CS 352 *Project 5: Concepts and Early Prototype*

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Abstract—**This will consist of concepts and a storyboard of a prototype for a user interface that facilitates communication between users despite language barriers. These could include language barriers or deafness.**

I. INTRODUCTION

After conducting interviews with potential users, and gaining insights, the next step to creating a user interface design is to come up with some concepts and settle on one to prototype. From our interviews we found several subsets of users. The first is someone traveling in another country, another is someone who is living as an expat in a country with a language non-native to their own, the third would for business communications users, and finally users who are deaf or interact with the deaf population.

II. CONCEPTS

Based on our insights, we developed four concepts; A web site with bidding for translation, An application based on a tablet that does translations automatically, A slightly different application for translation based on people's personal devices and finally a wearable application that does translations.

A. Website with Bidding for Translation

B. App That Does Translating
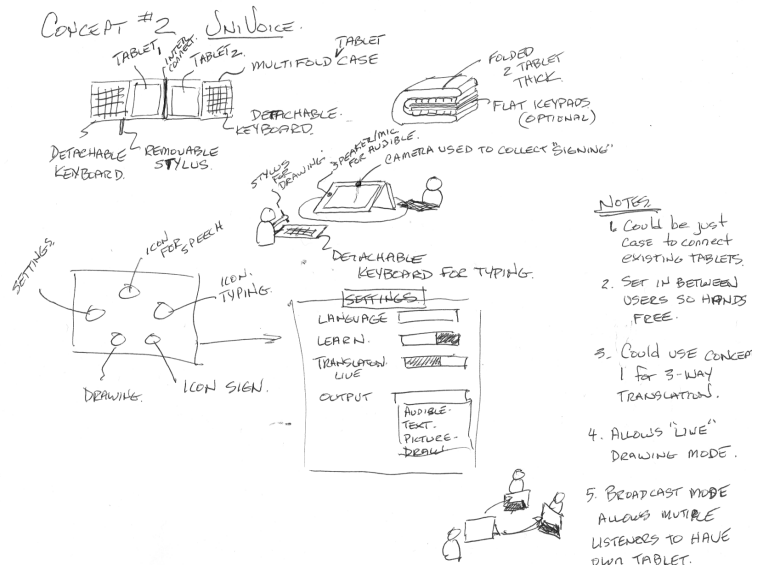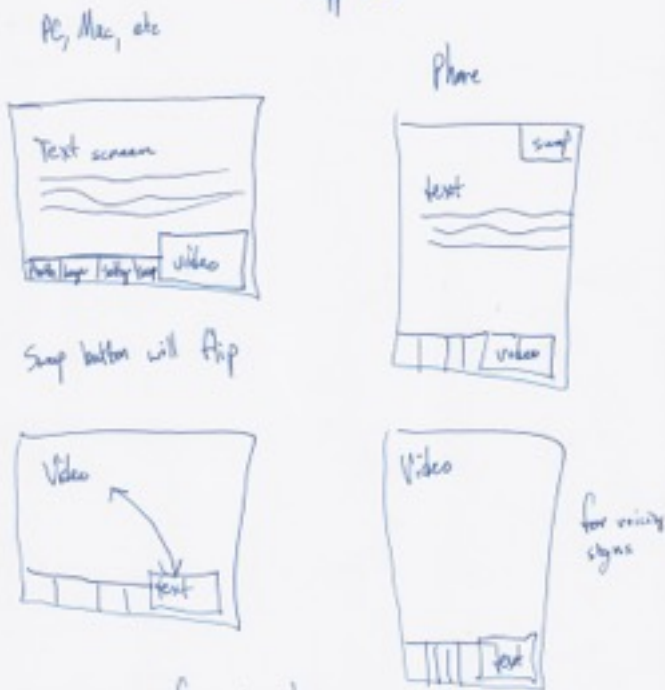

C. App That Does Translating

C.2

CS 352
Prototype Ideas
App based

PC, Mac, etc

D.1

D.2

C.3

CS 352
Prototype ideas
App based

PC, Mac, etc
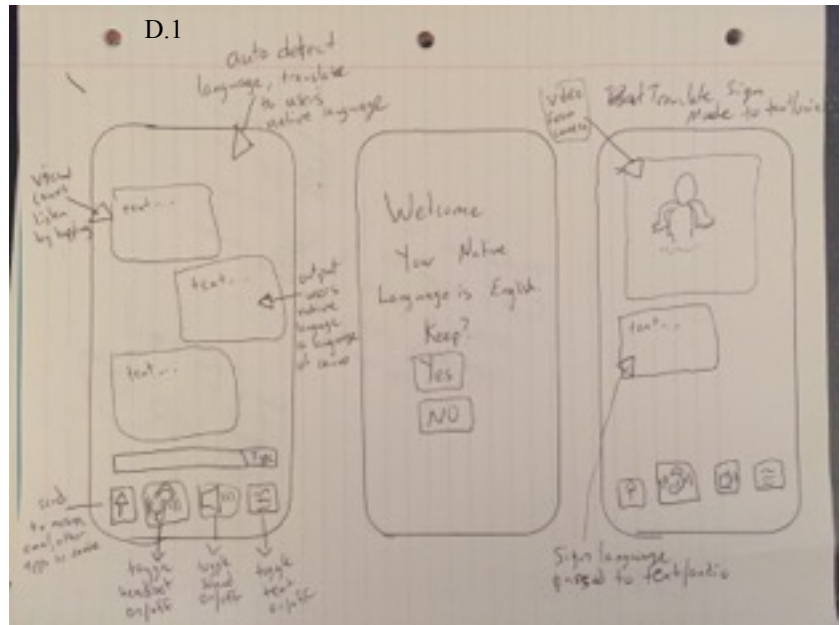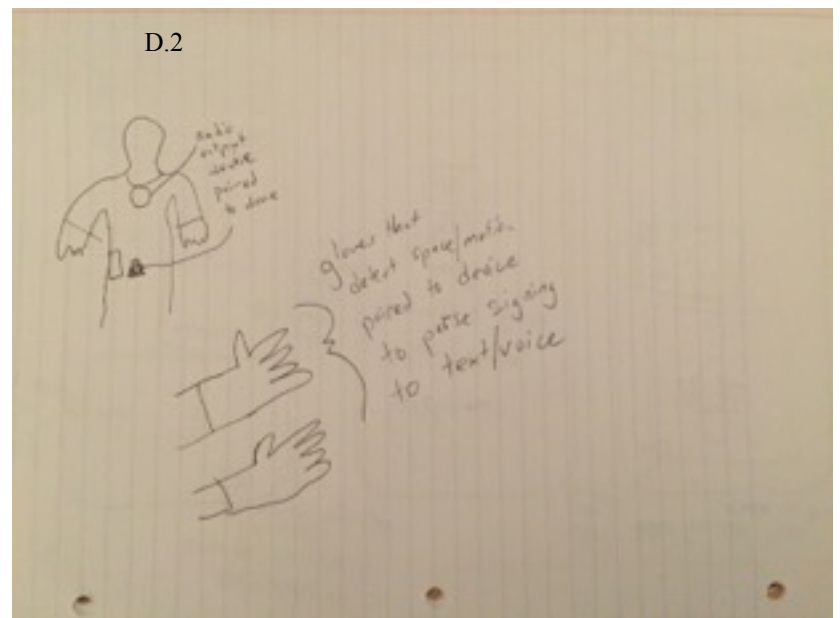
III.   STORYBOARD AND DESIGN DECISIONS

We used elements of the apps in creating our prototype because most people have access to a phone, and it is a common way to facilitate 2-way communication. Additionally, we thought that a smart-phone app would easily be able to be extended to a desktop or tablet environment.

The storyboard has been developed using Balsamiq. This gave us a rapid way to develop our story while causing us to focus on the navigation, the devices it will run on and highly leveraging the iOS megaphone for "FaceTime" and

"Messages". Another heavy influencer of our conceptual model was Google Translate.

A. Prototype Page 1 - Application Launch

We made a design decision that upon opening the app, the app tried to pair with the closet device using the app. The facilitates immediate communication between 2 users. We heard loud and clear from our interviewees that the "app has to simply work" or it gets in the way and people won't use it.

A second decision was to keep the graphic for the application very simple. Recognition of operations was very important to our users.

B. Prototype Page 2 - Welcome Screen

Given that this program is totally new and our users requested simple operation, we provided a simple "Welcome" page to inform the user what the program does and how to operate it. This increase the learnability of the program and offers affordance to setting up the application.

C. Prototype Page 3-5 - The Settings Wizard

This is the screens that the user will see upon first installing and opening the app. Based on the phone settings, it auto-highlights the user's native language and asks them to confirm.

It then asks them to choose if they would like auto-translate on or off. This is a design decision where the app detects what language is being spoken and automatically translates it into the native language of the user. To turn it off, the user would have to manually select the translated language.

This design was developed to address efficiency. Once set the user is most likely not to reset it.

There are additional settings like how to display date and time (regional settings), and whether the voice for audible translations should be male or female. Each one of these settings are designed with constraints and feedback in mind. Constraints in that there are few selections offered and it is impossible to "mis-configure". Feedback is given both by the instantiation of "pickers" a visual feedback mechanism to say you selected to change something but also the disappearance of the picker and the selected setting text now appearing on the item clicked.

The final setting is to allow one's availability or presence of having the app made visible to other users of the app. This facilitates communications as users can see those who also have the app nearby to easily have communication. The settings are easily changed in the settings menu. The design decision here was effectiveness & constraints. By indicating presence the user avoids trying to set up a schedule with people who are unavailable.

D. Protoype Page 6-10 - Applications Settings

In order to provide consistency with the iOS environment we have created an application setting page to be placed under the settings option within iOS. The settings page is a alternative way to set the settings wizard content. We believe that after the first couple of times the program is used. The user will explore the settings area to see what they can do. In this case we group like things together to facilitate chunking and thus make the page easier to remember. In support of the un-intrusive operations that our interviewees requested, we

believe we made the wizard robust enough that the user will have no need to change anything.

