Project (Summer 2020)

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1 INTRODUCTION

The interface I choose to redesign is the WhatsApp Messenger's iPhone interface.

Brief Overview of WhatsApp:
WhatsApp is a free text and voice messaging app that also allows users to make voice and video calls. The user can create a Whatsapp account by linking the account to the user's phone number. The user can later add new contacts by adding the phone numbers of those contacts. Once the contact is added, the user can start messaging the contacts. The user can send audio messages, photos, videos, documents, links etc. The user can audio or video call the contacts. The app also lets the user to form a group of contacts and then they all can communicate as a group. That is, all the communication in the group is visible to all group members. An admin can be selected for the group who will monitor the group members and the group settings. Whatsapp also lets users create a broadcast list so that the user can send a message to everyone in the list at once. The app also lets users archive chats, set status, change profile pictures etc. There are also a lot of options provided for privacy settings, backup of messages, saving media to phone's memory etc. This provides a lot of flexibility to the user.

Access and Steps to experience the interface
To download and install this app on your phone,

1. Go to the App Store and search for Whatsapp Messenger.
2. Install the app.
3. Once the app is installed, open the app and start setting it up by adding your phone number, name and a profile photo (Optional).
4. Once the set up is complete, you can see a list of contacts from your phone's contact list that are on whataspp.
5. You can click on the desired contact and start messaging, calling, sharing pictures, videos etc.
6. By going into the settings page, the user can play around with the options provided.

2 INITIAL NEEDFINDING

I would like to gather information about the interface by using 2 approaches:
1. Reviewing the product reviews on the App Store.
2. Conducting a needfinding survey.

2.1 Description of the needfinding approaches

2.1.1 *Product Reviews*

I will get the reviews from the App Store using the link :
https://apps.apple.com/us/app/whatsapp-messenger/id310633997see-all/reviews.
I will use the App Annie to analyze the reviews based on the ratings and keywords.

I will look at the most recent 100 reviews. I will first look at the recent 1 and 2 star rating reviews to see what problems the users are facing with the app. Then I will look at the 3 star ratings as this will contain more of mixed reviews where users are neutral about the app. Since reviewing only the 1,2, 3 star ratings will create a negativity bias, I will also look at the 5 star ratings to see what parts of the interface users like the most so that I can use some of those ideas to improve the areas which are not very well liked by the user.

To perform all this, I will be using the AppAnnie engine. This lets me order reviews based on ratings, date, location etc. I can also specifically search for reviews that contain a particular keyword. The ratings are graphically represented which portrays a very useful image of the review and ratings data.

2.1.2 *Survey*

I will send out the survey based on the findings from the product reviews. I will send them to my peers at OMSCS, friends and family. I will collect and analyze 25 survey responses. I will make a list of problems that users are facing. I will send out the survey to estimate how many participants are facing the issue. The survey will also have a question where participants can mention if they are facing any additional problems while using the interface. The survey also let's the users give suggestions for improving the interface.
The needfinding survey is attached in the Appendix.

2.2 Conclusions

After reading a number of reviews and analyzing the survey results, the following are the issues that needs to be fixed.

1. Lot of users in the reviews mentioned that they made a call unintentionally while viewing profile information of a contact.
   And also, **19 out of 25** survey participants said they have done this at least one time. We need to come up with a solution to avoid this. This is an improvement to the existing interface.
2. In the reviews, a lot of people requested the addition of online status of contacts on homepage.
   11 out of 25 survey participants said they would like to see the online status of contacts on the homepage. This is a feature that has to be added to the interface. This is an improvement to the existing interface.
3. Reviews also contained complaints about record feature. Lot of users were not comfortable with using the voice record function in WhatsApp.
   12 out of 25 survey participants said they have faced issue while recording at least once. We need to come up with a user-friendly design to solve this issue.This is an improvement to the existing interface.
4. Many users said in the reviews that they were not happy with the idea of forwarding only picture even when a text was attached to the picture. So the design has to support forwarding both the picture and the text (if exists). This is an improvement to the existing interface.
5. Many users also showed concern when searching for a particular media item in the product reviews. The existence of lot of media files makes this job tough.
   19 out of 25 survey participants said they faced a similar issue. We need to come up with a way to resolve this. This is an improvement to the existing interface.

