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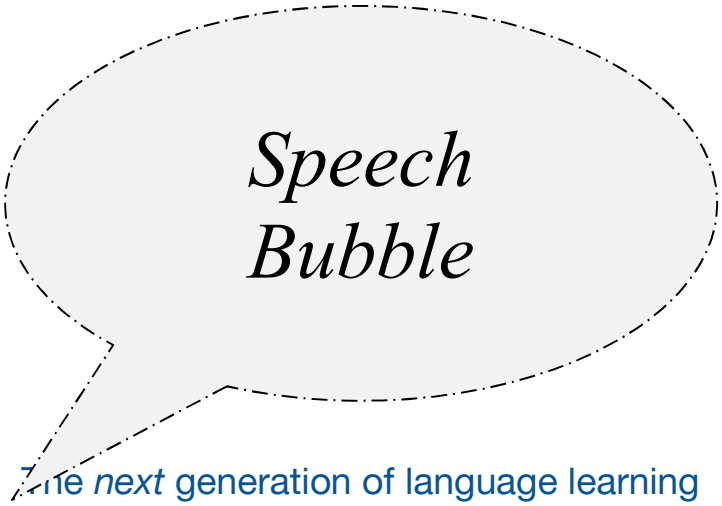

The *next* generation of language learning and speech suggestion wearables

Each Team Member's Name and Role

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Problem and Solution Overview: In today's globalized world, we meet people from all over the world, people from many different countries who speak many different languages. Between accents and colloquial phrases and slang, it's all too easy to become *Lost In Translation*. We aim to tackle the problem of communication difficulties head on, using our 3-pronged cross platform approach. By integrating a small, earpiece wearable, a smart watch interface, as well as a smartphone application. We create a consistent feedback loop by giving more consistent updates to the watch interface, as well as more detailed reports to the smartphone application. Utilizing our earpiece we are able to provide audio feedback of current and previously held conversations. Through our smartwatch and or our smartphone application, we also provide storage and replay of commonly misunderstood phrases, idioms, and metaphors. By providing the client with regular, reliable and honest feedback, we are able to help them track their progress in achieving greater conversational fluency.

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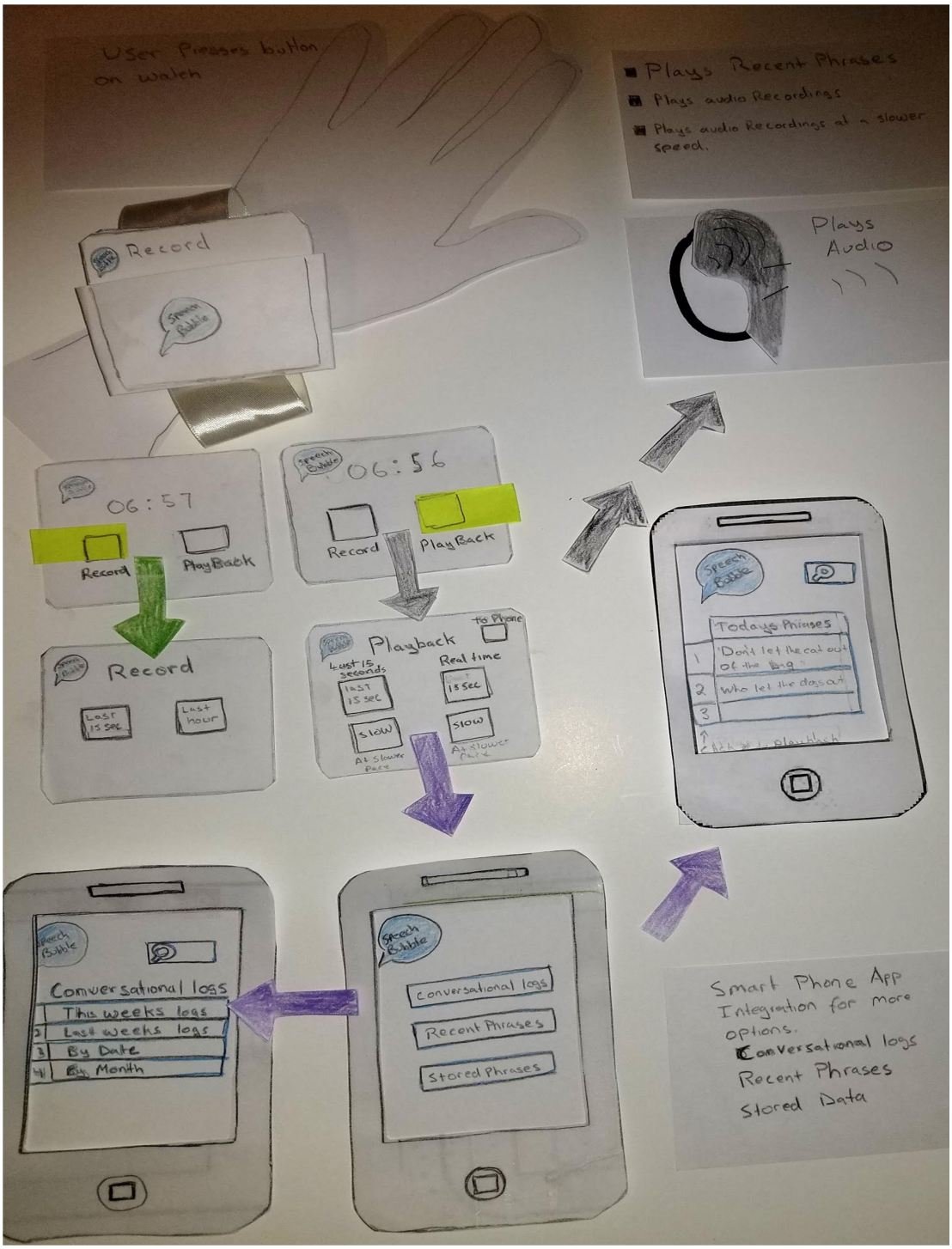
Initial Paper Prototype: Our paper prototype shows the ways in which people will interact with the product. The workflow shows the various configurations that the devices can have, and how all of these distinct parts work together to provide the most value. When conversation is misunderstood, the smartwatch interface is pressed. The current conversation is recorded and