E. Prototype Pages 11-16: Meetings

This page is the main page of the program. Our interviewees told us that they wanted a history of their conversations so they could go back and review them (recollection). Our interviewees told us that the utility of the program is greatly enhanced when they can "go back over what was said (memory) and respond accordingly", To address this request we offer a simple list of past conversations. If the user wants to review conversations from the past, they browse the meeting names, verify the right meeting by its brief description, select it and it will display the text threads in the same manner as when the meeting took place.

To create a new meeting, the plus icon is tapped and then each person is tapped to add them. Once set up, the user can then select if they want a video, audio, or text feed, or any combination of those.

This allows the creation of a meeting with multiple attendees. This can be useful for a conference call or for an in person interaction that is planned. It enables the attendees to be selected and will pair their apps to each other to auto-detect languages being spoken and what languages they need to be translated to on each device (A multi-user interface).

We used the + symbol and the "Contacts" metaphor to provide consistency with iOS itself. This greatly reduces the need to learn (learnability) new things and improves the familiarity with the program.

F. Prototype Pages 16-17: Video Mode

There is a video icon to tap to start video mode. By either having the devices camera on the subject, or by receiving a video feed, the app will translate the video from either the spoken or sign language to the user's native language.

Green icons signify that a certain feature is enabled (feedback). So the video icon will be green when on and working. There is a text icon to activate a text translation, a speaker icon to enable conference mode (activates both the microphone and speaker for multiple participants at the same time), and a microphone to enable the user to speak. There is also a person-plus icon to add participants.

Affordance is offered on these pages by the use of "Back" and "done" text buttons.

By clicking on the thumbnails representing the participants in the meeting, they can be expanded be the primary one on the screen. The text translation can also be expanded by tapping on the "full screen" on the bottom right hand corner of the larger image. We borrowed from the YouTube metaphor for the full screen model as this is well understood. The thumbnail idea is taken from Apple's "FaceTime" to preserve consistency with other iOS applications. This also improves learnability.

G. Prototype Page 19-20: Text Mode

By tapping the + symbol, the user indicates a desire to add content to the discussion. The user is presented with the familiar iOS keyboard and message field for typing in text. Alternatively, if the user desires, they can click the microphone icon and verbally enter their content.

H. Not Shown: Conference Mode

Included in the application is a conference mode. This is activated by pressing the "speaker" icon. We learned from our interviews that there is a particular challenge with communications in groups. We were told that when many people speak at the same time or too quickly, this can get very difficult and frustrating to the user.

To address this issue, we introduce a conference mode where multiple people can listen and speak. The text of the conversation will be transcribed to allow the listener to better understand what is being said and effectively to allow the conversation to happen at the pace of the reader in their native language.

IV. DESIGN DECISIONS

From our interviews we knew that we needed to be able to let users easily toggle through a voice, video, or text feed depending on their circumstance and needs. As a group we decided to introduce the constraint of speed and ease of use to our prototype.

In our interviews and with subsequent insights it became very clear that if the app "got in the way" no one would use it. We imagine the app being used on personal computers (Windows & Mac), mobile devices and tablets. We focused this prototype on the mobile phone as everyone carries one where we couldn't be sure that everyone has a tablet. The mobile phone also represents a constraint on us as designers. It it challenges us with a very small interface to present our application. We are going back to interview again to better determine the likeness of the tablet being preferred. We believe that the design principles for the app on a phone would translate to having it on the computer or tablet if a user wanted to use that for an in-person meeting or video/phone call.

We wanted to make our icons easily recognizable symbols that are self-explanatory or are commonly in use in other apps (affordance and consistency). We also wanted the options for video, audio, and text to be toggled. So a user can just toggle on or off by tapping and not interrupt the conversation (efficiency). This encourages users to experiment and become comfortable with the app so that they know they cannot mess anything up (learnability and constraints).

Listed below are some additional explanations of design decisions for specific pages of the application.

The Setup Wizard

In the spirit of being fast and not in the way, we introduced a simple setup wizard to provide set it and forget it operation. Given that this program is totally new we also provided a simple instructions page to inform you what the program does and how to operate it.

We learned from our interviews that if the program isn't very simple to set up and use, people will abandon it. To address this issue we created a one time "set it and forget it wizard.

We keep the wizard operation to mostly simple, single tasks with explanations so the user both understands what is being asked (affordance) and also to provide feedback .

We expect that after the program has been used once or twice (memorability) , the user will want to turn this wizard off as they will have memorized its operation.

Holding a Conversation

The program offers multiple "modes" of operation. We learned that language does just include foreign language speakers. Those that are deaf or hard of hearing can also benefit from this application. In each case we learned that a blend of modes yields the best utility. For example, a deaf person will gain little utility from the "voice modes" or the "conference mode" but will gain high utility from seeing the signing (video mode) and the text conversion.

We invite the user to select Video mode when the meeting coordinator knows that the audience is comprised of either the deaf or those who want to see the speaker's body language or facial expressions. In the case of the deaf, there are multiple forms of sign language. We learned from one of our interviewees that in addition to forms of sign language, there are "home signs" These are self created signs to represent a thought or object or word. There is no direct translation of video mode, this is introduced with text mode.

We also learned from our deaf interviewees that they communicate by reading lips or reading text. In one case the interviewee told us that they could read text faster than any other method. In addition to or alternately, we provide a text mode. As the speaker "signs" or speaks, this is transcribed into text. The benefit here is that the listener still has the advantage of body language and facial expressions but they also gain the speed and accuracy of text. The communicator will see the text in the default language they set at the setup wizard or within settings, the listener will see the same text, translated into the language of their settings choice.

Video Modes

With the video mode set as the main mode, the user will see other participants either from a stream from the other participants, or from the camera from the device. The user will be able to toggle between participants if desired, by clicking on the participant. This is to ensure that the focus of the conversation can be selected by the user.

This mode will also allow the output of a text and/or audio translation depending on what the user wants. To make it easy for the user, they are the same icons that are used in other places in the app for text and audio.

Text Modes

When the text mode is the main mode of communication, users will be able to either type text, enter it via speech, or enter it via video if they have a video feed and are signing. This enables a text message stream with what each user has said in the conversation stream highlighted. In the interviews, users told us that sometimes it would be helpful to just type things out when there isn't a need for a spoken or video conversation. Text and email messaging are a common form of communication, this could help facilitate breaking down language barriers relating to that.

Conference Mode

Our last option is voice. When the listener is not deaf, voice may be the preferred medium either due to tones and inflections in the native language or because it is more efficient

to process the communications audibly. In many cases we heard that the listener can't read fast enough to keep up with the dialog when many participants are involved. This option includes voice recording, voice listening and speaker phone operations when the listen is a group rather than an individual.

The audio mode is rather simple for the user. By selecting it, any audio the device takes in is translated to the users native language. This would be useful for an expat living in a country with a non-native language, or for a traveler. While it would be hard for them to communicate back to the speaker, they could at least understand what was being said and then try to use gestures to communicate .

In the case that 2 devices or more devices were paired through the app, users would just hear the translations from each other and would easily be able to have a conversation. This would however; require users to have the phones to their ears, have their phones on speaker, or have a headset or earpiece in. The earpiece or having the phone next to their ears is probably the best for in person communication since the speaker phones could interfere with each other. However in a group the combination of speaker phone and text may be the best option for utility.

Storyboard #1: Application Launch

UniVoice launches the application

Settings is the iOS settings button under which is settings for UniVoice is in the applications settings area

●●●○○ ABC   02:15 AM

Welcome

UniVoice is an application that translates from one language to another. Be it written, spoken or sign language.
The program starts with a three-step wizard where you select your language and translation mode.
The program's main page is the Meetings page. To start a new translated conversation, create a new meeting, invite guests, select your mode of communication and start communicating! While you see everything in your native language, your friends see or hear your conversation in their native language.

☐ Don't show this

The welcome screen tells you how to use the application. It will be shown eveytime until the user clicks to remove it. This will also remove the wizard.

