

No Nā Hale: Developing an Interactive iBook to Promote Learning for the Hawaiian Immersion Lower Elementary Classroom

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[iBooks file for No Nā Hale](#)
[Pdf of No Nā Hale](#)

Abstract: While Hawaiian immersion classrooms have been equipped with 21st century technologies, there continues to be a void in interactive, open-source, digital resources in the Hawaiian language. This paper reports on the analysis, design and development of a Hawaiian language interactive e-book (iBook). The published *No Nā Hale* book was developed into an iBook using the authoring software program, *iBooks Author*. Interactive multimedia widgets were created and embedded into *No Nā Hale* to supplement the book's content. An animated and narrated introduction video, interactive glossary, audio read-aloud feature, multiple image galleries, an embedded Google survey, review quizzes and audio help features were strategically integrated within the iBook through a series of prototype iterations. A usability study was conducted to evaluate the satisfaction and effectiveness of a Hawaiian language iBook for learning with second grade Hawaiian Immersion public school students. Based on feedback, Mayer's Cognitive Theory of Multimedia Learning principles and the Universal Design for Learning methods, various additions and improvements were made to the prototype including: page numbers, a user-guide, translated widget titles, an additional review question quiz and photo captions. The progression of *No Nā Hale* from a paper format to an interactive iBook format will be discussed and how each interactive component promotes learning.

Introduction

As learners and educators, we understand the impact that instruction has on learning when it is aligned with students' needs and preferences. Understandably, elementary students today are different than their teachers, parents and even recently graduated peers. They live in a world where technology is ubiquitous in almost every aspect of their lives, so much so, that many expect it to be part of their daily school experience. However, not all teachers or schools have transitioned to this 21st century way of life. Many educators still rely upon traditional instructional methods by giving lectures followed by paper-based assessments that may not suit the needs and preferences of today's digital learners (Yong & Hoffman, 2014).

Public schools in Hawai‘i that are part of the Hawaiian Language Immersion Program (HLIP) struggle to keep up with the trends of today. Despite many immersion classrooms having the necessary equipment to take advantage of the power of technology, most struggle at doing so due to a severe shortage of Hawaiian-medium digital materials. The lack of open-source, Hawaiian-medium and web-accessible curriculum available for the HLIP continues to plague this learning community (Galla, 2009; Yong & Hoffman, 2014). This is especially critical given that language scholars foresee the future of the language’s survival being dependant largely on technology (Galla, 2009).

Therefore, in response to this problem, a Hawaiian language interactive iBook was designed and developed for elementary immersion students. This iBook prototype will hopefully encourage other educators in the Hawaiian language community to develop more Hawaiian language iBooks and research its effects on learning. The purpose of this usability study was to develop and evaluate an iBook’s effectiveness and satisfaction for second grade Hawaiian Immersion students.

Literature Review

One specific contemporary technology that has been growing in popularity amongst a variety of educational institutions is interactive digital books (Chong, Lim & Ling, 2009; Dameg, 2015). Interactive digital books (iBooks) are electronic books (eBooks) enhanced with various features that offer users an interactive experience such as embedded media, audio narration and hyperlinks. iBooks present information to readers through a variety of modes such as audio, text, narration and animation making it align with a variety of learning styles and needs. Recent studies suggest that second-language learners prefer using iBooks over other learning materials (Dameg, 2015; Chong et al., 2009). Furthermore, iBooks intended for language classrooms can offer users with opportunities to practice newly acquired language skills in private and at their own pace without the pressures of being in a face to face classroom (Saqlain, 2012). In the past, paperback and digital books were the most popular methods for dissemination and transmission of knowledge (Bozkurt, 2015) until just recently when electronic book collections, including iBooks, began gaining popularity amongst libraries and educational institutions (Bozkurt, 2015; Chong et al., 2009).

iBooks Author is a free e-book publishing tool that allows virtually anyone to create and publish multi-touch interactive electronic books (Torique, 2013; Payne, Goodson, Tahim, Wharrad & Fan, 2012). Interactive iBooks created on iBooks Author contain interactive widgets that are embedded into the iBook including Keynote presentations, videos, photo galleries, interactive images, three-dimensional animations and chapter review questions. Besides the interactivity of an iBook, users in various studies report that one of the greatest benefits of iBooks is its high portability. iBooks can be accessed ‘on the go’ without being connected to the Internet (Bozkaya, 2015; Payne, Goodson, Tahim, Wharrad, Fan, 2012). In addition, iBooks can hold enormous amounts of information in a variety of formats and is highly durable (Bozkaya, 2015). Students no longer need to

carry backpacks loaded with numerous traditional textbooks, instead multiple texts can be transported on a single, handheld device without being damaged during use.

