

4STUDY

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1. Introduction

This project borns for the need of find different students in the same **study** field, in order to build some **study groups**, for which all these students can join them for sharing their **knowledge** and **notes** about the courses. Students will also have the possibility to book a seat in any available **study room** in the Italian cities.

During the pandemic period, relationships between students decreased because of remote lectures, and so retrieve some informations also became difficult.

So the purpose of **4Study** is to support and increase relationships between students, also remotely.

In particular, 4Study will be developed as a **web application**, in which we will find a lot of features:

- **Find a study group** according to a specific subject
- **Sharing notes and documents** related to specific subject
- **Find study rooms**
- **Create announcements** for particular requests

2. Development methodology

The methodology adopted for developing 4Study is a **Scrum methodology**: this is an Agile method based on daily meetings in which all the group members will share their opinions on the work done until that moment, focusing on what can be improved in the next iterations.

Each sprint will be of the duration of **one/two weeks**.

All the development process has been done fully remotely, by using videoconferences platforms such as **Google Meet [3]** or **Zoom [4]**, and **GitHub [1]** and **Google Drive [2]** platforms for data and content sharing.

3. Requirements' analysis

The requirements' analysis is very important to develop a product which is useful for the end user. In this phase, it is important to define the **needs** of the **users**, in order to deliver an high quality product, which is able to help them to use our product in a simple way.

3.1 User analysis

The first kind of requirement analysis is the **user analysis**, which consists identifying the target that will use our system. Given that our application is addressed for **students**, we have defined our target audience has the following features:

- Age: 14 – 25
- Gender: Male and Female
- State: Worldwide
- Technology: Web application (Laptop / Desktop)
- Education: High school / University
- Occupation: Student / Working student

3.1.1 User personas and scenarios

The next step of the user analysis is to define several **user personas** and **related scenarios**.

User personas are useful to describe the potential users of the system, based on the user profile defined above.

A **scenario** is a story that describes how a particular persona completes a task or behaves in a given situation.

3.1.1.1 First Persona: Roberta



Roberta is a 17 years-old high school student who is studying at Liceo Scientifico Galileo Galilei in Rome. She lives with her parents and she is single. She doesn't like study a lot, she has troubles in learning and focusing both when she is at school and when she is at home. She loves spend time with other people.



It is a Wednesday afternoon and Roberta is going back home after a school morning. After lunch, she tries to study, but due to her inability to focus during study hours, she decides that it is better to find a study group, in order to improve her school marks.

3.1.1.2 Second Persona: Kevin



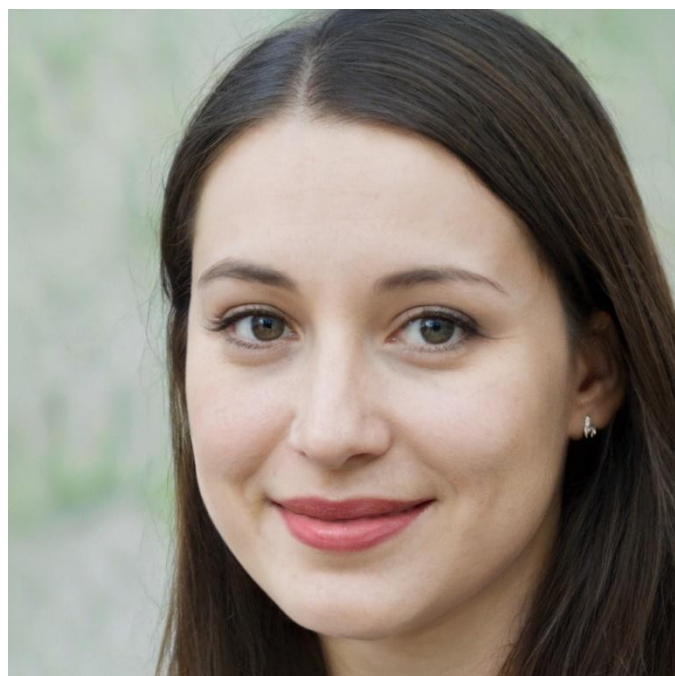
Kevin is a 22 years-old university student in Computer Engineering who is studying at La Sapienza University of Rome. He lives in Rome with his parents and he is in a relationship.

Before university, he achieved an high school diploma at Liceo Scientifico Darwin in Rome. He is strongly convinced that all the knowledge should be open and easily accessible to everyone. So, he would like a tool where he can share his notes.



It is a Tuesday afternoon and Kevin is studying. In the meanwhile, a lot of his friends message him by asking for his Physics notes, but Kevin doesn't want to waste time by sending his notes to all his friends, one by one. So he would like to use a tool where the notes can be shared forever to all of them.

3.1.1.3 Third Persona: Alice



Alice is a 19 years-old high school student who is studying at Liceo Linguistico Isabella D'Este in Rome. She lives in Rome with her parents and she is single. She likes to study a lot and in particular, given that she wants to make some money, she would like tutoring in order to do save some money.



It is a Monday morning and Alice needs money to pay for a trip for next month, so she decides to publish an announcement on the web in order to make herself available for tutoring.

3.1.1.4 Fourth Persona: Giovanni



Giovanni is a 28 years-old working student in Mechanical Engineering at La Sapienza University of Rome. He lives in Rome with his parents and he is single. Before university he achieved a scientific diploma in Liceo Scientifico Da Vinci in Rome. He likes to study but he needs to work to help his family, and so he would like to have easy access to notes and to create a group to study together.



It is a Friday evening and Giovanni has finished working and now he wants to study the Rational Mechanics lessons that he has lost due to the work, so he wants to create a study group in order to make the study easier.

3.2 Competitors

The next phase of user requirements step is to identify **competitors** and to analyze the **pros** and the **drawbacks** of 4Study with respect to the other applications.

	4Study	StudyDrive	Docsity
Unique Features	All in one: it offers all services useful to students	Job market and companies search	Marketplace notes
Design strengths	Study groups by map Study rooms by map	Mobile app	Video Private lessons
Design weakness	Location based difficulties	Social based approach (Post) Not worldwide availability	Only teaching material Contents not free
Customer base	Customer size unknown	2.400.000	6.600.000
Satisfaction score	Not available	80	Not available
Requirements	Accessible on all browser types	Available on all browser types and mobile OS	Accessible on all browser types
Core features:			
Sharing notes	v	v	v
Find study groups	v	v	x
Job search	x	v	x
Video lessons	x	x	v
Earn money	x	x	v
Find study rooms	v	x	x
Create announcements	v	v	x

3.3 Questionnaire

There are many ways that can be used to reach a real audience, get an initial **feedback** about our idea and investigate user needs, expectations, perspectives, priorities and preferences.

The most used one is the **questionnaire**, which is easy to use and gives quick feedback from users, and furthermore it can be useful to present several choices to our users in a clear way.

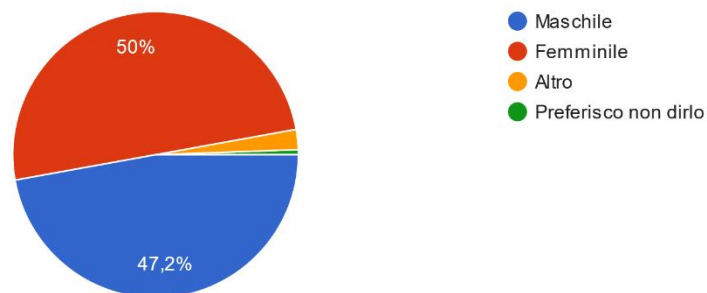
In order to reach a good amount of users we used **Google Form [5]**.

Questionnaires principal **advantages** are:

- Quickly collecting quantitative data from a large number of users
- Collect information from a large number of users simultaneously
- If designed correctly, it can be quick & easy to analyze the data
- Relatively cheap
- The evaluator must be skilled in creating unbiased surveys (this requires training)
- If it is posted to the web, little effort is required to distribute it

3.3.1 General Questions

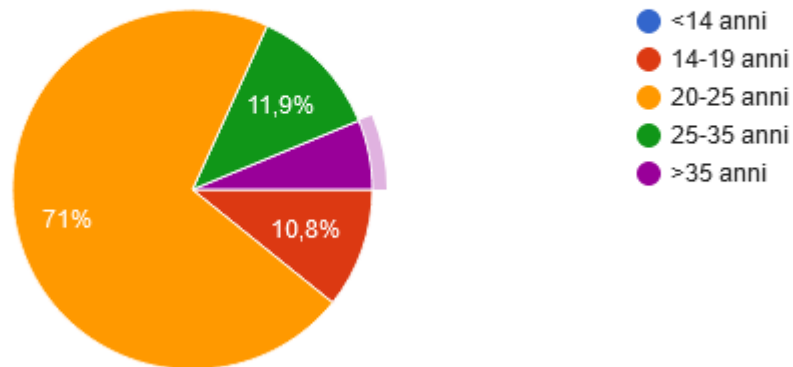
Quale è il tuo genere?
176 risposte



Men and women are equally distributed and this respects our target audience.