Storyboard #3 Settings Wizard

Language

English

Français
Deutsch
Nederlands
Italiano
日本語？？？
American Sign Language
Langues des Signes Française
Deutsche Gebärdensprach
日本手話
Nederlandse Gebarentaal
Lingua dei Segni Italiana
？？？？？？？？？？？？
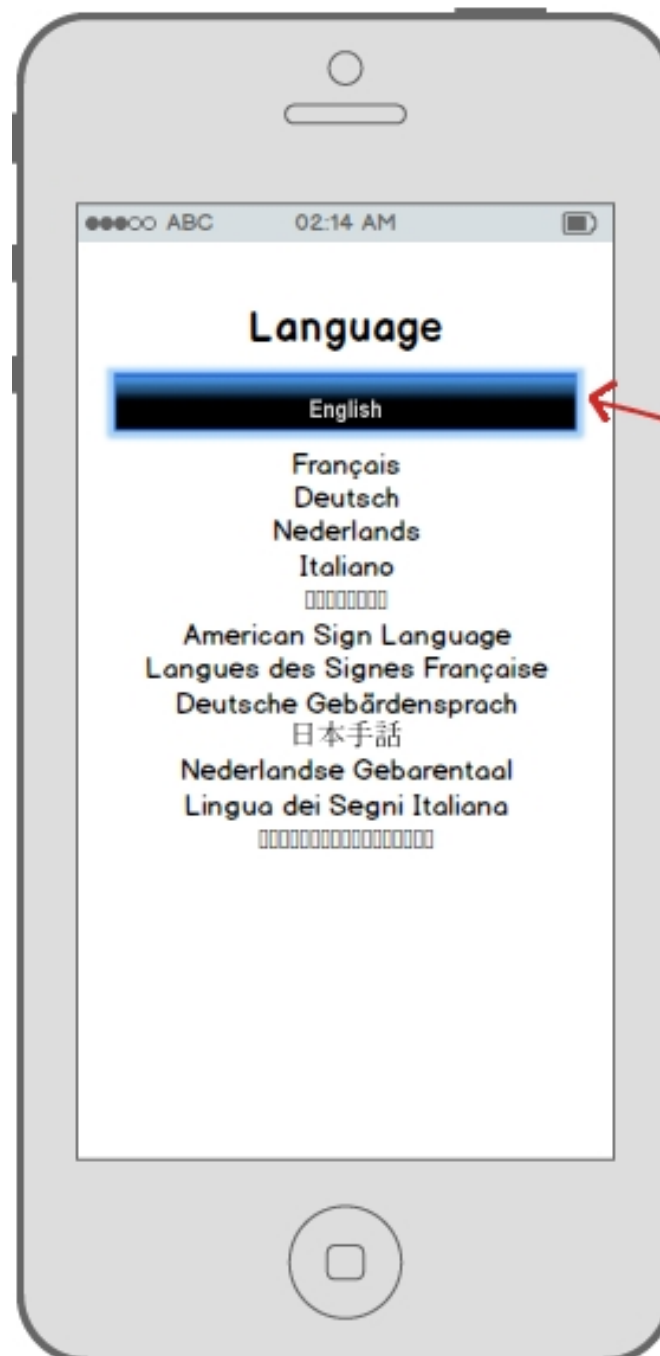
The user selects the language that they speak. Clicking the language will cause the wizard to advance to the next page.
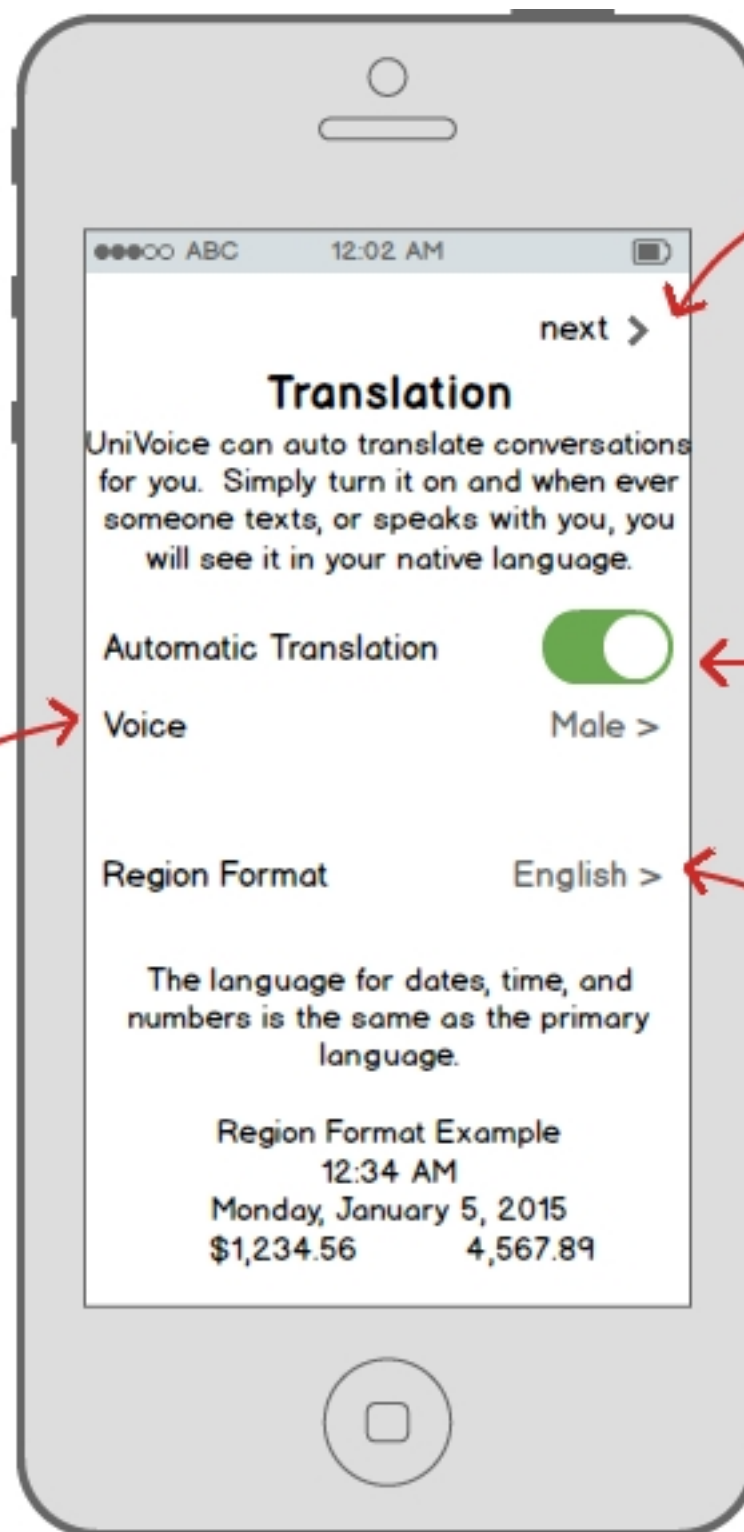
Next takes them to the next page of the wizard. No changes are necessary (default settings) to move to the next page.

Automatic translation is a toggle, either on or off.

Voice is for audio only. If voice is not on, it won't matter what they have selected. If voice is on, then they will hear the translation either in male or female voice.

Region format is set so numbers, dates, currency all appear in the correct format for the listener. This setting is only valid for the listener.

●●●○○ ABC   12:02 AM

next >

Translation

UniVoice can auto translate conversations for you. Simply turn it on and when ever someone texts, or speaks with you, you will see it in your native language.

Automatic Translation

Voice   Male >

Region Format   English >

The language for dates, time, and numbers is the same as the primary language.

Region Format Example
12:34 AM
Monday, January 5, 2015
$1,234.56   4,567.89

Presence

UniVoice can let you friends and acquaintances know you are available for a conversation. By turning presence on, they will see a message indicating your availability.

Presence

Presence is a toggle, if on then others can see that you are available. This is done by coloring all circular images of a contact either green for present or red for not available.

Storyboard #4 Application Settings
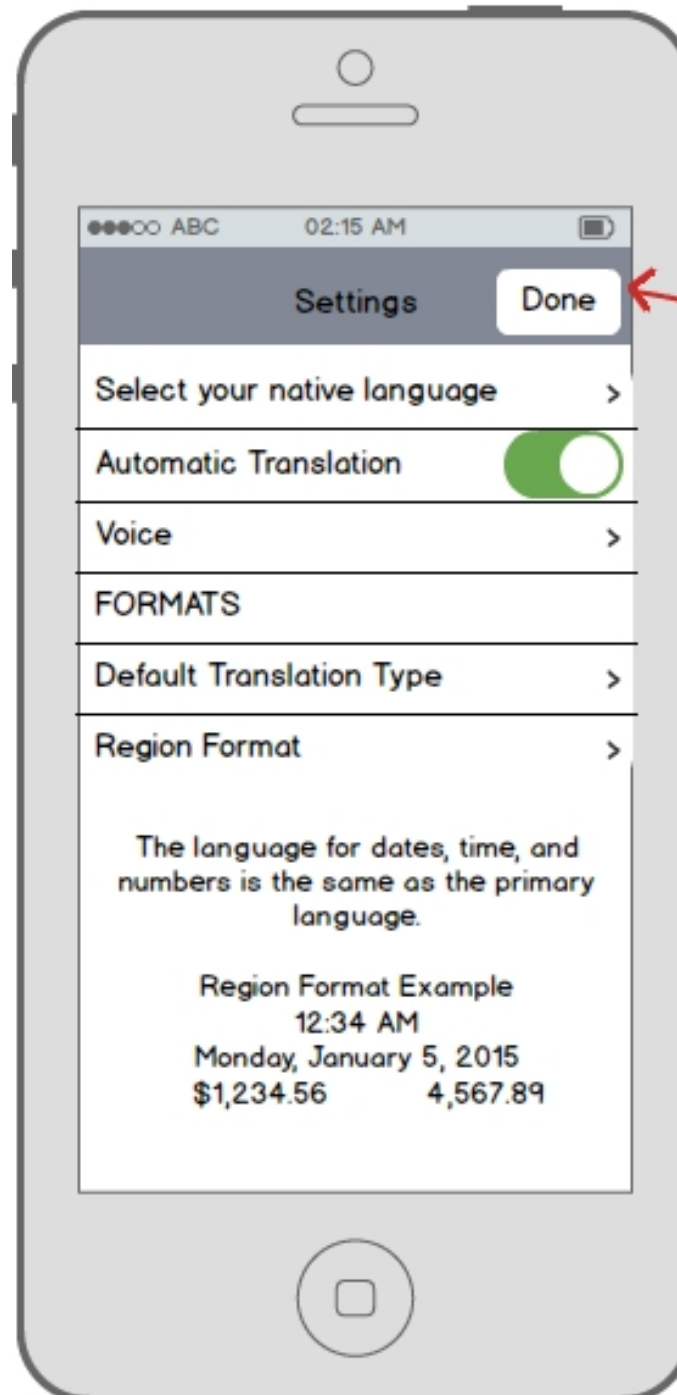
●●●○○ ABC   01:32 AM

Settings

Select your native language   >

Automatic Translation   🟢

English   ›

Français

Deutsch

Nederlands

Italiano   ›

□□□□□□□

American Sign Language

language.

