Università degli Studi di Salerno

I.T. Department

Assistive Technology and Universal Design

Assignment 1

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1 Contextual Investigation Plan

1.1 Presentation of the problem

The area in which we operate concerns the sphere of health, in particular we will deal with problems related to hearing loss.
Hearing loss has several consequences, for example, in children, it can affect the ability to learn the spoken language. In adults it can cause difficulties related to the world of work, while in the elderly the consequences may be related to loneliness. Our goal is to go and analyze how hearing problems can affect people's lives, analyze different reactions and then offer a tool that goes against their needs.

1.2 Planning the collection of information during contextual investigations

We have provided for two types of questionnaire (see the following two paragraphs), aimed at our two types of target group: one to deaf people and one to friends and family. Two types of interviews were conducted, one in the field and one through online surveys. We interviewed 5 deaf people in the field and then wrote down all the relevant aspects useful for the design of the application. As for friends and family, we have prepared an online survey using the Google tool, "Google Docs".

1.2.1 Field interview

Before starting the interview we will introduce to the subjects the idea of our project and of the problems we are trying to solve, we will ask for the authorization to the treatment of the answers given to us and if they want their answers to remain anonymous or their consent to give us their data (at least name, surname and specialization). The interview is divided into three parts: the first part is very general about how they relate to others every day, the second part contains more specific questions that represent the problems we want to solve through our application, and finally a question about how they would relate to a software solution to the problems encountered. These are the questions we want to ask:

- How long have you been deaf?
- How do you communicate and/or access information at home?
- How do you communicate and/or access information with friends?
- In what environments is it difficult for you to understand other people?
- How do you communicate in a small-group setting like a discussion group?
- What other accommodations do you use at home (bed-shaker alarm, signal lights and alert systems, etc.)?
- Have you used interpreters in the past? If so, what has been your experience?
- Do you prefer that interpreters use signing only, signing in English word order, or no signing but mouthing and gestures to lip read?
- Do you usually speak for yourself or do you prefer the interpreter to voice for you?
- Have you used speech-to-text or text-to-speach services?

- If not, would you feel comfortable watching a laptop screen to read the lecture rather than listening and lip-reading the instructor?

At the end of each interview we left in our contacts in case they had other suggestions or wanted to be updated on the development of the application.

1.2.2 Online Survey Interview

Using many social channels, so as to have a high number of responses, we will ask users to respond to our online questionnaire. The questionaire is also divided into four parts: the first part contains general questions about the user to understand what kind of user has answered, the second part contains questions about the relationship with the deaf person, the third part about specific problems that may arise and that we want to solve with our solution, and finally a question about the willingness of the user to use a software solution to these problems. The questionnaire will have the following questions:

- Are you male or female?
- How old are you?
- How often do you interact with a deaf person?
- Usually, such as communicating with deaf people?
- Is it hard to understand?
- is it hard to make yourself understood?
- Do you think that using an application can improve communication?
- Do you think that usingn a application can halp you to know ASL language?

2 Analysis of the Contextual Investigation

In this section we will show the results we have obtained from our field surveys and how these results have shaped the requirements of our application.

2.1 Interviews Answers

2.1.1 Interviews with deaf peolple

We interviewed 5 deaf people who preferred anonymity but gave us permission to use their answers.

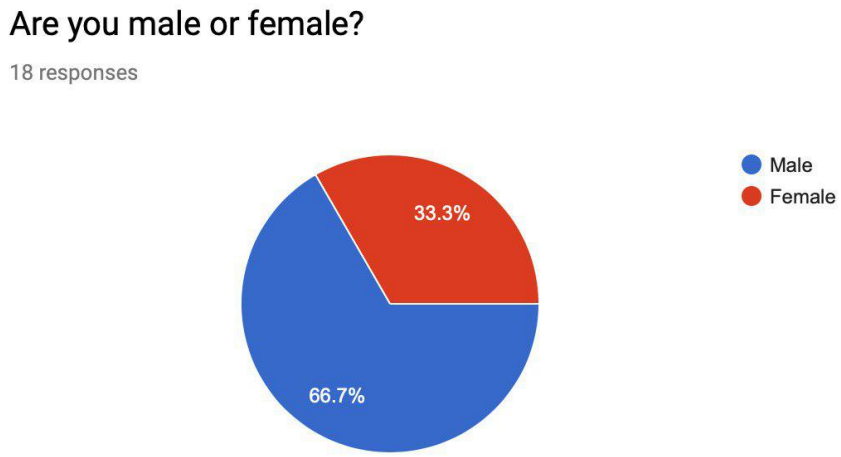
First part of the interview (first 5 questions): 3/5 of the interviewed are deaf from birth. The other 2 are becamed deaf as a result of health or congenital problems.
In general all of them haven't problems in communication at home, because all their relatives are now able to understand them and make themselves understood and, even without the use of LIS or ASL, the interviewees have become accustomed to reading the labial.
Sometimes, with friends and other person, the interviewed had some problems in communication, expecially in being understood. This problem is most visible when they talk with more people at the same time.
It rarely happens to fail to understand people, especially when dealing with technical or specialist fields. In those cases it becomes problematic to resume the thread of the speech and this causes them embarrassment.