3 HEURISTIC EVALUATION

3.1 Ease and Comfort

What doesn't work well? : The voice record feature is a little tricky to get it right the first time. There are multiple options provided like lock, cancel, but these actions are not clearly shown and requires the user to swipe up to lock the

recording, swipe left to cancel, hold the icon to record etc. Even a slightest movement of hand will result in the recording being deleted without the possibility of retrieving it back.

Why doesn't it work well? : The comfort principle states that the user needs to perform operations irrespective of the posture and mobility. But in this case, when the user is moving, it is very easy to swipe unintentionally which will lead to the deletion of the recording.

3.2 Tolerance

What doesn't work well? : When the user wants to view information of the contact, he has to click on the area that has the name of the contact. This can be seen in Figure 2. While doing so, the user might accidentally touch the video call icon as it is placed very close to the name of the contact. I myself have got many missed calls from relatives who later sent a message saying the call was made accidentally. This can also be considered as a **Slip**.

Why doesn't it work well? : The app isn't tolerant in this particular area. If the user clicks on the video call icon by mistake, the call is placed without asking the user any confirmation. Same is the case with voice call. This is what the principle of tolerance suggests. The interface should be tolerant and reduce the cost of mistakes. And it should also prevent errors wherever possible. I believe the app should ask for confirmation before placing the call or move the icons to a different place which will avoid the slip.

3.3 Mental Models

3.3.1 *Delete Message*

What doesn't work well? : When the user deletes a message when he has already sent, the user has a mental model that the message will be deleted and the receiver will not be able to know that any message was sent. This is how the delete principle works across all platforms. But in WhatsApp, when the user deletes a message, a *This message was deleted* will be displayed both to the user and the receiver. This defeats the purpose of deleting a message as the receiver will know that some message was deleted.

Why doesn't it work well? : This does not work well because the mental model of the user does not match the actual functionality. The designers should design

systems that act the way the user expects them to acts. But this is clearly violated in this case.

3.3.2 *Forward a Picture with text associated with it*

What does not work well : When the user wants to forward a photo with the attached text from one contact's message window to another, the user clicks on forward. But only the photo is forwarded. The text associated with the photo is not forwarded. The user predicts that both the photo and text will be forwarded but that is not the case.

Why doesn't it work well? : The mental model that the user creates when he looks at the forward icon is that everything associated with the picture will be forwarded. But that is not the case. There is a mismatch between user's mental model and the actual operation.

3.4 Distributed Cognition

Whatsapp as a whole is more of an extension of the user's long term memory. The user can just check WhatsApp to refer to messages or media he has sent or received.

What works well? :

1. The list of contacts are displayed. This enables user to just scroll down and identify the contact to chat with. The user need to keep the phone number of the contact in mind.
2. The app shows the new messages that was received and also the number of messages.
3. The app also provides back up functionalities to store and back up all the chats.
4. All the messages, images, videos etc are stored in each chat so the user can just go to the contact and click on media and retrieve any desired data.

What makes it work well? : The above operations are implemented keeping user needs in mind his cognitive abilities. This was designed to reduce cognitive load on the user.

What doesn't work well? : However, when the user wants to search for a particular photo or voice note that he has sent or received, the way to do it is not easy. The user has to remember the date when he sent it and scroll back to find

the picture (by viewing the thumbnail). The voice note is even difficult as it is impossible to identify without playing each one of them.

Why doesn't it work well? : There is no easy way to search for an item. Since there is a lot of media to search from, there should be a better search mechanism to help user find the content he is searching for.

3.5 Participant View

What works well : The user is notified about new messages even when he is busy elsewhere and not checking the phone.

What makes it work well : If user receives a message from a contact, a blue circle is marked and the number of messages is displayed inside. With this the user can come back anytime and easily identify the new message and can read it. The clear representation will help the user identify the new message. This upholds the participant view of the user i.e., it is considering the context and the world around him.

3.6 Discoverability

What works well : All the basic functionalities can be easily discovered in the app.

1. The chats are listed as the main part of the home page which helps the user to start the conversation with the desired contact.
2. When the user opens a chat window, the text box is clearly visible and the send button is also visible.
3. If the user wants to send an attachment, the + symbol is provided. Clicking on that will open up a list of types of attachments.
4. A camera is provided if the user wants to click a picture and send and mic is provided for the user to send a voice note.
5. A phone icon is provided for the voice call and video camera icon is provided for the video call.

What doesn't work well? : The functionalities like delete, mark as unread and archive are not so easily discoverable. The user either has to swipe the message left or right to view the options. Or the user has to long press on the message to view the options. Both these ways are not easy for a novice to discover.