Region Format Example
12:34 AM
Monday, January 5, 2015
$1,234.56   4,567.89
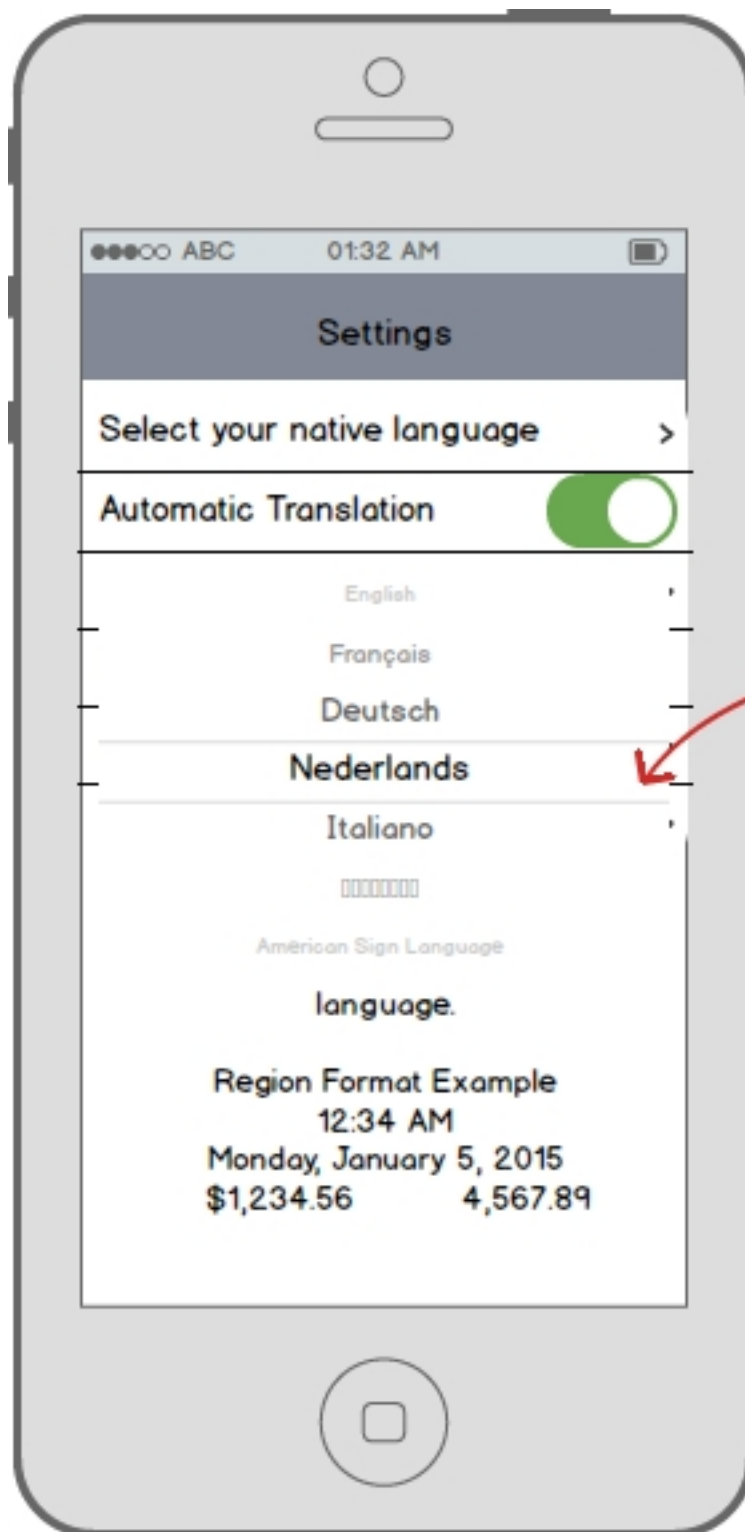
When Select your native language is clicked a language "picker" is displayed. The user selects the language and this is shown prior to the caret > in light gray.

●●●○○ ABC   01:32 AM   🔋

Settings

Select your native language   >

Automatic Translation   🟢

Voice   >

FORMATS

Default Translation Type   >

Video   ›

Audio

Text

Sign

Video & Audio

Video & Text
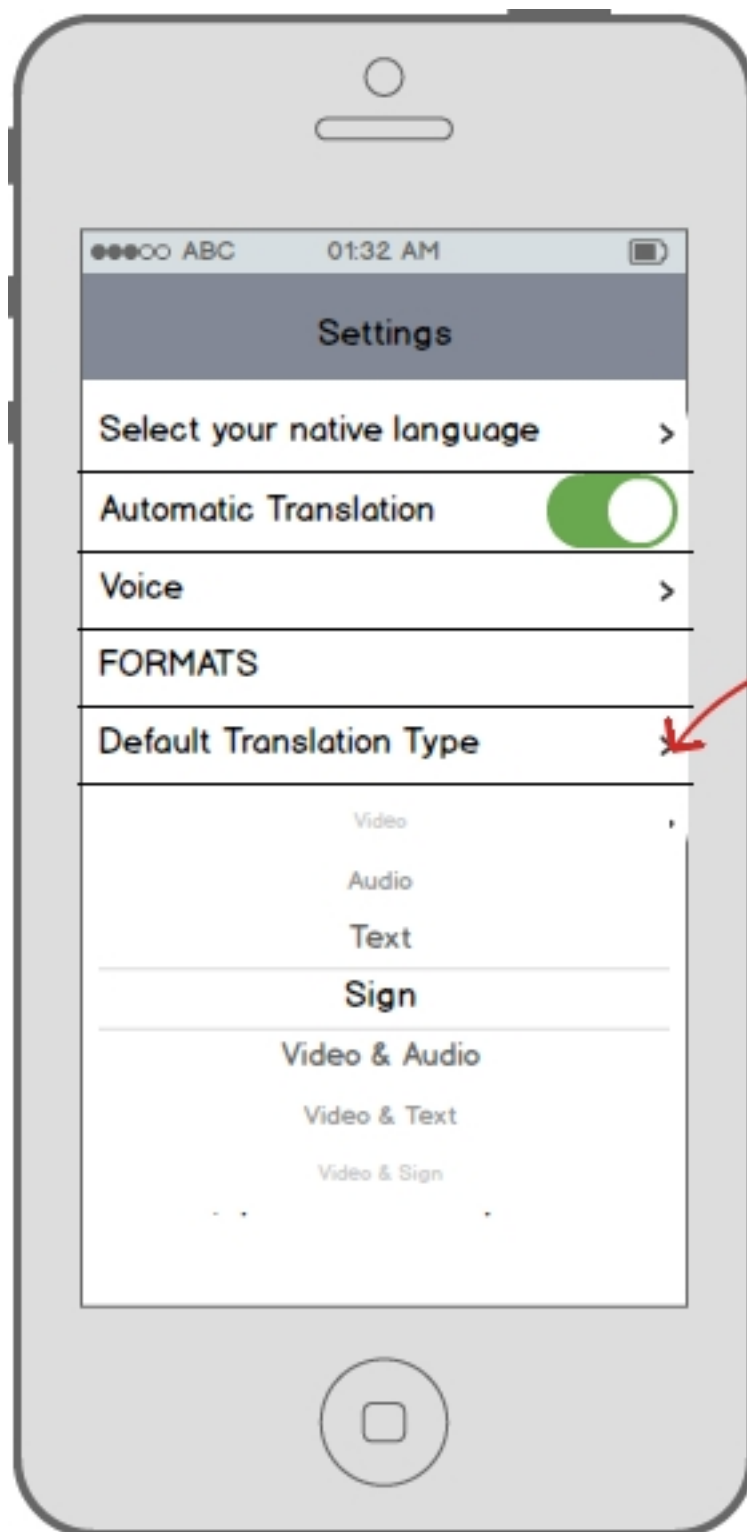
Video & Sign

When "Default Translation
Type" is clicked a translation
type "picker" is displayed.
The user selects the type
and this is shown prior to the
caret > in light gray.
The options are:
Video
Audio
Text
Sign
Video & Audio
Video & Text
Video & Sign
Audio & Text
Audio & Sign
Text & Sign
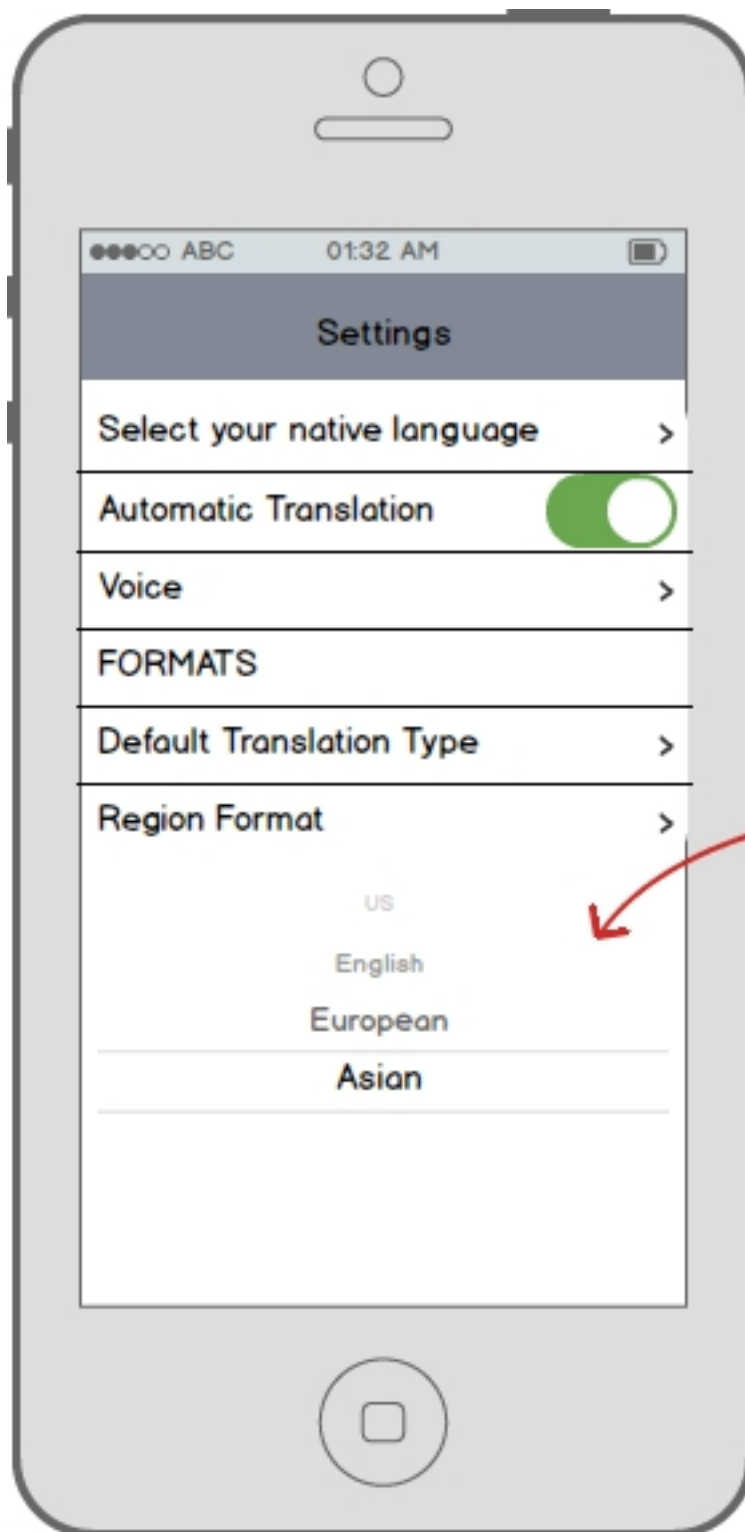
Phone screen (Settings):