The idea of harnessing the capabilities of technology for language instruction has been around for a long time. A proven method, Computer-Assisted Language Learning (CALL) has had positive results with student learning. This was especially true when CALL materials were interactive in nature (Heift & Chapelle, 2013). iBooks created on iBooks Author are an example of a recent technology that has similar features to CALL and offer a variety of interactive features to be included in its design.

Universal Design for Learning (UDL) is a scientifically valid framework for guiding instruction to align with many types of learning styles. It consists of using proactive instructional strategies to meet the needs of a diverse student population (Rao, Ok, & Bryant, 2014). Universal design aims at providing all students, including those who are learning a new language or who possess learning disabilities, with opportunities to learn in a way that suits their learning needs. Second-language students at the University of Hawai'i at Hilo accessed their universally designed language instruction through various widgets embedded into an iBook including audio recordings, links to pertinent language resource websites, digital worksheets and an audio option to listen to dialogue amongst proficient speakers (Dameg, 2015). iBooks were reported to be pleasing to use and those students who used them scored higher academically than those students who instead used traditional text for learning (Dameg, 2015; Torigue, 2013).

A combination and coordination of verbal presentation modes such as narration and on-screen text along with nonverbal presentation modes such as graphics, video, animations and environmental sounds have been found to facilitate learning and are known as the Cognitive Theory of Multimedia Learning (Moreno & Mayer, 1999). Based on this theory, implications for effective iBook design are that a variety of modalities be used to deliver the iBook's content. The widgets within iBooks make it possible for learners to access information using multiple learning channels. Subsequently, many Special Education students who struggle with working memory deficits benefit through activities that support this theory.

The primary purpose of a usability study is to improve a design. Real users test out a product by accomplishing real tasks within the product. Understanding how long a user spends on a specific task and how successful they are at meeting proficiency, provides insight to improve the product. Time spent testing technology with its intended users has resulted in products that are easier to use and are much more effective (Saragosa, 2014). Usability studies allow designers and developers opportunities to gain empathy for users and to think of alternative designs that better support their tasks and work flow (Usability Testing Basics An Overview, n.d.). Data suggests that conducting usability studies can help developers better understand how real-life users interact with a product such as an iBook and make improvements based on the results.

Project Design & Development

At the onset of this project, I was granted permission to use an existing book in my project that was published by the *Hale Kuamo 'o Hawaiian Language Center*. I selected a novice-level book titled, *No Nā Hale* (Figure 1) to transform into an iBook.

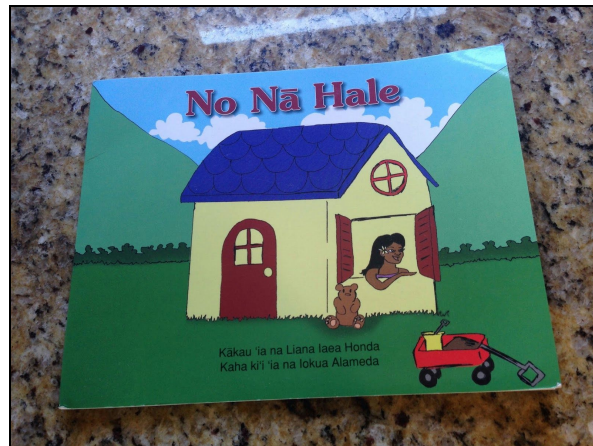


Figure 1. Paper version of Book

The content in the book focused on two learning goals. The first was familiarizing students with vocabulary terms for ‘opposites’. The illustrations and text used throughout the book presented a variety of opposites using images of houses. For example, a large house was described on one page and a small house on the next (Figure 2). The second learning goal focused on a specific sentence structure in Hawaiian known as the *Pepeke 'Aike He*. This sentence structure is a foundational language pattern essential for novice speakers of the Hawaiian language. In English, this sentence pattern would be equivalent to: “This is a _____”.