Also, the online status of the contacts are not readily discoverable. The user has

to click on the contact to see if they are online or not.

The third issue is the search icon in the chats. It's difficult to know that the option is even available at the first glance. The user has to click on the contact info and then find the search option. Instead, this can be placed on the chat page of every contact.

Why doesn't it work well? : The reason for all the above problems is that the operations are not easily discoverable. There should be a way to let the user know that these operations are available and easily accessible.

3.7 Structure

What works well? : The interface of WhatsApp is very neatly structured by grouping related things together and separating unrelated things. It also differentiates dissimilar things. For example:

1. The chat of each contact is placed one below the other in the order of the newest message received.
2. In the chat window, the message sent and message received is clearly differentiated with varying colors and placement of the message.
3. The dissimilar media items are clearly differentiated - a picture uses a camera icon, video uses a video camera icon, voice note uses a mic icon etc.
4. The media is arranged neatly in grid format which is easy on the user's eyes.

What doesn't work well and why? : The one issue here is that in the media page, the dissimilar things (photo, video, voice note, gifs) are not differentiated. Everything is put together in grid format which makes it difficult for the user to search for a particular content. To resolve this, we can add certain filters which will help users see only the type of media they want to see.

3.8 Gulf of Execution

Let's say the primary task of the user is to send a message to a contact.
Identify Intentions : The user identifies the goal as sending a message through the app.

Identify Actions : What works well and why: The list of chats are easily visible. The user can scroll down to find the desired contact. Once the user finds the chat and opens it, he can easily understand to open it and write in the text box.

Why doesn't it work well and why? : But when the user wants to message to a new contact, he cannot identify the actions easily. The symbol on the right top corner does not clearly depict that it should be used to create a chat for a new contact.

Execute in Interface : The execution is straightforward when the user is chatting with someone with whom user has already chatted. But since the steps identification is difficult when user wants to chat with a new contact, we can safely say that there exists a gulf of execution.

4 INTERFACE REDESIGN

Figure 1—The figure shows the redesigned home page of WhatsApp and the redesign to access audio and video call and search icons.

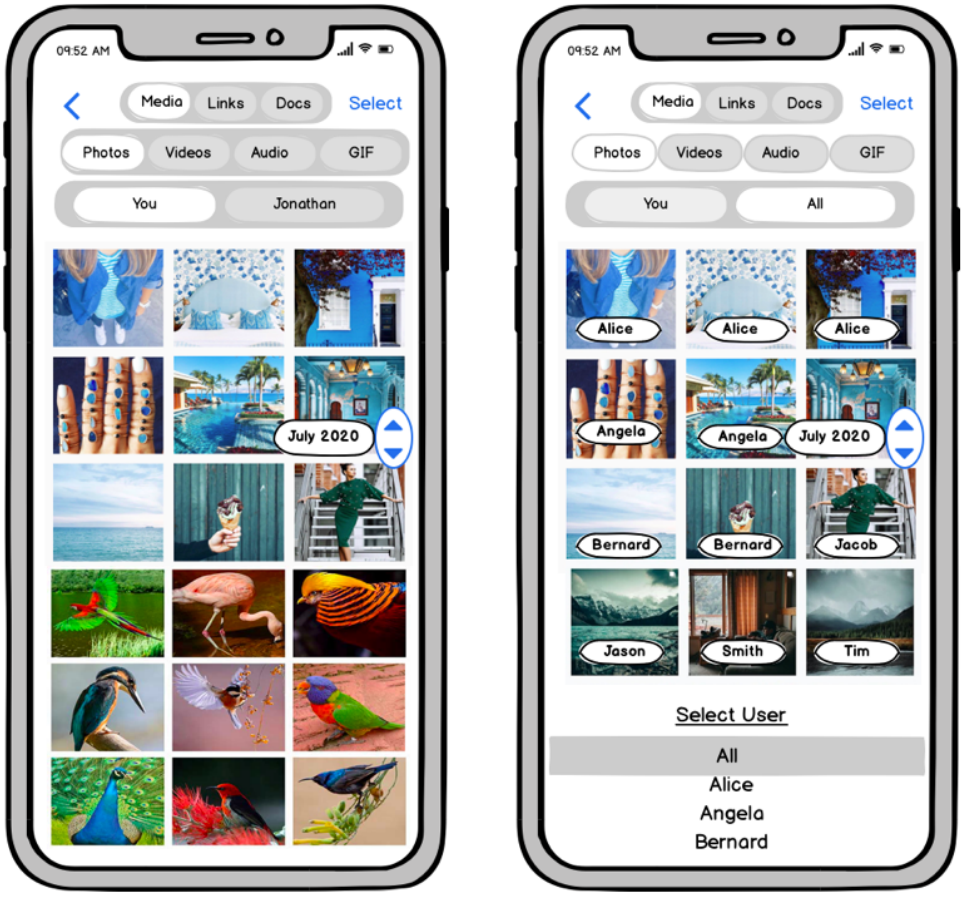

Figure 2—The figures shows the redesigned media page of an individual chat and a group chat.