●●●○○ ABC   01:31 AM   🔋

Settings

Select your native language   >

Automatic Translation   ⬤

Voice   >

Male

Female

Region Format Example
12:34 AM
Monday, January 5, 2015
$1,234.56   4,567.89

Yellow note:

When "Voice" is clicked a voice "picker" is displayed. The user selects the voice and this is shown prior to the caret > in light gray.
The options are:
Male
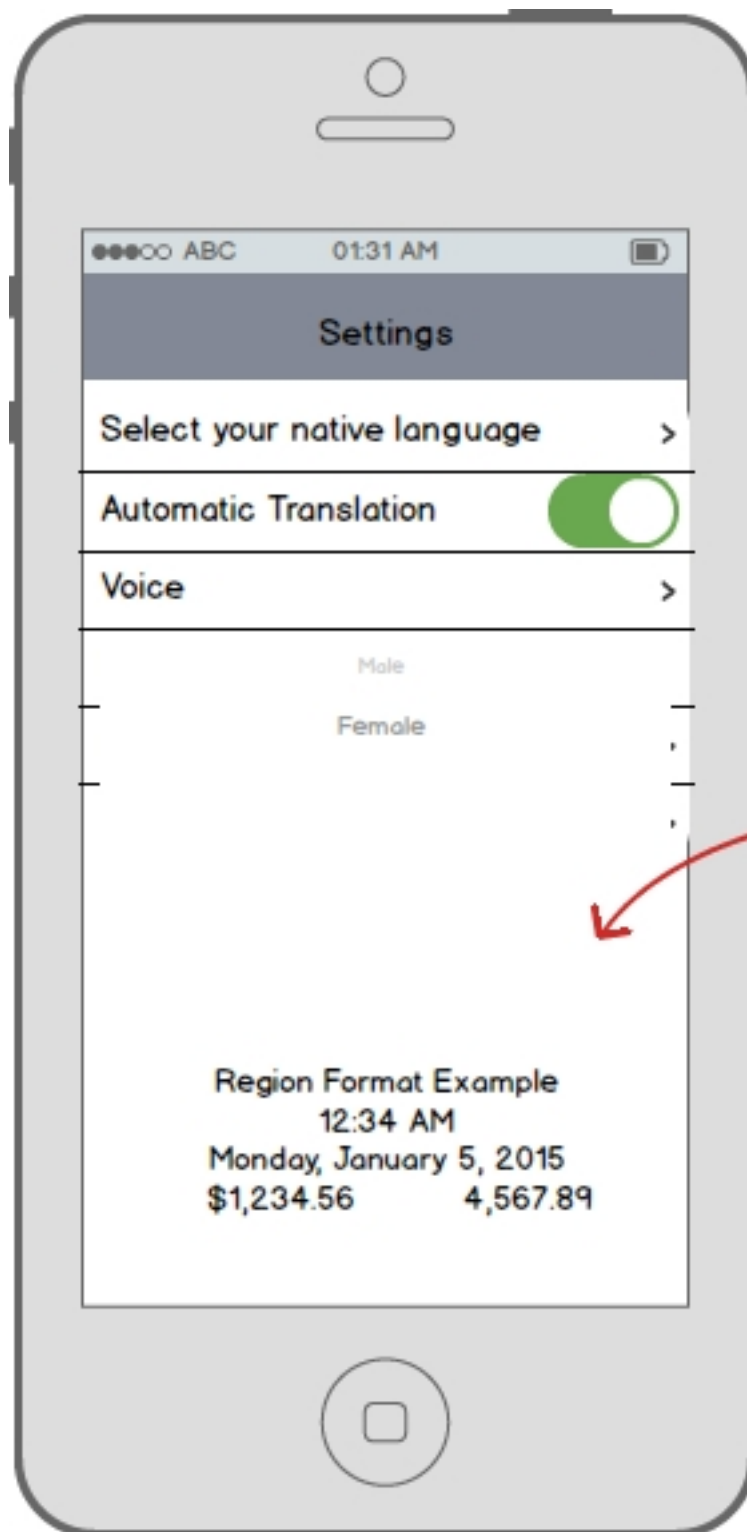Female

Storyboard #5 Meetings (Main)

Meetings +

Last Meeting
Concept Meeting   Yesterday ›

Team Meeting
Storyboard Meeting   1/29/15 ›
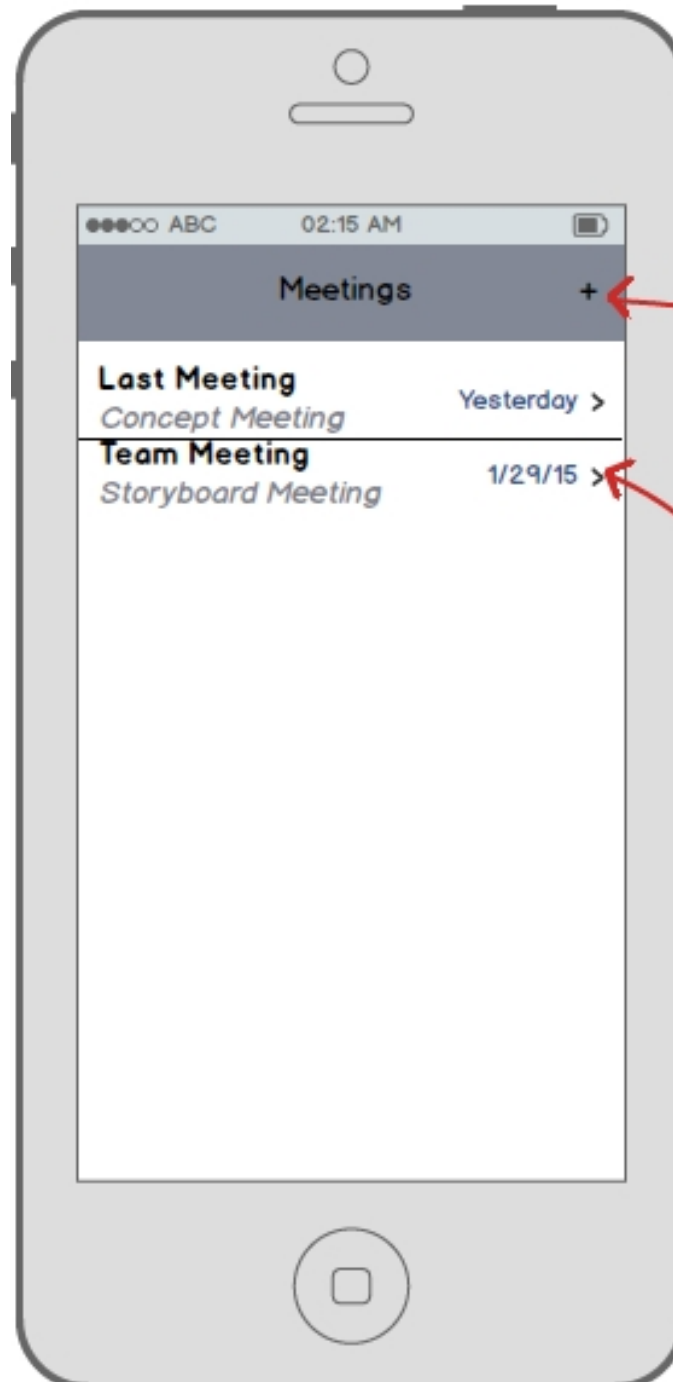
By clicking the plus icon, the user is indicating that they want to create a new meeting. They will be forwarded to the "Contacts" page

