



Master of Science of Engineering in Computer Science

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Human Computer Interaction



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Chapter 1 - Abstract

This project is about the development of a mobile app called RecAppMe, whose main purpose is to provide a student-to-student model to support the study of students with dyslexia.

The core of the App are the recorded files that non-dyslexic students can upload to summarize subject topics or book chapters. These recordings are then listened to by dyslexic students to easily grasp the concepts and to make the comprehension faster. The system is designed ad hoc to overcome the difficulties that students with dyslexia must face during their study and their daily lessons. Due to a possible collaboration with the local schools, to guarantee a reliable system, the teachers can certify the quality of the audio contents thanks to special permissions.

Chapter 2 - Requirement analysis

2.1 Competitor Analysis

For our project we have searched for possible competitors hosted on multiple platforms, and eventually we have found several apps that have aims similar to our app. The main differences between our app and the competitors are the following:

- The presence of a community that can upload recordings and provide a sort of feedback to them giving a rank;
- A high-readability text, focusing on students affected by dyslexia. For high-readability text is intended the use of particular fonts, size of text and spacing that aims to make it easier for the dyslexic student to use the app .
- The certifications of recording provided by the teachers whose main purpose is to provide a guarantee that the specific recording is referencing the subject that the student is talking about, creating a sort of trusting between the normal and the dyslexic student.

The app which comes closest to ours is “Educations whiteboard”.

2.2 User profiles

Using the app there are 2 user profiles, each of them have a specific aim and task. Those 2 user profiles are the students and the teachers. In turn, the user profiles of the students are splitted in normal and dyslexic students.

Student User profile:

- **Age:** 11-19
- **Gender:** 50% male/female
- **Category:** 3% dyslexic, 97% non-dyslexic
- **Education:** Attending middle or high school
- **Location:** anywhere in Italy
- **Technology:** great computer and smartphone experience, 4G/5G mobile internet connection

Teacher User profile:

- **Age:** 30-65
- **Gender:** 17% male, 83% female
- **Job title:** teacher
- **Education:** Bachelor degree to master degree
- **Location:** anywhere in Italy
- **Technology:** great computer and smartphone experience, 4G/5G mobile internet connection
- **Family:** Single or married (Predominantly married with at least one child)

2.3 Personas and scenarios

2.3.1 Persona 1: Non-Dyslexic student

Paola is 16 years old who lives in Verona where she has been attending the artistic high school for three years. She is passionate about what she studies, so she spends a lot of time learning from art history books to then put into practice the new concepts. Often in free time she uses her smartphone with 4G mobile internet to share her creations on social networks and to give some advice to the ones that ask for it.

Scenario:

It is Friday evening, Paola has finished her homeworks for the week, so she takes the smartphone to see if there are new comments below his Facebook posts. She realizes that one student who commented about a painting technique used by Dalì has not grasped the concept well. Discussing with him, Paola gets to know that the student is dyslexic, and that he has difficulties in understanding his art history book. To help him, Paola makes an audio recording in which summarizes Dalì main techniques, therefore she shares the link with the student, who answers with a big thanks.

2.3.2 Persona 2: Dyslexic student

Mattia is a 13-year-old boy who attends the eighth grade in a school in Latina. His diagnosis of dyslexia was not recognized until the end of the fifth grade. He doesn't like foreign languages, but he really likes to draw. He prefers to go out with friends in the afternoons rather than doing his homework. This affects his academic performance which is mediocre.

Scenario:

During the history hour Mattia often gets distracted or loses attention because events presented by the teacher appear confused and disconnected from each other. He has difficulty in understanding cause/effect relationships since he has not been able to consolidate the arguments already addressed. He cannot understand the meaning of specific terms in the book or used by the teacher and he does not

even pay attention to the questioning of his classmates because he is distracted and disinterested. At home, while studying, he finds himself alone and confused and he would need an ad hoc explanation made with simple and immediate terms, but he has no possibility of establishing peer-to-peer learning with a classmate.

2.3.3 Persona 3: Teacher

Letizia is 57 years old, she comes from Rome and works as a teacher of literature in two classes of a secondary school in Latina. She is not very familiar with technological devices, so she is trying to better learn the use of the interactive whiteboard recently installed in her classrooms. She is aware that her pupils show more interest and interaction if she accompanies her explanations with images and/or videos.

Scenario:

Both classes are very numerous and present a heterogeneous reality as a small number of autonomous pupils in the study is opposed by a majority who present, for various reasons, learning and attention difficulties. Among these there are some dyslexic students who cannot follow the explanations at the same pace as the others and to whom the teacher cannot devote particular attention due to both the high number of students in the class and the different types of the same. Together with the principal of the school, she realizes that these students especially need support during the afternoon tasks that they are not able to carry out independently.

2.4 Questionnaires analysis

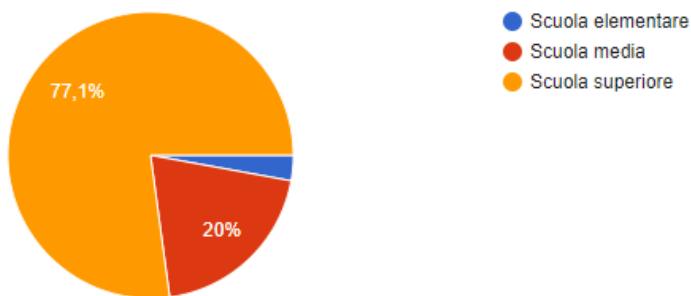
In order to collect user requirements and to reach as many people as possible we decided to make up some questionnaires, the result of which you can see below. There are **three questionnaires** depending on their target. The first one is for Non-dyslexic students, the second one is for dyslexic students and the last one is for teachers.

2.4.1 Non-dyslexic students questionnaire results

Q_1)

Quale è il grado di scuola frequentata?

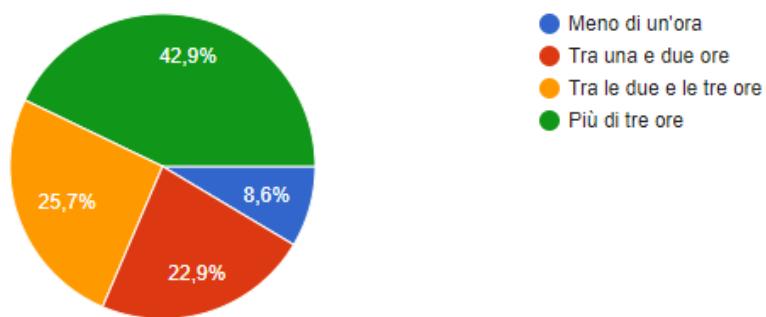
35 risposte



Q_2)

Quante ore giornaliere dedichi allo studio in media?

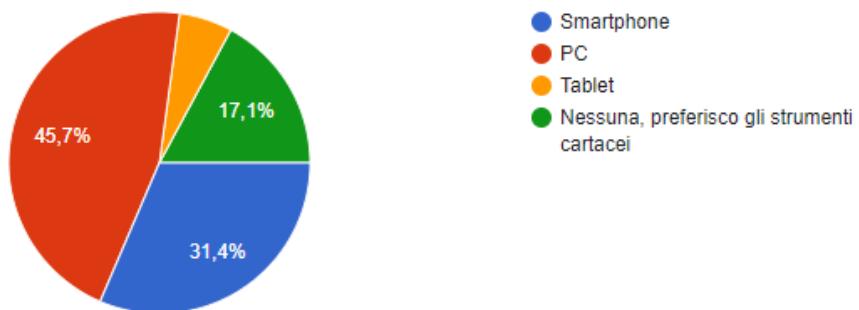
35 risposte



Q_3)

Indipendentemente dall' attuale situazione pandemica, quale tecnologia impieghi maggiormente a supporto dello studio?

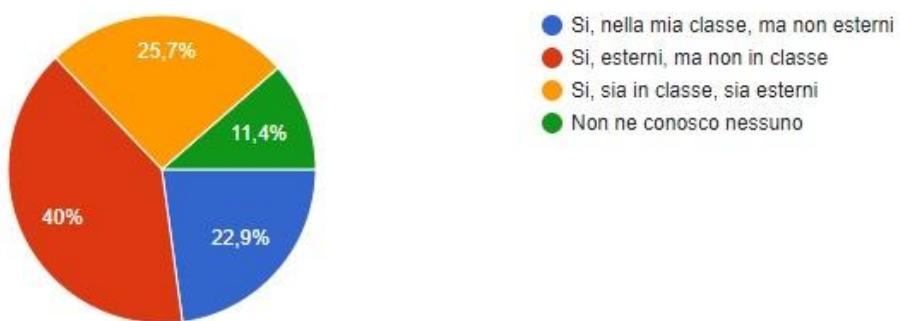
35 risposte



Q_4)

Conosci studenti dislessici? Se sì, sono nella tua classe o esterni?

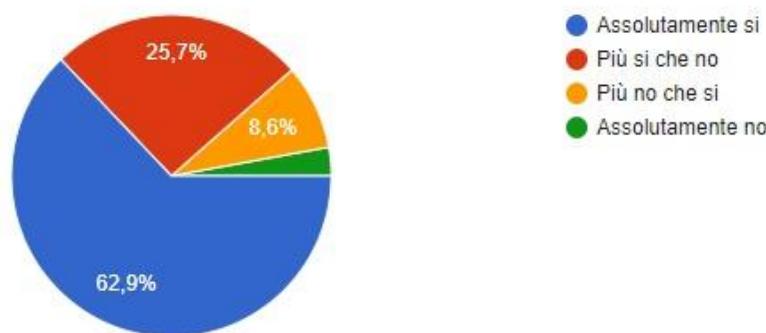
35 risposte



Q_5)

Saresti disposto ad aiutare nello studio un tuo compagno/a dislessico/a creando brevi riassunti audio relativi ad alcuni argomenti trattati durante le lezioni?

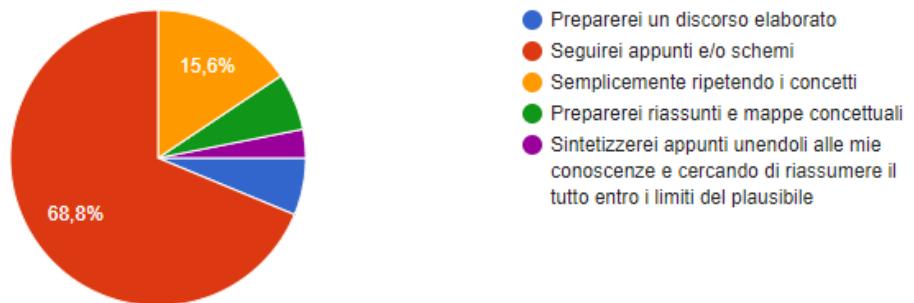
35 risposte



Q_5.1)

In riferimento alla domanda 5, in caso di risposta positiva o parzialmente positiva, quale metodo seguiresti nella creazione di un riassunto audio?

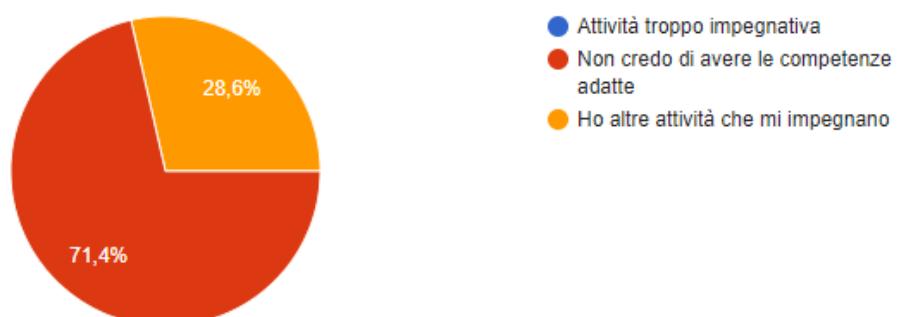
32 risposte



Q_5.2)

In riferimento alla domanda 5, in caso di risposta negativa o parzialmente negativa, quali sono le ragione dietro tale scelta?

7 risposte



Q_6)

Se vuoi, lascia un suggerimento per qualcuno che vuole sviluppare una piattaforma basata su riassunti audio, con l'obiettivo di aiutare gli studenti dislessici

7 risposte

Creando mappe/schemi su vari argomenti

Proverei magari con dei riassunti eseguiti sulla base di schemi, i quali contengono solo concetti chiave senza essere troppo impegnativi e dettagliati

.

Dipende dalla materia, spesso aiuto molti compagni in matematica, dando uno schema, delle linee da seguire per la risoluzione. Per quei pochi che mi chiedono la teoria, spiego i concetti

non andare troppo nel dettaglio ma mettere in chiaro i concetti principali

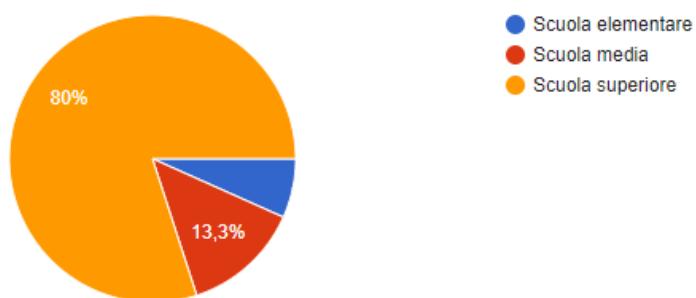
audio brevi ma efficaci

2.4.2 Dyslexic students questionnaire results

Q_1)

Quale è il grado di scuola frequentata?

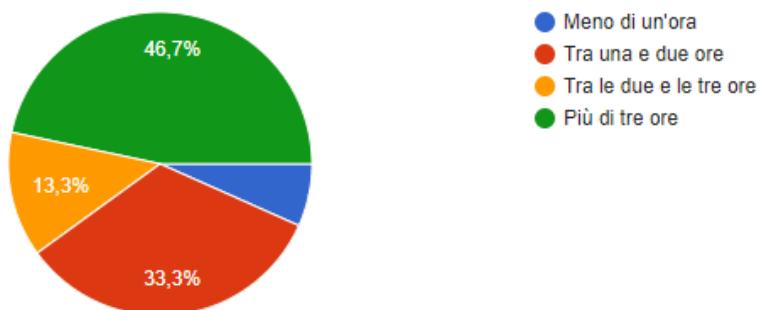
15 risposte



Q_2)

Quante ore giornaliere dedichi allo studio in media?

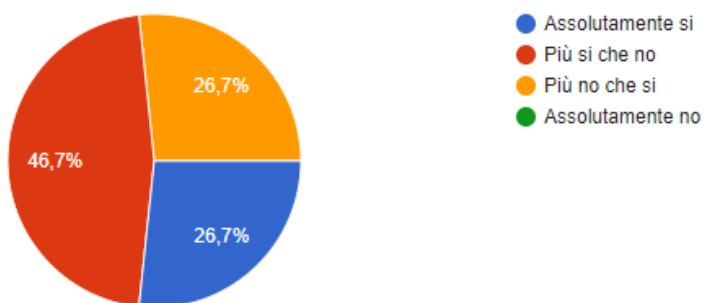
15 risposte



Q_3)

Sei soddisfatto del tuo metodo di studio?

