

# REQUIREMENTS

## Whiteboard: When Blackboard lends an ear

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## REQUIREMENTS ELICITATION

### 1. Interviews:

Our interviews are semi structured, with the goal to find out the most performed tasks on Blackboard and Piazza by the instructors, we asked them a specific set of questions:

- What will be your duties as a TA/instructor?
- How do you accomplish your duties?
- What tasks do you accomplish using blackboard?
- What purposes do you use Piazza for?

We then asked them about their experiences with voice assistants:

- Do you use any voice assistants?
- What do you use your voice assistants for?

We did not limit ourselves to these questions, we continued the conversation to know about their experience with voice assistants.

**Note:** Piazza and Blackboard have many functionalities in common, different instructors prefer different modes, for example some courses never use Piazza, some never use Blackboard except for final grading.

### 2. Surveys

The goal of our survey is to identify the most frequent tasks performed on Blackboard and Piazza. We sent the survey as a Google form with 12 questions to our classmates and friends who are students. The survey is still available on this link:[https://docs.google.com/forms/d/1rhOUdHnp\\_qo9Y6JUtlvOMHDgka97RKmyeUwN1jfBSMc/](https://docs.google.com/forms/d/1rhOUdHnp_qo9Y6JUtlvOMHDgka97RKmyeUwN1jfBSMc/)

The other goal of our survey is to know the about users' experience with the voice assistants. We asked questions to know the general trend of what percent of the users are familiar with voice assistants and their experience using them (satisfaction on a scale of 1 to 5).

### 3. Observations:

Since voice assistants are fairly new and still not absorbed/widely used by a vast majority of people, we wanted to observe how people interact with them.

**Method 1:** At HackIllinois 2017, our team built an Alexa skill that is related to food and nutrition. We had a dedicated table for our presentation. The flow of the project use is as follows: Judges/participants visit our table, listen to our idea and interact with Alexa (Amazon Echo) using the commands that are displayed on a monitor next to it.

**Method 2:** After we got an Echo, we set up the Echo in the living room of one of our team members and all the other roommates interacted with the new Echo device for a week. Since Echo has a history of all the conversations, the general trend of the conversations was observed.

**Note:** The observations were not for the purpose of this requirements gathering, they were not studies governed by IRB, rather experiences that could tell us general trend with the voice assistants. This is more of a cultural probe.

## RESULTS AND ANALYSIS OF THE REQUIREMENTS ELICITATION

### 1. Interviews:

The teaching assistants who were interviewed said that the most common tasks that they perform are uploading quizzes, course materials and grades on Blackboard. They mostly use Piazza for answering or checking for unanswered/unresolved questions (Design challenge 1).

From the interviews, we understood that a single interface could not sufficiently cater to all the needs of the target audience. Hence instead of necessitating the users to use a single interface for all kind of tasks, we decided to distribute the tasks (for example, based on the task difficulty or according to which interface supports which kind of actions) across both the interfaces.

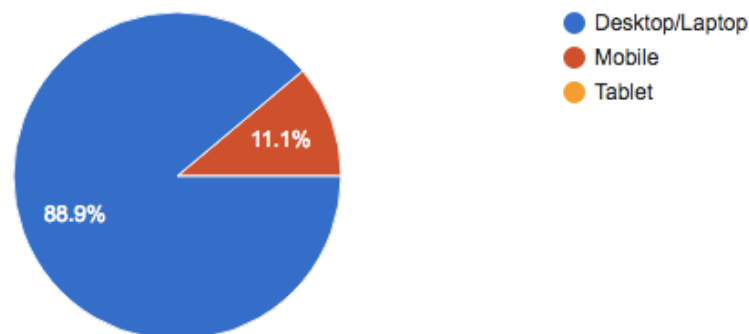
We decided to implement the simpler tasks such as answering or checking for unanswered/unresolved questions using voice interface as it better supports those kind of tasks and results in a easier to use/more natural interface. We opted to implement complex tasks like uploading course materials or grades using web interface (desktop computer/laptop) as it is better suited for these tasks (also, these tasks cannot be conveniently done using voice interface).