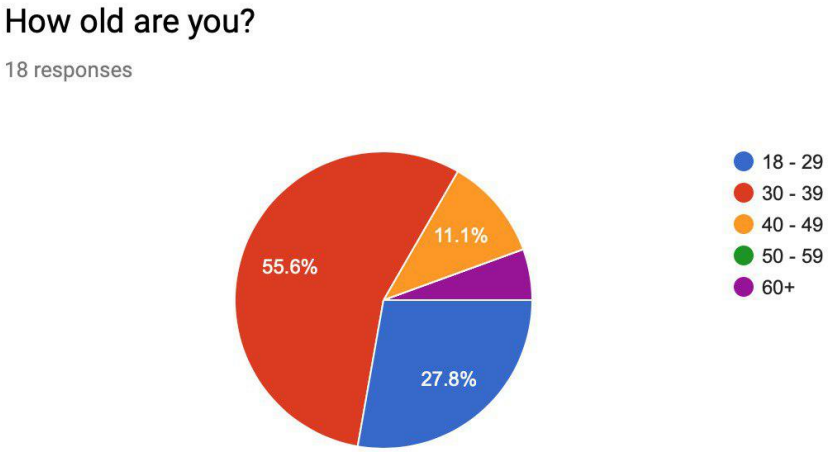
Second Part of the interview (questions 6 - 9): In general they use integrated functionality of their devices, such as signal light to see the notifications and alert systems that take advantage of the vibration, or app like whatsapp, facebook or telegram for doing videocall or texting in place of calls.
Some of them have used interpreter, especially when there was a need to speak to many people (for graduation or conference discussions). This gave them more security and allowed them to stay focused.
They have not expressed preferences on how the interpreter should speak and in everyday life, and in general, they prefer to speak for themselves.

Last part of the interview (last two questions): Some of them rarely used this type of services but they think that this would be a valid help for them, expecially when they attend conferences or frontal lessons where it becomes difficult to follow the interlocutor, who often is at a distance that does not allow lips to be read. But they would not want to use laptops or computers, but would prefer devices for the convenience and size of the device.

2.1.2 Interviews with friends and family

First part of the online survey (Questions 1 - 2):





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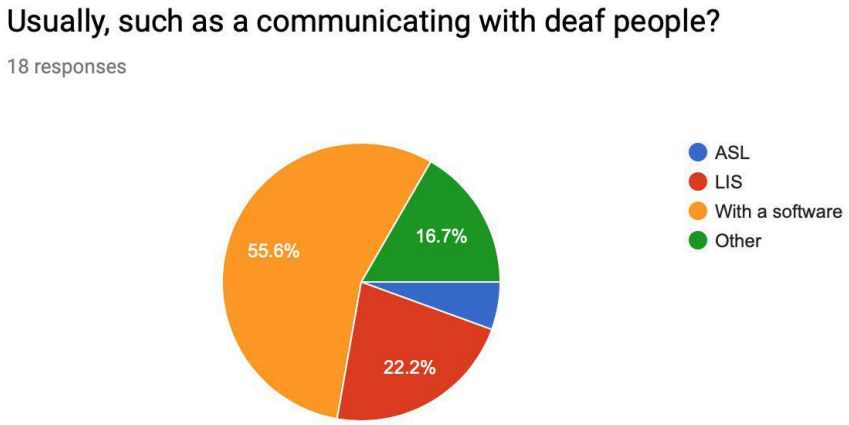
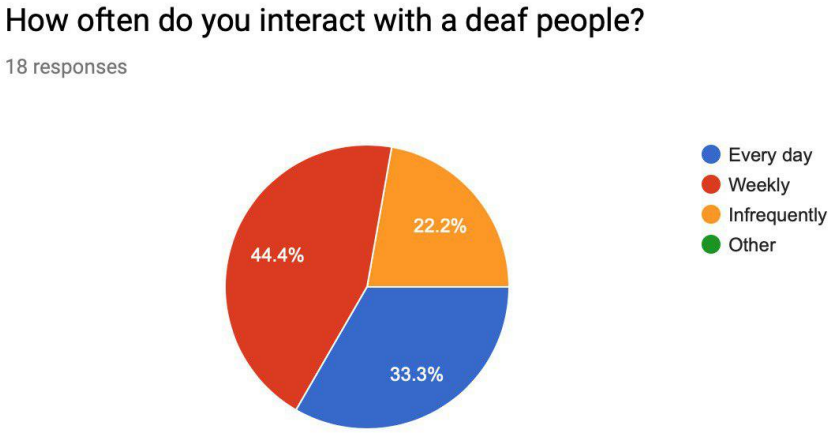
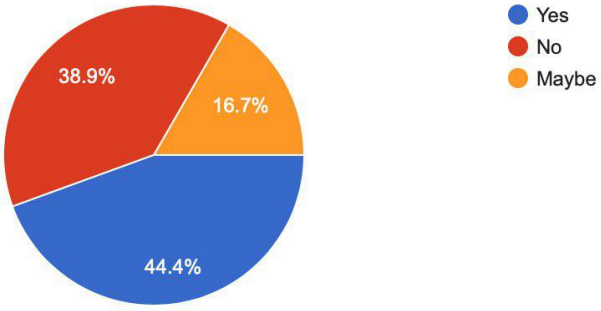