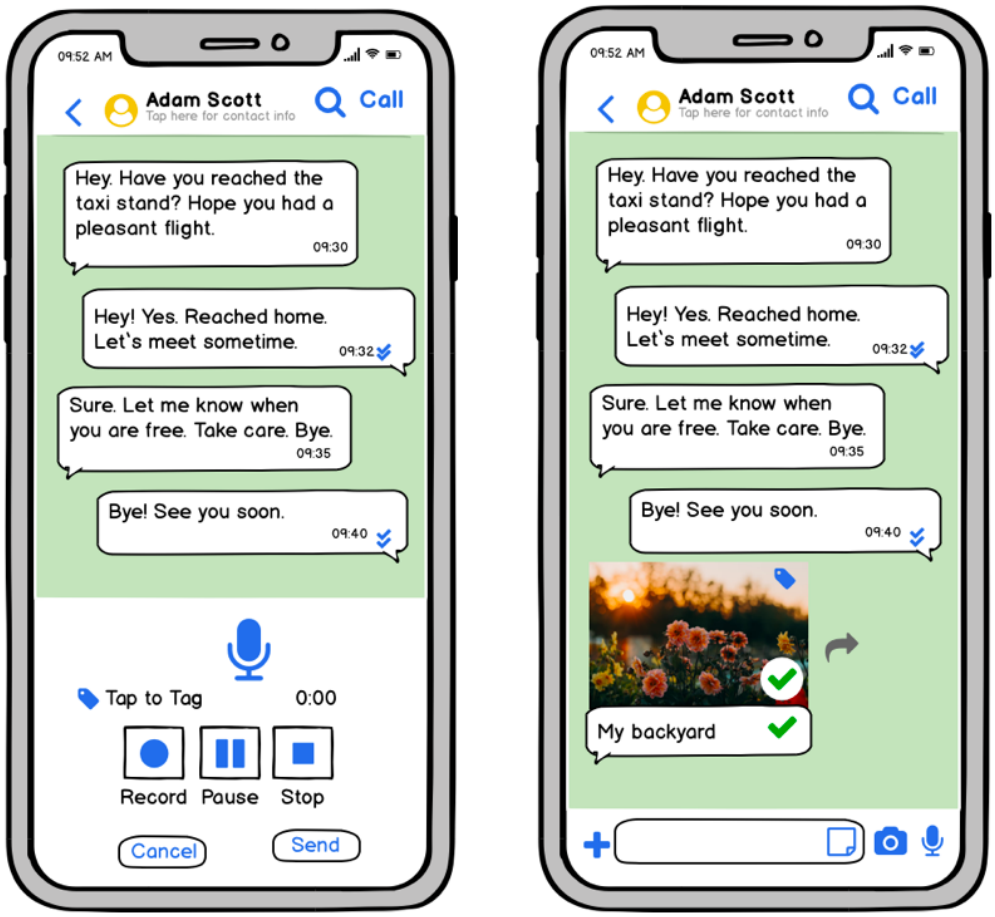

Figure 3—The figure shows the redesigned voice recording interface and the redesigned forward operation.