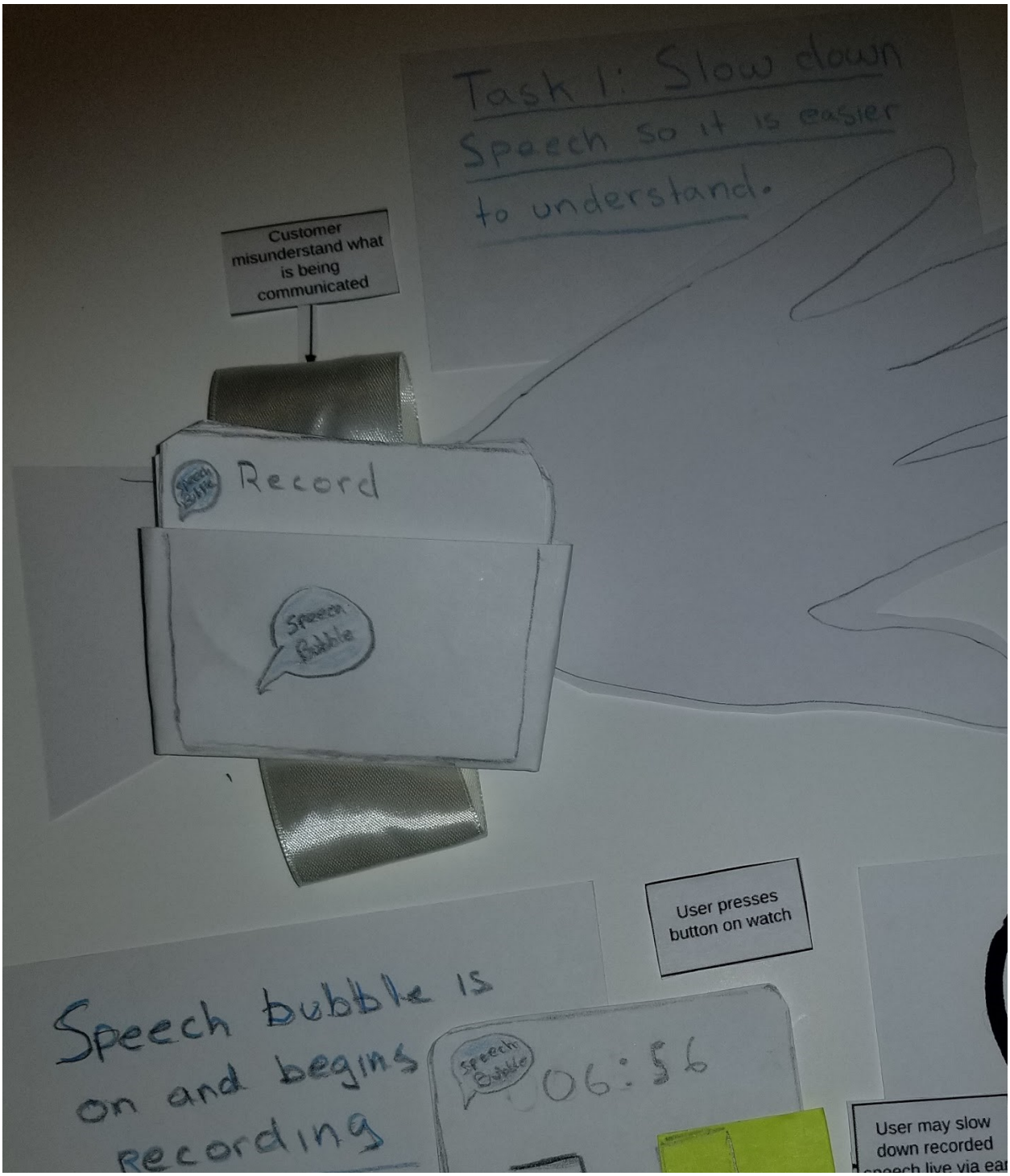
played back on the phone. Additionally conversational logs with pertinent phrases are stored and