Quale è il tuo range di età?

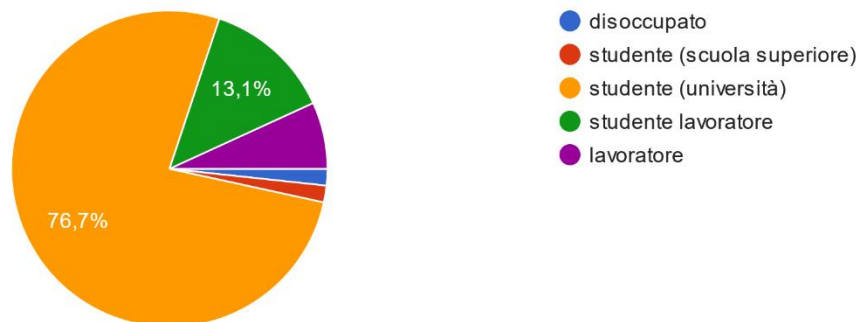
176 risposte



The range of age respects the age of the university students as expected, and there is also a minority of high school students.

Quale è la tua occupazione attuale?

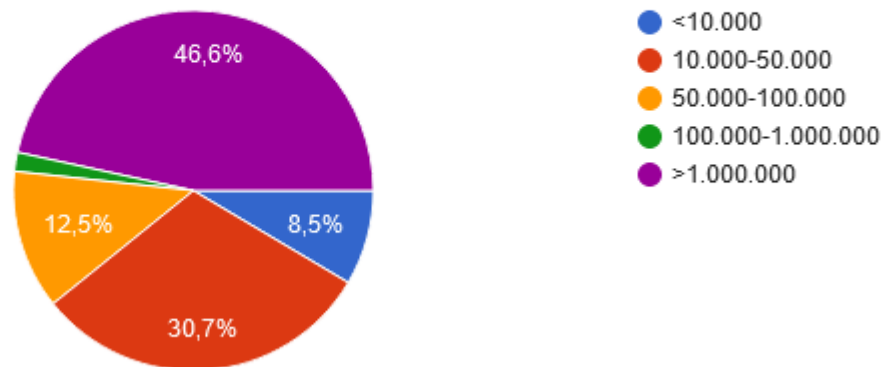
176 risposte



This graph respects what told above, indeed the majority are university students and there are two minorities: working students and workers.

Quanti abitanti ci sono nella tua città?

176 risposte

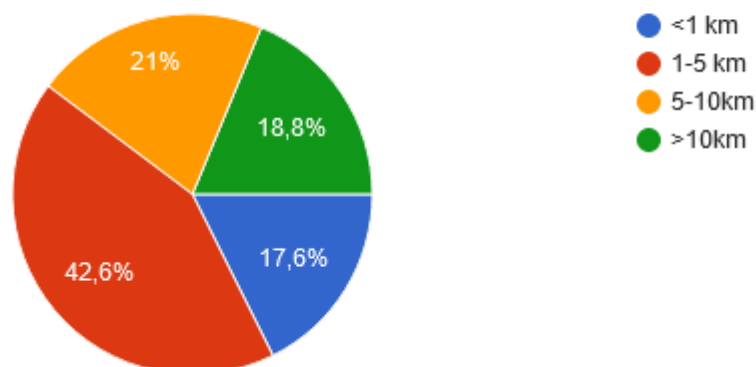


The half of the interviewed live in a big city and there are also three minorities that respect the high number of small-medium cities in Italy.

3.3.2 Questions about users' preferences

Quanto dista la biblioteca/aula studio più vicina a casa tua?

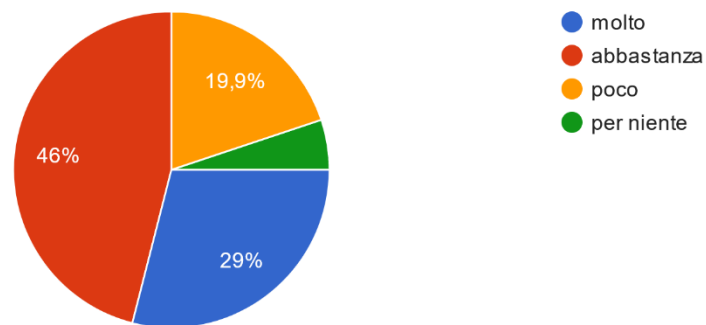
176 risposte



This question reflects the result obtained in the previous question, indeed the majority has a study room near his home.

Ti piacerebbe studiare in biblioteca, in aula studio o in altri luoghi di studio?

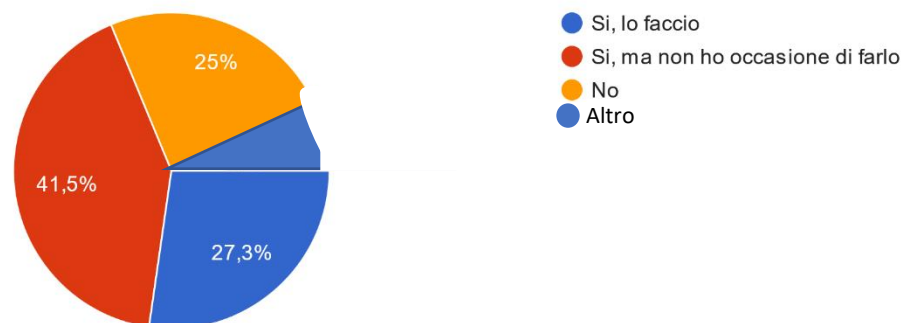
176 risposte



The majority of the students would like to study in a study room.

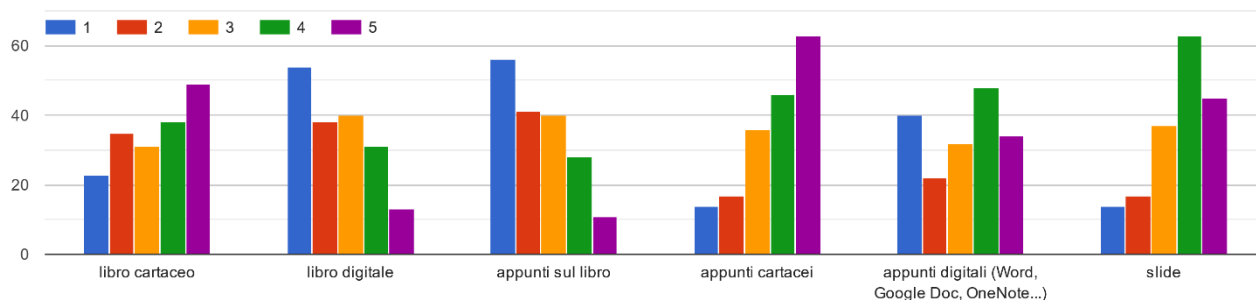
Ti piace studiare in gruppo?

176 risposte



2 over 3 of the interviewed likes to study in group, furthermore there is the 41.5% that would like to study in group but they haven't the possibility, so our application has a good target of students.

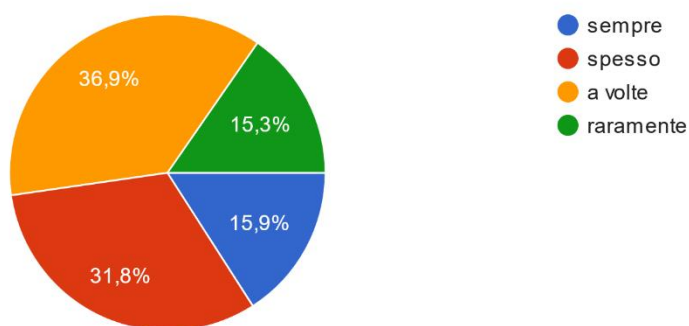
Quale materiale usi di più per studiare? (1=meno utilizzato, 5=più utilizzato)



A lot of people prefer to use paper notes, books and slides but they don't like digital books and notes on books. So, users will be able to upload their paper notes on the application and share them with other colleagues.