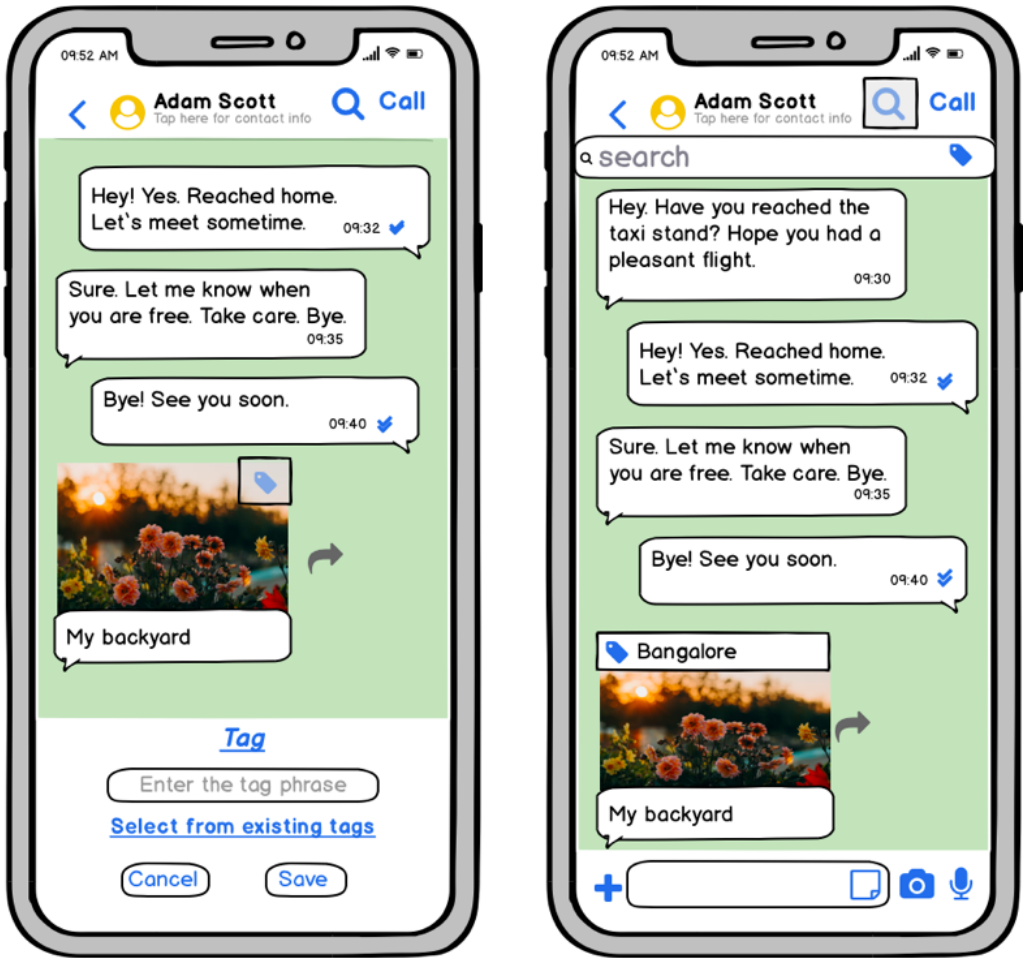

Figure 4—The figure shows the addition of tagging feature and performing the search using tags.

5 INTERFACE JUSTIFICATION

5.1 Redesigned Home Page

The redesigned home page still contains the **structure** as before by arranging the messages together and using different icons to denote different types of media.

For the changes, at the top right corner of the home page, I have removed the create new icon and replaced it with a text *New Message*. This will clearly let the user know that if they wish to chat with someone for the first time, they have to click on the *New Message* icon. The wordings are clear and the user can easily **map** them to the corresponding function and it is also easily **discoverable** by making it clearly visible. This problem also solves the **gulf of execution** as mentioned above in 3.8. After the redesign, when the user wants to send a message to a new contact, he exactly will know which button to click and hence the action is easily identifiable.

The second part of this design is the display of the online status of the contacts. It also use of the **visual perception** of the user to inform the online status of all the contacts. Instead of going into the chat screen of the contact to view their online status, the user can know from the home page. The green color can be easily **mapped** to the contact being online. This is a universal symbol for saying that the person is online and which is quiet familiar to the user. So we can say that it is **consistent** with the other applications. Even if the user cannot differentiate colors, he will be able to know that a circle next to the contact's profile photo indicates that the contact is online. This provides **equity** which means the design accommodates even people with diverse abilities.

However, if the contact wishes to hide their online status, the design **values** that and doesn't display their online status anywhere in the application.

5.2 Redesigned access to Video and Audio Calls and Search Icon

The redesigned interface still consists of all this important functionalities. In the redesign I am just rearranging their placements to avoid slips.

To avoid the slip mentioned in 3.2, I have introduced an additional step to get access to the audio and video call icons. This will make the design **Tolerant** to the calls users make as a result of a slip. By tolerant, I mean since there is an additional step involved, the design will avoid the slip. The icon is labeled *Call*

so this let's the user easily **map** the icon to it's functionality and this is also easily **discoverable**. It is easy to locate the call button as it is very clearly put at the right place and made easily visible.