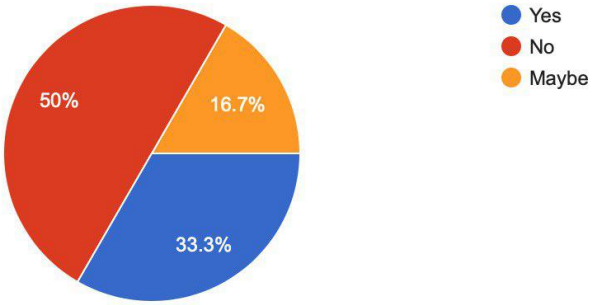
Is it hard to understand?

18 responses

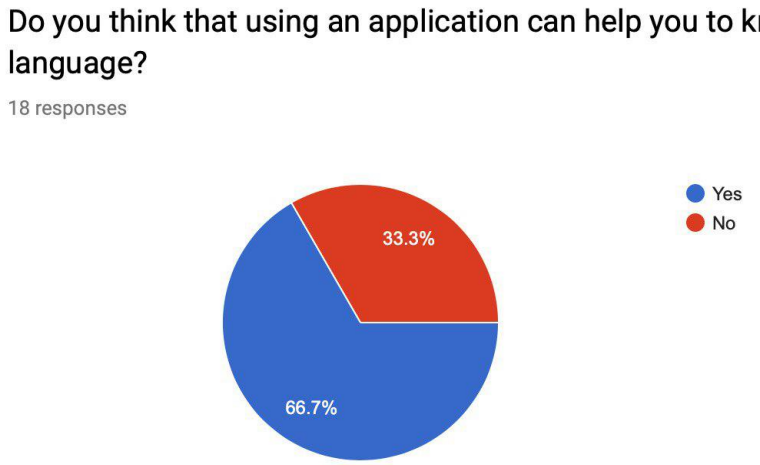


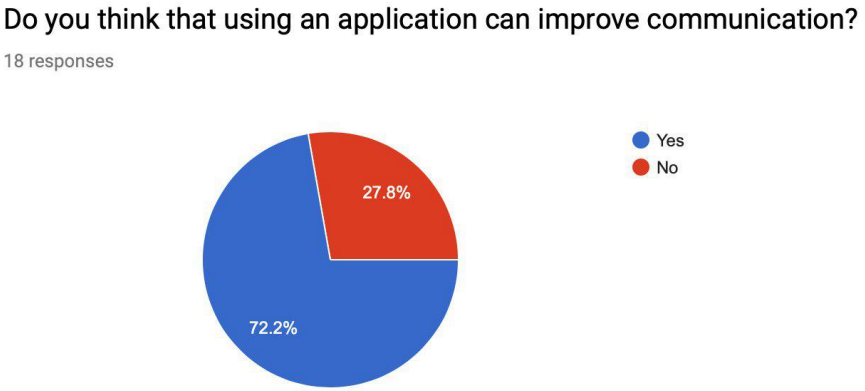
Is it hard to make ourself understood?

18 responses



Last part of the online survey (Questions 7 - 8):





2.2 Result of the contextual survey

2.2.1 Question 1: What activities do users currently perform?

Some users communicate with a software, others with LIS language and finally others with different systems. Sometimes they have problems in communication and for this reason, whom that don't have applications use different ways for facilitate the communication itself. A lot of people would like to learn LIS or ASL language and use online sites or youtube videos.

2.2.2 Question 2: Which tasks would you like to do?

Users want support for the learning of ASL language and for facilitate the communication.

2.2.3 Question 3: How are the activities to be learned?

The main activities to be performed can be learned with a software.