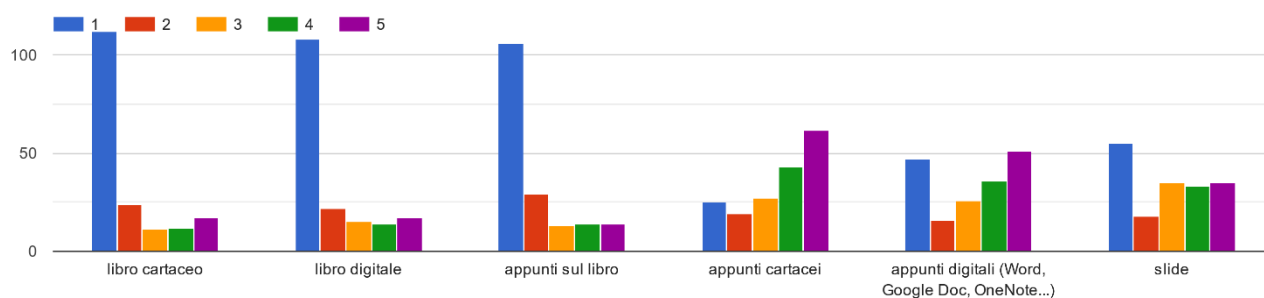
Condividi i tuoi appunti con qualcuno?

176 risposte



People are divided into half between users that like to share their notes and who doesn't like too much to do that.

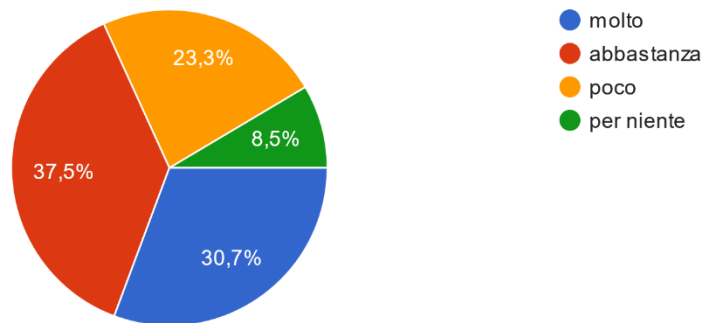
Se condividi i tuoi appunti, quale tipo di appunti condividi (1=meno frequente, 5=più frequente) ?



Paper notes, slides and digital notes are the most shared.

Quanto sei interessato all'acquisto di materiale scolastico usato?

176 risposte

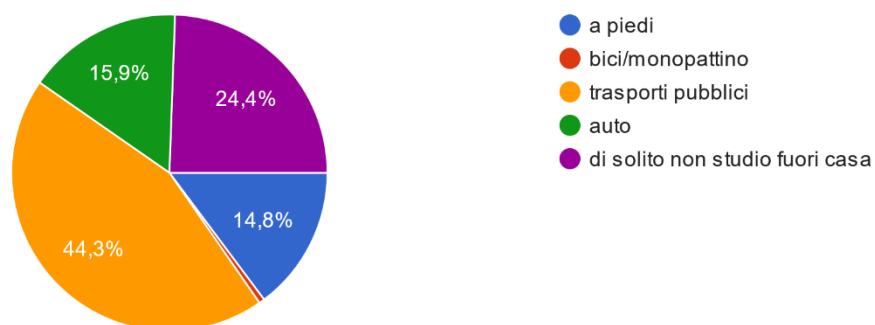


The majority of people like to acquire used materials, so the application will offer the announcements' section to acquire and sell material.

3.3.3 Personal Questions and opinions

Come ti sposti per studiare fuori casa?

176 risposte



The majority of people use public transports because they live in a big city but there is also another part of users (24,4%) that usually don't study out of home.

4. Task and Dialogue Analysis

The next steps that we need to do are the **task analysis** and the **dialogue analysis**. They are both considered very important when we deal with the most relevant and representative **use cases** of our system. Obviously, the use cases of the application can be defined if and only if we previously went through a deep analysis of the requirements, by identifying the main users, the users' needs, and by looking at the competitor's analysis and the results of the questionnaire.

Let's start by introducing the **task analysis**: this is a method used to analyze **people's jobs**, in particular what they do, what things they work with and what they must know. The system analysis' method is different from the task analysis method, because the first one focuses more on the **system design**, while the second one focuses more on the **user**.

At the same time, we have differences between cognitive models and task analysis, because the first one focuses more on the internal mental state and the tasks intended as individual work units, while the second one focuses more on the **external actions** and the **whole work** behind the task itself. The general method associated to task analysis is to **observe, collect unstructured list of words and actions** and finally **organize using notation or diagrams**. There are several approaches related to task analysis, but we will focus on **task decomposition**, which consists into splitting a task into **subtasks**: in particular, with task decomposition we can describe the actions people do, structure them within task subtask hierarchy and describe order of subtasks. The variant of task decomposition we will use is **Hierarchical Task Analysis (HTA)**, which is the most common. For generating the hierarchy when analyzing a task, we first need to get list of tasks, then we group tasks into higher level tasks and finally we decompose lowest level tasks further.

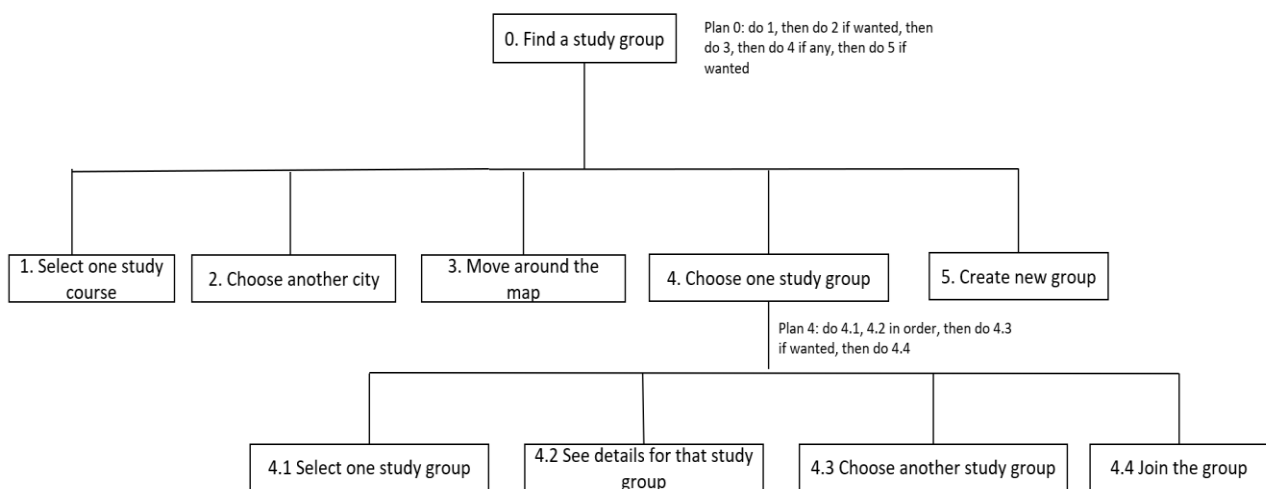
Now let's focus on **dialogue analysis**. The dialogue is also considered very important in the human computer interaction literature, especially from the point of view of **user interfaces**, when we deal with the syntactic level of **human-computer conversation**. The dialogue analysis helps us gain a better understanding of the whole system, from a lot of points of view. In order to conduct the dialogue analysis, we will use the **State Transition Network (STN)**, one for each of our most relevant tasks for which we have first defined the HTAs. A STN is a **directed graph** where each node represents a **state** in which the user will go through during the execution of the task, while each edge represents a **transition** from a state to another one, that is triggered by a **user action** and performed by the **system** in response to the user trigger.

We have identified four relevant tasks for our application, and now we will show, for each of them, their HTAs and STNs.