### 2. User Surveys:

There were 27 responses in total from students who use Blackboard and Piazza for their course work regularly. The results are presented below:

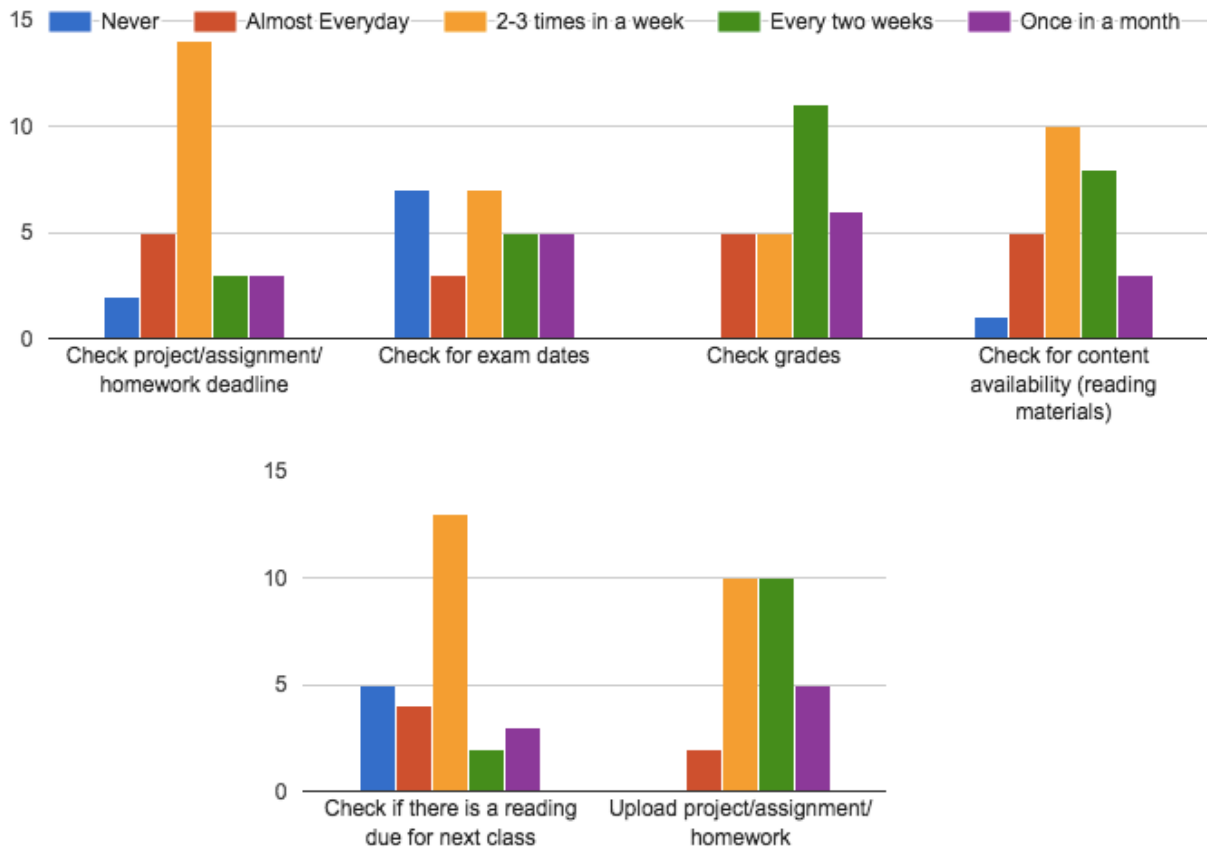
Question 1:

Which device do you most often use to check your grades on Blackboard?