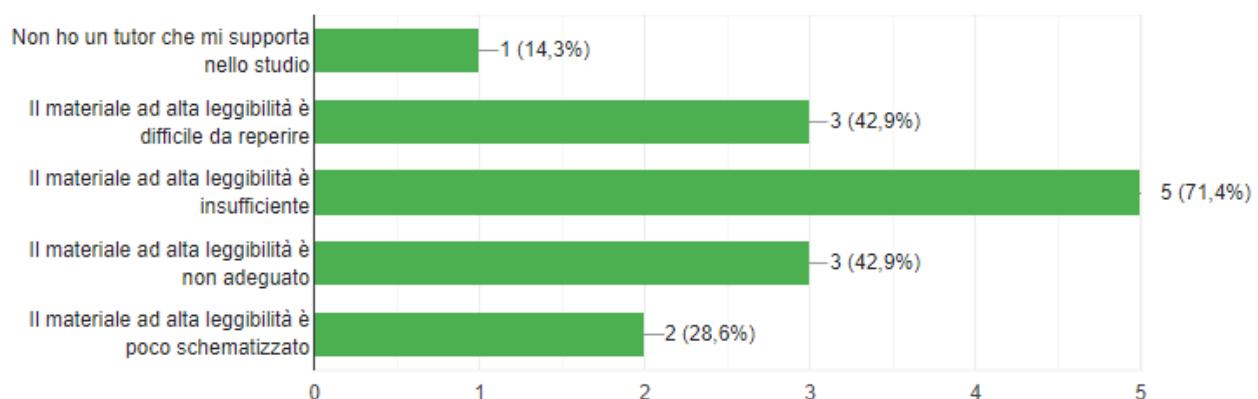
15 risposte



Q_3.1)

In riferimento alla domanda 3, in caso di risposta negativa o parzialmente negativa, quali sono i motivi della tua insoddisfazione? (Scegli una o più risposte)

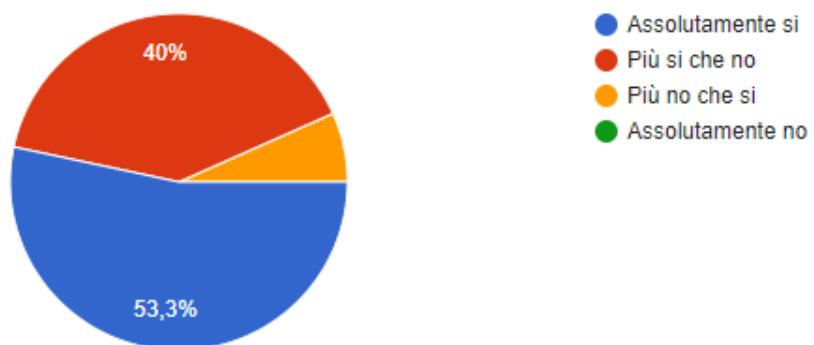
7 risposte



Q_4)

Pensi che dei riassunti audio fatti da altri studenti possano aiutarti nello studio?

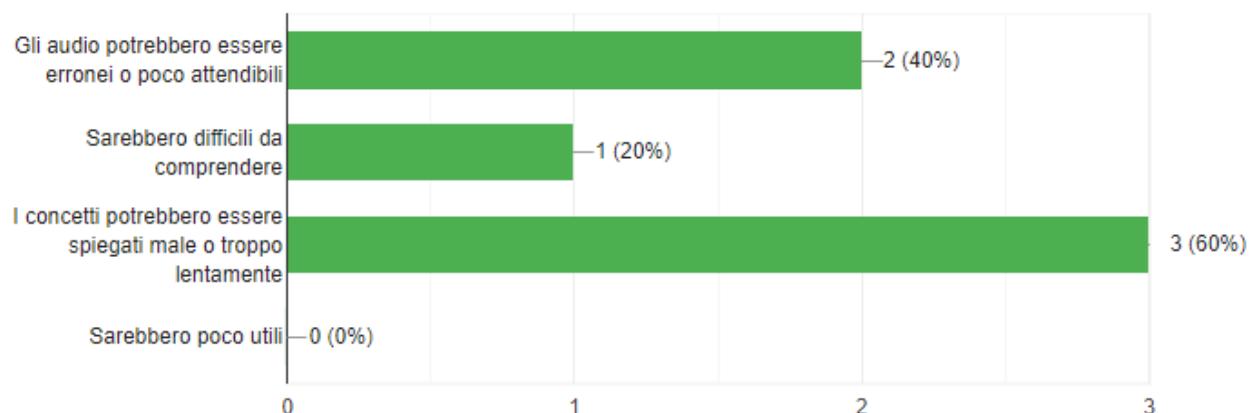
15 risposte



Q_4.1)

In riferimento alla domanda 4, in caso di risposta negativa o parzialmente negativa, per quale motivo? (Scegli una o più risposte)

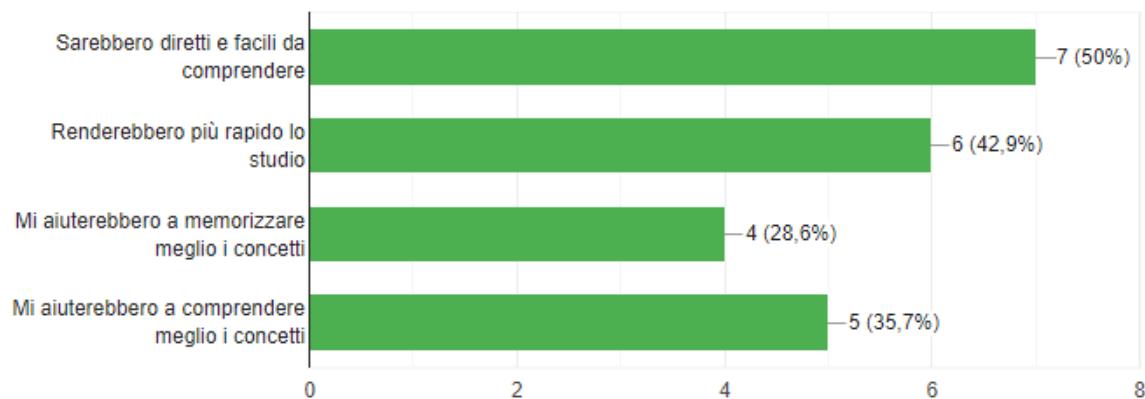
5 risposte



Q_4.2)

In riferimento alla domanda 4, in caso di risposta positiva o parzialmente positiva, per quale motivo? (Scegliere una o più risposte)

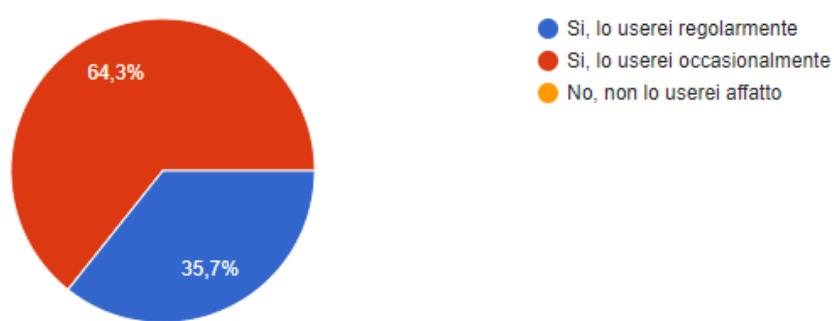
14 risposte



Q_4.3)

In riferimento alla domanda 4, in caso di risposta positiva o parzialmente positiva, saresti disposto/a a utilizzare un servizio che ti permetta di usufruire di tali riassunti audio fatti da altri studenti?

14 risposte

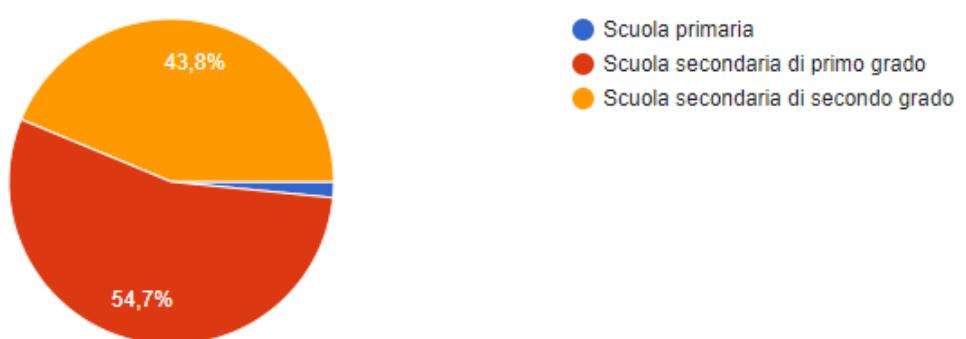


2.4.3 Teachers questionnaire results

Q_1)

Quale è il grado della scuola in cui insegna? (Scelga una o più risposte)

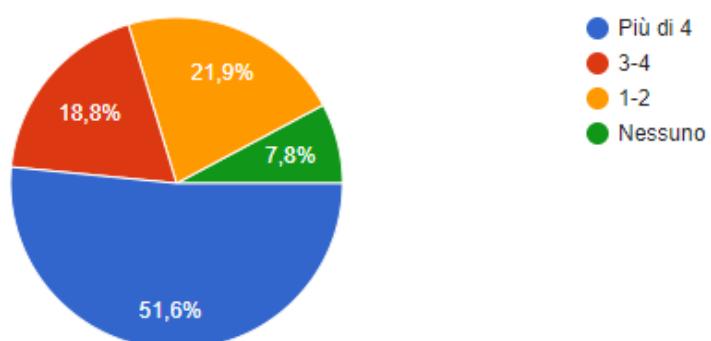
64 risposte



Q_2)

Quanti ragazzi dislessici segue settimanalmente?

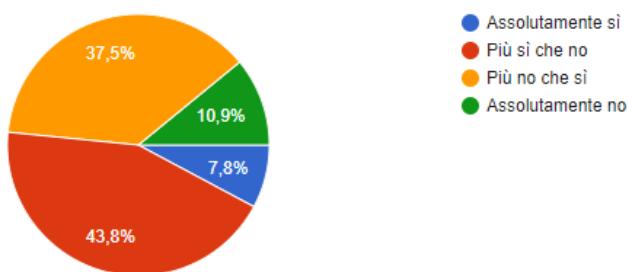
64 risposte



Q_3)

Sei soddisfatto/a dei sussidi didattici disponibili nella sua scuola per l'insegnamento a ragazzi dislessici?

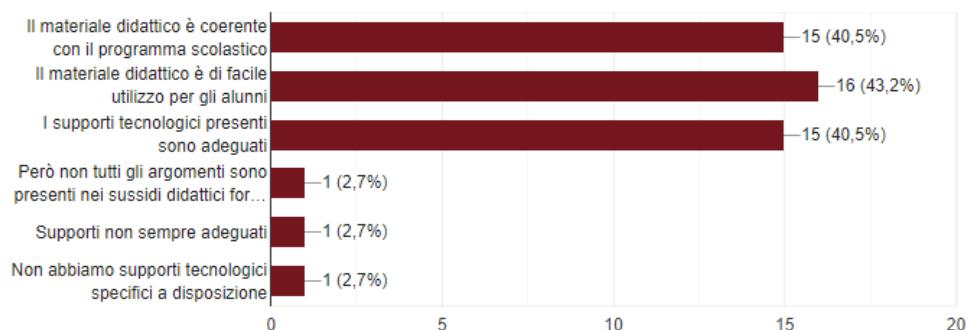
64 risposte



Q_3.1)

In riferimento alla domanda 3, in caso di risposta positiva o parzialmente positiva, per quale motivo? (Scelga una o più risposte)

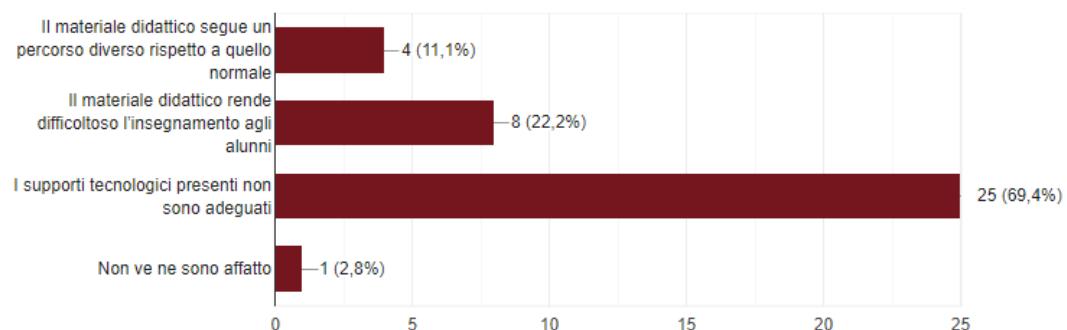
37 risposte



Q_3.2)

In riferimento alla domanda 3, in caso di risposta negativa o parzialmente negativa, per quale motivo? (Scegli una o più risposte)

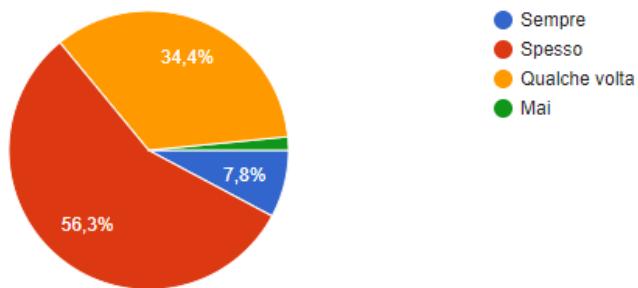
36 risposte



Q_4)

I suoi alunni dislessici raggiungono i risultati previsti ...

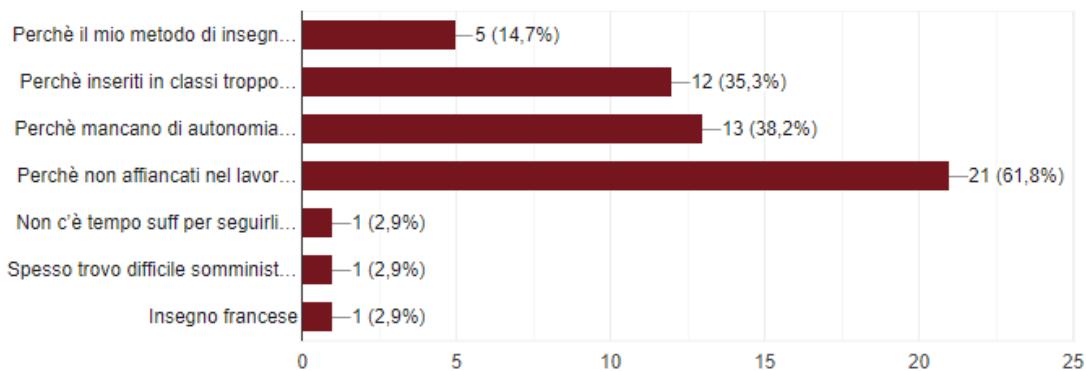
64 risposte



Q_4.1)

In riferimento alla domanda 4, in caso di risposta negativa o parzialmente negativa, per quale motivo? (Scelga una o più risposte)

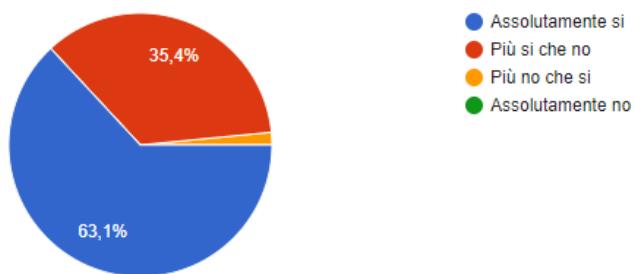
34 risposte



Q_5)

Pensa che l'ascolto di brevi audio riassunti, creati da studenti, possa agevolarli nel lavoro a casa?