available for definition lookup and playback.

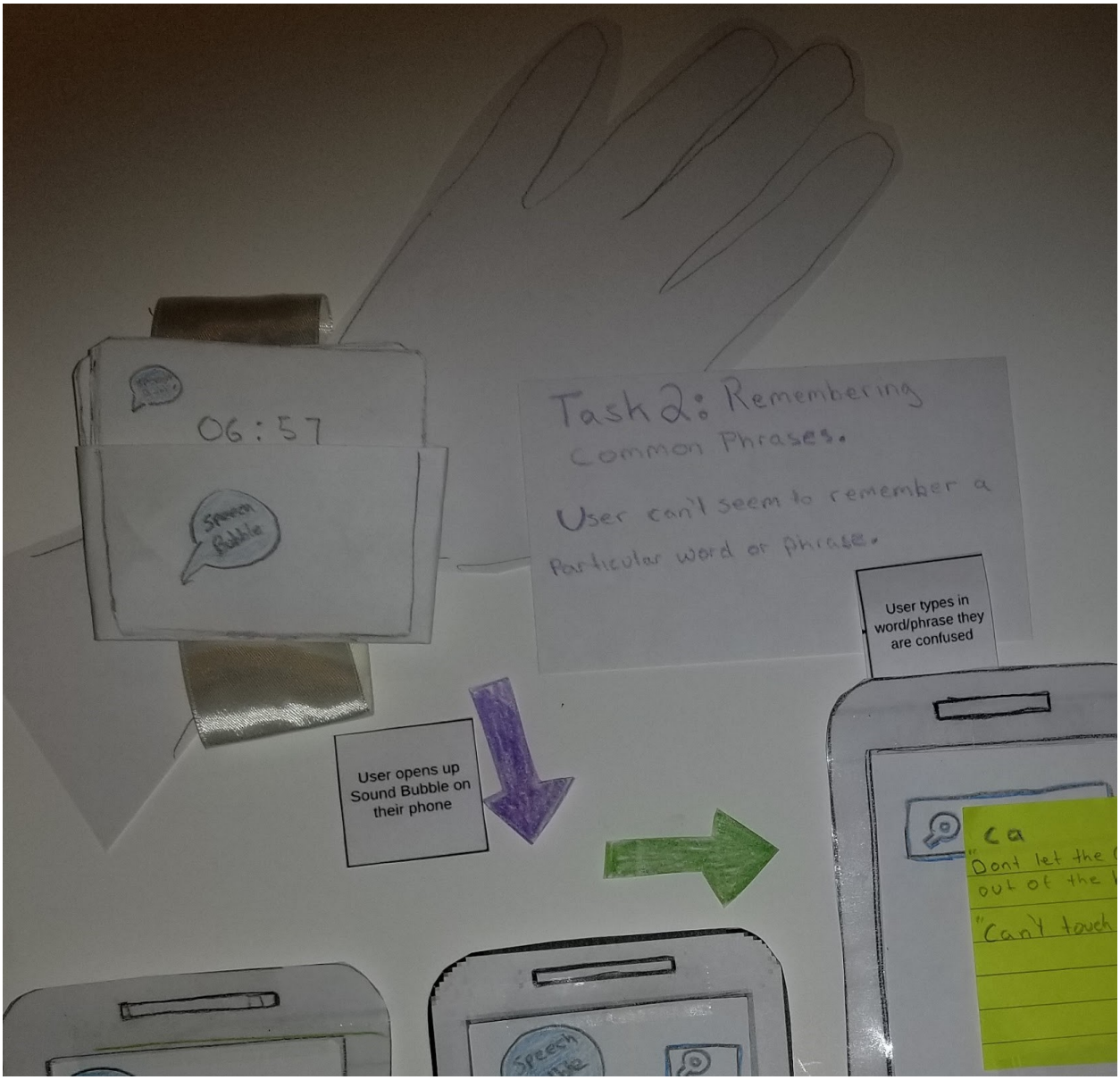
Task 1: Slowing down speech so it is easier to understand. During conversations the user is able to select playback of real time audio as a slowed down version or as normal. As well the playback can

be for a set time of only the most recent 15 seconds. Furthermore, the user is able to replay saved speech and listen to it with the ear piece.