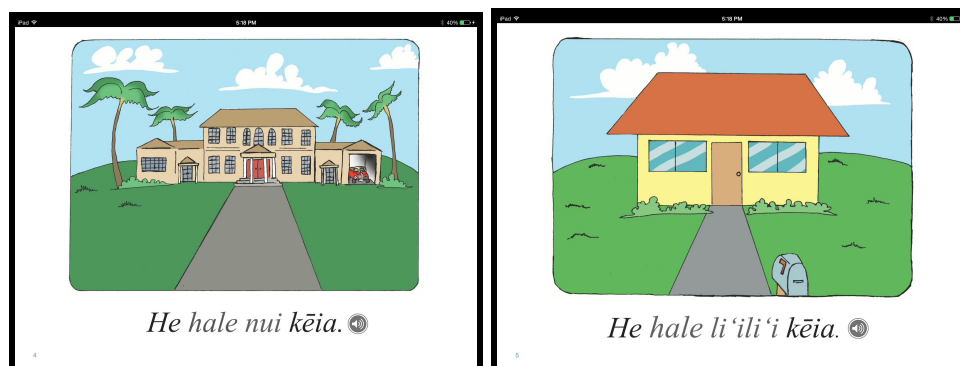


Figure 2. Example of page content




iBook Design





A rapid prototype was developed using the iBook software developing tool, iBooks Author. The non-interactive illustrations and text from the book were uploaded onto separate pages within iBooks Author. The main objective at this point of development

was to utilize negative white space during the layout of text and graphics to aid in readability (Hagen & Golumbisky, 2013). The background was kept uncluttered and extra space was included by adding blank pages into the book for further development of interactive content. A priority was to make pictures and words work together in the given space to meet the needs of the iBook's intended audience. According to Hagen and Golumbisky's book, *White Space Is Not Your Enemy* (2013), knowing your audience well is critical for developing visual communication that resonates" (p. 10). Enhancing children's verbal and visual experiences through aesthetically appealing ebooks has been effective at improving readers' experiences (Harms & Lettow, 1998). At this point in development, the iBook only contained images and text.

Because scrolling, clicking, computing, and interactive widgets are considered to be the strongest components of iBooks, the interactive features added to the iBook focused on incorporating these key components into the iBook's design to improve learning (Table 1) (Payne et al., 2012). Some of these elements required using outside programs and software to develop them before insertion such as Keynote, iTunes, QuickTime and iMovie.

Table 1. Learning Outcomes for each Interactive Learning Feature

Interactive Feature	Learning Outcomes
<p>Media Widget: Audio buttons</p> 	<ol style="list-style-type: none"> 1. Learn proper enunciation and intonation of the Hawaiian language. 2. Use multiple learning channels (visual and auditory) to support learning (Moreno & Mayer, 1999).
<p>Intro-media video</p> 	<ol style="list-style-type: none"> 1. Ensures that students are aware of the book's learning goals 2. Gives clarity of purpose 3. Focuses learner's attention 4. Provides a reference point for self-assessment 5. Allows for reflection before reading 6. Caters to a variety of learners (Universal Design)
<p>Google form</p> 	<ol style="list-style-type: none"> 1. Collects relevant data 2. Assessment opportunity 3. Evaluation of learning and/or content 3. Personalize learning 4. Second language students are able to contribute and use newly acquired skills to communicate authentically with author/teacher.

<p>Touch glossary</p> 	<ol style="list-style-type: none"> 1. Supports the clarification of vocabulary and symbols 2. Interactive learning 3. Does not interrupt the flow of the students' attention when looking for vocabulary definitions 4. Images provide young, second-language learners vocabulary definitions in a quick and effective way
<p>Popover audio help feature (Kōkualani)</p> 	<ol style="list-style-type: none"> 1. Encourages autonomous learning 2. Provides learners with help without having to seek physical help from a parent or teacher. 3. Second language learners can learn new vocabulary and sentence structures
<p>Review questions</p> 	<ol style="list-style-type: none"> 1. Aids in retention of material 2. Helps learners to generalize information 3. Encourages reflection 4. Promotes autonomous learning - Learners can self test and reflect upon what was learned 5. Provides immediate feedback to students about what they have or have not learned
<p>Interactive picture Galleries</p> 	<ol style="list-style-type: none"> 1. Images supplement content 2. For second language learners, captions below photos can supply descriptive vocabulary and appropriate sentence structure in the target language 3. Photos and captions within galleries were organized into a coherent pictorial representation which has been known to support learning better than text alone (Moreno & Mayer, 1999).