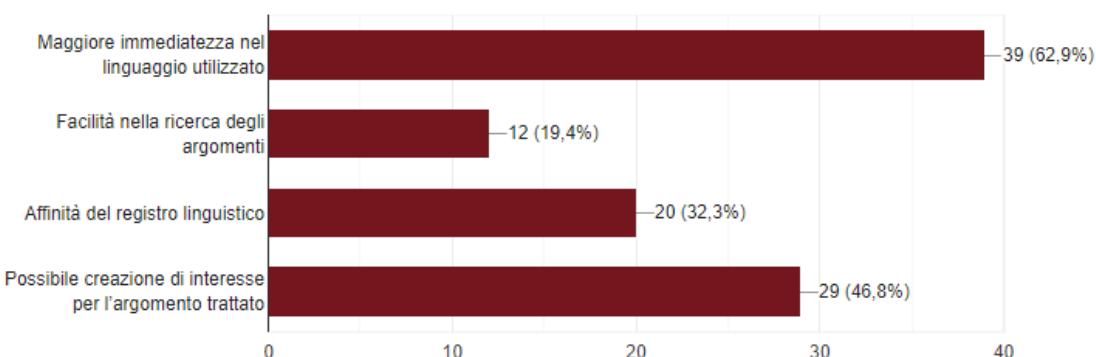
65 risposte



Q_5.1)

In riferimento alla domanda 5, in caso di risposta positiva o parzialmente positiva, per quale motivo? (Scelga una o più risposte)

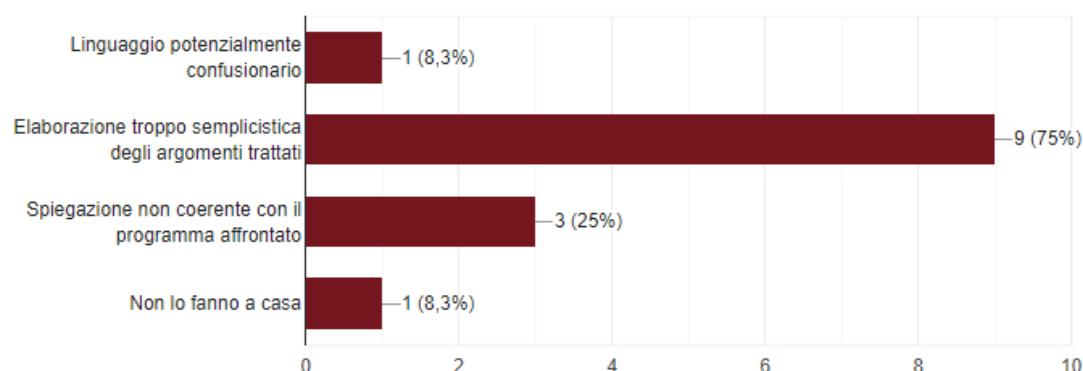
62 risposte



Q_5.2)

In riferimento alla domanda 5, in caso di risposta negativa o parzialmente negativa, per quale motivo? (Scelga una o più risposte)

12 risposte



Q_6)

Se vuoi, lascia un suggerimento per qualcuno che vuole sviluppare una piattaforma basata su riassunti audio, con l'obiettivo di aiutare gli studenti dislessici

14 risposte

Creare sintesi vocali di più semplice utilizzo per la lettura autonoma di qualsiasi testo

Effettuare una selezione accurata degli argomenti basata su obiettivi realisticamente raggiungibili

Audio del docente stesso così lo studente segue la lezione senza stress e se manca qualcosa ha la registrazione a casa di ciò che ha perso

Io non ho ben capito come funziona questa app, io inseguo inglese , ma i contenuti delle registrazioni saranno adattati ai libri di testo in corso d'uso? E se l'hanno successivo c'è un cambio di testo? I testi in uso sono di diverso livello: prima-seconda e terza media sarebbero disponibili registrazioni per tutti e tre i livelli?

Suggerisco che i riassunti audio siano affiancati da slides con i concetti chiave.

Credo sia un'idea eccellente che si basa sul per tutoring coinvolgendo altri studenti

Le registrazioni devono essere validate da un insegnante

2.4.4 Questionnaires conclusions

Analysing the first two questionnaires, we understood that a great amount of non-dyslexic students are willing to help dyslexic students in their studying activities. At the same time it has clearly emerged dyslexic-students' dissatisfaction and the related causes. One of the most apparent reasons, for instance, is the lack of specific material to support the dyslexic-students' studies. As a result of those dissatisfactions, it has arised the dyslexic-students' willingness to take advantage of an eventual service providing supporting audio material for their studies.

In view of the outcome of the teachers' questionnaire, for those teachers who were not satisfied with the support material for dyslexic students it has emerged that the reason for these dissatisfactions is related to the inadequacy of the available materials. So, considering the teachers' suggestions, we verified the utility of an eventual service providing audios to support dyslexic-students' studies, based on the peer education model.

Chapter 3 - Task analysis: HTA & STN

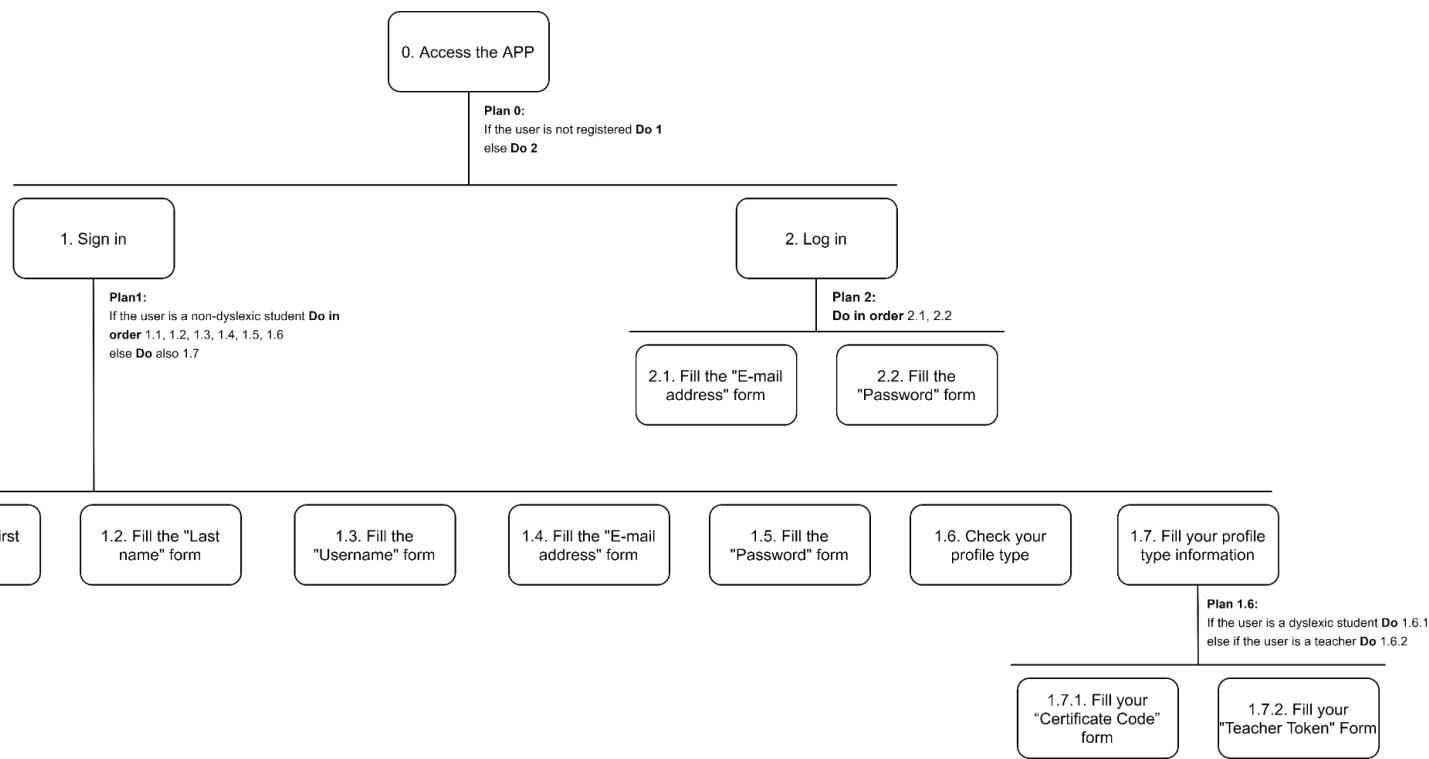
After the requirements analysis step, we prepared HTA and STN schemas for the basic functionalities of our Tesina based on the data collected during this previous stage.

For the STN's we considered only normal escapes, to not clog up the diagrams.

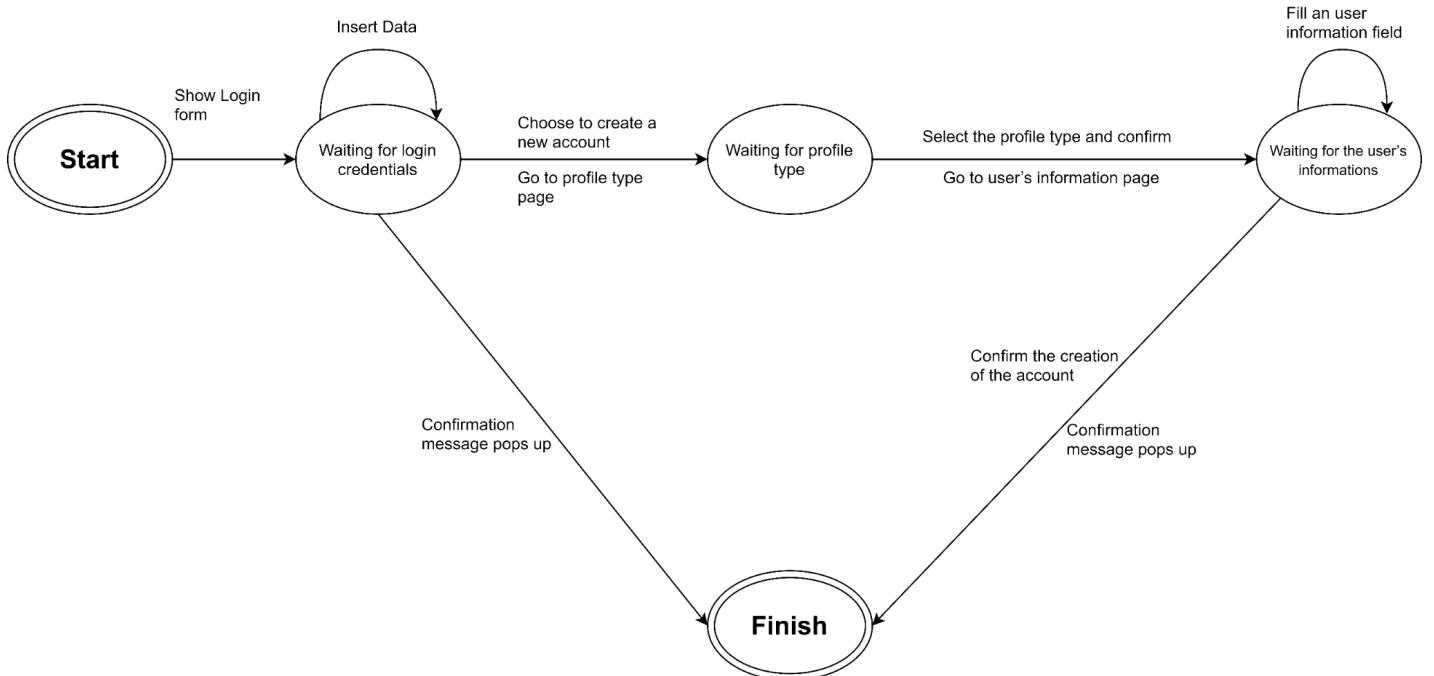
The tasks presented in this section are:

1. Access the App
2. Listen of a recording
3. Upload of a recording

3.1 Access the APP

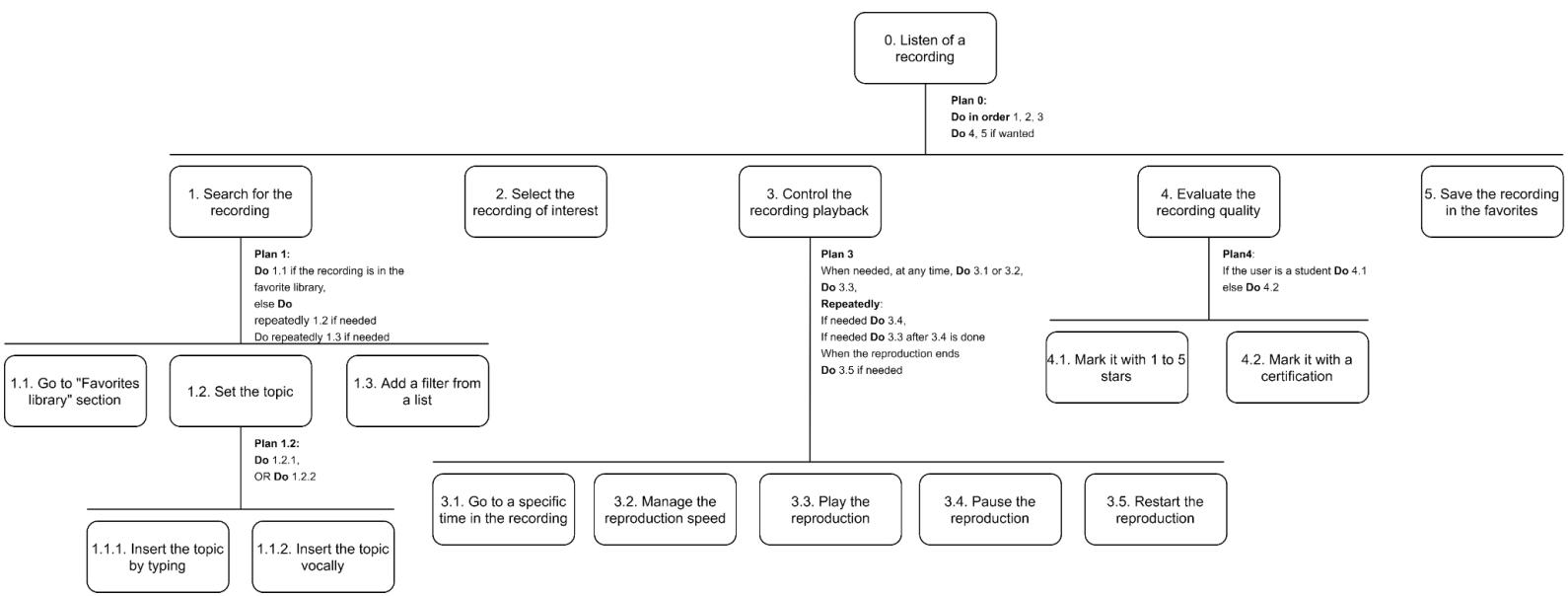


HTA: Access App

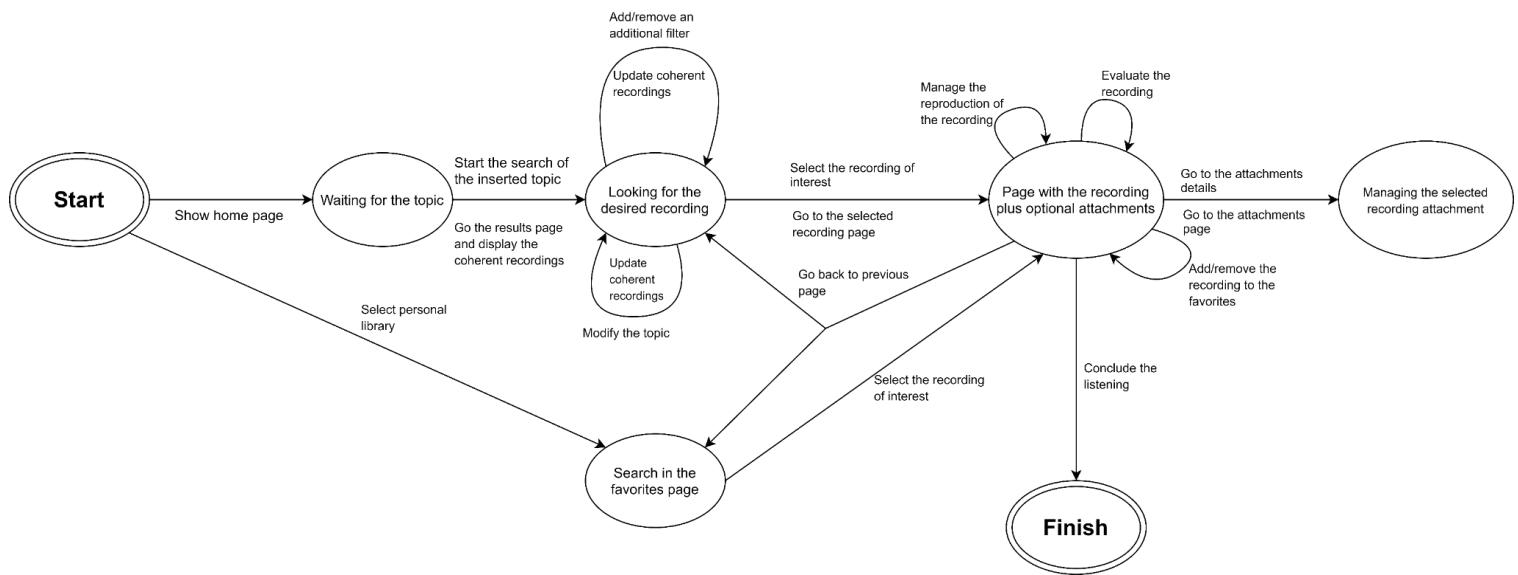


STN: Access App

3.2 Listen of a recording

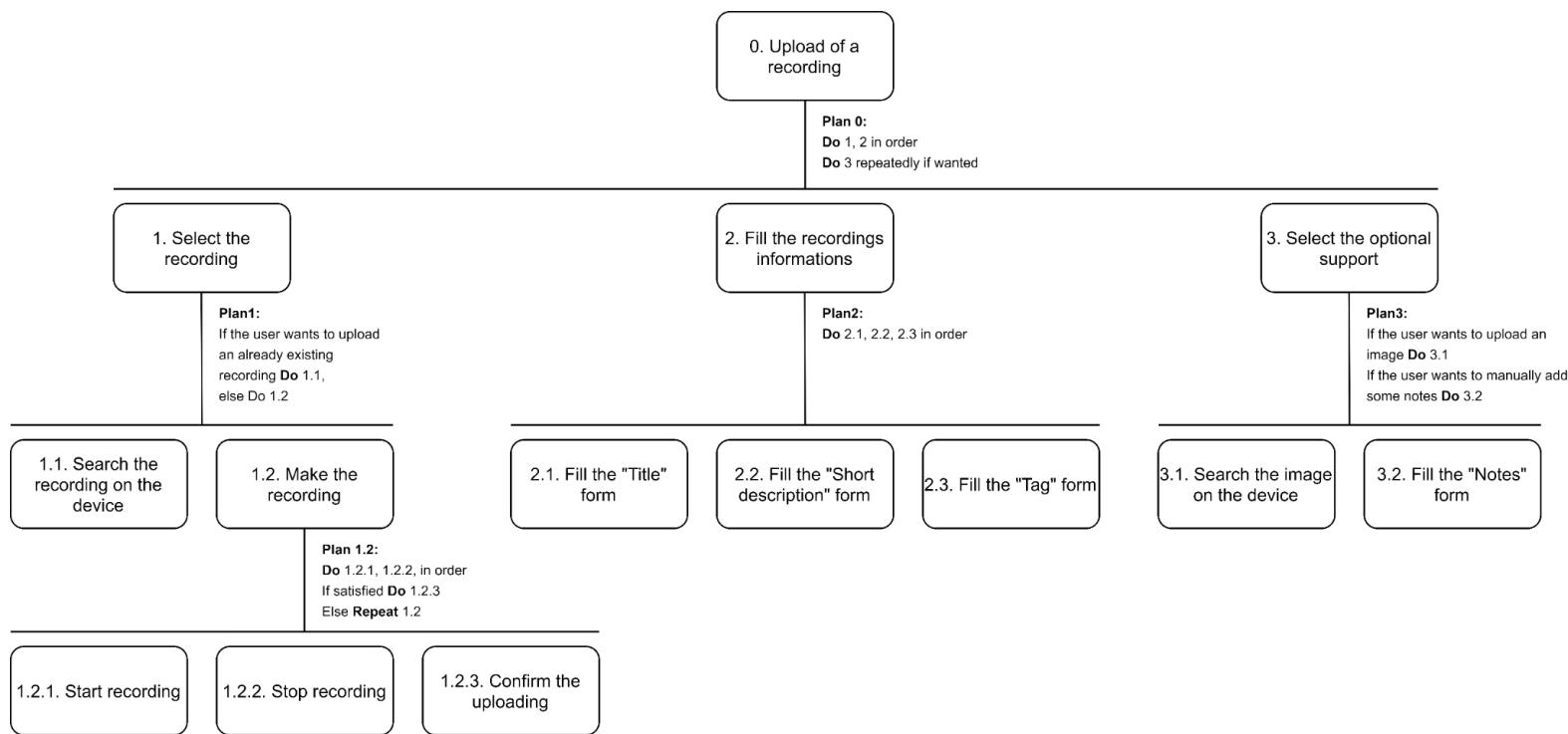


HTA: Listen of a recording

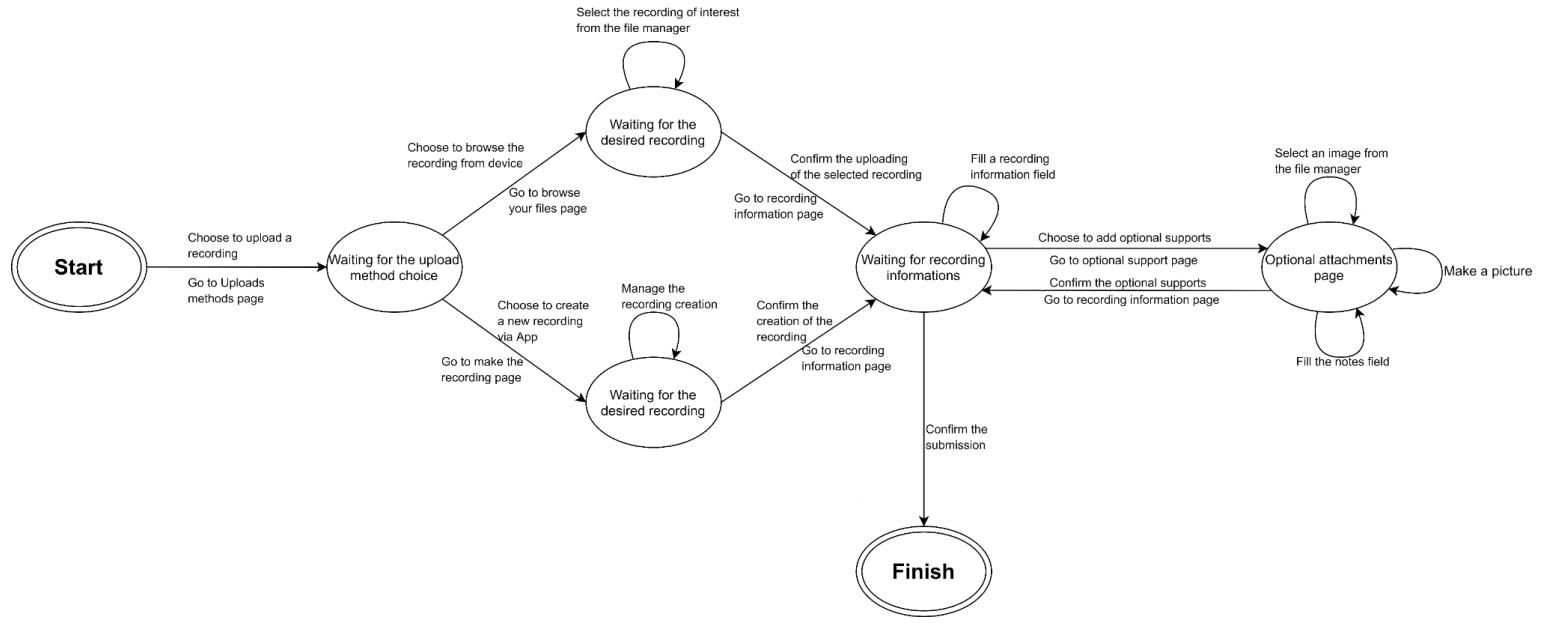


STN: Listen of a recording

3.3 Upload of a recording



HTA: Upload of a recording



STN: Upload of a recording

Chapter 4 - Mockup

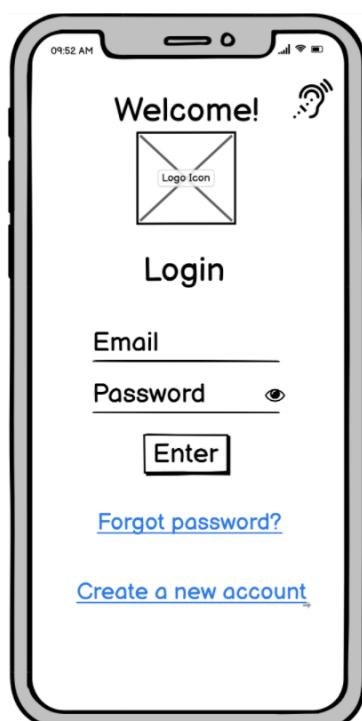
After the design of HTA and STN of our system, we proceeded by developing the mock-ups.

The tasks presented in this section are:

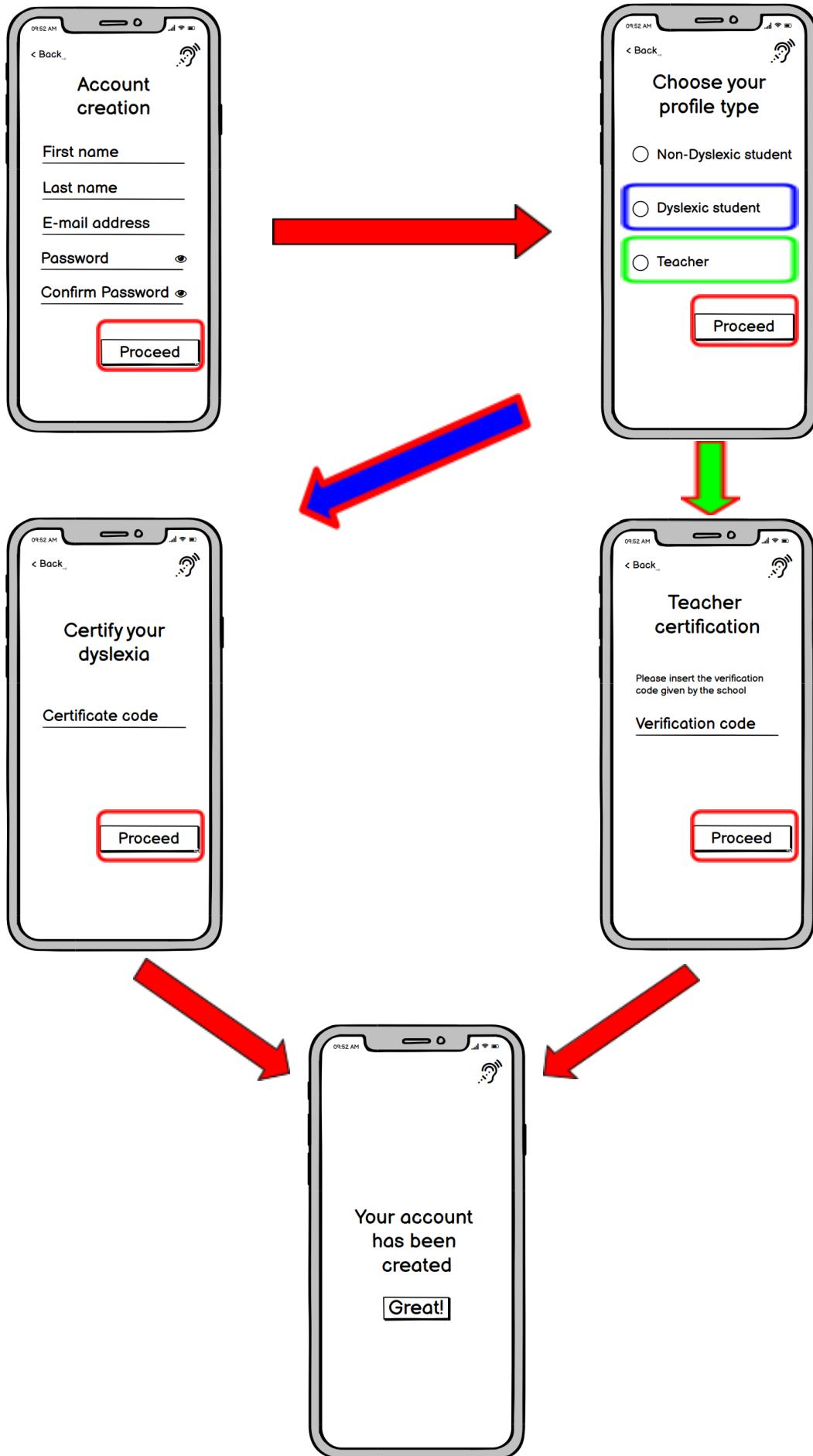
1. Access the App
2. Listen of a recording
3. Upload of a recording