Task 2: Remembering Common Phrases. When a user can not remember a particular phrase he or she has heard recently. The smartphone application allows for access and parsing of the stored

results and to play back of the phrase for proper pronunciation.



Testing Process:

All of our testing participants were either male or female non native English speakers. Most were students while others were professionals. Since our design is geared to supporting non native english speakers, we preferred a non native English speaker for their insight on how this product could be applicable to them and if they would want to use it. We met in libraries for each test as we thought a somewhat quiet environment would be generally okay for the test. As well it provided a public place and comfortable setting. We began the testing process with a brief introduction of who were were. We also gave an overview of what the product was and the two tasks that it covered. We asked the user to speak his or her thoughts aloud during the testing process. Additionally, we requested the user walk through both tasks.We periodically asked questions about the paper product in regards to the tasks. Finally, we discussed the product in more detail after the test.

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Initially we did not request the participant to to read through the tutorial as we wanted to see if they could get through the tasks without us, and assumed if they had questions they would use the tutorial. However, some of the participants did not read through the tutorial and did not choose to use the tutorial. Thus we found we needed to explain more than should have been necessary, and that initially some of the confusion could have been avoided with reading the tutorial. Moreover, in the initial tests we also went more swiftly through the tasks but did not test all of the options. Therefore we later requested the participant to attempt multiple options for performing each task. This lead us to more thorough testing. Furthermore, we had superfluous information at some of the tests, such as suggestions of different colors for watch bands, or suggestions for mascots, which lead us to address the participants that we were more concerned with looking for feedback on the paper prototype with regards to the two tasks.

Testing Results:

Heuristic evaluation testing results: in visibility of system status and consistency and standards, we got a lot of feedback about the clarity of features and options throughout the interface. For example, users couldn't understand the difference between our "record" and "playback" buttons, since both captured fifteen seconds of audio but one played it back immediately while the other queued the clip for playback later. Many comments also addressed a lack of consistency or intuitive connection between the watch interface and the smartphone interface. Suggested fixes included renaming buttons to have more intuitive words, or adding a tutorial to the beginning of the app to explain more comprehensively which button does what.

In user control and freedom we got feedback that the used had a good level of freedom in controlling when not to record conversations, and that the technology successfully made people evaluating us feel like they could control how much their privacy was compromised. However, the record feature was out of easy reach of the user, so in a conversation the user would be unlikely to be able to navigate to the record button in time to capture what they didn't understand. The suggested fix was to make the record button quickly accessible, perhaps as a home screen shortcut.

The buttons in our interface also got quite a bit of attention in the visibility, aesthetics, and efficiency of use heuristics. The record, playback, home, search, sort, start favorites, and recent phrases buttons all got comments requesting that they be made more intuitive, easily accessible, and more natural to understand and use. The feature of our interface that showed recently used or looked up phrases got several notes--evaluators wanted phrases to be easy to sort or filter by "past day", "past week", "past month", and so on, and to be easy to search through by tag word.

One more suggestion pertaining to real world connections and user freedom heuristics was that the technology should somehow (visually or otherwise, in an evident but unobtrusive way) indicate that a conversation was being recorded. This is both to address privacy concerns and communicate the system status more clearly with the users.

Overall the focus of our feedback was about ease of intuitive use and understanding the function of each feature. With focus on revamping the instruction we include with the interface and the consistent and smooth transitions between each state of the technology, hopefully we can address these concerns.

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Usability test 1 results: Revisions we decided to make were to move the magnifying glass to the right side of the search to be more consistent with other platforms. Rename recent phrases to say today's phrases, to be more clear that it is from today's phrases. Annotate playback realtime to include "current" for better recognition. Change Stored phrases to now say "My stored phrases" so the user knows it is their personally stored phrases rather than from a database. Provide more information in the tutorial in regards to phrases.

Usability test 2 results: Added search option to smartphone application. We made both are smartphone application and smartwatch application support the same tasks and features so they could be used as stand alone devices. Added ability to record and playback from smartphone as well. Added search for phrases option/today's phrases/stored phrases on smartWatch. Changed design of earpiece to be sleeker and show speech bubble icon.