The user might want to perform a chat search and by default he will look at the top right corner to find the icon. But in the current design this function is not present there. Hence in the redesign, the chat search functionality is made more **discoverable**. The search icon is placed at the top right corner like in many of the apps. This is how the redesign follows **consistency**.

5.3 Redesigned Media Page for individual and group chat

The redesign still preserves the idea of displaying the media contents next to each other in the form of a grid - **structure**. In the redesign, we are putting each type of media in a different page for easy access.

Since WhatsApp has become the go-to messaging app nowadays, there is a possibility that the users have a hard time searching for a particular media in the huge pile. So the redesign adds some additional filters to make the job easy. The filters are clearly depicted and easy to understand. With this the user can filter media sent by a particular contact.

The scroll button and the scroll bar uses the principle of **affordance** to let the user know that they can pull it up and down to navigate. Even if the user has problems with identifying what to do, the up and down arrows act as **signifiers** to tell the users what to do. Next to the scroll bar, the month and year is shown to let the users know how far they have scrolled. This is the principle of **Perceptability** - showing user what they are currently doing in the application.

This redesign also upholds the principle of **structure** by keeping similar media items together and differentiating dissimilar media items.

5.4 Redesigned Interface for Voice Recording

The redesign doesn't change the placement of the mic icon. This placement is very apt and useful of the user. The redesign is just changing the interface of the record function once the user clicks on the mic icon.

The current design for voice recording is not very user friendly and the operations are not easily discoverable. Hence I have redesigned it to match the other recording apps to maintain **consistency**. I made the design consistent by follow-

ing the same layout that many apps use to record voice. By making it consistent the users will feel more comfortable using the interface. In this design, all the necessary buttons are clearly **discoverable**. They are made visible and even the description of each button is displayed.

Most importantly this design is **tolerant** to sending unintended voice messages. This was a complaint in most of the product reviews. With this new design, the user can even preview the voice message before sending it. When the user is recording, a timer is displayed which tells the user that the recording is happening and that the duration of it. This will let the user know the progress of their actions. This is the principle of **Perceptability**.

The record interface is displayed at the bottom of the screen and hence the messages are not blocked. The user can scroll and view messages **comfortably**.

The other advantage is that the user can listen to the recording using the play/pause button and also trim the recording before sending it. (Figure 5 in Appendices). The user can also tag this media using the tag icon for easy access in future.

5.5 Redesigned Forward functionality

The redesign doesn't change the location of the forward icon. But the redesign gives user the flexibility to choose what they want to forward.

As we mentioned in 3.3.2, there is a mismatch between the mental model and the actual functionality of the forward function. To resolve this, now the user has the **flexbility** to forward only picture, only text or both. When the user presses forward button, the app will let the user select what he wants to forward and forwards it. Now the user knows that only the things he has selected will be forwarded.

5.6 Addition of Media Tagging Feature

To further make the media search easier, the new design introduces the functionality of tagging. This is optional. The user may choose to tag a media. The user can either create a new tag or select from the existing tags. The tag feature is easily **discoverable** as it is placed right at the top right corner of the media. The icon used can be easily **mapped** to tagging as the same icon is **consistently** used to denote tag across all apps. This tagging feature can be used with all media types. This will especially help recognizing voice notes because currently there

is no way to search for a voice note without playing each one of them.

When user clicks on *Select from Existing Tags*, a list of tags is displayed as shown in Figure 6 in Appendices. The user can either select one or close by clicking cancel.

The interface for tagging is displayed at the bottom of the screen and hence the messages are not blocked. The user can scroll and view messages **comfortably**.

6 EVALUATION PLAN

I will perform Empirical evaluation on the above wireframe. I chose this as there is an interface to compare with (the existing WhatsApp iPhone application).

6.1 Control and Experimental conditions

Testing : I will be testing the efficiency of the existing WhatsApp interface and the new improved prototype mentioned above.
Point of Comparison : I will collect the time taken by a user to perform different operations in the original interface and the same operations in the redesigned interface. The operations are :

1. Knowing the user's online status.
2. Searching for a media in the contact's chat media page.
3. Searching for a media in a group's chat media page.
4. Recording and sending a voice note as message.

For the 2nd and 3rd operation, I will request the participants to use the filter and tag feature in the redesigned interface.

6.2 Null and Alternative Hypotheses

The **Null Hypothesis** is that the time taken to perform all the mentioned operations above is same in both the existing interface and the redesigned prototype.

