult
- o   Neutral
- o   Easy
- o   Very easy

Were there any confusing links or buttons? If yes, which links or buttons were most confusing?

If there were something about the navigation you could change, what would you change?

Aesthetics

How easy was the font to read? *
- o   Very difficult
- o   Difficult
- o   Neutral
- o   Easy
- o   Very easy

Did you find any images distracting? If yes, which images were most distracting?

If there were something about how the app looked that you could change, what would you change?

Usefulness

How useful is the content of this application to you? *
- o Very useless
- o Useless
- o Neutral
- o Useful
- o Very useful

How useful is the content of this application to you? *
- o Very useless
- o Useless
- o Neutral
- o Useful
- o Very useful

Are there any features that you thought were useless? If yes, which features?

Are there any features that you think would make the app more useful? If yes, which features?

General Questions

How likely are you to use this app? *
- o Very unlikely
- o Unlikely
- o Neutral
- o Likely
- o Very likely

How likely are you to recommend this app to your friends? *
- o Very unlikely
- o Unlikely
- o Neutral
- o Likely
- o Very likely

Do you have any suggestions for improvement?

Appendix C

Ilokano To Go Mobile Application Screenshots