4.1 Access the App

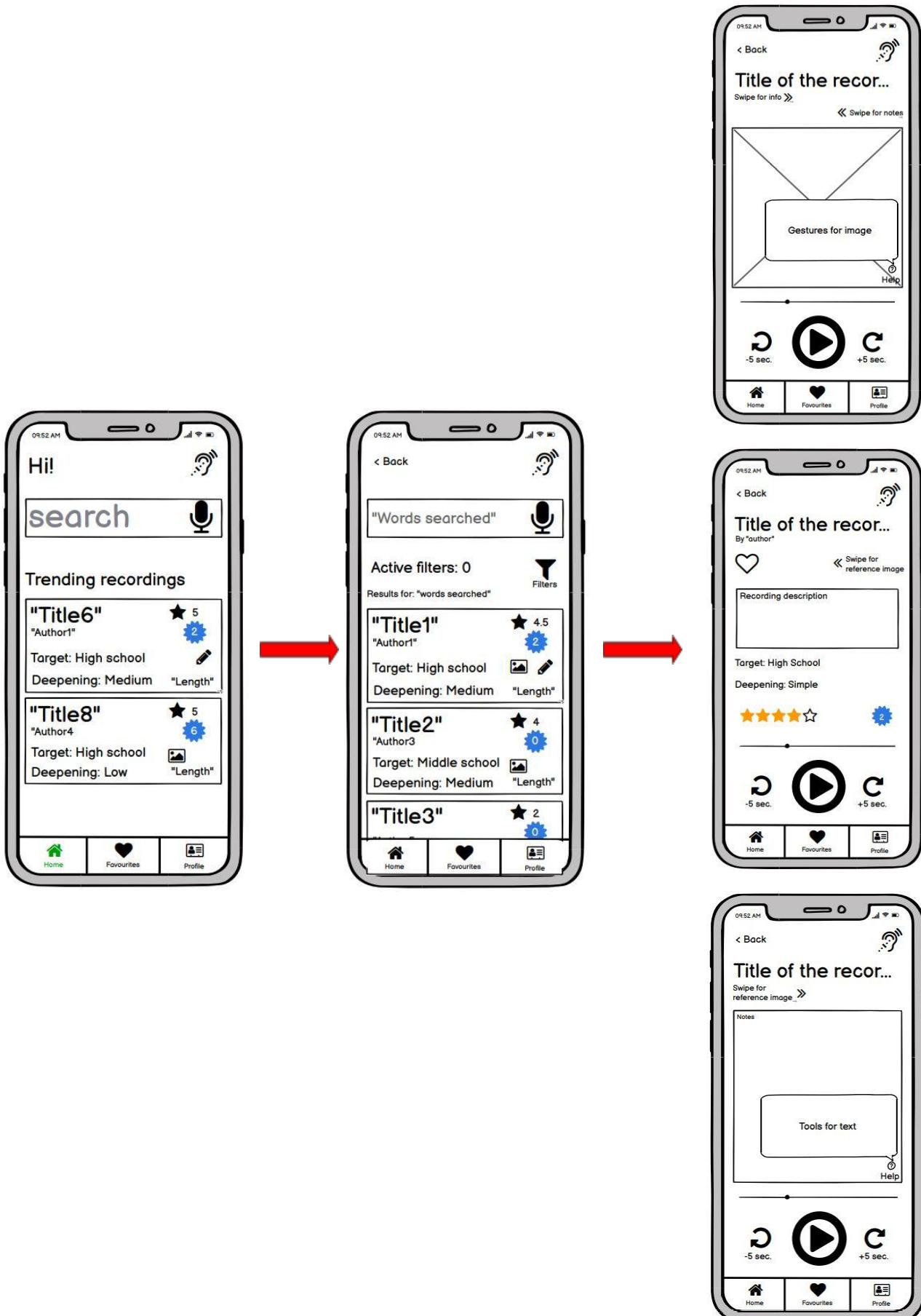
4.1.1 Login



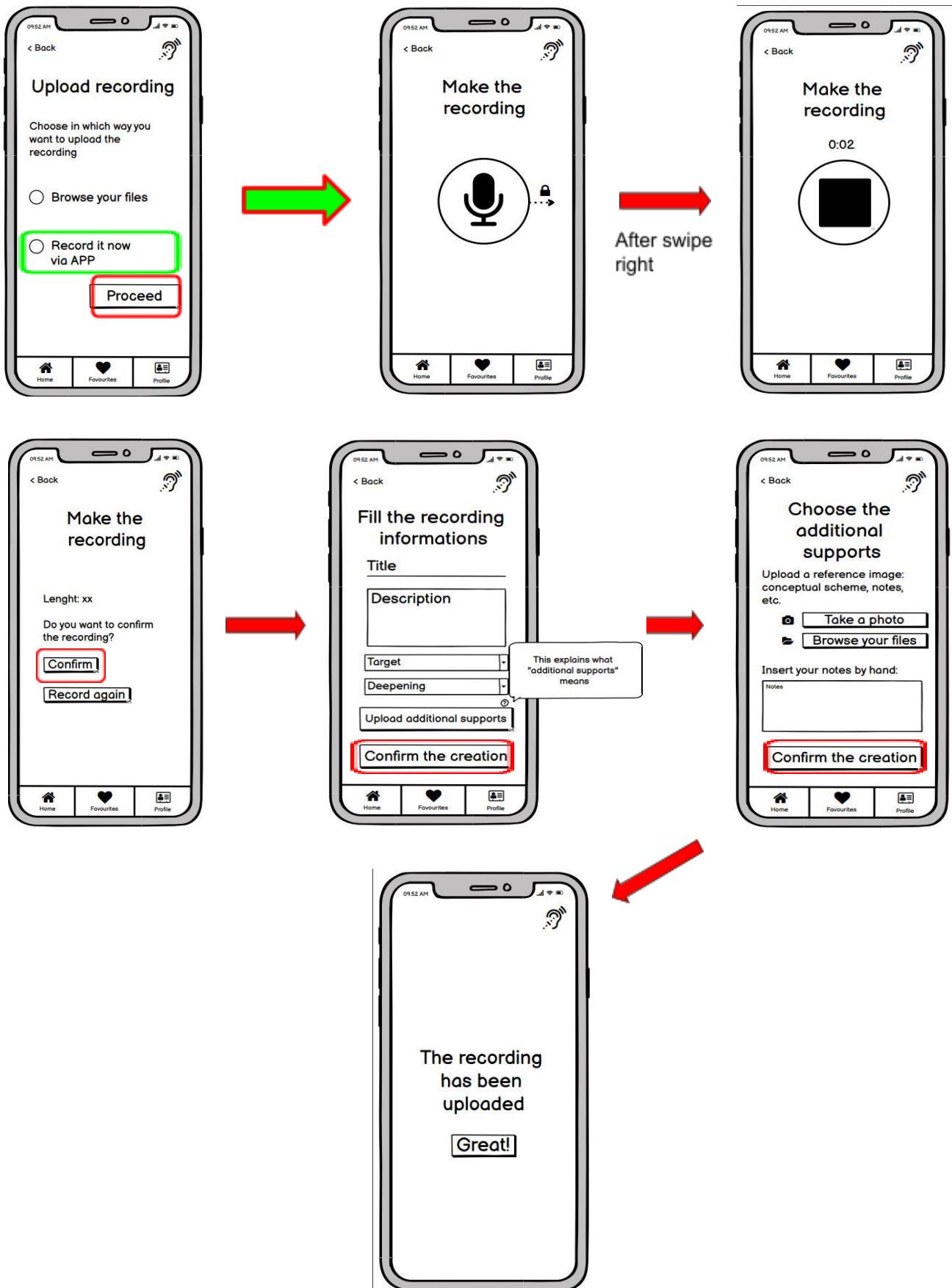
4.1.2 Sign Up



4.2 Listen of a recording



4.3 Upload of a recording



Chapter 5 - Expert Based Evaluation

5.1 Definition of Expert Based Evaluation

In expert-based evaluation, a designer or a human computer interaction expert assesses a design based on standard cognitive principles or empirical results. Expert-based evaluation techniques are also referred to as expert analysis techniques. Examples of expert analysis methods include: heuristic evaluation, cognitive walkthrough, and review-based evaluation.

5.2 Heuristic Evaluation

A heuristic evaluation is a usability inspection method for computer software that helps to judge its compliance with recognized usability principles (the "heuristics"). The evaluation of our system was made by Professor Valeria Mirabella by using Jakob Nielsen's 10 heuristics. In our initial Mock-Up, we have violated a total of four different heuristics. The violated items can be seen in the table below:

Evaluation

Frame	Heuristic violated	Severity	Description / Comment
Sign-in	Flexibility and efficiency of use	2	Consider offering alternative methods of registration such social login or Google login
Choose your profile type	Match between the system and the real world	2	Consider having two mail groups: Students and Teachers and a flag "I am dyslexic"
Certificate code	Error prevention	3	Supply some details on where and how to find the code
Deepening: Simple ★★★★☆ 	Recognition rather than recall	3	Make clear the meaning of the numbers

Heuristics used

1. Visibility of system status
2. Match between the system and the real world
3. User control and freedom
4. Consistency and standards
5. Error prevention
6. Recognition rather than recall
7. Flexibility and efficiency of use
8. Aesthetic and minimalist design
9. Help users recognize, diagnose, and recover from errors
10. Help and documentation

- 0 = I do not agree that this is a usability problem at all
 1 = Cosmetic problem only
 2 = Minor usability problem
 3 = Major usability problem
 4 = Usability catastrophe

5.3 Errors correction and First Prototype

In view of the outcome of the heuristic evaluation, we have made some improvements by considering the four violated heuristics.

1. The first violation was “flexibility and efficiency of use”, with severity equal to ‘2’, regarding the methods of registration into the application. We solved the issue by allowing the user to log-in or to register into our application by using the Facebook log-in or the Google log-in. The changes can be seen in the two images below.

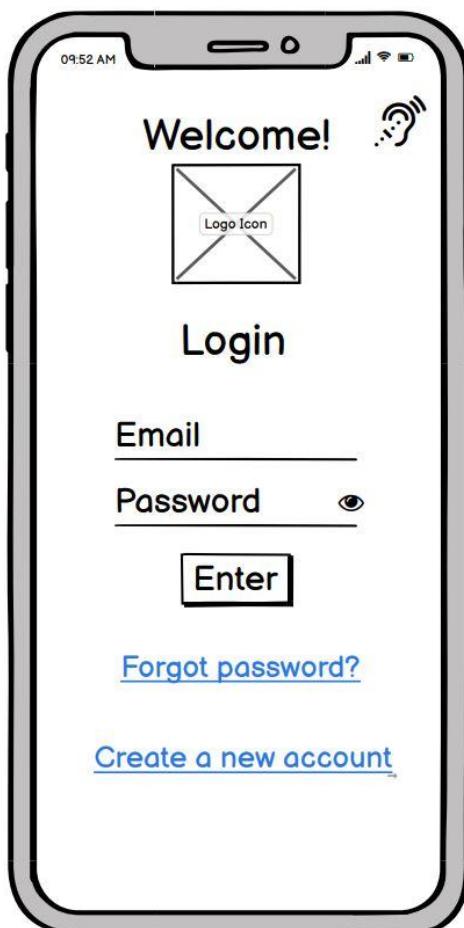


Figure 5.3(a): Mock-up “Login” page, without alternative login methods

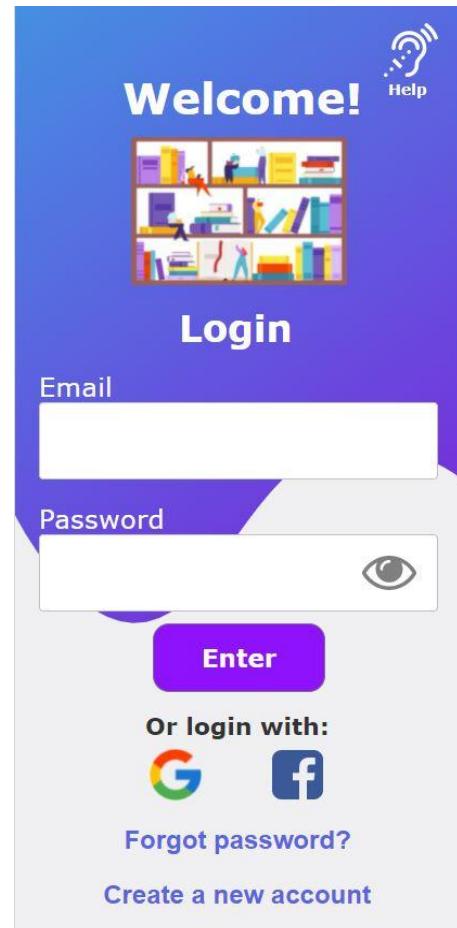


Figure 5.3(b): Prototype-1 “Login” page, with alternative login methods

2. The second was about “Match between the system and the real world”, with severity ‘2’. We agreed with the comment of the evaluator, considering only two main groups (Students and Teachers) with a checkbox to distinguish between dyslexic and non dyslexic students.

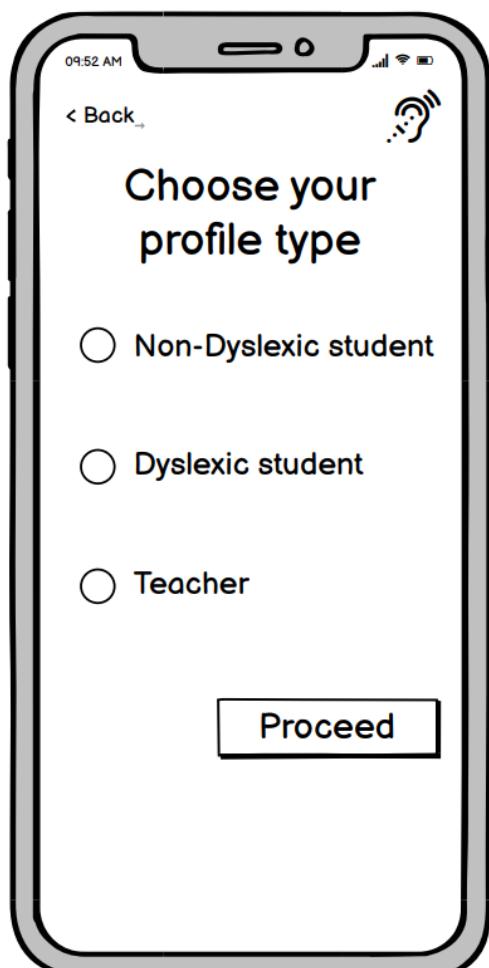


Figure 5.3(c): Mock-up
“Choose your profile
type” page, with three
group of users

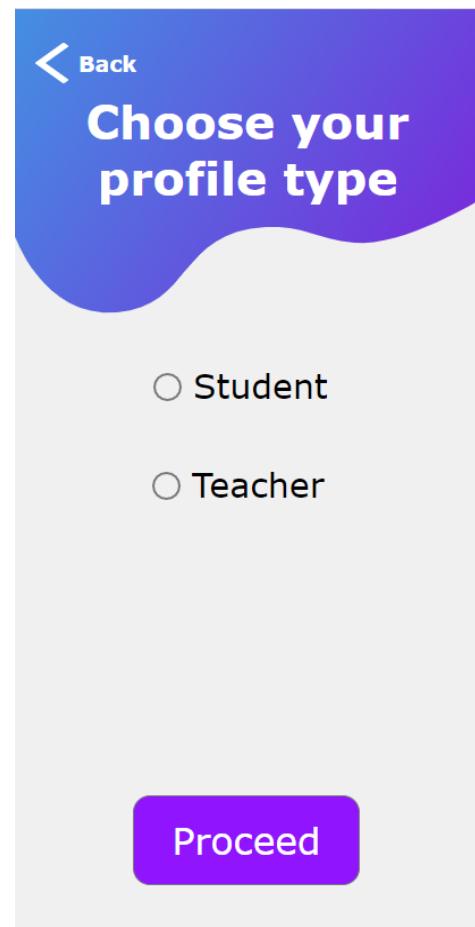


Figure 5.3(d):
Prototype-1 “Choose
your profile type” page,
with two group of users

3. The third violated heuristic was an “Error prevention” one, with severity ‘3’. To solve it, we added a “?” icon that can be clicked to pop up an information box about the certificate code.