Usability test 3 results: Changed to icons instead of a list-view, to be more consistent with tablet type interfaces. Quick Record and Playback option locked until user reviews tutorial, Added an insert to have microphone option appear to allow for voice recognition while searching recent phrases and stored phrases.

In summary:

The refinement of our paper prototype testing and changes from the heuristic evaluation, critiques and usability testing consisted of many changes. One of the first changes we made was providing a tutorial that could help the user understand the paper prototype and all the options available to them. A lot of small changes we made had to do with recognition rather than recall, with renaming buttons for the participant to have a better understanding of each button's purpose. As well as consistency, to match android/apple smartphone/smartwatch conventions for icons as well as searching. There were some aesthetic changes to the earpiece. Another revision we made was to incorporate a search option for the users. Being able to query important phrases on the smartwatch contributed to making the device much more cohesive by incorporating a useful feature throughout the various platforms. Adding a search phrase option improved the usability of our product because it prevented redundant recordings and playbacks, and thus integrated better into the conversation. And finally, a larger revision was breaking up the various components of our system to be more modular. For example, if someone would rather use their existing smartwatch as opposed to purchasing an extra hardware wrist wearable, or if someone would rather use headphones than purchasing an earpiece, then we can break up our product into distinct parts that have a unified software system where each can work as stand alone devices.

Final Paper Prototype:

Final overview: When conversation is misunderstood, the smartwatch interface is pressed. The current conversation is recorded and played back on the phone by selecting the speech bubble icon and by default playing back the last 15 seconds. Moreover, real time conversational data can be played in normal or slow mode for unlimited time by selecting from either the smartphone application or the smartwatch application.

During playback mode transcripts are available on the smartphone.

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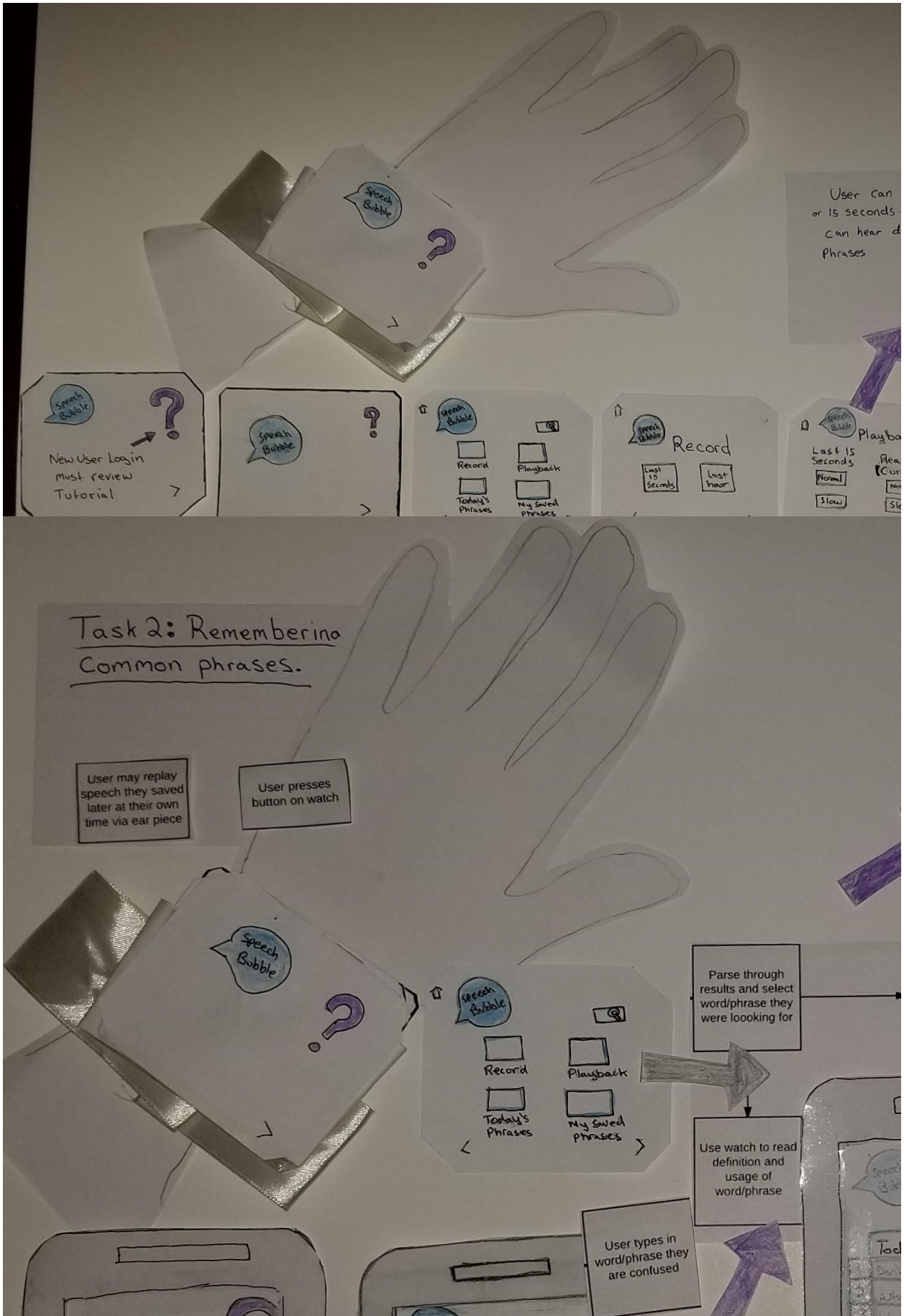
Additionally conversational logs with pertinent phrases are stored and available for definition