## Question 2:

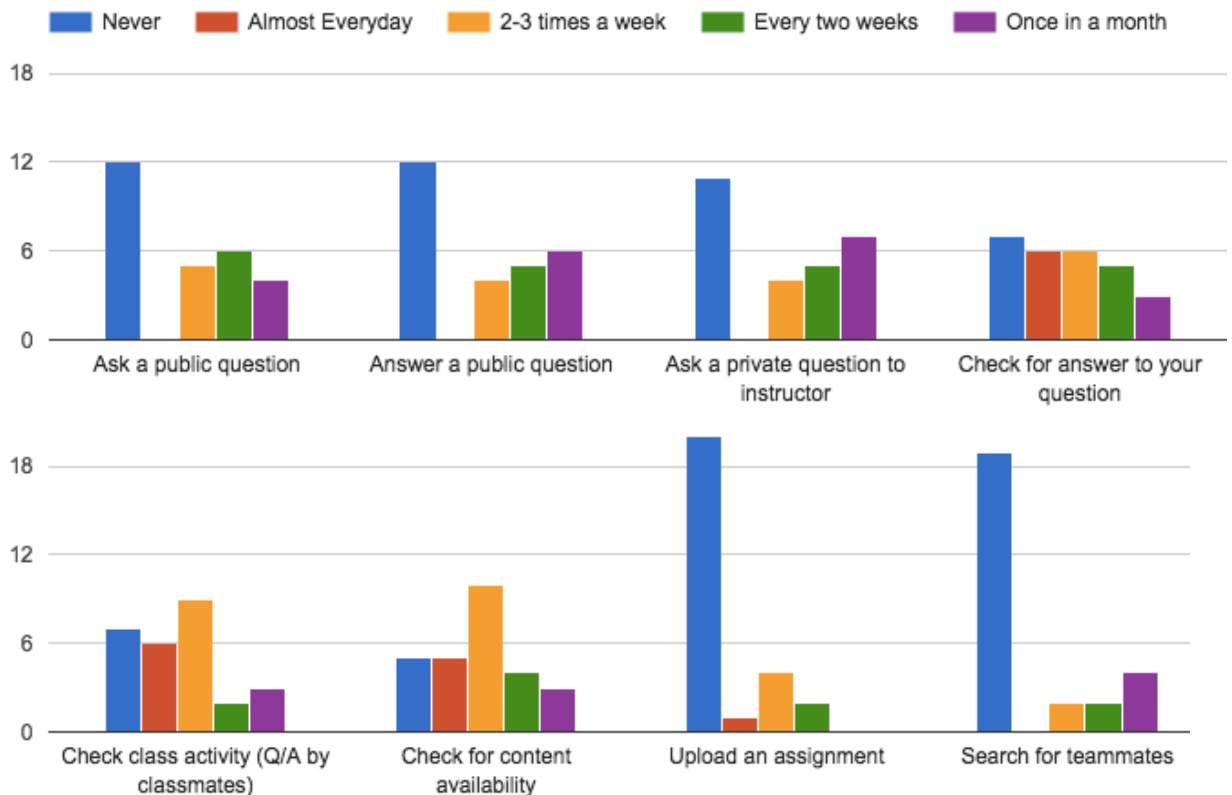
How often do you use Blackboard to do each of the following tasks?



- ◆ A majority of our target users (55%) use Blackboard very often (at least 2-3 times a week) to check for content availability – reading materials and assignments (**Design challenge 2**).
- ◆ 77% of our target users use Blackboard every 2 weeks to check if a grade has been posted (**Design challenge 3**).

### Question 3:

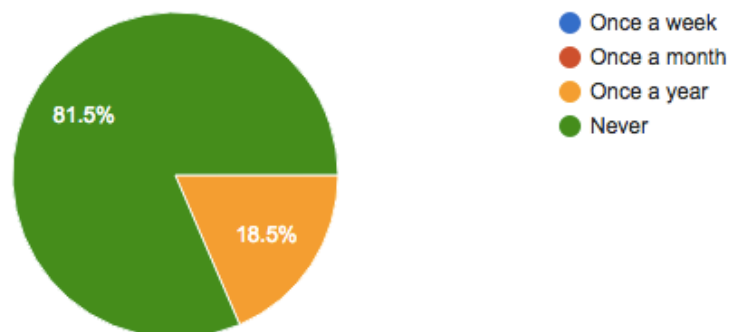
How often do you use Piazza for each of the following tasks?



- ◆ 40% of our target users use Piazza to ask public questions every few weeks and a slightly higher percentage (44%) use it to ask private questions to instructors (**Design challenge 4**).

### Question 4:

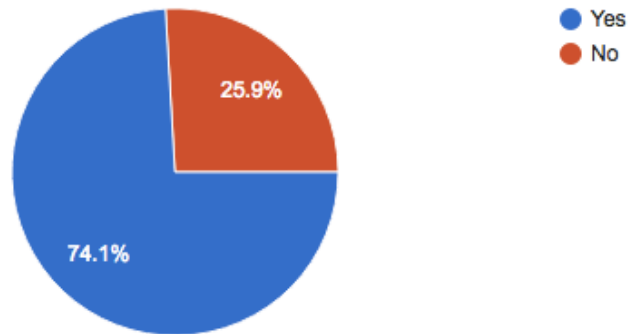
How often do you change your theme in Blackboard?



- ◆ The task of changing the theme on Blackboard is very rarely used (81.5% of the target users use it once a year and the rest of them never use it). We decided to go with what is useful and required than what is possible.