Figure 5.3(e): Mock-up
“Certify your dyslexia”
page

A prototype-1 “Fill student information” page. It features several input fields: "Email address*", "Password*", and "Confirm your Password*". Below these is a text area containing instructions: "Please report here the ID of your dyslexia certificate. You can find it in the upper-right corner of your certificate". At the bottom, there is a "Certificate code" input field with a question mark icon in the top right corner, and a large purple "Submit" button.

Figure 5.3(f):
Prototype-1 “Fill student
information” page, with
the “?” button.

4. The fourth violated heuristic was the “recognition rather than recall”, with severity ‘3’, regarding the absence of specific names to identify the fields in the evaluation of the recording. We have solved the issue by explicitly showing “Teacher certifications”.

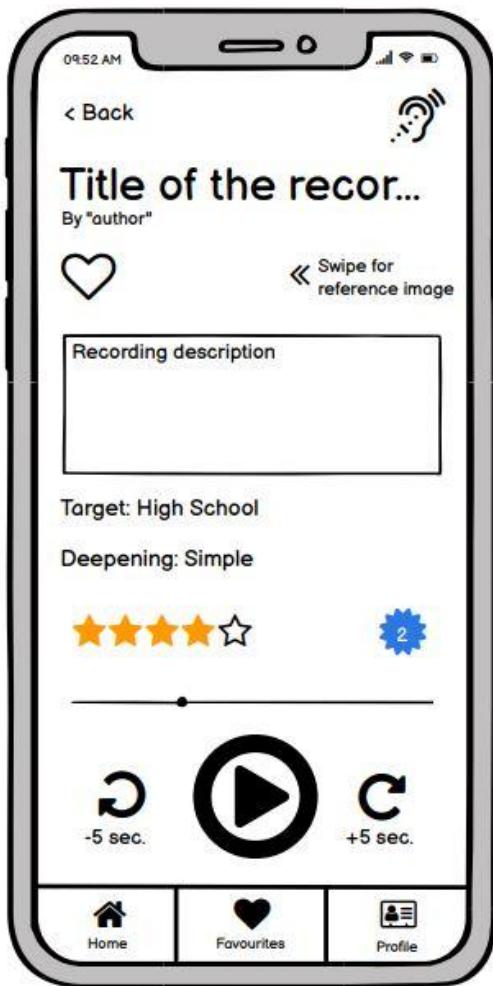


Figure 5.3(g): Mock-up
“Listen of a recording”
page

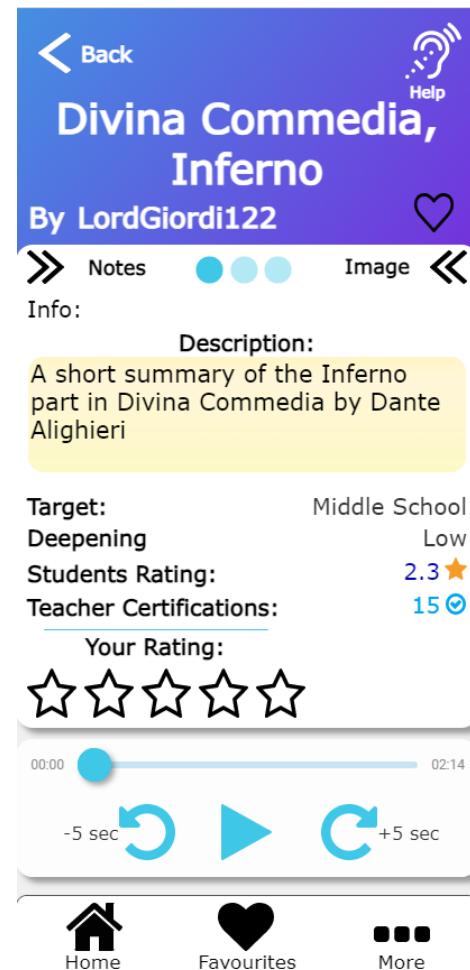


Figure 5.3(h):
Prototype-1 “Listen of a
recording” page, with
the “Teacher
certifications” explicitly
written.

Chapter 6 - User Based Evaluation

6.1 Think aloud

A think-aloud protocol is a method used to gather data in usability testing in product design and development. Think-aloud protocols involve participants thinking aloud as they are performing a set of specified tasks.

We selected a group of twelve people of different ages to perform the examination using the first prototype. More specifically, they were: four non dyslexic-students, four dyslexic students and four teachers. All of them were selected such that each category contains a pair of students, or teachers, from middle school, while the other pair is from high school.

The selected tasks for the examination were:

- listen of a recording (starting from search);
- upload of a recording.

For the execution of the upload of a recording, the selected users were four non-dyslexic students from the previous examination; more specifically: two students from middle school and two students from the high school.

The examination took place in each user's house, using Zoom. During the examination, we collected all the information using "paper and pencil", and "audio".

6.1.1 First task: listening of the recording

The users appreciated the presence of the description section of the audio, where they were able to have a short summary of the concepts that will be explained in the audio. During the listening of the recording, the users found useful the presence of the attached image with a conceptual scheme to be zoomed in or out, since it provides a visual feedback of the explained conceptual steps. Finally the users highlighted the notes as a useful way of reviewing the concepts after the ending of the audio. Even the teachers considered the attachments powerful instruments to intensify the learning phase during and after the listening of the recording.

The dyslexic students appreciated the presence of the helper to guide them on understanding the content of the page, like fields, text areas and buttons.

All the users pointed out that the icon to add the recording to the favourites was not clearly visible due to the black border color and its small dimensions. Additionally the users reported that, when listening to a recording with some missing attachments, it was a bit distracting the presence of the attachment panel, for instance the note panel, where there were not real notes but just a line expliciting the absence of notes. Finally, in the initial search phase, they marked the need for additional filters in order to make searches based on the professors' certification.

6.1.2 Second task: upload of the recording

During the execution of the second task, the users appreciated the possibility of having multiple methods for the uploading of a recording. By selecting the method of recording the audio from the app, the users found useful the opportunity of both listening again to the created audio and recreating the audio from scratch.

When navigating the content of the pages, especially in the “Fill the recording informations” page, the users suggested placing fields and information in such a way more emphasis is given to the contents, for instance by detaching them from the grey background following the layout of the listening of the recording page.

6.2 Controlled experiment

Controlled experiments are a widely used approach to evaluate interfaces and styles of interaction and to understand cognition in the context of interactions with systems. The question they most commonly answer can be framed as: does making a change to the value of the independent variable have a significant effect on the dependent variable?

6.2.1 Independent variables

Initially, in the design phase of the “Create a new recording” feature we decided on a “classic” interface, which is the one in the figures 6.2(a), 6.2(b) and 6.2(c). This first interface is based on: guiding text to explicit what the user should do; a timer, always visible, for the recording duration; and standard buttons to start the recording, stop the recording, conclude the creation (“Yes, proceed” button) and discard the recording.

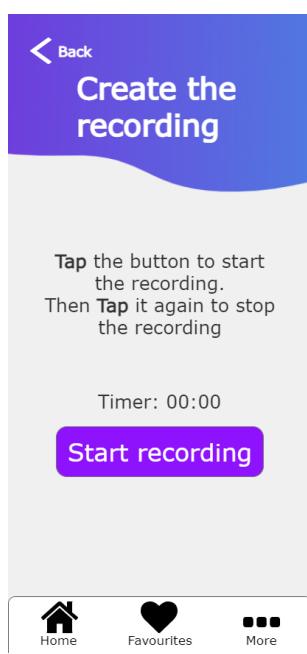


Figure 6.2(a): First interface of “Create the recording page”, Before starting the recording

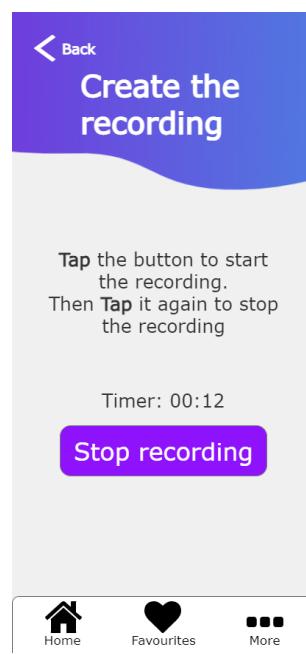


Figure 6.2(b): First interface of “Create the recording page”, After starting the recording

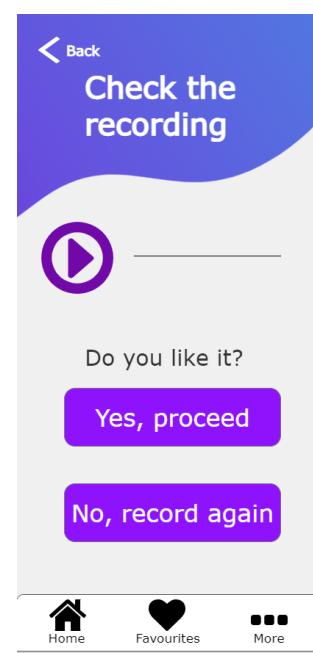


Figure 6.2(c): First interface of “Check the recording”

In the “Create the recording” page, after tapping the “start the recording” button, it changes to a “stop the recording” and the timer starts to increase. To finish the registration process the user has to tap the “stop the recording” button. Then in the “Check the recording” page, he can decide with buttons to accept or discard the audio just recorded.

However, after a while we thought about implementing another interface(the one that partly is in the mockups), which can be seen in figures 6.2(d), 6.2(e) and 6.2(f).

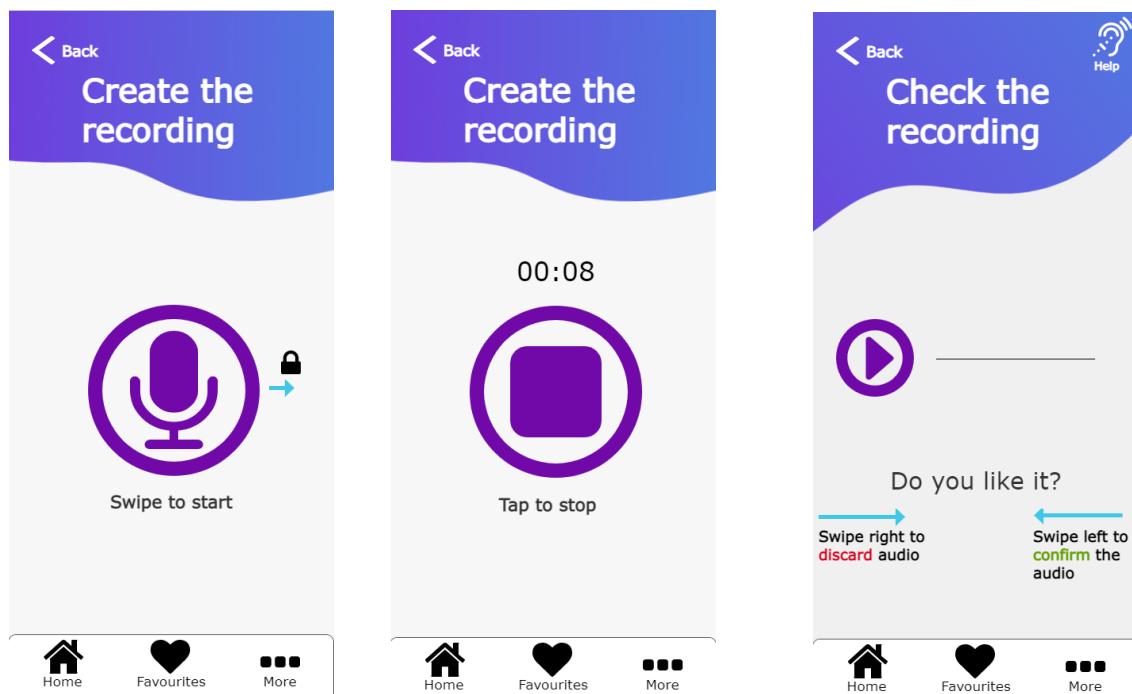


Figure 6.2(d): Second interface of “Create the recording page”, Before starting the recording

Figure 6.2(e): Second interface of “Create the recording page”, After starting the recording

Figure 6.2(f): Second interface of “Check the recording”

This new interface aims to simplify and speed up the feature by removing some textual content, and by modernizing the buttons. The “start recording” button is indeed transformed into an icon that can be滑动 to start the recording. Also the “Yes, proceed” button and the “No, record again” button are converted into a swipe

based approach. This interface tries to push on the swiping gesture which is currently used a lot in other applications for the same targets.

Therefore, for the controlled experiments we considered the two interfaces as the independent variables.

6.2.2 Dependent variable

As a dependent variable we considered the time to complete the task: “creation of a new recording”. Therefore the time starts when the user enters the “Create the recording” page and stops when he leaves the “Check the recording” page (ignoring the time spent recording the audio and the time spent listening to it).

6.2.3 Hypothesis

Our assumption/hypothesis was that the second interface is actually simpler and faster for the user, thanks to the modernized start method and to the reduction of superfluous textual content.

The null hypothesis in our case would be that the two interfaces had no substantial differences in the time of executing the task.

6.2.4 Subjects

For the controlled experiment we reached a total of twenty people, from eleven to nineteen years old.

6.2.4 Running the experiment

Every participant tested both the interfaces. The advantage in using this method is that it is still valuable even with a low number of participants, that in our case were just twenty. While a downside is the transfer of learning issue, that derives from the fact that a user who is asked to do the same task twice, will inevitably acquire knowledge about the design in the first task execution; therefore the second

execution will be influenced by this previous knowledge. To mitigate this issue, half the participants faced the first interface in the first execution and then the second interface in the second execution; while the other half faced the opposite order of interfaces.