4.1 Hierarchical Task Analysis

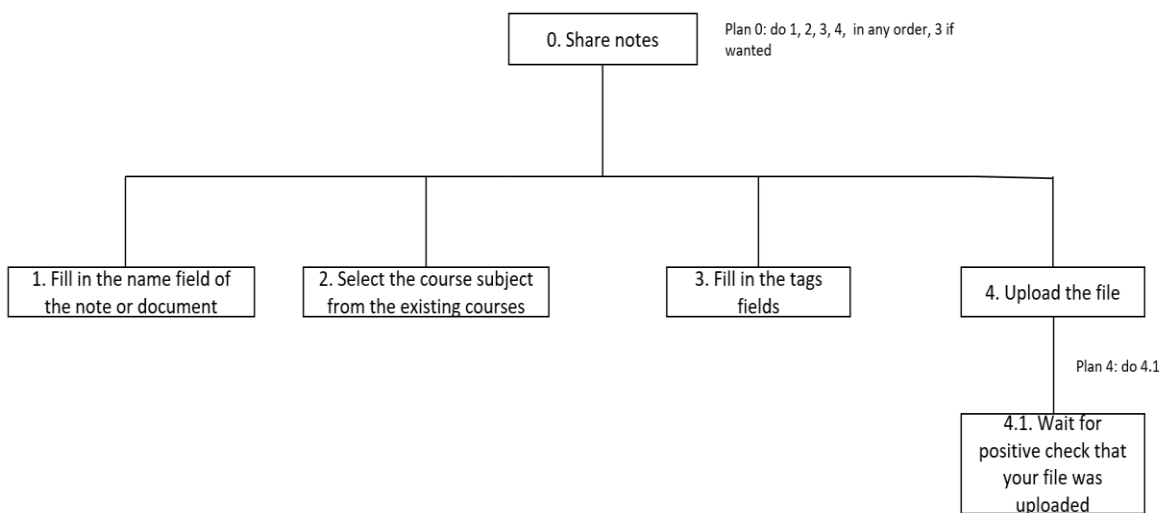
4.1.1 Find a study group

The first task we show is the one of **finding a study group**. This task allows the user to filter possible existing study groups on an interactive map, in order to join one of them if any available or, in case no group is found, to create a new group. This task is representative for the application, because one of the main goal of our application is making possible for students to improve their knowledge and concentration by studying with other people. Below we report the HTA:



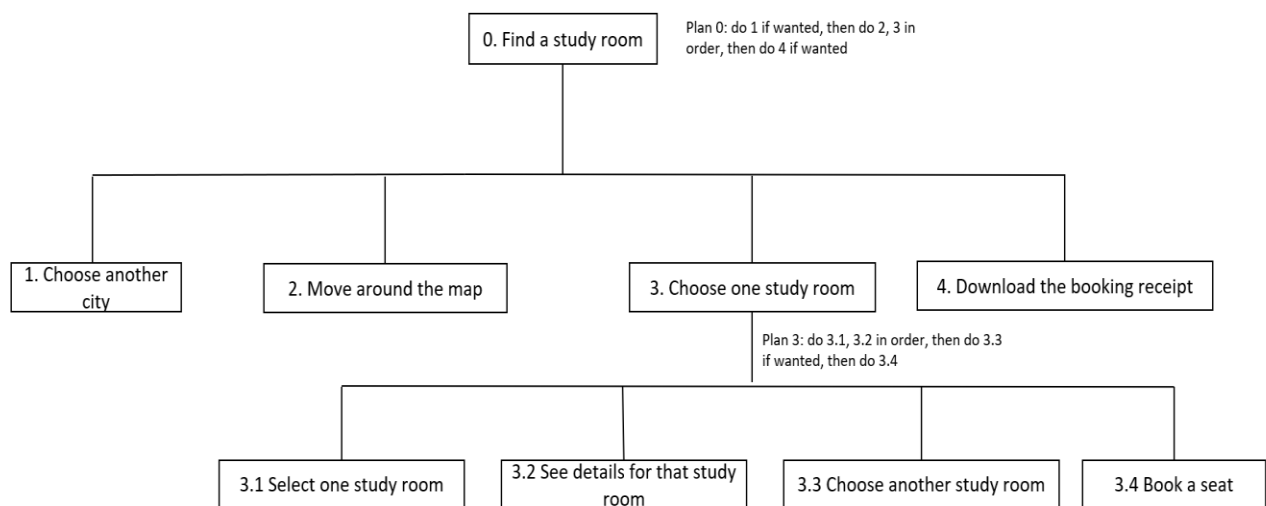
4.1.2 Share notes

The second task we show is the one of **sharing notes**. This task allows the user to upload files on the application, in order to share notes with other people: in particular, it will be required to insert the name of the document and the course subject and, if desired by the user, the tags. Finally, he will upload the required file. This task is representative for the application, because another main goal of our application is making possible for students to share their knowledge on the application, in order for a student who wants to study at home alone to improve in one or more specific subjects. Below we report the HTA:



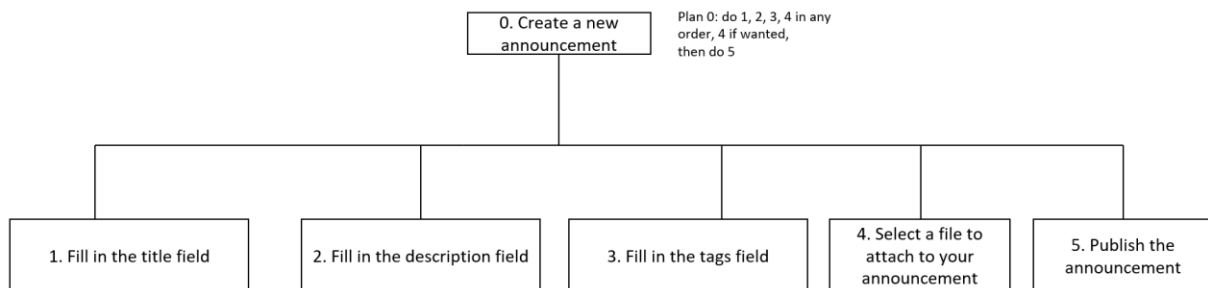
4.1.3 Find a study room

The third task we show is the one of **finding a study room**. This task allows the user to find a study room: in particular, the user will have the possibility to book, if possible, a study room by using an interactive map pointing on his residence town. If he wants, he can also book a study room in another city. This task is representative for the application, because another main goal of our application is making possible for students to exploit the university/school environments, in order for them to improve their study skills. Below we report the HTA:



4.1.4 Publish a new announcement

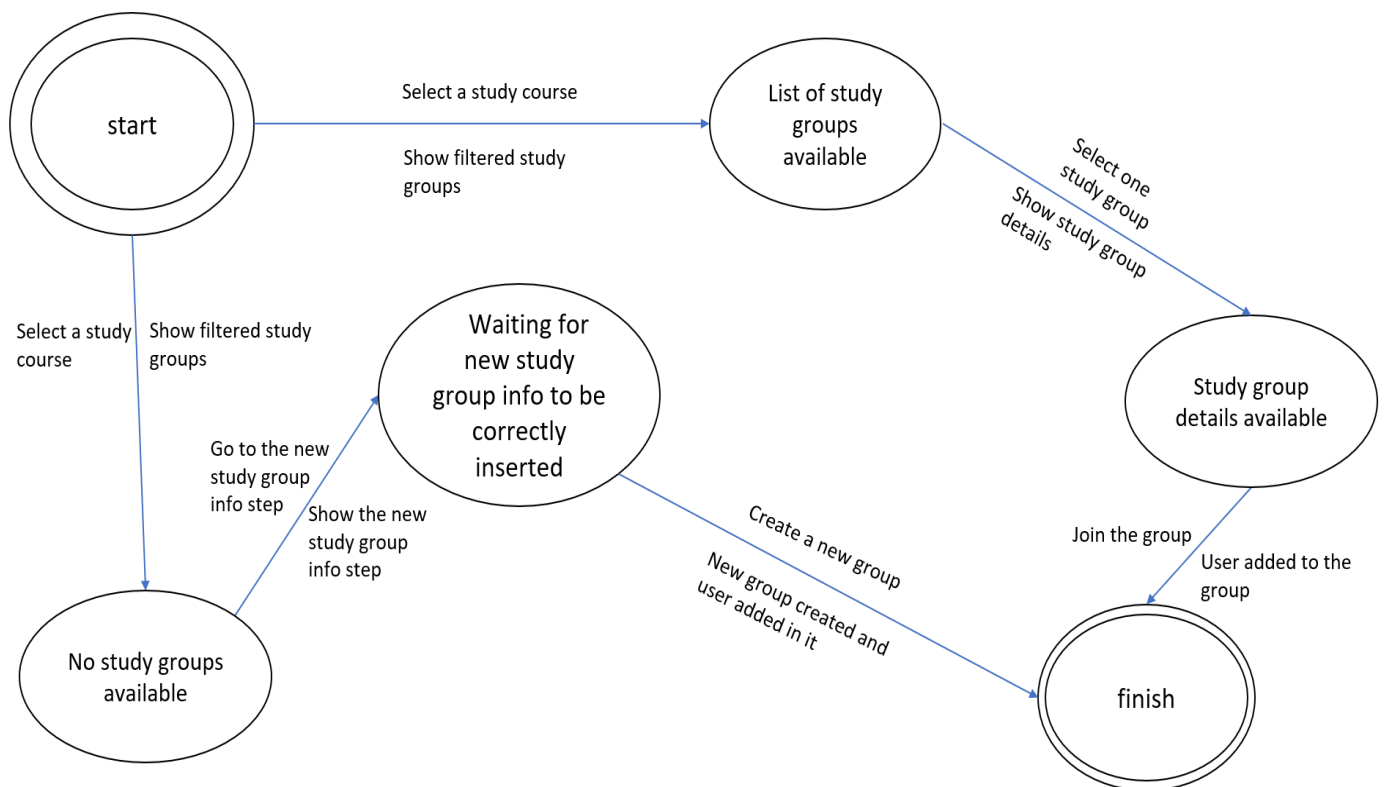
The fourth task we show is the one of **creating a new announcement**. This task allows the user to post an announcement on the application: in particular, the user will be required to insert a title, a description and at least one tag for the announcement, and also to attach a file, if he wants. This task is representative for the application, because another main goal of our application is making the life of students easier for any kind of eventuality, such as sharing of personal notes, requests to find people or asking for the solution of exercises. Below we report the HTA:



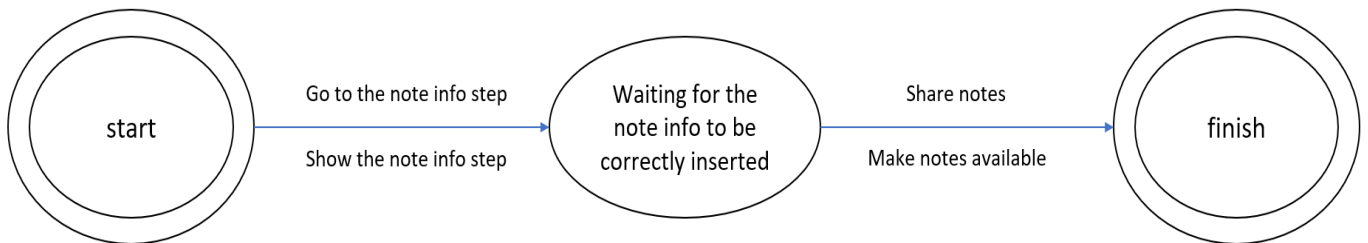
4.2 State Transition Networks

Now we will show the **State Transition Network** for each of the four tasks that we have just analyzed with HTAs.

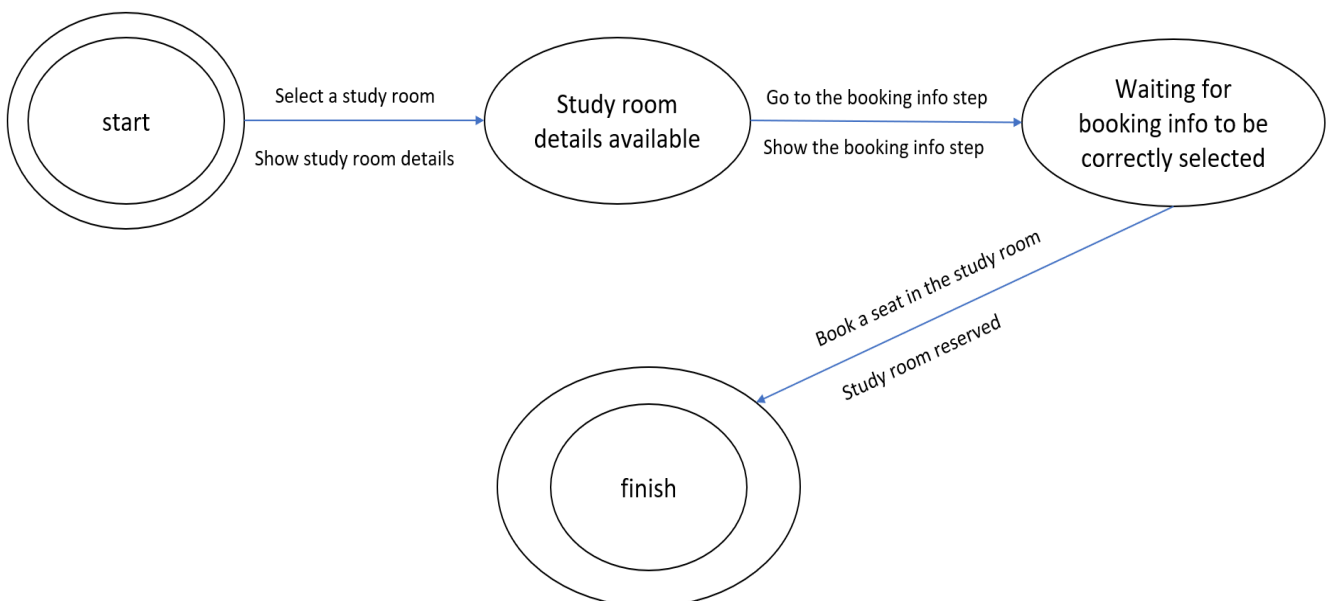
4.2.1 Find a study group



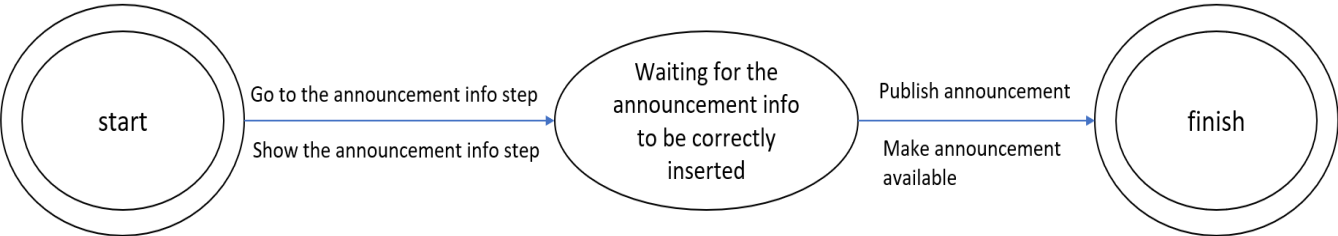
4.2.2 Share notes



4.2.3 Find a study room



4.2.4 Create a new announcement

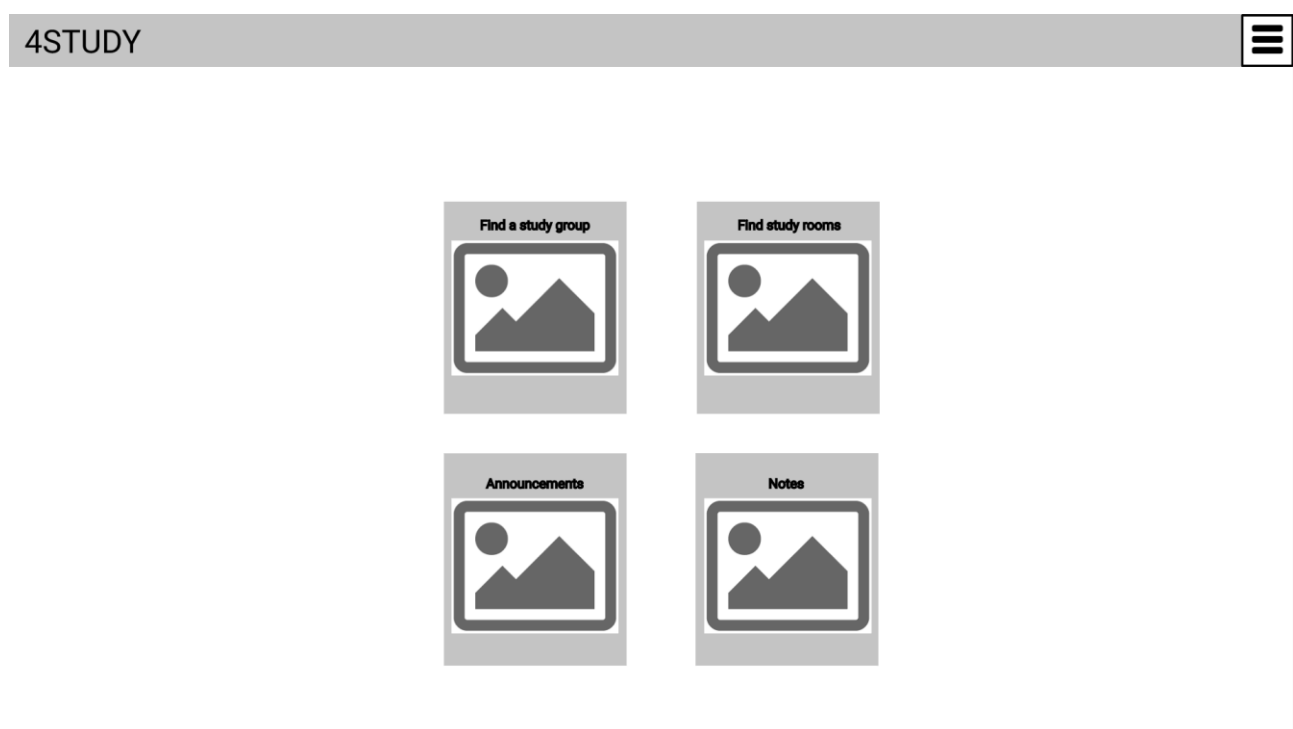


5. Prototype Zero

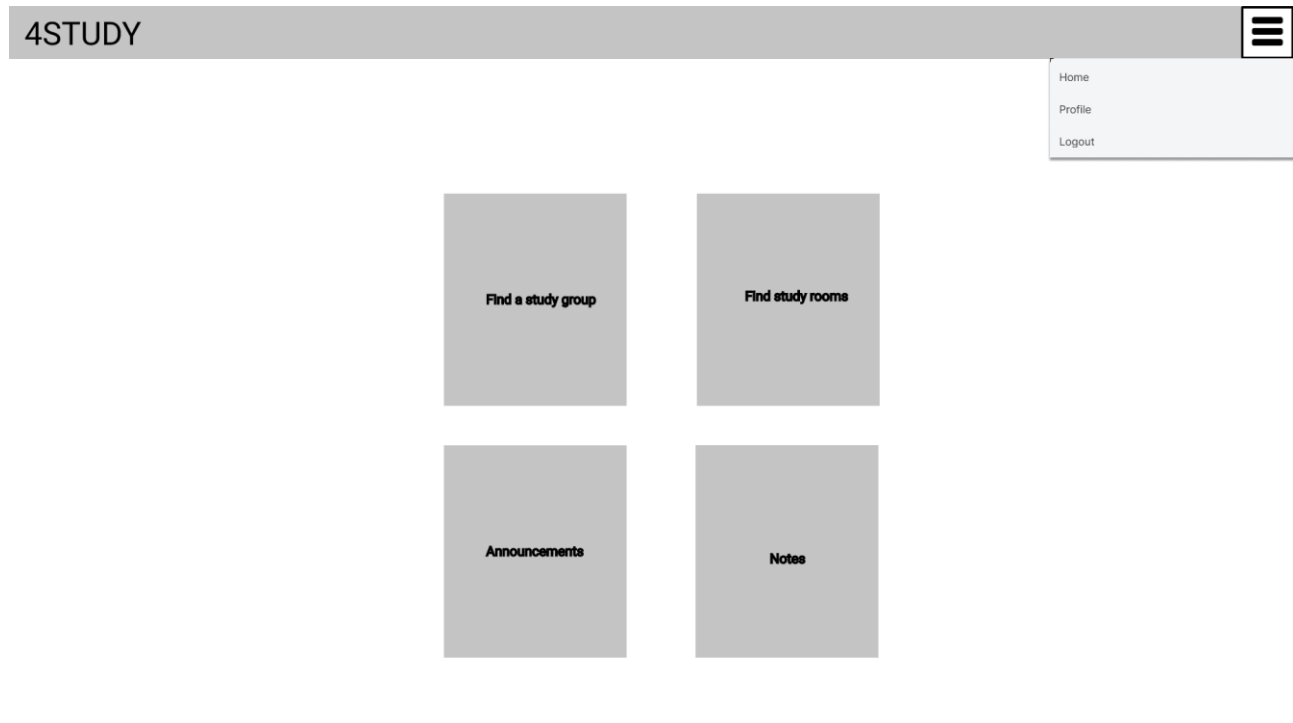
In this section we will present the **first prototype** of our application. In order to build the prototype, there was first the need to gather all the possible informations from the questionnaire, because we needed to be sure whether some of the first ideas could be interesting or not for our typical users. The realization of the first prototype has been conducted with the tool **Figma [6]**: Figma allowed us to create all the **mockups** of the application, thanks to his powerful and creative tool, but also allowed us to create a **dynamic prototype**, where all the interfaces where connected between them, in order to show the **interaction** between the system and the user in a clear way.

Now we will start showing the most representative interfaces of our first prototype, because the entire application will be composed by many others of them, so if you want to check the entire prototype, you can check that online on Figma, by looking at the bibliography.