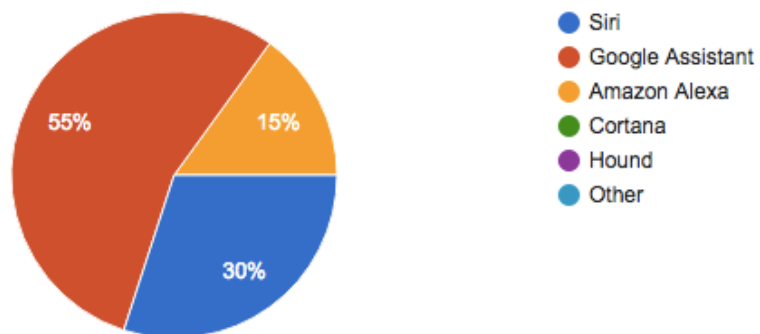
Question 5:

Have you used a voice assistant like Siri/Google Assistant/Alexa/Cortana/Hound before?



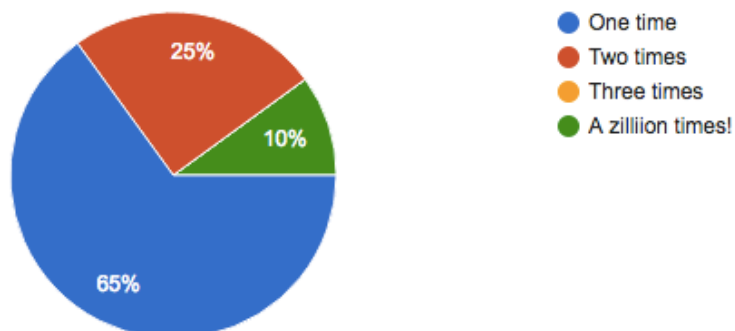
Question 6:

What voice assistant do you most frequently use?



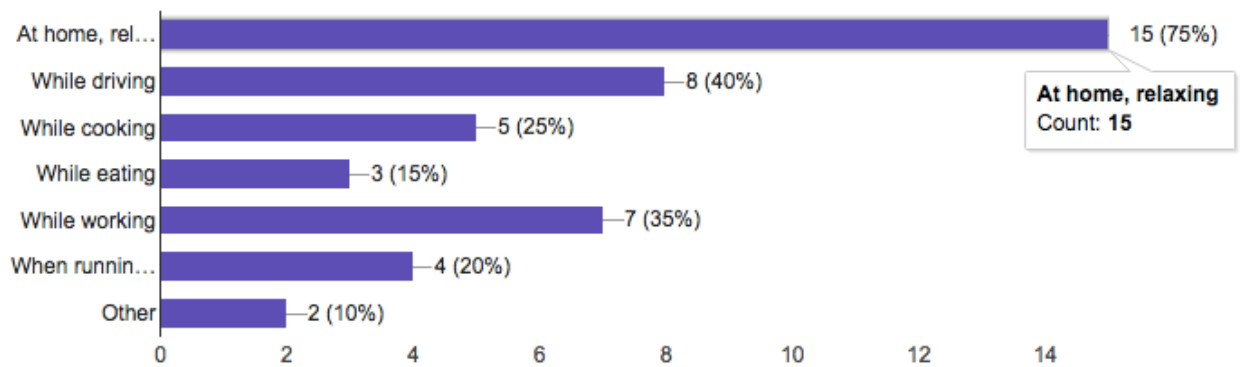
Question 7:

How many times do you have to repeat for your voice assistant to understand what you said?