lookup and playback from either the smartwatch or the smartphone application. A tutorial is

provided for each interface. And audio is played through the inconspicuous earpiece.



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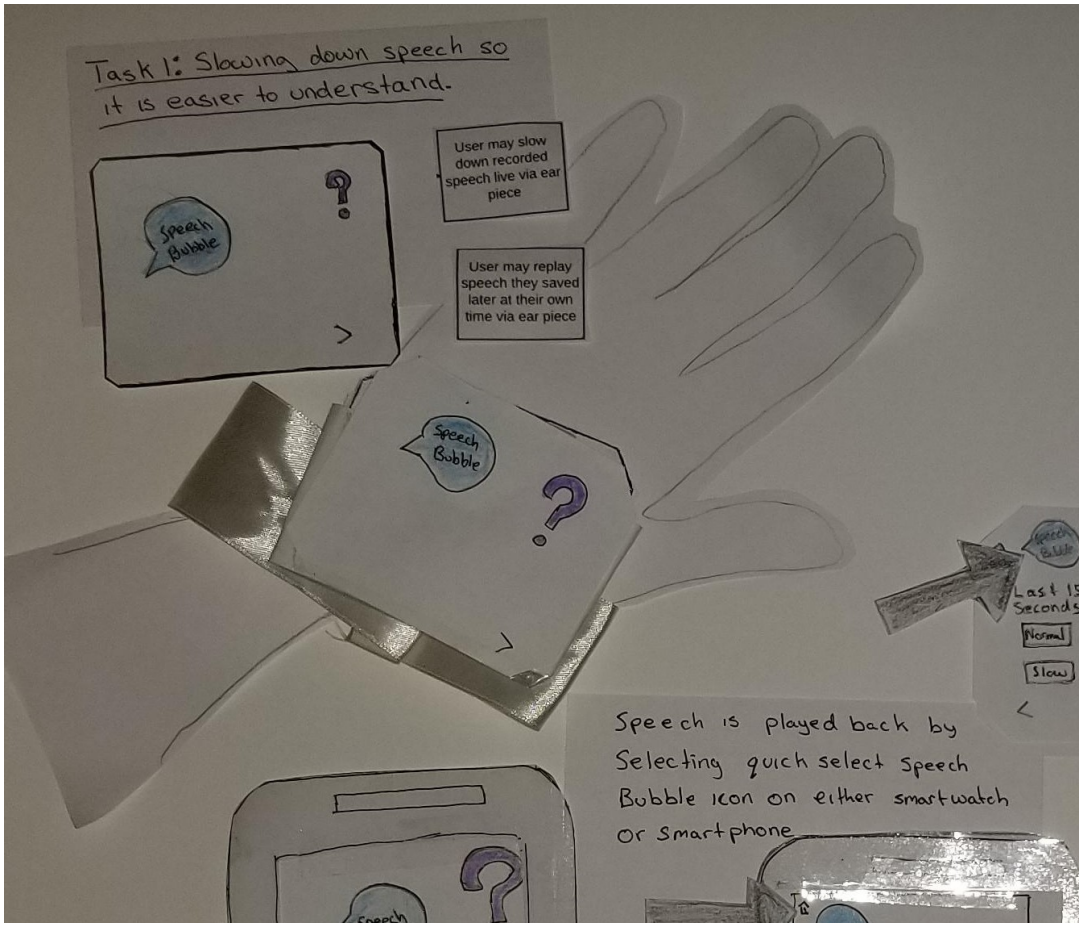
Task1: Slowing down speech so it is easier to understand. During conversations the user is able to select playback of real time audio as a slowed down version or as normal. As well the playback can be for a set time of only the most recent 15 seconds. Selecting the speech bubble from either the smartphone app or the smartwatch will play the last 15 seconds by default.



