Express²

Project Express² Requirement Document

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1. Introduction

This application is intended to be an aid for children to young adults with Down Syndrome who have trouble articulating their thoughts to strangers in emergency situations. Express^2 hopes to give Users a sense of independence when they need it most. Users will be able to navigate through a phrase library to their desired sentence in an efficient and visually engaging manner. While the application will be primarily composed of a phrase library, it will also include integrated maps, settings, introductory tutorials and error reports. It is important to note that this application is not a replacement for speech or speech practice; it is merely an aid to these individuals, during times of distress, to ensure that they convey their thoughts to a stranger effectively and efficiently.

2. Intended Audience

The intended audience includes the people who satisfy the following criteria:

Criteria	Description
Age Range	Children to young adults.
Target Issue	Persons with Down syndrome who have verbal communication issues with people who are unfamiliar with their speech patterns.
Knowledge	Good understanding of basic English, both written and verbal. The person will need to know how to read and what they want to say.
Technical Experience	The person should have had previous interaction with touch-based technologies, such as the iPhone, iPad or iTouch, and speech applications. If not, they should have an external aid guide them through the learning process. This ensures that they will be able to operate the application independently.
Physical Ability	Sufficient motor skills to be able to work with the interface and sufficient eyesight to be able to see the text and pictures on an iPhone display.
External Aid/Guardian	Required for initial download and setup, to teach User how to operate the application, and to help with any issues the application might encounter thus ensuring that someone is there to use the help feature on their behalf.
Goals	To successfully communicate an immediate desire to someone who may have difficulty understanding them. To accomplish independent communication without the use of any aid in the future.

3. Features and Functional Requirements

3.1. Initial Setup

Upon downloading the app, the Guardian of the User will be prompted to create a 4-character password to be able to adjust the settings to the Users preference. Please note that only the Guardian is expected to have secure access to the settings thus allowing the User to focus on the applications primary purpose, to serve as an emergency aid. Initial Setup will also include storing the Users name, home and school address, emergency contacts and allergies.

3.2. Main Menu

The Main Menu comprises of three buttons: Phrase Library, Emergency Info and Options, which will be represented by a gears symbol. A majority of the buttons, text and pictures in this application have been made large so as to aid the User in a more efficient way to get them to their next point.

3.3. Phrase Library

The Phrase Library button leads to another screen displaying 3 buttons for Food, Actions and Feelings, to get the User started with their sentence. To see the phrase library hierarchy, please refer to Table 3.3-A. The Phrase Library button will be the gateway to the rest of the Phrase Library. The Food button will lead to another subcategory with the Snack, Drink, Meal and Allergies buttons. The Actions button will lead to another subcategory with the Need Help, I'm Lost, Home, Bathroom and Next Bus buttons. The Feelings button will lead to another subcategory with the Sick, Hurt, Too Hot, Too Cold, Tired and Sleepy Buttons. Upon pressing any of these tertiary buttons, the application will read out the sentence in the first-person.

Library Phrase	Pathway
I would like a snack, please.	Phrase Library > Food > Snack
I would like to have a drink, please.	Phrase Library > Food > Drink
I would like to have a meal, please.	Phrase Library > Food > Meal
I have the following allergies:	Phrase Library > Food > Allergies
I need help.	Phrase Library > Actions > Need Help
I am lost, can you help me?	Phrase Library > Actions > I'm Lost
I need to go home.	Phrase Library > Actions > Home

Where is the bathroom?	Phrase Library > Actions > Bathroom
When is the bus coming?	Phrase Library > Actions > Bus
I feel sick.	Phrase Library > Feelings > Sick
I am hurt.	Phrase Library > Feelings > Hurt
I am feeling too hot.	Phrase Library > Feelings > Too Hot
I am feeling too cold.	Phrase Library > Feelings > Too Cold
I am feeling tired.	Phrase Library > Feelings > Tired
I am feeling sleepy.	Phrase Library > Feelings > Sleepy

Table 3.3-A: A table with the list of phrases that will be implemented within the application. This list is designed to provide the User with communication options with another person during a time of need. The table also illustrates the path within the Phrase Library that the User has to go through in order to reach that phrase.

3.4. Emergency Information

The Emergency Info button leads to another screen displaying the user's name, their allergies, emergency contact information (name, number, relation), along with buttons for View Home Location and View School Location. Upon the initial run of the application, the Emergency Information screen will have a prompt asking the User for their location thus allowing the app to access the Users current location for the maps feature any time after that.