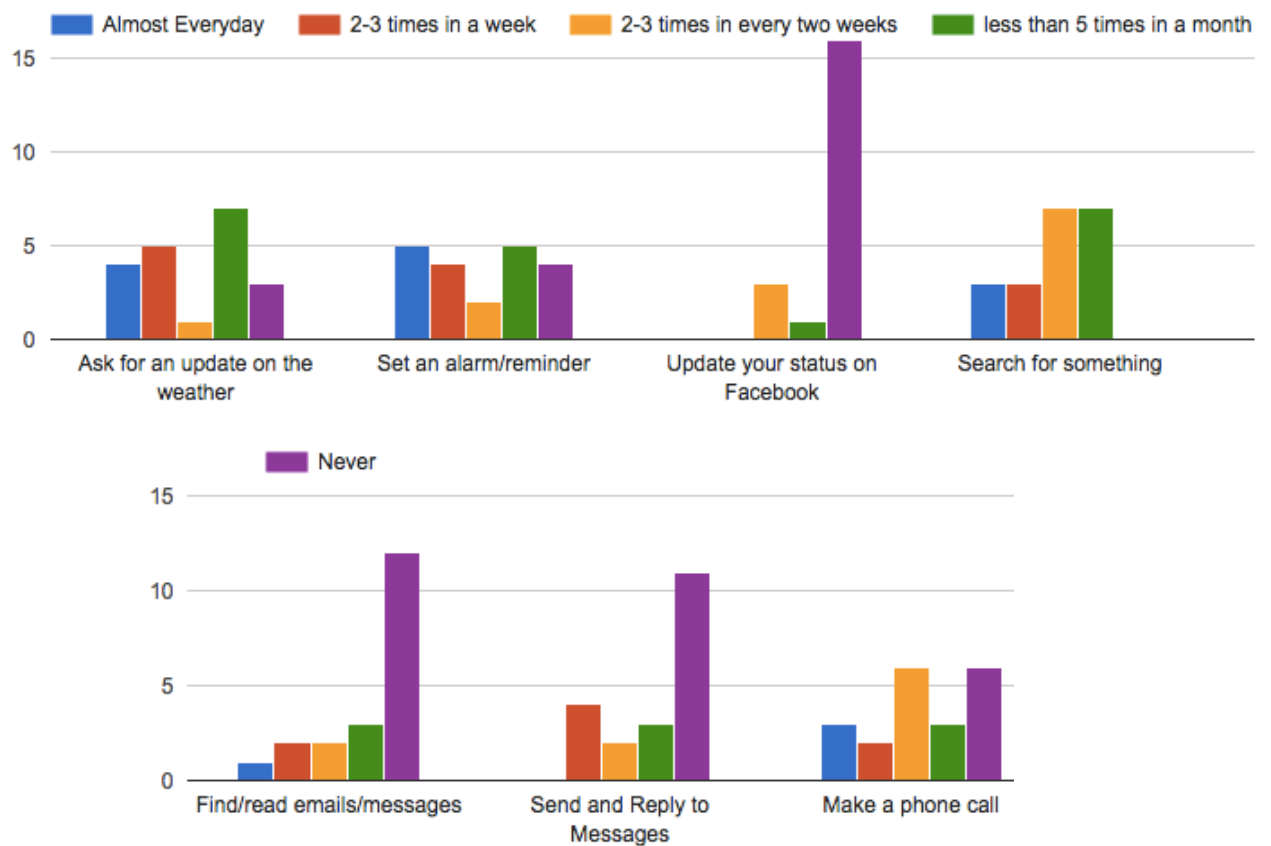
Question 8:

When do you prefer to use your voice assistant more?



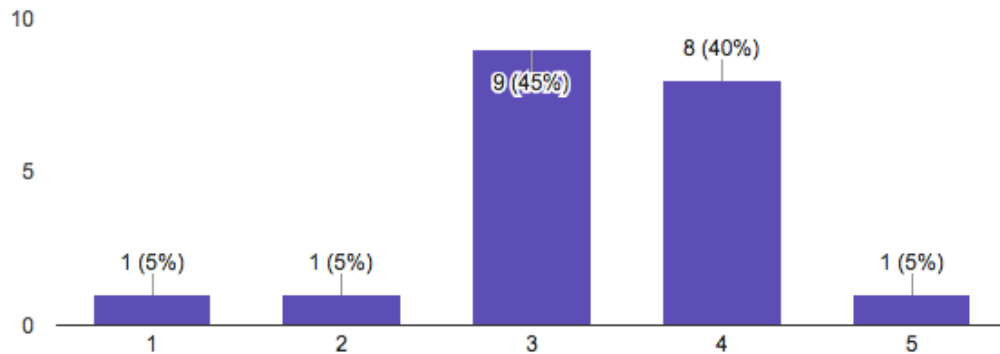
Question 9:

How often do you use a voice assistant for each of the following tasks?



Question 10:

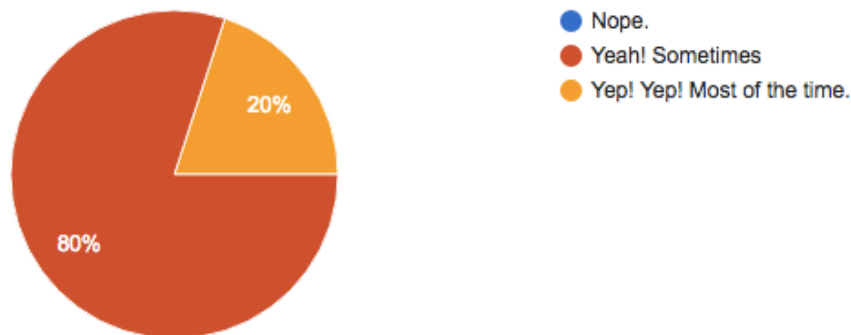
On a scale of 1-5, 1 being the least satisfied and 5 being the most satisfied, how would you rate your experience with voice assistants?