6.2.5 ANOVA single factor

After the experiment, we had collected enough data to run an ANOVA (analysis of variance) single factor statistical analysis on them. This type of statistical analysis is useful for us to understand if the data are statistically relevant or not.

The following figures show the data collected with the Controlled Experiment and the ANOVA single factor results:

First interface	Second interface
15	9
13	8
14	8
14	10
12	9
14	10
16	14
12	10
11	8
9	6
10	11
9	11
10	12
11	10
12	12
10	9
9	10
7	8
9	11
8	10

Figure 6.2(g): Data collected with Controlled Experiment, with the two independent variable as columns

Anova: Single Factor					
SUMMARY					
Groups	Count	Sum	Average	Variance	
Column 1	20	225	11.25	6.197368	
Column 2	20	196	9.8	3.221053	

ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	21.025	1	21.025	4.464655	0.041228	4.098172
Within Groups	178.95	38	4.709211			
Total	199.975	39				

Figure 6.2(h): ANOVA
single factor analysis

The most important result is that F is bigger than F crit ($4.464655 > 4.098172$). Therefore, we can reject the null hypothesis; that means that there is a difference between the two interfaces in terms of time needed to execute the task “creation of a recording”.

Moreover, the P-value is greater than 0.05, which is a well used indicator to highlight that the results are significant because they don't depend too much on chance.

Thanks to the result obtained we can conclude the analysis by saying that overall the second version of the interface made the task faster, therefore we decided to discard the previous version and to keep the new one for the final prototype.

Chapter 7 - Final Product

7.1 Overview of the final product

The final application was realized through Axure RP by modifying directly the first prototype and by implementing front end and a simulated back end thanks to the global variables feature of the program.

Features of the final product:

- Login through the App or Google/Facebook
- Recovery of the password
- Sign-Up based on the type of user
- Profile page with possibilities to modify the credentials of the user and manage the personal recording uploaded
- Home page with filters and search capabilities
- Favourites page
- Upload of the recording
- Listen of the recording

7.1.1 Login through the App or Google/Facebook

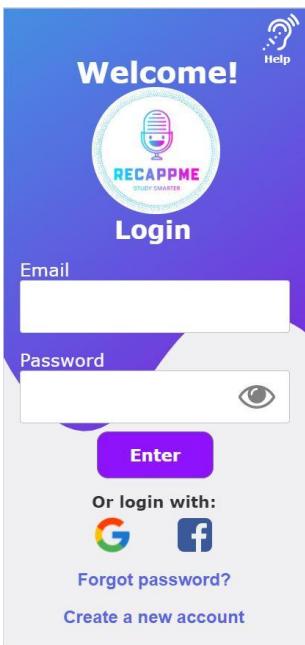


Figure 7.1.1(a):
Login page

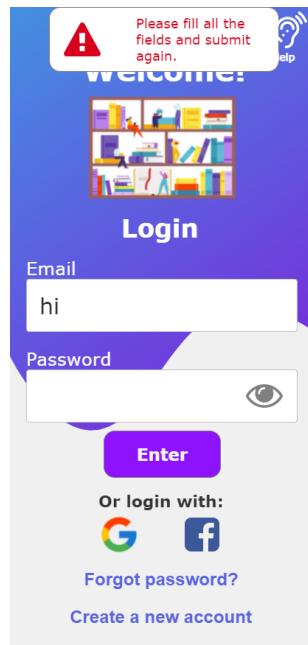


Figure 7.1.1(b):
Login page with
“missing field error”

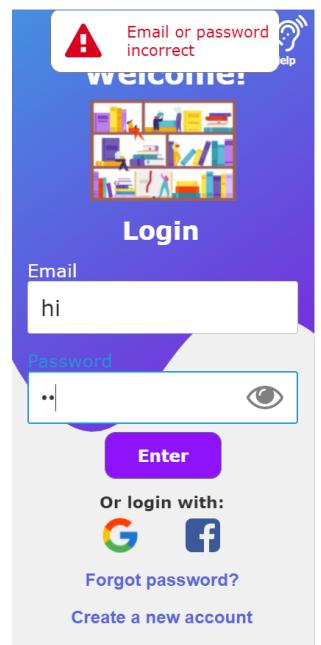


Figure 7.1.1(c):
Login page with
“match error”

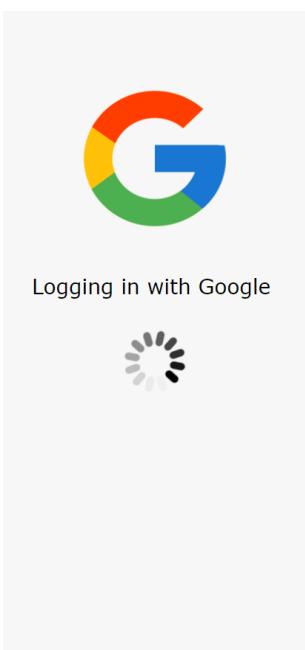


Figure 7.1.1(d):
Google loading
page

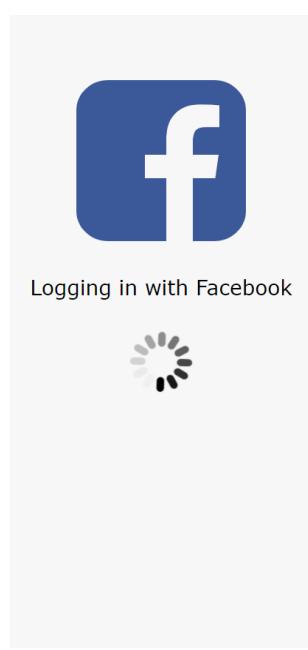
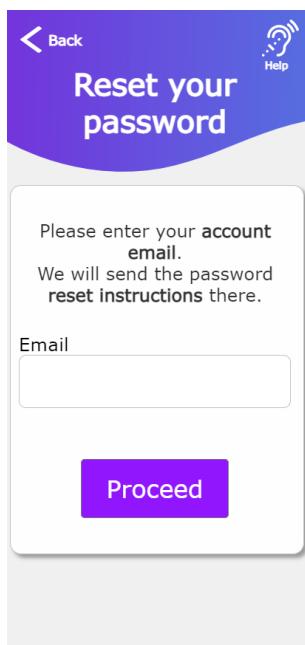


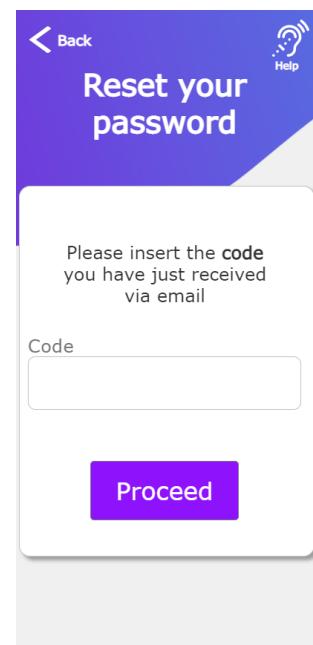
Figure 7.1.1(e):
Facebook loading
page

7.1.2 Recovery of the password



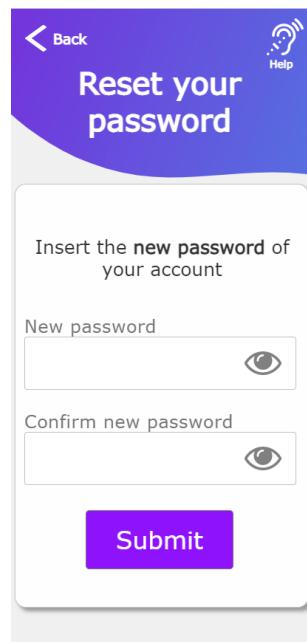
The screenshot shows a mobile application interface for password recovery. At the top, there are navigation icons: a back arrow, a microphone icon, and a help icon. The main title is "Reset your password". Below the title, a message reads: "Please enter your account email. We will send the password reset instructions there." A text input field is labeled "Email" and contains a placeholder. A purple "Proceed" button is at the bottom.

Figure 7.1.2(a):
page to insert the
email of the account



The screenshot shows the next step in the password recovery process. The title "Reset your password" remains at the top. The message now says: "Please insert the code you have just received via email". A text input field is labeled "Code" and contains a placeholder. A purple "Proceed" button is at the bottom.

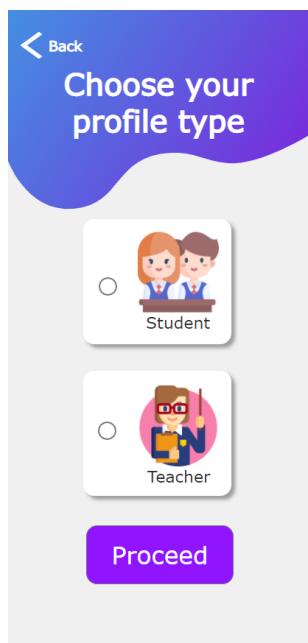
Figure 7.1.2(b):
page to insert the
code received



The screenshot shows the final step of the password recovery process. The title "Reset your password" is at the top. The message reads: "Insert the new password of your account". There are two text input fields: "New password" and "Confirm new password", both with placeholder text and eye icon password visibility buttons. A purple "Submit" button is at the bottom.

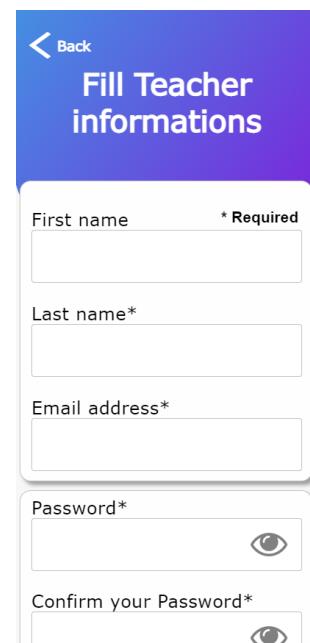
Figure 7.1.2(c): page
to insert the new
password

7.1.3 Sign-Up based on the type of user



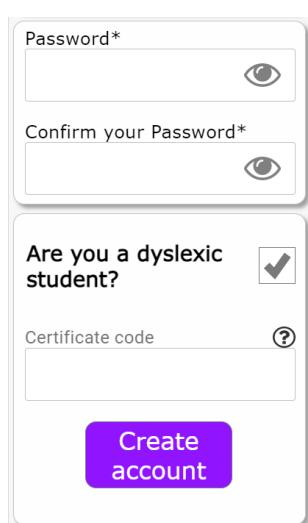
The screenshot shows a mobile application interface for selecting a user profile type. At the top, a purple header bar contains the text "Choose your profile type" and a "Back" button. Below the header, there are two circular selection buttons: one for "Student" (with an icon of two children at a desk) and one for "Teacher" (with an icon of a teacher holding a book). A large blue "Proceed" button is located at the bottom of the screen.

Figure 7.1.3(a):
select type of user
page



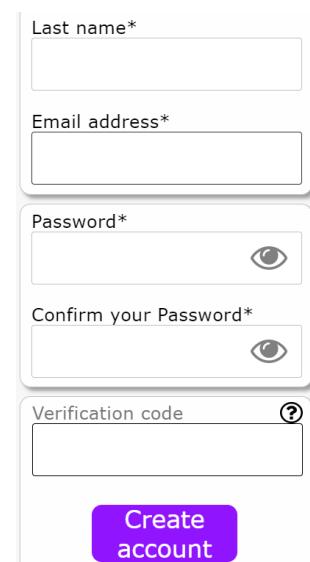
The screenshot shows a mobile application interface for filling teacher information. At the top, a purple header bar contains the text "Fill Teacher informations" and a "Back" button. Below the header, there are five input fields: "First name" (marked as required), "Last name*", "Email address*", "Password*", and "Confirm your Password*". Each input field includes an "eye" icon for password visibility.

Figure 7.1.3(b):
common informations
form



The screenshot shows a mobile application interface for student-specific account creation. It includes fields for "Password*" and "Confirm your Password*" with visibility icons. A checkbox labeled "Are you a dyslexic student?" is checked. A "Certificate code" field with a question mark icon is present. A large blue "Create account" button is at the bottom.

Figure 7.1.3(c):
specific informations
form for students



The screenshot shows a mobile application interface for teacher-specific account creation. It includes fields for "Last name*", "Email address*", "Password*", and "Confirm your Password*". A "Verification code" field with a question mark icon is also present. A large blue "Create account" button is at the bottom.

Figure 7.1.3(d):
specific informations
form for teachers

7.1.4 Profile page with possibilities to modify the credentials of the user and manage the personal recording uploaded

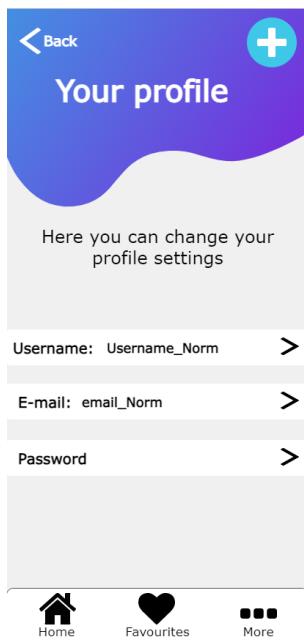


Figure 7.1.4(a):
page with profile
informations

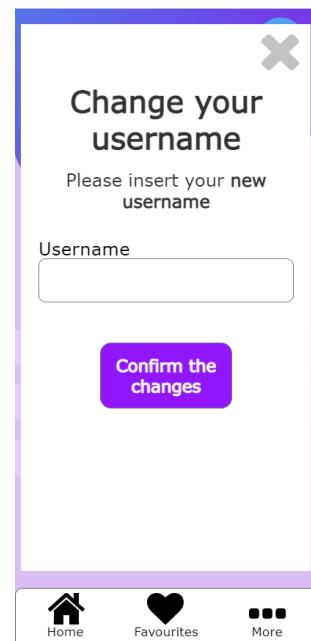


Figure 7.1.4(b):
page to modify the
username of the
user

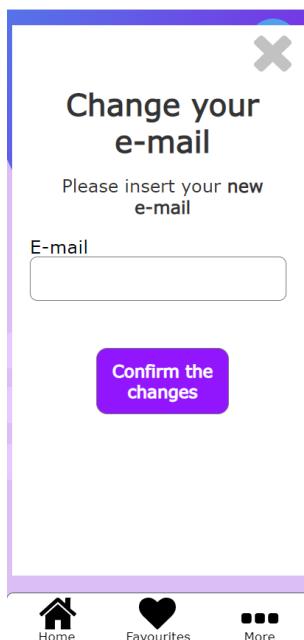


Figure 7.1.4(c):
page to modify the
e-mail of the user

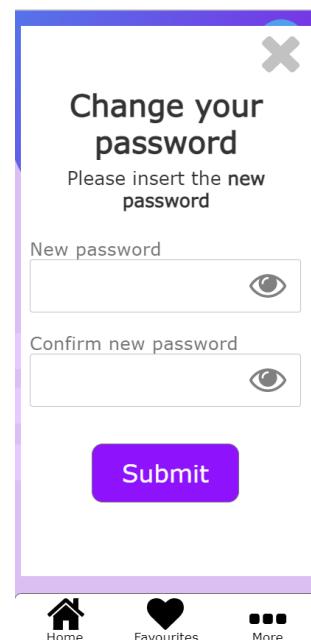


Figure 7.1.4(d): page
to modify the
password of the user

7.1.5 Home page with filters and search capabilities

The screenshot shows the home page with a purple header. At the top left is a greeting "Hi Username_Dis!". On the right are icons for Help and a microphone. Below the header is a search bar with placeholder text "Search recordings...". A "Trending recordings:" section follows, featuring a recording by "Divina Commedia, Infern" (LordGiordi) with a thumbnail, "Yes" for both photo and video, a student rating of 2.3 stars, teacher certifications of 15, target level Middle School, and deepening level Low. The duration is 06:43. Below this is another recording entry for "Freud for the experts" with similar details. At the bottom is a navigation bar with "Home", "Favourites", and "More" buttons.