3.4.1. Home Location and School Location buttons

Upon pressing either button, if the User's mobile device has a network connection through Data or Wi-Fi, the integrated maps feature will display directions from their current location to their preset location of the Home or School address. If there is no network connection available, the application displays an address overlay in the Emergency Info screen.

3.5. Options Screen

This screen contains different option categories where the Guardian has the option to customize and learn more about the application. This screen includes buttons for the following screens:
• Settings
• Change Password
• Tutorials
• Error Report
• Credits

3.5.1. Password Protected Options

After pressing the Options button from the Main Menu, the application will advance into a screen requesting for the Guardian's previously set up password. This ensures that the User will not accidentally adjust the preferences set up by the Guardian. If the scenario occurs where the User accidentally accesses this screen, they can press either the Back or Cancel button to be brought back into the Main Menu. Should the Guardian forget their password, they have the option to press the 'Reset Password' button that resets the password to the one mentioned in their manual. For all intents and purposes, this password is currently 'Exp2'.

3.6. Settings

i. User Information
All titles (ex. Name, Home Address etc.) under 'User Information' will be represented by buttons which lead into a secondary screen with editable text fields. These secondary screens will display the relative text fields, a Back and a Save button. After entering the required information, the Guardian will have to confirm the changes by pressing 'Save'. This will activate a pop-up asking the Guardian whether they are sure of the edit, thus requiring them to press 'YES' or 'NO'. The 'YES' button will save the changes and return them back to the Settings Menu. The 'NO' button will not edit anything and return back to the currently displayed title screen. The Guardian will need to fill in the User's Name, Home Address, School Address, Emergency Contact (names, number and relation to User) and Allergies to ensure full functionality of the application.

ii. User Preferences
User Preferences will be saved automatically, without any confirmation messages. The Guardian can choose between the following options:

- Voice Gender Option: The Voice Gender Option gives the Guardian an option of changing the gender voice of the output audio file from the selected phrase in the Phrase Library to Male or Female.

- Color Theme: The Color Theme setting will have a menu of preset colors (Blue, Green or Purple) that change the color scheme of the applications interface to promote interactivity. This application also ensures that no matter what color is chosen, Users will be able to distinguish the button from the background.

- Button Graphics Option: The Button Graphics Option is a toggle button that turns the graphics in the Phrase Library On or Off. When the Button Graphics Option has been enabled, the button size will be larger in the tertiary level, displaying both an image representation of the button as well as a short text description. When the option is disabled, the button size will decrease if they are in the tertiary

level of the phrase library. Only the text representation of the phrase will be displayed in this case.

- Contact/Address Privacy: The Contact Privacy and Address Privacy allow the Guardian to enable or disable the display of the Emergency Contacts information and the Address information within the Emergency Information screen. When Contact Privacy is enabled, the text in the contact information fields will change to 'Private'. When Address Privacy is enabled, the View Home Location and View School Location buttons will not be displayed.

3.7. Change Password

The Guardian has the option to change the password after the initial set-up by hitting the Options button and entering their 4-character password, which will lead to the Options Menu. They will then need to select the Change Password button, which takes them to the Change Password Screen where they need to enter their old password, new password, and confirm the new password before pressing the Submit button.

3.8. Tutorial Videos

Express[2] will come with links to introductory tutorials on YouTube where the Guardian will be able to watch and learn about the application's functionality. These videos will cover: How to Edit Settings, How to Navigate the Phrase Library, and The Emergency Info tutorial.

3.9. Error Reports

Should the application malfunction, the Guardian has the option to send the developers an error report through a form within the application. Submitting the form will send the developers details of the issue through email.

4. Non-functional Requirements

The non-functional requirements for Express[2] are listed below in Table 4-A.

Property	Measure
Size (Hardware)	• The total size of the application should not exceed 15MB. • Should be compatible with iPhone screen
Usability	• Having larger buttons, graphics and text than most general applications to better suit the needs of our specific target audience

