

Abstract

This research focuses on the development of an application to aide non-verbal autistic students.

The purpose of this study is to determine the unique aspects of developing software, as well as the similarities and differences compared to the traditional development process, for students with special needs, as well as laying the groundwork for an Open Distribution program under SWOSU for future developers.

The special needs community can be a very niche market depending on the type and severity of the condition, and is often overlooked by software application developers.

This study follows the development of an Android based communication application for a low cost tablet; this product is a work in progress.

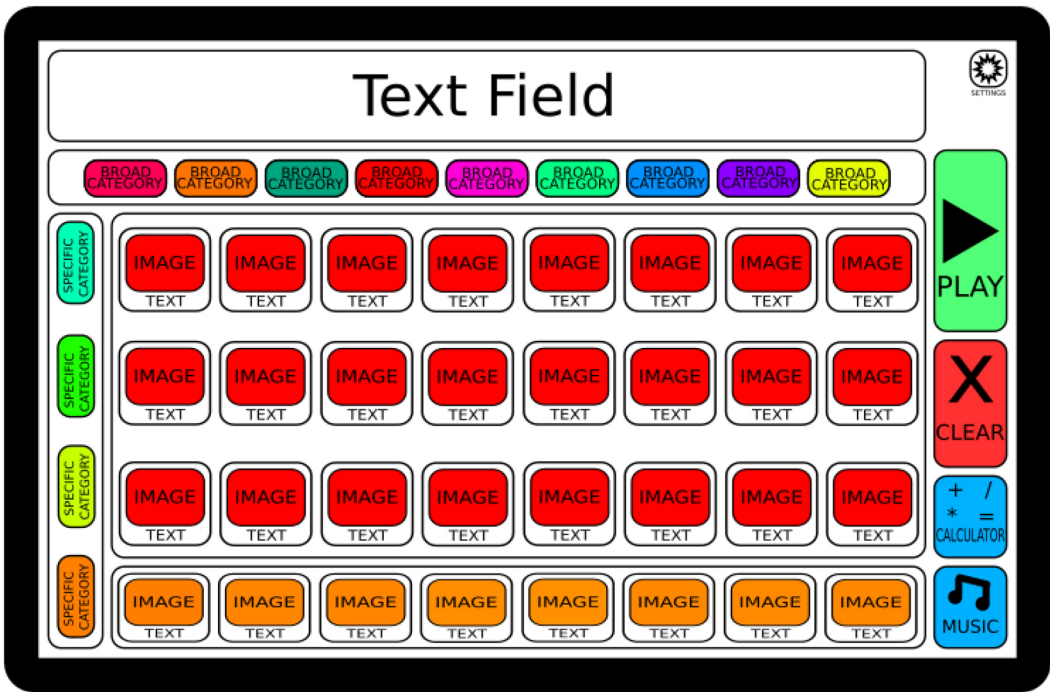
Problem Description

- Severe non-verbal autism means difficulty communicating with others in traditional ways, but technology can help.
 - Aid tablets that run specialized software have been a significant help in giving non-verbal students a voice.
- There are two target users for this application that each have unique needs.
 - The autistic student needs simple interfaces with multiple ways of communicating a buttons function, and they should not be able to alter the content or layout of the application
 - The guardians of the autistic students need to be able to easily customize the content and layout of the application without needing to jump through hoops to make it best suit their student.
- The solution currently on the market is not easily available
 - The current aid device, while exceptionally designed, can cost between \$5000 and \$7000. This means the only way to get one is through an insurance company, which can be a lengthy process.
 - The applications are not necessarily easy to customize, needing a trained technician to make the desired alterations.

Product Design

- To best solve these problems, the application will aim to:
 - Emphasize simplicity in communication. Each button will have a text label and icon to identify its function.
 - Be familiar. Familiarity is important for those with autism, as change can be confusing. The applications layout is designed to be similar to the tablets currently available.
 - Give control to the caregivers. The text and image associated with each button will be customizable, allowing the caregiver to change the layout and design of the program to best suit the autistic student.
 - Have different modes for each user. A login screen will allow the caregiver to switch between multiple users. This will allow a caregiver to protect the student from accidentally changing the program.
 - Be easily accessible. The code is clean and well documented. The modular source code for the application is intended to be an ongoing project for future student developers and will be easily accessible through SWOSU websites.

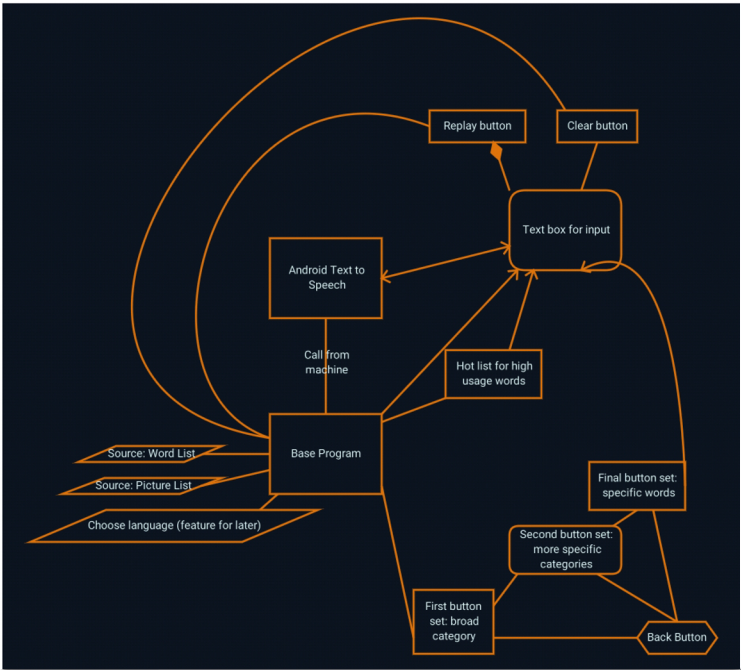
Application Design



Design Logic

- The layout for this application requires certain elements to remain stationary, while allowing other elements to be dynamic. The static components will be: the text-field; the “Speak” and “Clear” buttons; the “broad” category buttons; the “specific” category buttons; and a “Settings” button. The actual word buttons will be in a dynamic portion of the screen which changes based on the “broad” and “specific” buttons to make relevant suggestions. The text-field will be at the top of the screen, starting from the far left and proceeding three quarters of the way across the top of the screen. The “Speak” and “Clear” button will be located on the right of the screen and will be sized as development progresses. The “Speak” button will be green, and the “Clear” button will be red to better communicate their function to those who may have trouble with words. Each word will have the ability to display an image as well as the word itself as text as an additional aid.

Design Logic Flowchart



This diagram shows the logic map of the functions. Almost every function is tied to the text-field.

Project Future/Goals

- The primary goals for this project are: Text-to-Speech capabilities; Specialized Keyboard with enlarged buttons; Password protected settings function to customize layout and buttons.
- The secondary goals for this project are: A simple calculator with a speech function; A simple memory game; A basic music emulator.
 - These secondary goals do not affect the core functions, but give the program more scope.
- The future of this program is to be an Open Distribution under SWOSU for future student developers to learn from.

Current State

- The current build of this project has successfully implemented Text-to-Speech operations, and is operated by text buttons.



- This project is still a work in progress.

Works Cited

- <https://developer.android.com/studio/index.html>
- http://at.okstate.edu/detail.php?item_id=2991
- <https://www.nidcd.nih.gov/health/autism-spectrum-disorder-communication-problems-children>
- <https://www.ncbi.nlm.nih.gov/pubmed/19372766>