The first interactive feature added to the iBook were audio widgets. Using the media widget option, an audio icon was placed next to all text passages in the iBook (Figure 3). This feature provided users with the opportunity to have the text read to them by a fluent speaker using proper enunciation and intonation of the Hawaiian language. The audio option enabled users to use both their visual and auditory learning channels while learning which is known to be an effective approach for learning (Moreno & Mayer, 1999). The recordings for each audio widget were recorded using QuickTime, saved to iTunes and uploaded to each page within the iBook.

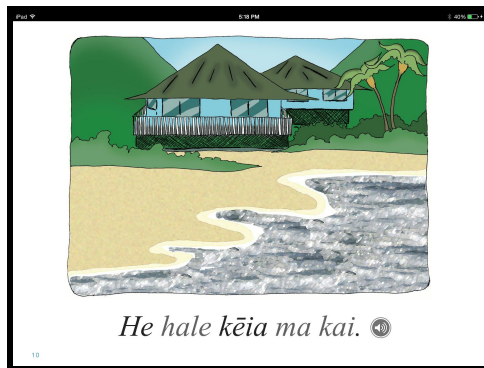


Figure 3. Audio widget example

An interactive glossary was the next interactive feature added to the iBook. Essential vocabulary terms for the learning objectives of the book were linked to this glossary feature (Figure 4). This feature enabled learners to be able to click on words to view their definitions. When clicked on, each word's definition would pop-up in an overlay above the word. Photographs were used to define each term instead of text in order to support the learning needs of early elementary second-language learners (Figure 5). Because of the embedded glossary links, readers could quickly look up a word's definition while reading without having to leave the book to do so. Words that were glossary linked appeared in a different font color that made it easy for users to identify (Figure 4).

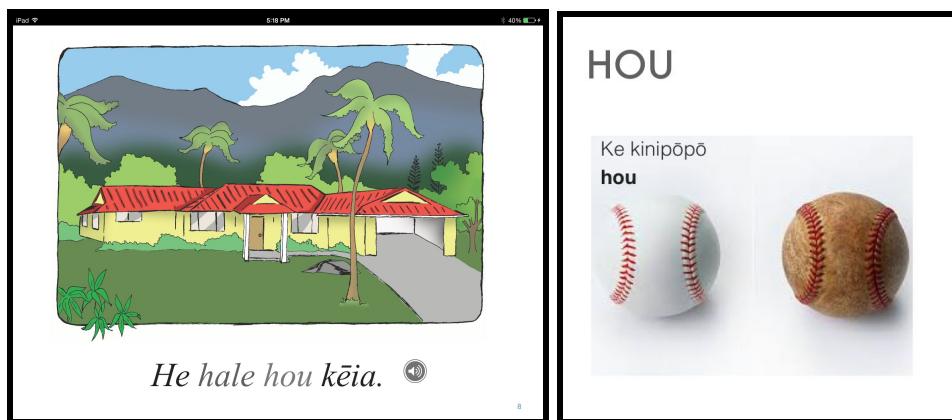


Figure 4. Words are grey when linked to glossary **Figure 5.** Illustrated definitions

An introduction video was designed, developed and inserted into the iBook and served as a means to orient the reader and provide some context before they read the iBook (Figure 4). A slideshow presentation including a fictitious caterpillar named Kōkualani was created using the presentation software program Keynote. Narration for the slides was recorded in Quicktime but done so from the perspective of the caterpillar Kōkualani. The recording and slides were meshed together and further animated using a video editing software application iMovie. The movie was finally uploaded into the iBook that readers viewed first after opening the iBook.



Figure 6. Animated introduction video

The next interactive features added to the iBook were image galleries. Instead of viewing just one image on the page, users were able to scroll through a collection of interactive photos in the image galleries. These image galleries were used to support the two learning goals for this book. For example, one of the image galleries contained pictures of a variety of old and new items (opposites). Each picture within the gallery had a caption that used the *Ka Pepeke 'Aike He* sentence pattern explaining what the picture was. For example, if there was a picture of an old car, the text would read, *He ka 'a kahiko kēia* (This is an old car.). The other two image galleries focused on other opposite sets.