The **Alternative Hypotheses** is that the time taken to perform all the mentioned operations above is different in both the existing interface and the redesigned prototype.

6.3 Experimental Method

6.3.1 *Within-subjects*

I will use within-subjects to perform the evaluation. The reason for selecting this is that by having each user try out both interfaces, I will be able to gather double the data. The other reason is, if each user tries out both the interfaces, the final reading that is obtained will say a lot more things about the interfaces - like which interface user liked more.

6.3.2 *Assignment of subjects to groups*

For this evaluation I will try to recruit 15-20 participants. I will try to recruit both novice and expert users to take part in the assignment to get impartial data. While splitting the participants into groups, I will make sure that each group has a combination of both novice and expert users.
FIrst Group : First perform the above mentioned operations on the existing WhatsApp interface and later on the new redesigned interface.
Second Group : First perform the operations on the redesigned interface and then the existing WhatsApp iPhone application.

6.3.3 *Execution and Data Collection*

Each participant will be given a set of operations to perform that he needs to do in both the interfaces. While the participant is performing the actions, the time taken to accomplish each action in both the interfaces will be noted down.

Later, this nominal data is analyzed to see if the difference is significant enough to prove the null hypothesis false.

6.4 Analysis

The data gathered is the time which is nominal data. Hence I will be using Chi-Squared test to analyze the gathered data.
Independent Variables - The existing WhatsApp iPhone application and the newly redesigned WhatsApp.
Dependant variable - The time taken to perform the above mentioned operations.

While the user is performing the operations in both the interfaces, I will make note of the time of each operation and calculate the total and use it for analysis.