	• Target audience should have no trouble reading and understanding the application.
Reliability	• Level of Reliability: Application should not crash more than 5 times within a month • Is usable without any network (Data or Wi-Fi) access
Library Size and Scope	• At least 4 phrases in each secondary category within the Phrase Library • Ensure that all of the most frequent emergency situations faced by the target audience is addressed • Size should be optimized to get a more efficient/faster response time
Color Theme	• Customizing the colors, types of graphic and wording throughout the user interface to make the use of the application more distinct and visually appealing
Security (Password)	• Type of the password: 4-character password • Encryption level: Not Required, minimum security
Voice (Male/Female)	• Have gender specific voices read out the final sentences to promote User confidence and interaction
System Response Timing	• Response time of the app including start up time and the time required to process the phrase and vocalized playback • Start-up time should not exceed: 5 seconds • Response time for vocalized playback should not exceed: 2 seconds
Project Development Time Constraints	• The completion of each part of the project on time as determined by the schedule developed by Team X.I.S.
Ethics	• Information that the User fills out in the Settings Menu will not be stored in any cloud services or disclosed to any third party • Information will only be disclosed/displayed within the application if the User has privacy settings disabled • Email used to submit bug reports will not be stored or disclosed to any third party.

Table 4-A: A table of non-functional requirements for Express[2].

5. Example Tutorials

The following example tutorials go through three scenarios involving Express[2]. Please note the following when viewing the visual representations of the scenarios:

Scenario 1

After initial set up, the Guardian realizes that there are some preferences that they would like to change. Please refer to Image 5-A for a visual representation.

1. On the Main Menu, press the Options button.
2. Enter your 4-character password to receive access to the Options screen.
3. Press the Settings button to enter the Settings Menu.
4. To change the Name, Home Address, School Address, Emergency Contacts or Allergies, press the button to go to the secondary screen and enter the new information in the provided text fields. After all the desired changes have been made, press the Save button and confirm your changes on the following pop up.
5. To change any of the User Preferences, slide the Toggle Buttons or select the Segmented Buttons to the desired setting. All User Preferences changes will be saved upon being changed.
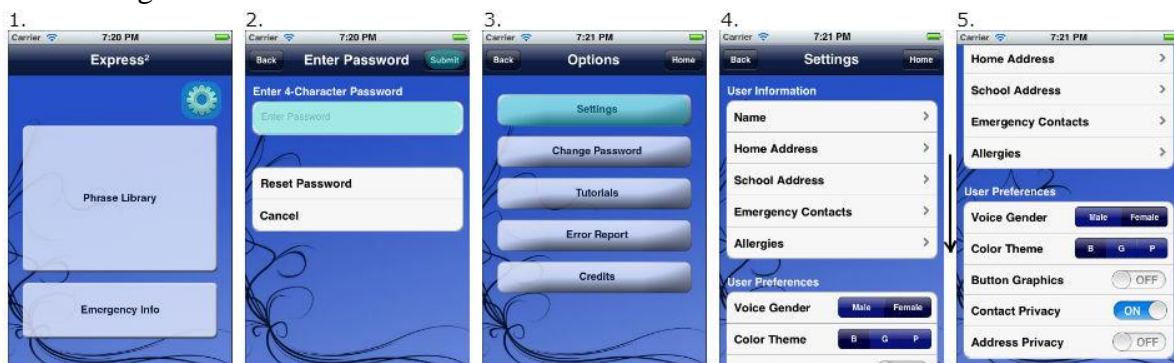
Image 5-A: A series of screenshots to represent the application functionality in order to follow the scenario steps of Scenario 1.

Scenario 2

User needs to tell their teacher that they need to go to the bathroom. This can be seen as a low priority emergency situation where it is necessary that the User can express their needs to the teacher in a timely manner. To do this, they would use the Phrase Library that contains phrases the User may need to communicate quickly to others, such as expressing their need to go to the bathroom. Please refer to Image 5-B for a visual representation.

1. On the Main Menu, press the Phrase Library button.
2. Press the Actions button to display a list of action phrases.
3. Press the button labeled 'Where is the bathroom?' to play the corresponding audio file.

Image 5-B: A series of screenshots to represent the application functionality in order to follow the scenario steps of Scenario 2.

Note that the phrases aren't being built part-by-part, which means there is a chance that the representation of what the User is trying to say isn't the same. However, since this applications goal is to provide the User with quick representation of their thoughts to others in emergency situations, this type of interface, although very assumptive, provides the User with the fastest response.

Scenario 3

User is lost in a mall and does not know the way to get home. They find an Information Desk in an attempt to get assistance in finding their way back. Using the Emergency Information feature of this application, they are able to quickly show the mall staff their emergency contacts, where they live, and instructions showing how to get back. Please refer to Image 5-C for a visual representation.