By clicking the arrow at the end of each entry, the user is indicating a desire to see details for the meeting.
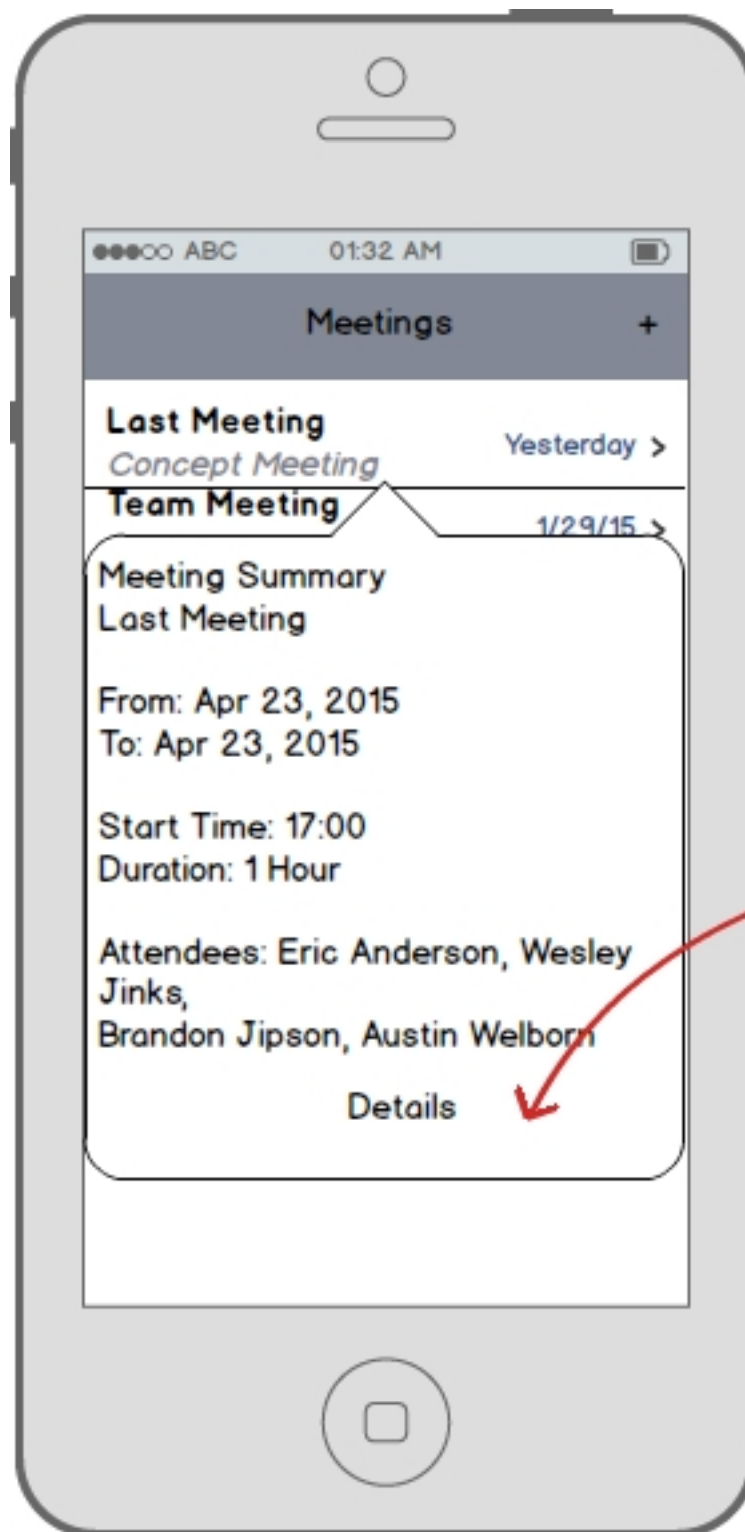
The details lin will take the user to the tread of conversations that pertain to the selected meeting. If the meeting hasn't occurred yet and message indicating this will be displayed.

Back, will send the user back to the "Meetings" page

Clicking + indicates that the user wants to add a new contact (from their contacts list) to the list of potential attendees.

The Video, Text and phone icons are to indicate capabilities that the attendee can support. Video means they have a camera and are willing to join in video conversations. Text means that they will also do text-based conversations. Phone means they will participate in audible conversations.

Given that the contacts list can get quite large, a "spotlight" like search is included to make finding attenees quicker.

The list is a "multi-select list" meaning that more than one participant can be selected

Presence of an individual is indicated by the green or red circles around the attendee's picture. This is enabled in the "presence" setting.

●●●○○ ABC   01:32 AM

Back   Select Contacts   +

Q search

Eric Anderson ✔

Wesley Jinks ✔

Jane Doe

Brandon Gipson

Austin Welborn ✔

●●●○○ ABC   02:06 AM

Meeting Type   >

Video
Camera required   ✓

Text
Text of conversation   ✓

Audio
Microphone required
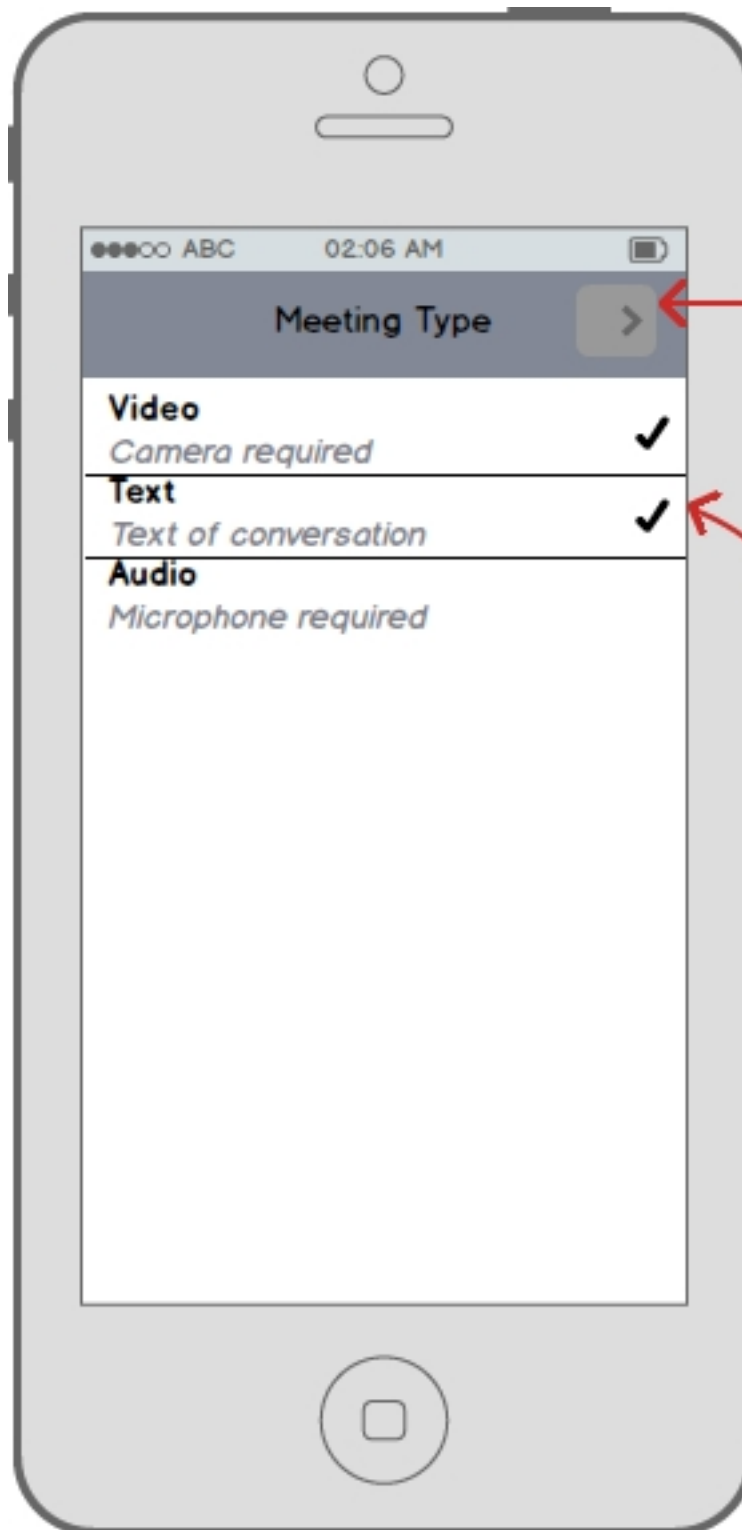
Clicking the next button will take the user to the "schedule page". No changes are required to advance to the next page.

This page is a "multi-select" list. It is from this list that the video, text or phone settings are derived.

Clicking the previous button will take you back to the "Meeting Type" page.

Existing schedules are listed at the top of the page.

Clicking the + symbol indicates that you want to create a new schedule.

If a new schedule is requested, then date and time fields are displayed along with "date picker" to assist the user in entering a valid date.
Times are to be entered in 24-hr format.
Duration is in 15 min increments.

Clicking the done button will create the new schedule and advance you back to the "Meetings..."

●●●○○ ABC   02:06 AM

‹   Schedule   +

From Thu Apr 24 19:00
To Thu Apr 24 21:00   ›

From Thu Feb 8 11:00
To Thu Apr 8 11:30   ›

From Date   / /

To Date   / /

Start time [   ] Duration [   ]