7 APPENDICES

7.1 Additional Wireframes

7.1.1 *Voice Record Feature*

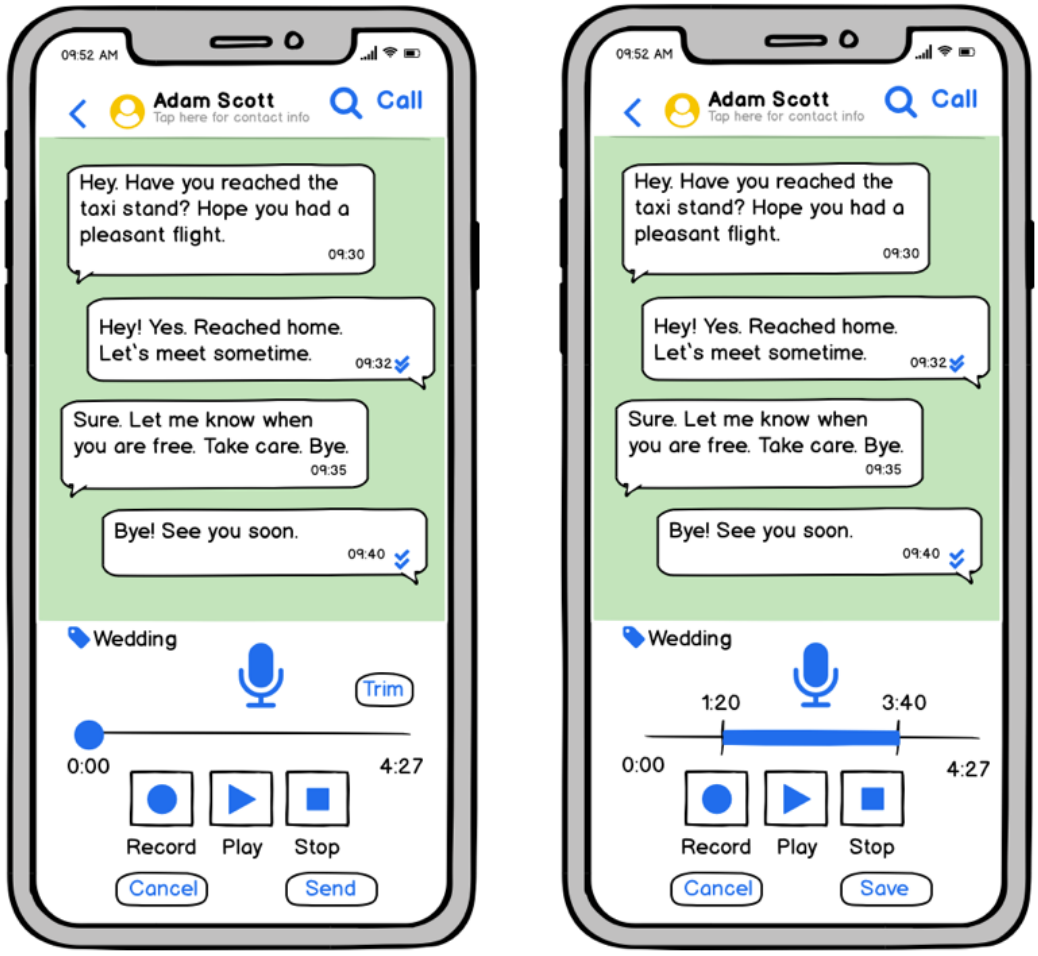

Figure 5—The figure shows the screen where user can play the recorded voice note before sending and also trim the recorded voice note.

7.1.2 *Selecting from existing tags*

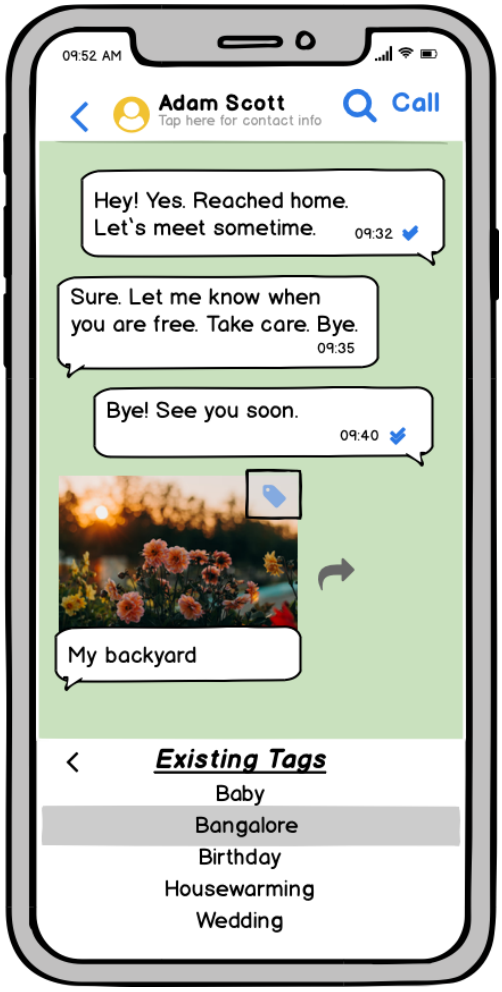

Figure 6—The figure shows the screen where users can select a tag from the existing list of tags.

7.2 Needfinding Survey

Table 1—Survey Questions.

No	Question	Options	Purpose
1	What is your age?	1) Under 18 2) 18-29 3) 30-49 4) 50-59 5) 60+	To gather user's age
2	How many times in a week do you use WhatsApp?	1) 1-5 2) 6-10 3) 10+	To gather information about user's frequency of app usage
3	How familiar are you with WhatsApp?	1) Very Familiar 2) Familiar 3) Neutral 4) Not Familiar 5) Never heard of it	To learn about user's expertise
4	How often do you accidentally place a call while viewing the contact information?	1) Very frequently 2) Frequently 3) Occasionally 4) Rarely 5) Never	To see how often users commit the slip
5	Would you benefit from the display of online status of the contacts on the home page?	1) Yes 2) No 3)Not Sure	To analyze if users will benefit from display of online status
6	How often do you have trouble using the voice record feature of WhatsApp	1) Very frequently 2) Frequently 3) Occasionally 4) Rarely 5) Never	To get statistics about how comfortable users are with current record feature.

Table 2—Survey Questions.

No	Question	Options	Purpose
7	How often do you have difficulty finding the voice note, photo or video sent or received in WhatsApp?	1) Very frequently 2) Frequently 3) Occasionally 4) Rarely 5) Never	To see if users have difficulty searching for media
8	Would you like it if WhatsApp did the splitting of video into 30s and uploading to the status when you try to upload a video longer than 30s?	1) Yes 2) No 3)Not Sure	To see if people will like the video status update feature
9	How satisfied are you with the WhatsApp message delete feature? (Displaying "This message was deleted" when a message is deleted)	1) Highly Dissatisfied 2) Dissatisfied 3) Neutral 4) Satisfied 5) Highly Satisfied	To see user's satisfaction with delete feature.
10	Do you face any other issues while using WhatsApp?	Free Text	To understand user's problems.
11	Do you have any suggestions to improve WhatsApp?	Free Text	To collect user's suggestions.