2.2.4 Question 4: Where are the activities carried out?

Everywhere, because the only tools neded are internet connection.

2.2.5 Question 5: What is the relationship between the user and the data (personal data, private data, public data, their meaning for the user, etc.)?

The user must enter their personal data, they are sensitive data that will be displayed within the application and used to perform certain tasks, such as video calling. However, the user must be aware that his data, even if encrypted, will be subject to the normal security risks of any data that must travel on the network.

2.2.6 Question 6: What other tools does the user have to complete the task?

Tools needed are internet connection and online websites to learn ASL and, in some cases, the support of a persone to facilitate the communication.

2.2.7 Question 7: How often are tasks executed?

User tasks will be executed whenever there is a communication difficulty. To learn the ASL/LIS, tasks are executed everyday.

2.2.8 Question 8: What are the time constraints on tasks, if any?

There are no time constraints on tasks, tasks are constrained solely by the needs of users.

2.2.9 Question 9: What happens when things go wrong during task execution?

The communication became complex or in some cases impossible

2.2.10 Question 10: How do users communicate with each other about tasks?

Users of tasks communicate in direct way (with ASL/LIS language) or via notifications. For example, if a video call comes in, the device starts to vibrate.

3 Problem Design

In this paragraph we will propose two proto-personas (i.e. two possible actors present in our application) and for each of them, we will propose a different scenario. Finally, for each scenario we will draw up the Claims table.

3.1 Personas

3.1.1 Mario - Studente

Mario is a student at the University of Salerno. He is 24 years old and studies computer science and he's been deaf since birth. At least 3 days a week, he goes to university to study and to meet friends for the correction of the exercises. He would like to both improve communication with them and try to teach the main notions of the ASL language.

3.1.2 Luca - Studente

Luca is an economics student who, in addition to studying, also spends his time helping a deaf friend. He was interested in the ASL language and therefore wants to start studying it from home.

3.2 Scenarios

3.2.1 Mario

Mario's going to university. After meeting a friend and having a coffee, they decide to start studying. Although we have successfully completed all the exercises, he has doubts about the correctness of a process. He decides to ask his friend for help. But there are communication difficulties, so the friend decides to do the exercise without justifying his actions. In this way the problem is only remedied.

so Mario remembers to have the ProSigne application and you'll use the text-to-speach function. With this feature, the two of them overcome the communication difficulties and dispel the various doubts about the exercise.

3.2.2 Luca

As a social student, he decided to improve his knowledge of the ASL language, after having encountered several problems of communication with a friend. He decides to start this process of improvement by doing several searches in the network, but finds problems in the use of the platforms, of which many are paid.

decides to start this improvement process using the ProSign application. He starts with a review of the alphabet and known words and then moves on to new words or phrases. In the end, again through ProSign, he decides to video call a friend to test his skills.

3.3 Claim

3.3.1 Mario

PRO	CONTRO
Possibility of video calls	No face-to-face
Facilitates communication	Possibility to forget the data
Auto-learned	Internet connection for use
Report of the improvements	

3.3.2 Luca

PRO	CONTRO
Possibility of video calls	No face-to-face
Facilitates communication	Possibility to forget the data
Auto-learned	Internet connection for use
Report of the improvements	

4 Functional and Non-Functional Requirements

4.1 Functional Requirements

- Profile Management:
  - Login (with email, facebook and google);
  - Logout;
  - Modify personal information;
  - Modify passwor;
  - Forgot password;
  - Save user email and password;
- Learning ASL Management:
  - Learn ASL Alphabet;
  - Learn ASL Words;
  - Save Words Learned.
- Communication Management:
  - Text to Speech;
  - Speech to Text.
- VideoCall Management.

4.2 Non-Functional Requirements

The application will be used by users with a varied level of technological background, therefore, the goal is to comply with the following non-functional requirements:

- **Usability**: The interfaces have been designed to be fun but at the same time intuitive. The expert user should not get bored, while those who know less should not be in trouble. The user must be able to intuitively recognize which commands to perform to complete the desired actions, starting from the first use.
- **Performance**: The system will respond quickly to user requests.
- **Reliability**: The system will handle irregular and incorrect inputs and will alert them to the user without interfering with the normal execution of the program. it is necessary to prevent the system from creating damage due to failures. This thanks to information screens that will report exactly the mistake made and how to correct it.
- **Security and protection of legal aspects**: The data stored and managed by the system will be adequately protected from all risks related to the holding and the possible loss of data. This is thanks to the use of the online cloud provided by Google, Firebase, which will handle all aspects of data security and persistence.
- **Modularity**: The system will be modular, in order to make the addition or elimination of functionality simple if the functional requirements change over time.
- **Constraints**: The development of services for end users is expected using mobile technologies.