The first mockup we show is that of the **Homepage**: after the user has registered or logged himself into the application, he will be redirected on the Homepage, that represents the start point from where navigate into the system; in particular, he'll have the possibility to explore the **main sections** of the application, such as **the announcement section, the study room section, the study group section and the notes section**. Below we report the Homepage:



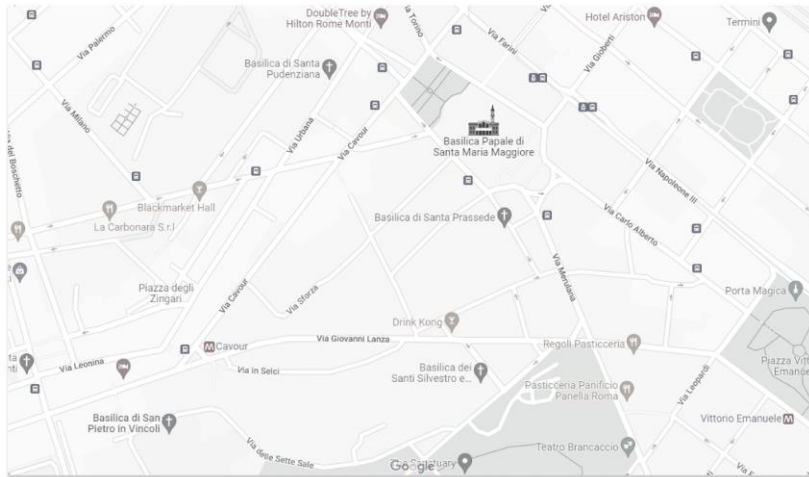
On the top left of each webpage, we can notice the **4Study logo**, while on the top right, we can see a **drop-down menu**: the user will be allowed to interact with it from every interface, in order to access the **profile section**, the **homepage** and also he will have the possibility to **logout** from the application. Below we report the drop-down menu opening after the interaction of the user on the Homepage:



By clicking on the **'Find a study group' box**, the user will be redirected on a new page where there will be shown a **map** on the left part of the screen, and a drop-down menu on the right, with **a list of courses**. On the bottom of the page, we have two buttons: one to change the city where to find a study group, if the user wants, the other to create a new group, if the user wants.



Find a study group



Change city

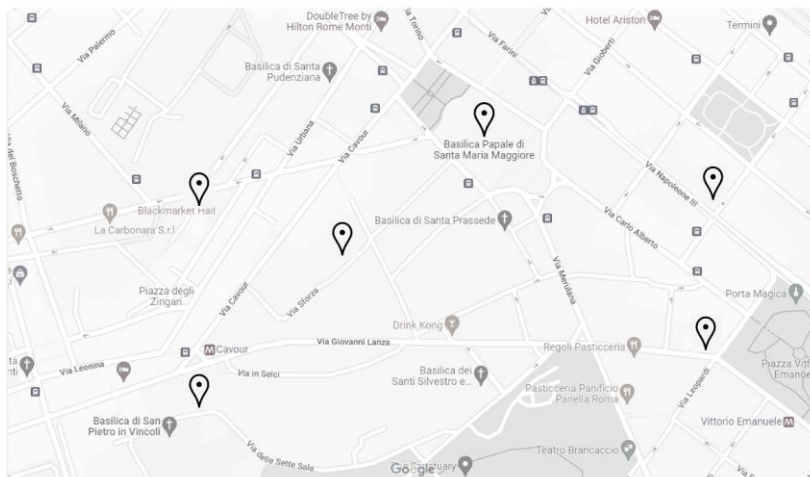
Create new group

This section is very important for our users, because they will have the possibility to find one or more **study group** located on a **map** centered on a town, in order for them to **join** an existing study group, if they want. The main goal of this section is to allow students to easily find informations about existing study groups in their zone with the help of an **interactive map**, in order for them to **increase their study skills** and **improve their marks**.