Furthermore, the user is able to replay saved speech and listen to it with the ear piece.

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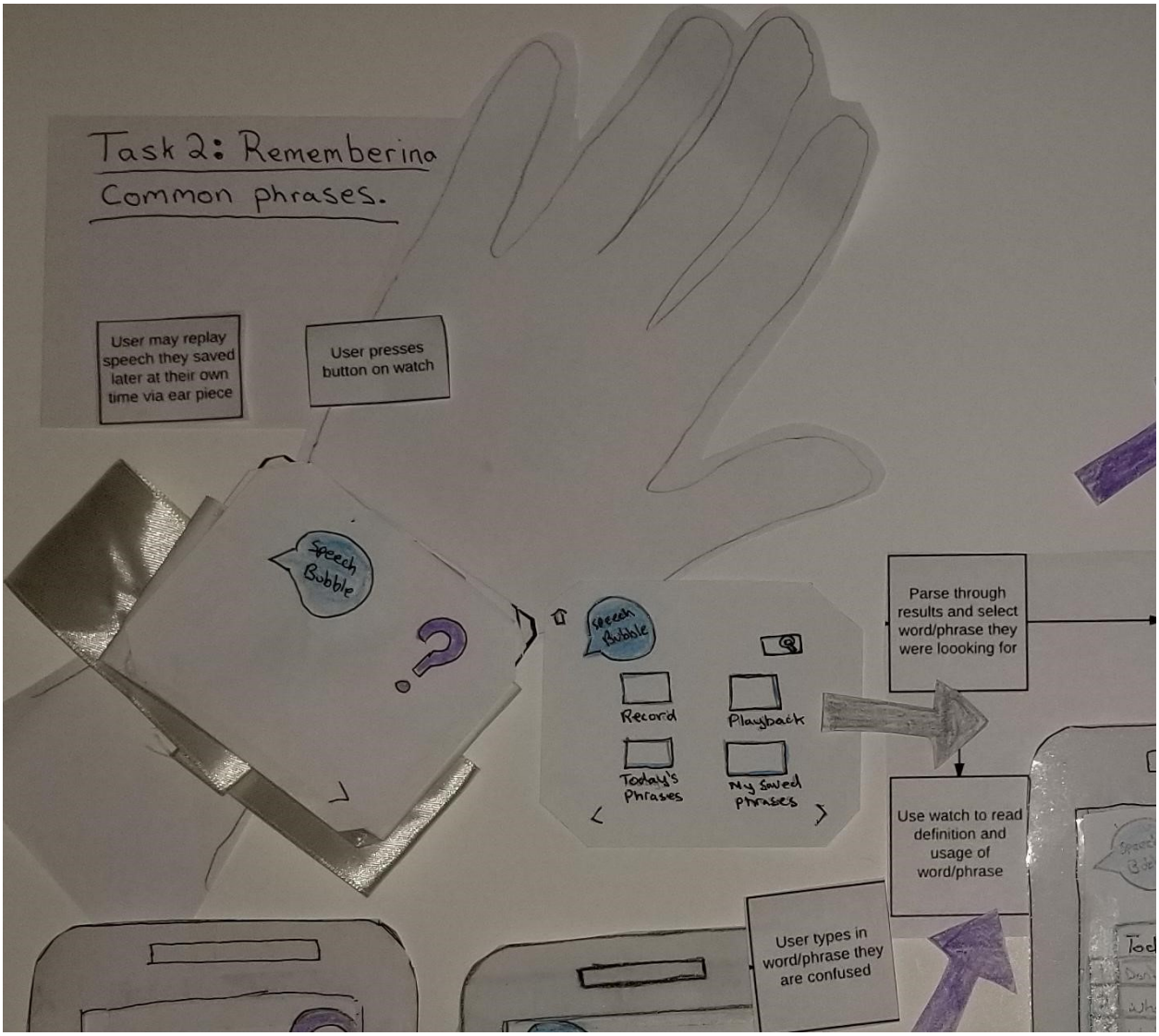
Task 2: Remembering Common Phrases. When a user can not remember a particular phrase he or she has heard recently he or she can access either the smartphone or smartwatch application which allows for access and parsing of the stored results and to play back of the phrase for proper pronunciation. Additional supportive features include voice search options.