1. On the Main Menu, press the Emergency Info button.
2. To obtain home address information, press the View Home Location button.
3. Upon pressing the button the address will promptly be displayed in an overlay which the user can then click OK to view the route.
4. Since the User's iPhone is connected to a network connection via data, an embedded map application is displayed, allowing the User to show the mall staff instructions on how they could get home along with a button on the bottom which allows the user to pull up their address on screen once again.
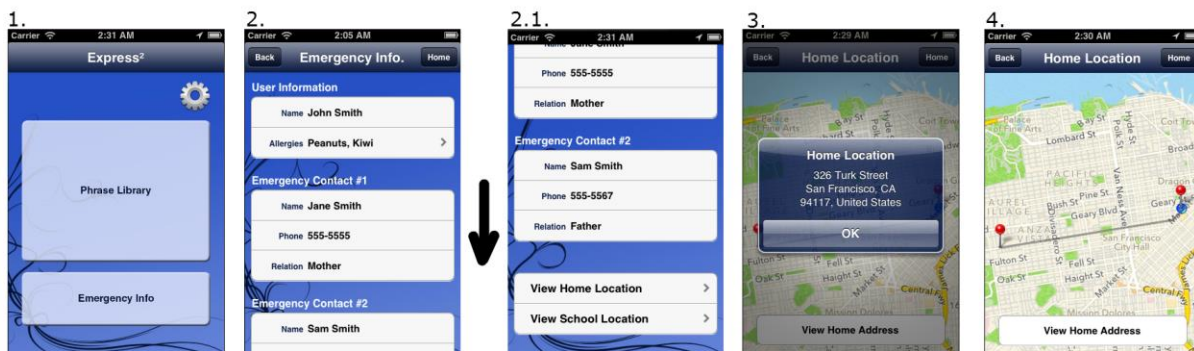
Image 5-C: A series of screenshots to represent the application functionality in order to follow the scenario steps of Scenario 3.

Note that since this application is to be used in case of real need, this information can be displayed without any security barriers. However, this information can also be locked from being displayed within the Settings Menu by toggling the Privacy Settings.

6. Glossary

6.1. General Terms

Term	Definition
Data	Mobile internet network supported by a wireless network service provider.
Down syndrome	Delay in cognitive ability, specifically focusing on individuals experiencing significant speech delay who have trouble developing clear speech.
Error Reports	A compilation of system errors performed by the application.
External Aid	Someone or something that helps the User learn and use the application.
Guardian	The person in charge of the settings and teaching the User about the application.
Integrated Maps	Navigational features to pre-selective places (Home and School).
Password	A numerical lock for the Settings feature to be created and used by the Guardian.
Phrase Library	A hierarchical organization of emergency phrases divided into sub-categories which will be navigated by the User to reach their target phrase.
Secure Access	Access to settings in secure fashion (Password)
Tutorials	Guides on how to operate the application successfully.
User	A child or young adult who has Down syndrome.
Wi-Fi	A mobile hotspot whereby an internet connection is provided wirelessly.

6.2. Screen Names

Term	Definition
Change Password screen	This screen will contain three text fields: Old Password, New Password and Confirm New Password, and a Submit button.
Emergency Information screen	Displays both emergency contact(s) information along with buttons for View Home Location and View School Location.
Error Report screen	Displays an email form in which the Guardian will be able to send the developers, Team X.I.S, an error report upon completion of the requested information.
Main Menu	The first screen encountered by everyone who uses the application; the hub of the application. Displays the Phrase Library, Emergency and Settings buttons.
Options screen	The screen will contain the following buttons; Setting, Change Password,

	Tutorials and Error Report.
Password screen	Displayed after a person has hit the Settings button. Contains a text field for User to input their 4-character password along with Back and Cancel buttons should the User accidentally click on the Settings button. Pressing either of the buttons will return the User back to the Main Menu screen.
Settings Menu	Displays User Information, User Preferences contain Themes and Privacy Settings.

6.3. Button Names

Term	Definition
Back button	A button that returns the User to the previous screen.
Change Password button	Links to the Change Password screen.
Emergency button	Links to the Emergency Information Screen.
Error Report button	Displays the Error Report screen.
Options button	Displays the Options screen.
Phrase Library button	Links to the next page containing the sub-categories: Food, Actions and Feelings.
Phrase Library Sub-Category buttons	Link to the next sub-category till the User reaches the target phrase.
Settings button	Links to the Settings Menu.
Submit button	This button confirms edits made by the Guardian.
Toggle button	An iPhone button that allows User to switch between two defined options.
Tutorials button	Displays the list of video links that are meant to be used as guides for learning the application's use and functionality
Voice Gender Option	A toggle button that lets the Guardian set the audio output voice between Male and Female.