- ◆ A huge fraction of the target users (74.1%) are familiar with voice assistants and almost all of them (90%) are satisfied (rating of 3 or more on a scale of 1 to 5) with experience with voice assistants.

Question 11:

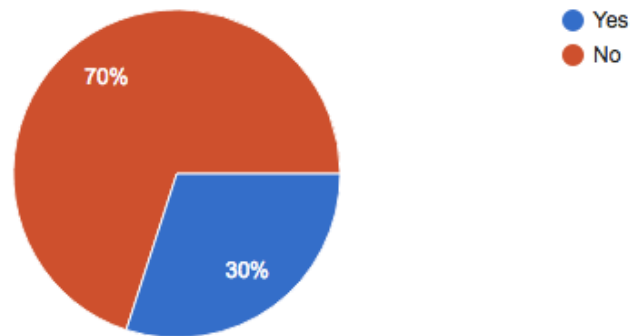
Do you have your phone in hand when interacting with voice assistants?



- ◆ When a voice assistant replies with long messages, the user might lose track of what was being said. Since 80% of the users have mobile phone in hand while using voice assistants, we got the idea that we can use a mobile notification to send the message in the form of text.

Question 12:

Do you feel voice interfaces are better than web interfaces?



- ◆ Since a high number of target users (70%) responded with the opinion that voice interfaces are not better than web interfaces, we deduced that we cannot discount the role of web interface in our project.

### 3. Observations:

After looking at almost 200 interactions with Echo in a span of two weeks, most of the interactions seemed to be very short commands rather than long sentences from the user. This drives our designs to use shorter commands. When it comes to nature of the interactions they are mostly asking Alexa factual information. For example, “Who is the President of the United States?” and giving it instructions such as, “Alexa, can you play Blank Space by Taylor?”. This guided our designs to have simple factual information questions such as, “When is the homework due?” and instructions like “Post a question for 522”.

## REQUIREMENT SPECIFICATION

### A. Functional Requirements:

#### i. Voice interface:

- Students must be able to check grades posted by instructors for an exam/assignment/homework/project.
- Students must be able to check for content availability (course materials/homework/assignments).
- Students must be able to check due dates for assignments/homework/projects/exams.
- Students must be able to set reminders for deliverable due dates and exam dates.
- Students must be able to ask/answer questions in a class discussion forum. There should be options for posting public, anonymous questions and answers to the entire class and private questions to the instructor.
- Students must be able to check questions and answers posted by peers and instructors in the discussion forum using voice interface.
- Instructors must be able to check and answer unresolved questions posted by students in the discussion forum.



**ii. Web interface:**

- Students must be able to download course content (course materials/homework/assignments/projects) posted by the instructor.
- Students must be able to upload their submissions (homework/assignment/project).
- Students must be able to view their grade book.
- Instructors must be able to post content (course materials/homework/assignments).
- Instructors must be able to grade students for exams/assignments/homework/projects.

**B. Non-functional Requirements:**

- The user's academic records must be kept encrypted in the backend.
- The voice assistant must ask the user if information requested by the user can be read aloud or not, when dealing with sensitive information like grades.
- The voice assistant must have the option to send information to the user's mobile phone when requested.
- The voice assistant must redirect user to the web application in case of repeated failures in understanding the user's queries (based on feedback from the instructor).
- The web interface must be available and accessible to users at all times.

**C. Usability Requirements**

- The initiation command for the voice interface must be simple and easy to remember for the users.
- The voice commands used to perform actions must be in simple English and easy to learn.
- The voice interactions must be conversations rather than commands.
- The voice assistant must try to understand the user's instructions and questions as accurately as possible.
- The voice assistant must confirm before posting an update.
- The web interface must be clutter-free and intuitive.

**INSTRUCTOR FEEDBACK**

- Map the sketches to Design of Spoken Interaction techniques discussed in class in Week 6 (Schneiderman et al Chapter 9 pg 284). We mapped our alternatives for the four design challenges and included them in the Sketch Diary.
- The techniques for the requirements gathering were not clear. We discussed our methods and how we did the interviews, surveys and observations briefly in the beginning of this document.
- Bar graphs over pie charts, we partially agree with this so we converted the necessary and relevant pie charts into bar graphs.