Figure 7.1.5(a):
Home page with the
audio recordings

This screenshot shows the same home page as Figure 7.1.5(a), but the recordings are sorted by rank. The first recording is now "Freud for the experts" (username_N) with a student rating of 4.5 stars, teacher certifications of 1, target level High School, and deepening level High. The duration is 00:51. The second recording is "The cell" (Username_G) with a student rating of 4 stars, teacher certifications of 5, target level Middle School, and deepening level Medium. The duration is 03:54. The rest of the interface is identical to Figure 7.1.5(a).

Figure 7.1.5(b):
Home page with the
audio recordings
sorted by rank

This screenshot shows the search results for "Freud". The header includes a back arrow, a microphone icon, and a help icon. It features a search bar and a "Filters" button. The results section shows two recordings: "Freud for the experts" (username_N) and "Freud for the novices" (Gianl). Both recordings have a student rating of 4.5 stars, teacher certifications of 1, target level High School, and deepening level High or Low respectively. Durations are 00:51 and 04:54. The bottom navigation bar is identical to Figure 7.1.5(a).

Figure 7.1.5(c):
Results of the
search

This screenshot shows the search results for "Freud" with an active filter applied. The header includes a back arrow, a microphone icon, and a help icon. It features a search bar and a "RESET FILTERS" button. The results section shows the same two recordings as Figure 7.1.5(c), but the "Freud for the novices" entry is no longer visible. The "Freud for the experts" entry remains. The bottom navigation bar is identical to Figure 7.1.5(c).

Figure 7.1.5(d):
Results of the
search with active
filters

7.1.6 Favourites page

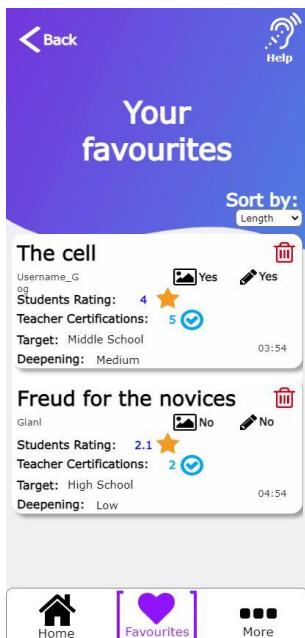


Figure 7.1.6(a):
Favourites page

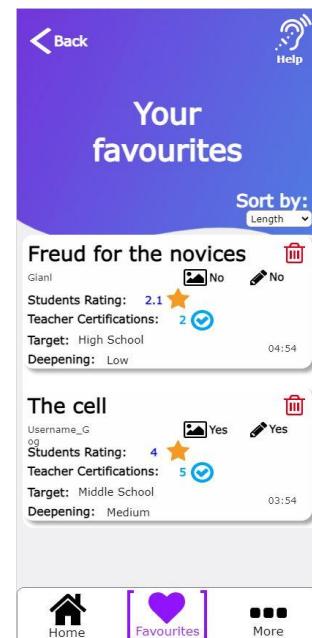


Figure 7.1.6(b):
Favourites page with
rank of recordings
based on the length

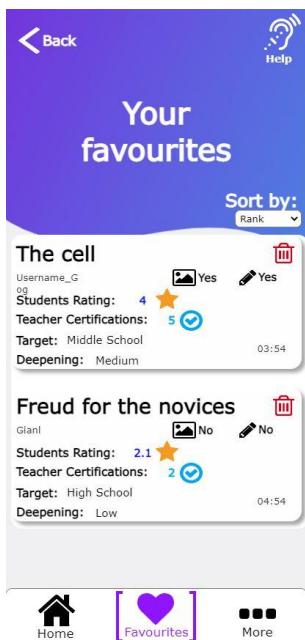


Figure 7.1.6(c):
Favourites page with
rank of recordings
based on the rank

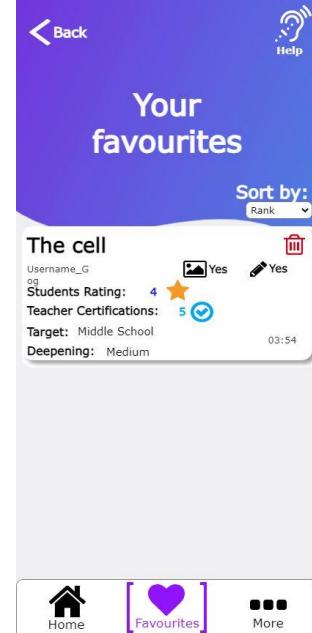


Figure 7.1.6(d):
Favourites page with
deletion

7.1.7 Upload of the recording

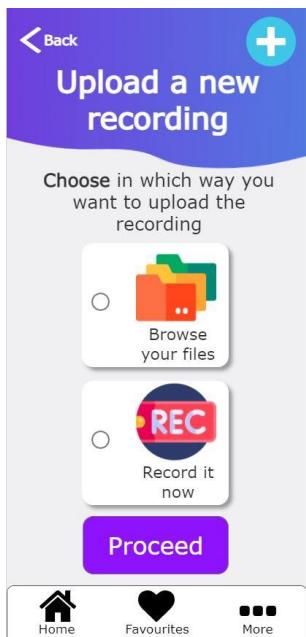


Figure 7.1.7(a):
Upload of a
recording

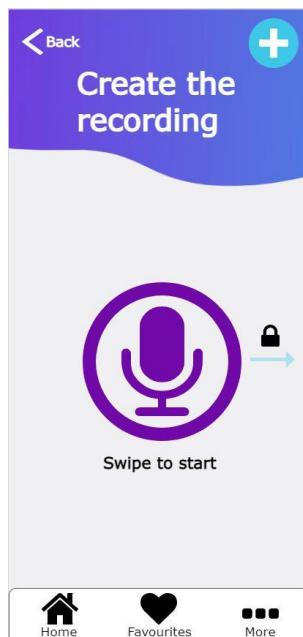


Figure 7.1.7(b):
Create the recording
in the app

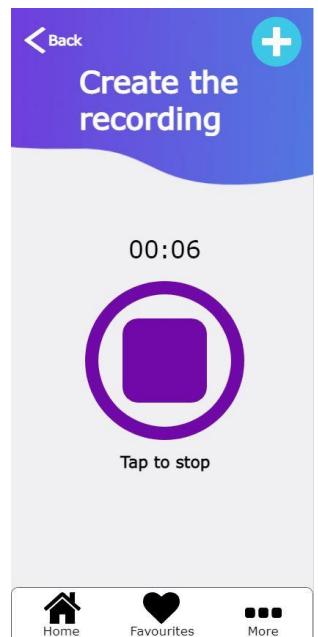


Figure 7.1.7(c): Stop
the recording in the
creation of the
recording

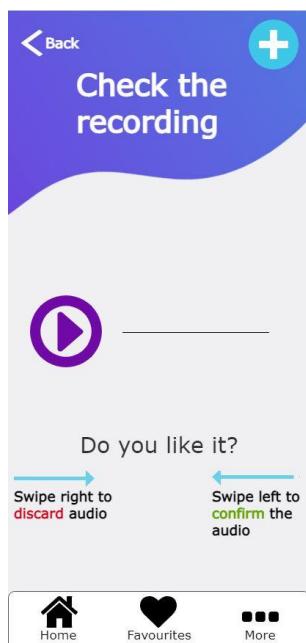


Figure 7.1.7(d):
Check the recording
after its creation

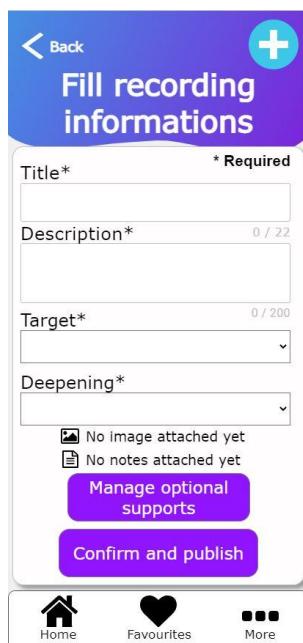


Figure 7.1.7(e):
Filling the recording
informations and
insertion of optional
supports

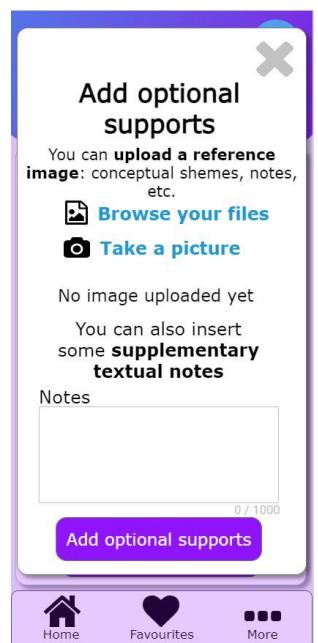


Figure 7.1.7(f):
Insertion of optional
supports

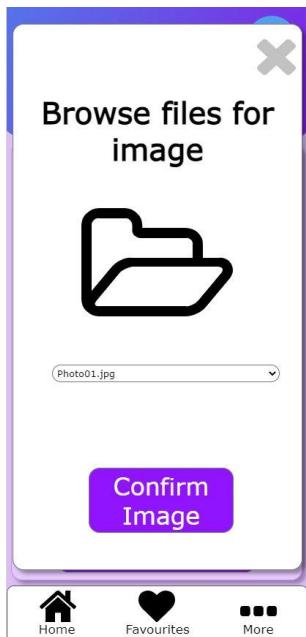


Figure 7.1.7(g):
Insertion of a image
from personal files

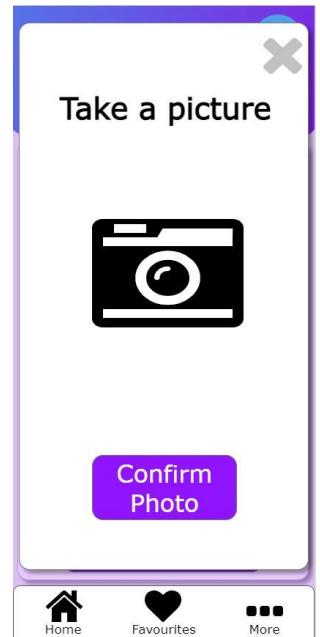


Figure 7.1.7(h):
insertion of a taken
image

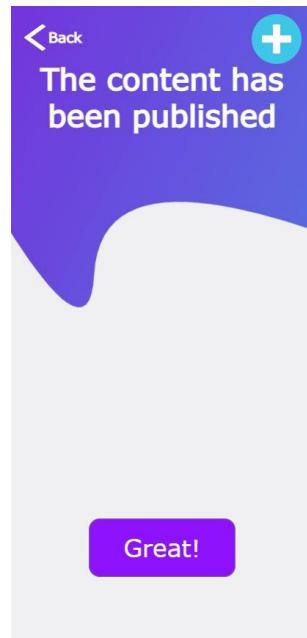


Figure 7.1.7(i): End
of the creation of the
recording

7.1.8 Listen of a recording

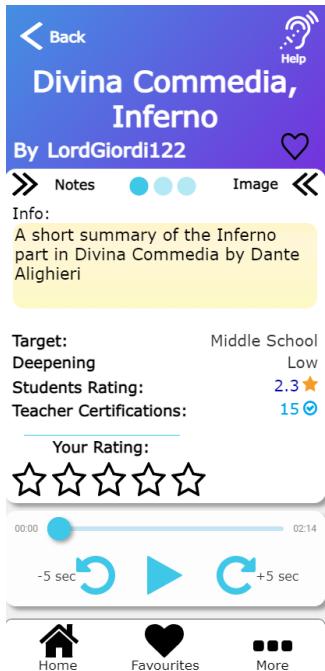


Figure 7.1.5(a):
listen of a recording
with the information
of the audio

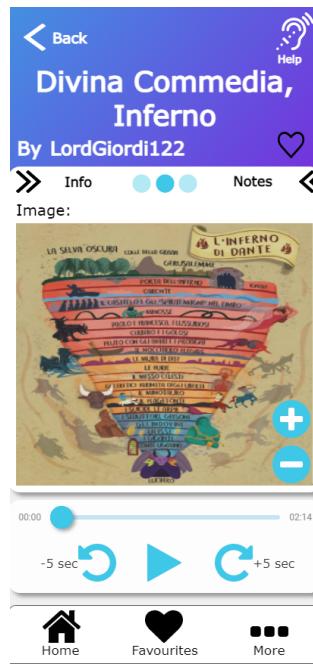


Figure 7.1.5(b):
listen of a recording
with the conceptual
image

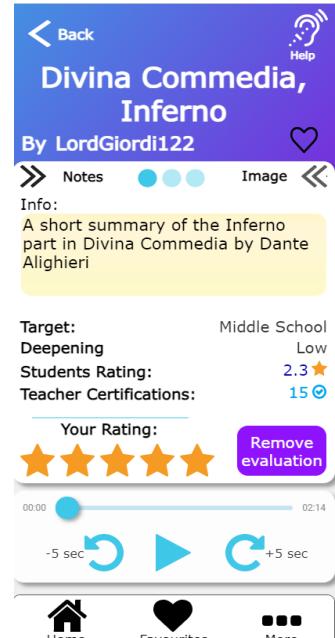


Figure 7.1.5(c):
listen of a recording
with the notes of the
recording

Chapter 8 - Conclusions

This project gave us the opportunity to understand the process of creating an application, focusing on the users' needs. From the beginning of the project, we realized that the entire developing process was centered on the users who will use the final interactive system. We comprehended the importance of each step of the development process of the application, starting from collecting information about our users through questionnaires, up to the implementation of the final product. Eventually, by understanding the difficulties of each step we have been able to improve both our working methods and our approach to the problems.

8.1 Future implementations

The application will be improved in the near future by adding some new features, with the aim of providing a better user experience. Some of the features are the one listed:

- To introduce a functionality that automatically reads the content of each page instead of letting the dyslexic students set the listening of the fields from his smartphone; by using this functionality, our aim is to further move the workload from the dyslexic-student to the system.
- Add a tool to parse the audio and automatically convert it into text, to have auto-generated notes.
- To allow the users, more specifically students, to create their playlist where they can organize the audio lessons according to their preferences; for instance, the user could be able to create a playlist in which she/he is able to group all the audio lessons related to history, etc.
- To introduce a “manage the recording speed” option when listening to a recording.
- Tools to control the notes in a recording page.