◀ **Feb 2008** ▶

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28		

Done
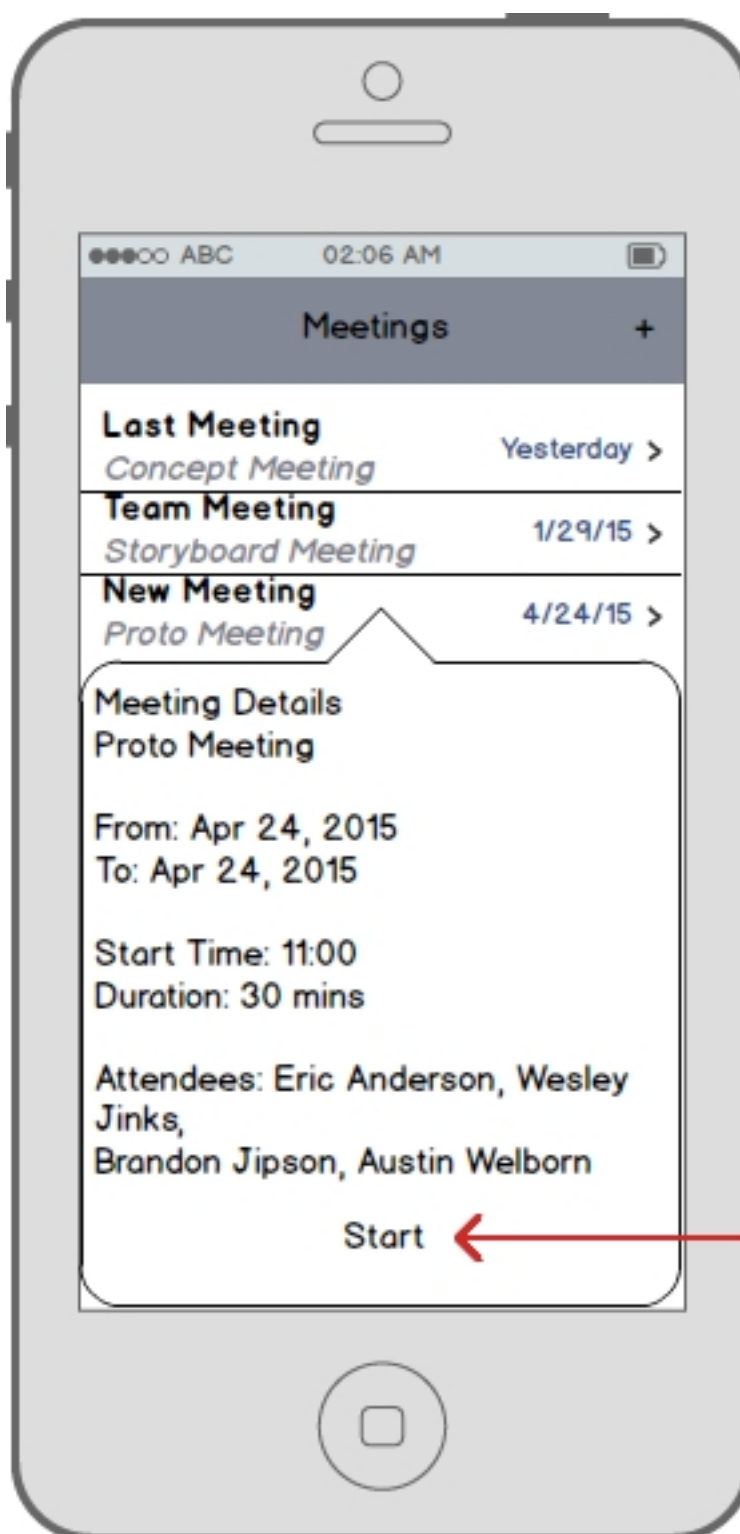
For a meeting that is not on the past, the "start button is to be displayed with 5 minutes of the scheduled meeting time.

Storyboard #6: Video Mode
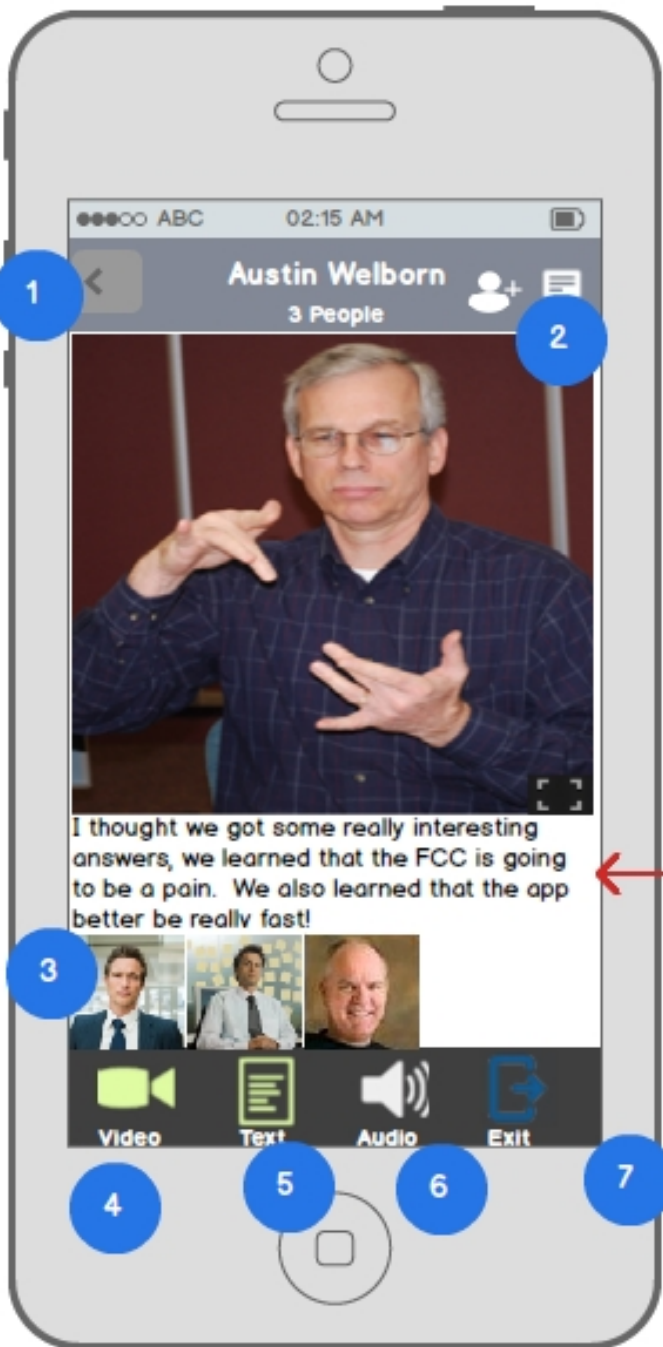
The following feature/functions are provided:

1. Back button - takes you back to the "Meetings" page.
2. Chat button - click to enable text or voice input to the discussion thread.
3. Thumbnails - click on any of the thumnails to switch presenters.
4. Video mode - Sets the main view of the conversation to video only (green indicates mode is on).
5. Text mode - Sets the main view to text. If selected with video mode, will show both elements with the video being the larger of the two (as shone here)
6. Audio Mode - Set the speaker and microphone of the device to the on position. Used mostly for "conference" calls.
7. Exit - Removes the participant from the conversation and closes the application.

Translated text

In video mode, the presenter sees a large picture of the presenter (in this case Austin signing). If the user has also selected text, the text will be displayed under the picture. This is based on an audio to text feature. The listener or attendee will see the text and/or audio in the defualt language they chose within settings.

Left phone screen

●●●○○ ABC   02:15 AM

Austin Welborn
3 People

I thought we got some really interesting answers, we learned that the FCC is going to be a pain. We also learned that the app better be really fast!

Video   Text   Audio   Exit

Right phone screen

●●●○○ ABC   02:15 AM

Eric Anderson
3 People

Pensé que nos dieron algunas respuestas muy interesantes, nos enteramos de que la FCC va a ser un dolor. También aprendimos que la aplicación mejor que sea realmente rápido!

Video   Text   Audio   Exit

●●●○○ ABC　　　02:06 AM　　　🔋

Austin Welborn　👤+　💬
3 People

I thought we got some really interesting answers, we learned that the FCC is going to be a pain. We also learned that the app better be really fast!
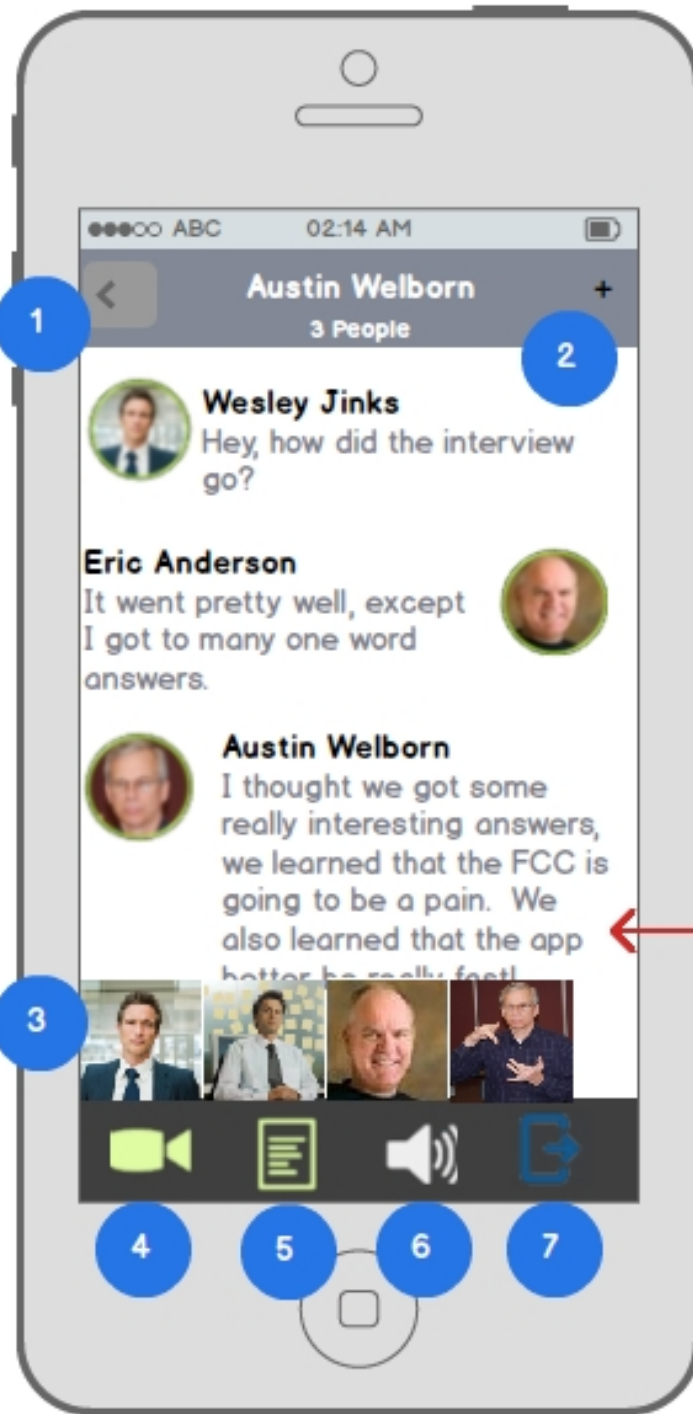
By clicking the "full screen" button the picture of the presenter is minimized. If text mode is also on, the text will be maximized (As shown here)

Storyboard #7: Text Mode

Left phone screen:

●●●○○ ABC · · · · 02:14 AM · · · ·▭

< · · **Austin Welborn** · · +
· · · · 3 People

Wesley Jinks
Hey, how did the interview go?