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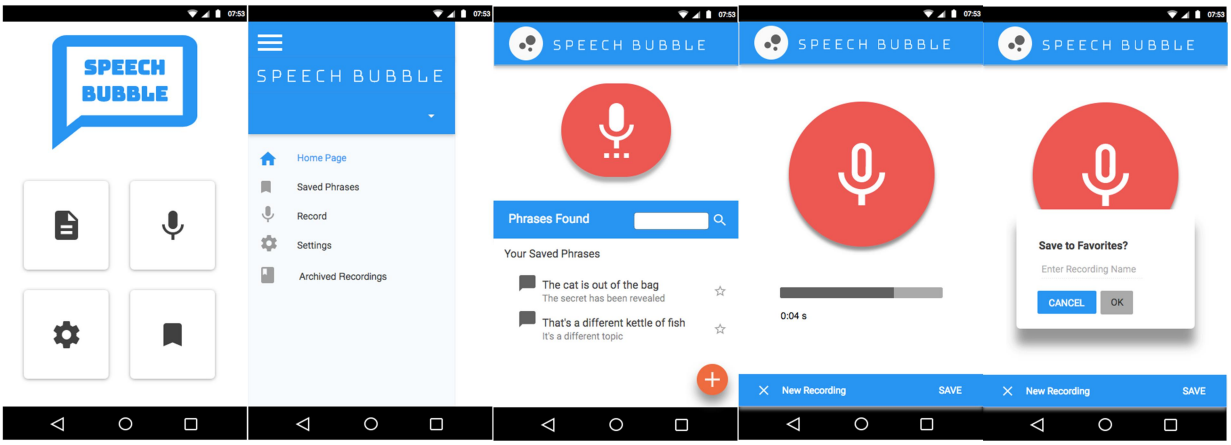
Digital Mockup:



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In our digital rendering, we focused on the outlay of icons and screens in the interface based on feedback we had gotten about how to most easily and intuitively access features of our technology in the middle of a conversation or in a social setting. Because our interface runs primarily on a smartwatch and an earpiece, we worked with limited screen space and a physical element of our design that had no interactive capabilities, so the “fat finger problem” and discussions about accuracy and speed of navigation through our interface were very important to our process.

Our first task is the task of slowing down speech to better understand it. To make this possible, our interface has a record button in the shape of our logo, a speech bubble. This button is immediately accessible as soon as the interface is running because we learned through our usability testing that it’s challenging to navigate to the feature when dealing with confusion from rapid speech and stress from trying to keep up with what another person is saying in live time. To be able to use this task a customer must press the record option from either the list tab that can be opened from any screen or the record button from the main menu of the watch and phone interface. You can then press the record button to use the record application where the last 15 seconds of what was being listened is recorded and so on until the user decides whether to save this sound clip or get rid of it. We put a large record button on the interface as we found during our evaluations that it should be prominently be shown in the record section of the application. We also added an “archived recordings” option to the drop down menu on all screens along with on the main menu where users can view their saved recordings for customers to hear at a later time.

Our second task is that of looking up an idiomatic phrase. This task we imagined to take place immediately outside of a conversation, as a person was walking away or stepping aside to remember what phrase they should have used in a particular scenario. We envisioned it this way because during usability testing there were no natural ways to start talking to a smartwatch or technology about phrase lookup without creating the feeling that the person was disengaging from the live interaction. We have two ways of phrase lookup: by verbal command into a search

engine, or by going through recently used or recently learned phrases. To navigate to this task,a customer must press the “Saved Phrases” option which opens up the phrases interface where a user can then firstly look at all of their saved phrases, search for new phrases they may have some confusion with and also add new phrases to their saved list for fast look up. The “Saved Phrases” based off of usability tests this page now reads “Phrases Found” in front of a search bar where a user can search for phrases and “Your Saved Phrases” as opposed to recent phrases.

Based off of our usability tests we were able to ascertain some problems that we as creators of the application overlooked. In the watch user interface based off of feedback we also added search for phrases and today’s phrases to the watch interface which were not present previously. We also changed the item in the recording task from ‘real time’ to ‘current’, so as to avoid confusion on the meaning of that option. In the phone interface we too made some changes based off of feedback. We added a insert microphone option to allow voice access to a search. We also changed the homepage to display the option in a tabular manner as opposed to a listview that was not compatible with a phone interface. In addition to all of this we added to ability to record and playback from the phone interface also and also added the ability to search for phrases in the phone interface also. The last modification we made was to make the earpiece more sleek and subtle so people can use it in a way that is less noticeable and able to carry out its function in a better fashion.

Discussion: (1 page)

1. Reflect upon and discuss your project and your results. For example:
    - What did you learn from the process of iterative design?
    - How did the process shape your final design?
    - How have your tasks changed as a result of your usability tests?
    - Do you think you could have used more, or fewer, iterations upon your design?
2. **Appendix**:
3. Attach copies of all materials involved in your testing. Includes any instructions or task descriptions you handed out or read aloud to your participants. Include identified critical incidents from your usability testing. The appendix materials and screenshots do not count in your page limit