The review widget was used to insert two separate review quizzes into the iBook (Figure 7). One of the two quizzes focused specifically on the *Ka Pepeke 'Aike He* sentence pattern. The other quiz focused on vocabulary terms for opposites. These review question widgets allowed users to review what they just read and learned in the book. Readers were able to comfortably practice their newly acquired knowledge right in the book, scroll back to find information if needed and receive immediate feedback regarding their newly acquired language skills. Questions were formatted using images when necessary to suit the needs of the learner.



Figure 7. Review questions containing images

Interactive learning has been known to aid in the learning process (Heift & Chapelle, 2013). Another type of widget that allows users to further interact with an iBook are embedded surveys. The information collected through surveys is organized and sent directly to the designer's Google Drive for immediate access. Using a widget creator website named Bookry, a Google survey was created and embedded into the final iteration of the iBook using the media widget as a hyperlinked image (Figure 8 and 9). Readers were prompted to tap on the image which then took them to the live survey to complete. There were 6 questions to answer such as: student's name, school, how they liked or disliked the book as well as their favorite and least favorite features in the iBook. Utilizing surveys in iBooks provides users with additional opportunities to apply their new Hawaiian language skills in an authentic and relevant way. Additionally, data collected through surveys provides important evaluative information that can be used to improve the overall design and usability of an iBook.



Figure 8. Page containing link to survey

Figure 9. Section of actual survey

Modifications

There were numerous modifications made to the iBook. Additions and improvements were made over a period of six months. Modifications to the iBook's page layout were made to improve navigation within the iBook. Pages were grouped into chapters to organize the iBook's content. A user guide page containing simple instructions for operating the iBook was designed and inserted at the start of the iBook (Figure 10). This new page provided new users with the basic skills to operate the iBook and more advanced users with the option to quickly skip over it and proceed.

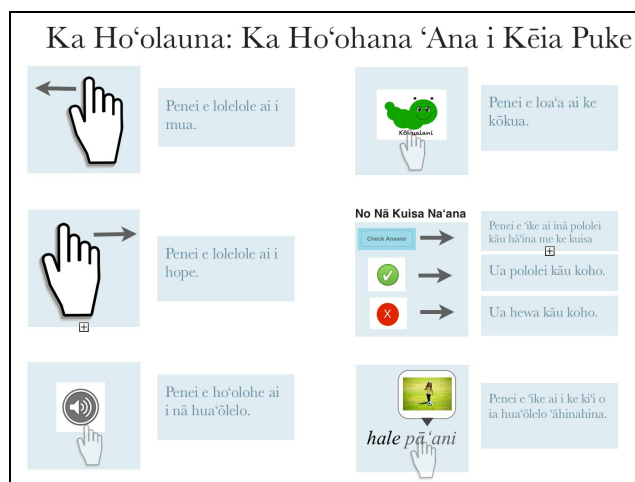


Figure 10. Page added containing user instructions

Conclusion

The development of the iBook, *No Nā Hale* was a success. *No Nā Hale* was transformed into an interactive, digital, open educational resource that will increase the selection of 21st century resources available for the Hawaiian language community. Most importantly, it is my hope that this study will promote future research to explore further development of Hawaiian language interactive iBooks and their learning implications. Future steps for this project will include formatting *No Nā Hale* to be compatible for publishing, so that *No Nā Hale* can be available on the iBooks Store to download for free.

Many of the interactive features within iBooks support research-based learning theories. Second-language students are afforded with additional opportunities that traditional paper-based books do not provide such as listening to audio clips, watching videos, answering review questions or replying to live surveys. Learning will no longer be packaged as one size fits all. Instead, instruction will be available in multiple formats, making it universal for a wide variety of learners. Students will no longer be dependant on face-to-face classrooms to learn and will be able to extend their learning experience according to their needs and preferences.

Digitizing and designing the interactive features that supplemented the existing content of *No Nā Hale* took many hours of work. Creating rich, interactive iBooks in the Hawaiian language that are pedagogically sound and aligned with users' needs requires a developer to possess a significantly broad set of skills. Relying upon one individual to do so would not be ideal. As the developer in this study, it is my recommendation that iBooks be developed by a team including at least one expert from each field (Torigue, 2013). Collaboration would help to optimize the process and quality of future Hawaiian language iBooks.

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