Eric Anderson
It went pretty well, except I got to many one word answers.

Austin Welborn
I thought we got some really interesting answers, we learned that the FCC is going to be a pain. We also learned that the app better be really fast!

(annotation markers: 1, 2, 3, 4, 5, 6, 7)
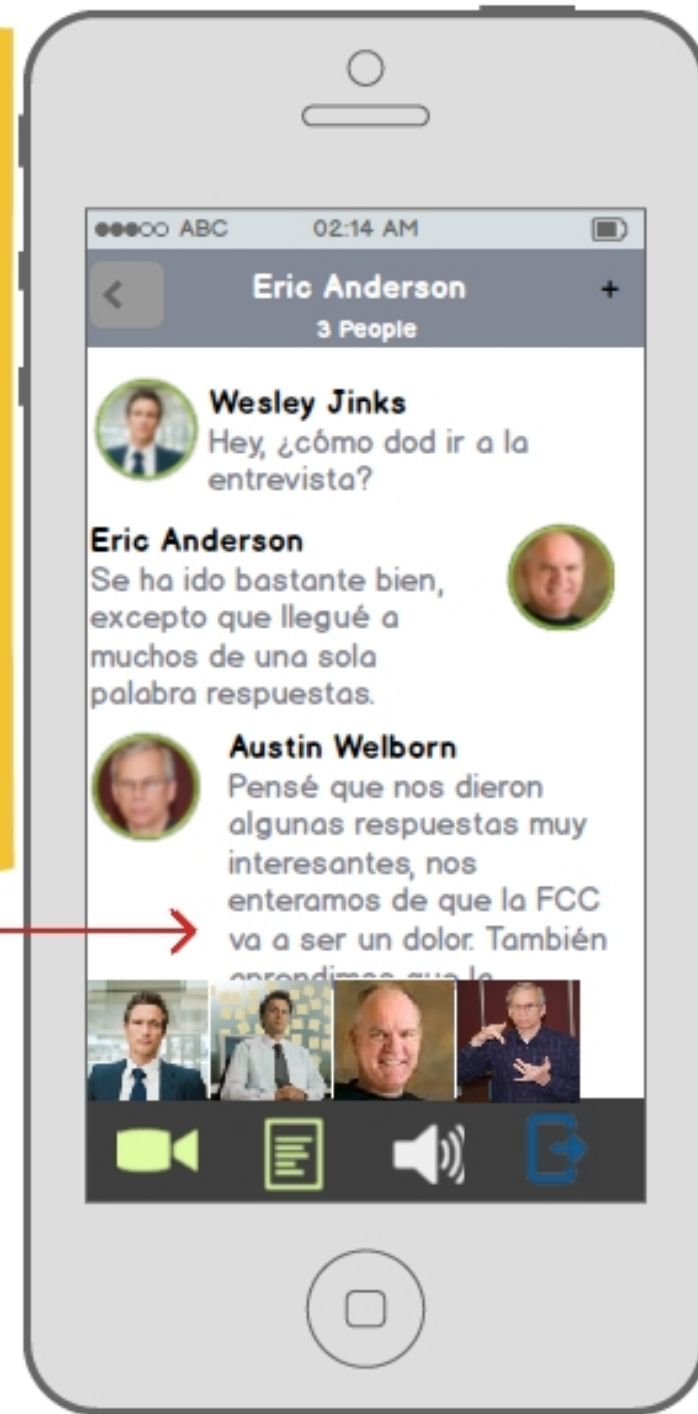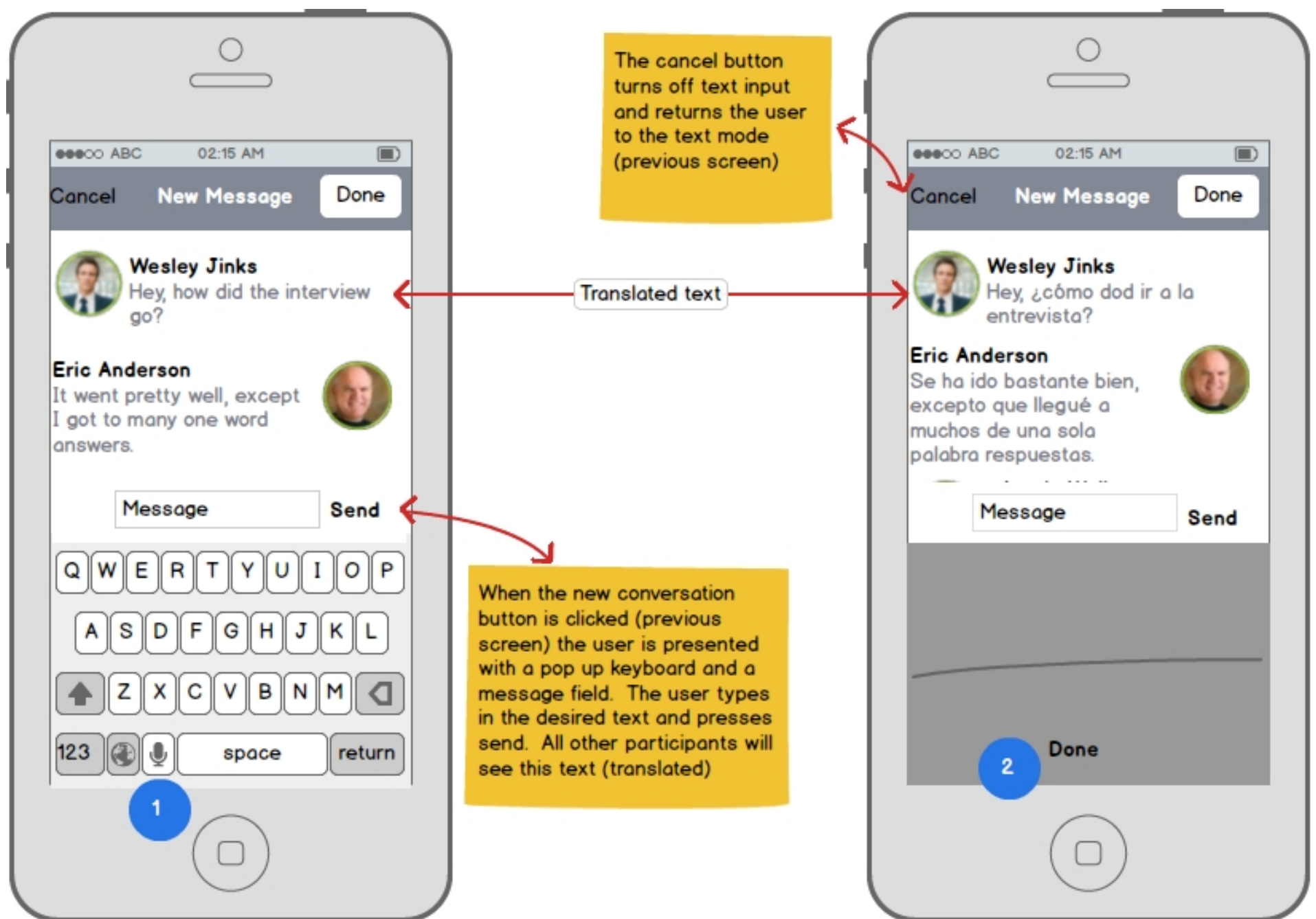
Center yellow note:

The following feature/functions are provided:
1. Back button - takes you back to the "Meetings" page.
2. + button - click to enable text or voice input to the discussion thread.
3. Thumbnails - click on any of the thumnails to switch presenters.
4. Video mode - Sets the main view of the conversation to video only (green indicates mode is on).
5. Text mode - Sets the main view to text. If selected with video mode, will show both elements with the video being the larger of the two (as shone here)
6. Audio Mode - Set the speaker and microphone of the device to the on position. Used mostly for "conference" calls.
7. Exit - Removes the participant from the conversation and closes the application.

Translated text

Center lower yellow note:

In text mode (without video) conversation threads are shown. The conversation text is automatically translated so the listener see it in their own language based on the language setting.

Right phone screen:

●●●○○ ABC · · · · 02:14 AM · · · ·▭

< · · **Eric Anderson** · · +
· · · · 3 People

Wesley Jinks
Hey, ¿cómo dod ir a la entrevista?

Eric Anderson
Se ha ido bastante bien, excepto que llegué a muchos de una sola palabra respuestas.

Austin Welborn
Pensé que nos dieron algunas respuestas muy interesantes, nos enteramos de que la FCC va a ser un dolor. También aprendimos que la

Screen 1 (left phone):

Cancel　　New Message　　Done

Wesley Jinks
Hey, how did the interview go?

Eric Anderson
It went pretty well, except I got to many one word answers.

Message　　Send

Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
123　　space　　return

(1)

Screen 2 (right phone):

Cancel　　New Message　　Done

Wesley Jinks
Hey, ¿cómo dod ir a la entrevista?

Eric Anderson
Se ha ido bastante bien, excepto que llegué a muchos de una sola palabra respuestas.

Message　　Send

Done

(2)

Annotations:

The cancel button turns off text input and returns the user to the text mode (previous screen)

Translated text

When the new conversation button is clicked (previous screen) the user is presented with a pop up keyboard and a message field. The user types in the desired text and presses send. All other participants will see this text (translated)

1. If the user wants to enter dialog verbally, they press the microphone icon to switch to voice activated mode.
2. The user speaks and the app record and transcribes the sentances. These can be viewed in the messges text box for accuracy. The use then presses the "done" button to indicate the conclusion of their verbal input.