Starting from now, we will show all steps that the user needs to complete in order to join a group. By clicking, for example, on Software Engineering, the map will change by showing to the user some existing study groups of Software Engineering located in different areas, with the help of **markers**, and below we report the related mockup:



Find a study group



Select a study course:

Software Engineering

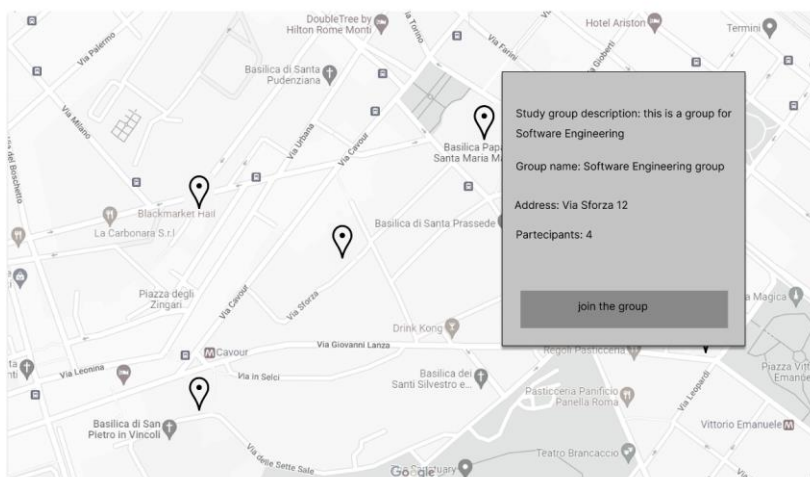
Change city

Create new group

By clicking on one of this marker, each associated to a Software Engineering group, he will see the details related to that group in a popup, in particular the group name, a short description, the address where the group is located and the number of participants. If the user is interested, there will be immediately the possibility for him for join the group. Below we report the related mockup:



Find a study group



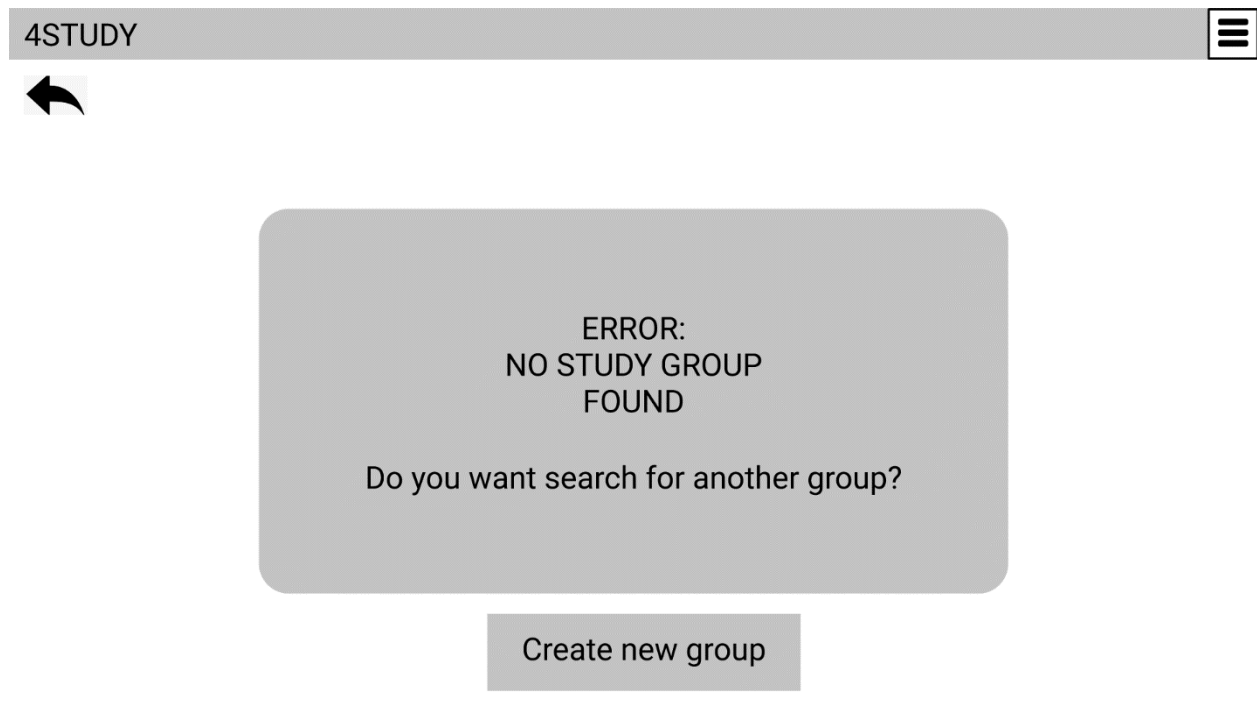
Select a study course:

Software Engineering

Change city


Create new group

In case no group is found for a certain subject, for example Machine Learning, the user will be redirected to an **error page**, with the possibility for him to search for another group or to **create a new group** for that subject, in our case Machine Learning. Below we report the related mockup:



If the user decides to create a new group, he will be redirected to a **form**, where he will be asked to insert the **group name**, the **group course** and the **address**. Below we report the related mockup:

4STUDY



Create a new group

Group name

Group course

Address

Create group

Going back to the Homepage, and by clicking on the **'Find study rooms' box**, the user will be redirected on a new page where there will be shown a **map**, which is centered on his residence town. All available study rooms are represented with **markers**. On the bottom, there is a button that will redirect the user to a form where he can choose a different city to find a study room, if he wants. Below we report the related mockup:



Find a study room

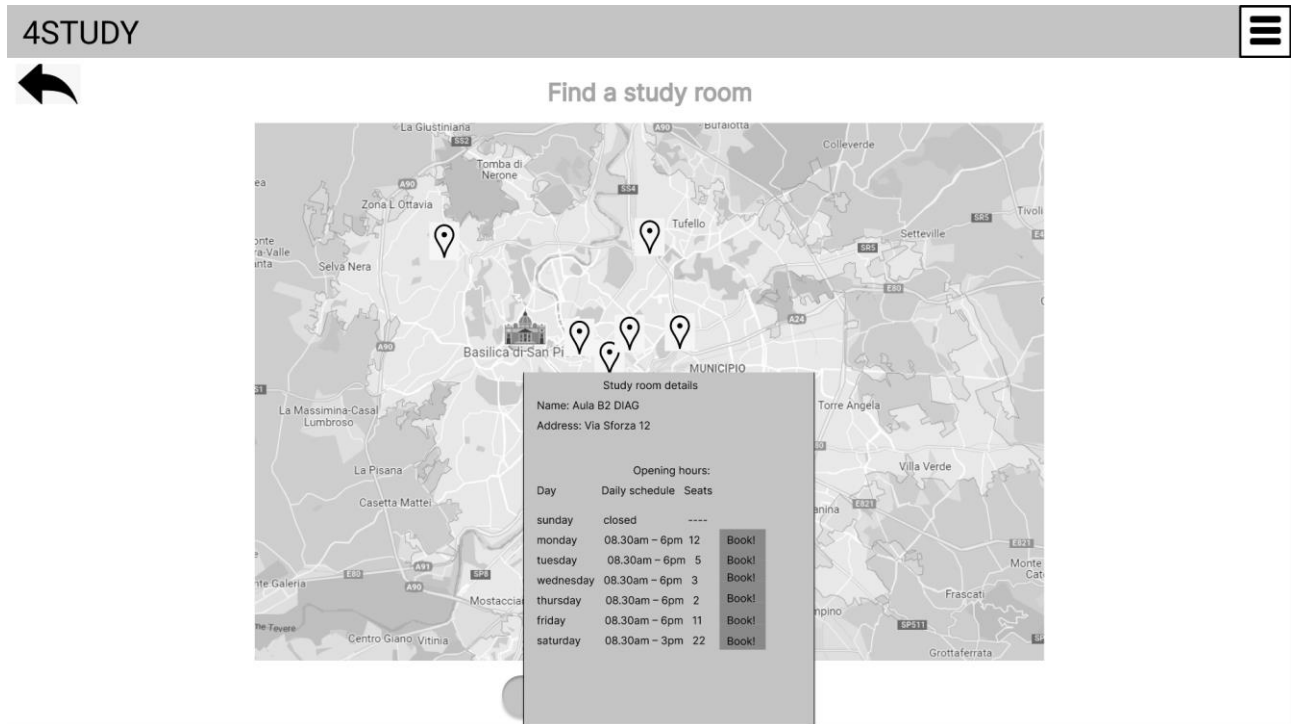


Change city

The main purpose of this section is giving the possibility to **find one or more study rooms** located on an **interactive map** pointing on their study town, in order to allow students to easily find free study rooms for studying alone or together with friends, if they want. This section has also another purpose, which is that of helping students who prefer studying in presence more than studying remotely at home, just like they did before the **Covid-19 pandemic**.

Starting from now, we will show all steps that the user needs to complete in order to book a study room.

By clicking on one of these markers, a **popup** will appear on screen, by giving us some useful **details** about that study room, such as the **address**, the **opening hours** and the **current available seats for each day of the week**. Below we report the related mockup:



By clicking on the 'Book!' button, the user will be redirected to a page where he needs to choose the booking time of the study room. Below we report the related mockup below:

Book your seat!

Room name
Aula 108 Edificio 108 MP

Room address
Viale Scalo S. Lorenzo

City
Roma

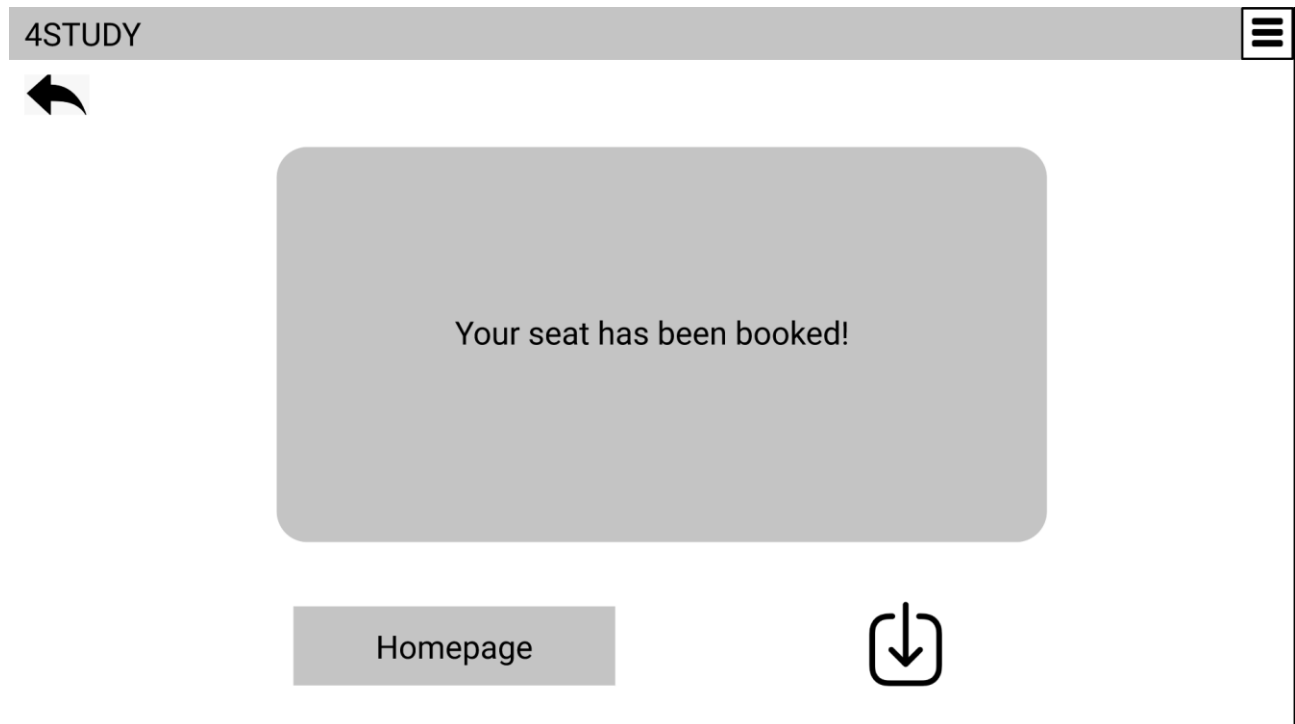
Day details
Monday May 13

Daily schedule
Opening hours: 8:30 Closing time: 18:00

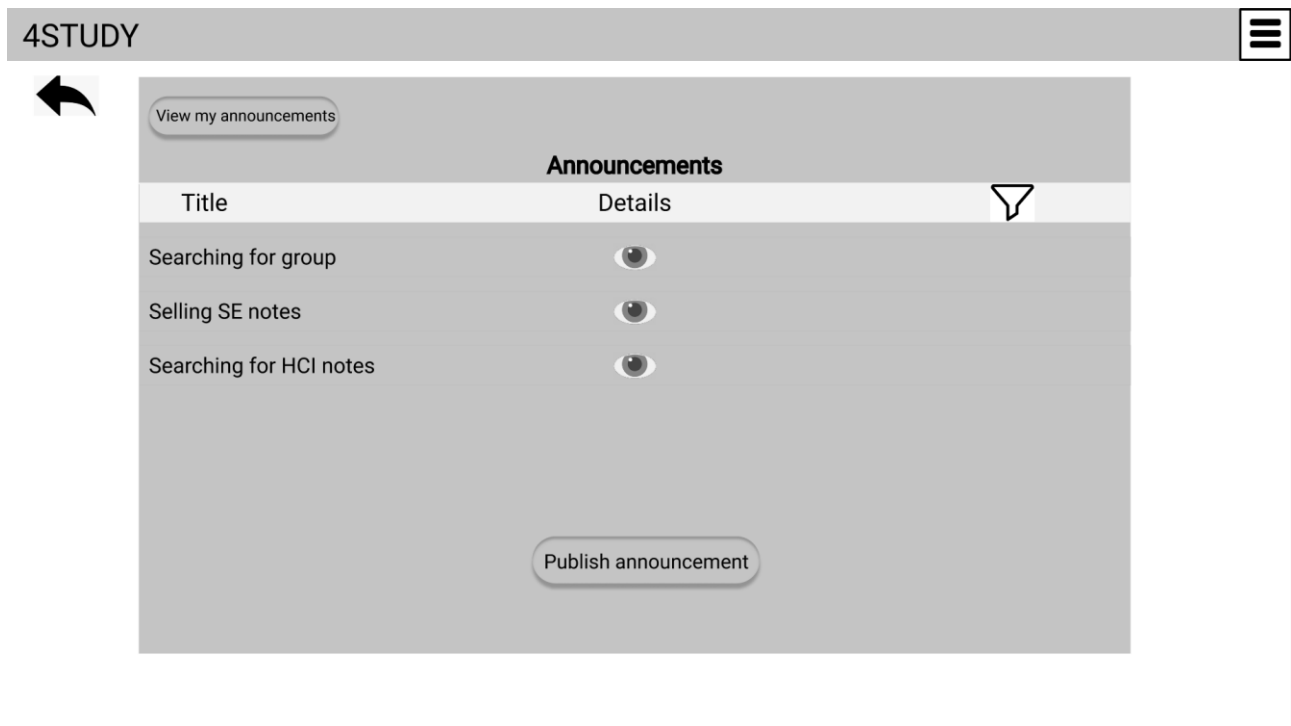
Booking Time
From: 08:30 To: 18:00

BOOK YOUR SEAT!

After clicking on the **'Book your seat!'** button, the user will be redirected to a confirmation page, where he can also download the booking receipt, if he wants. Below we report the related mockup:




Going back to the Homepage, and by clicking on the **'Announcements'** box, the user will be redirected on a new page where he will be shown a **table** containing all **announcements** published by **users** of the application. Below we report the mockup:



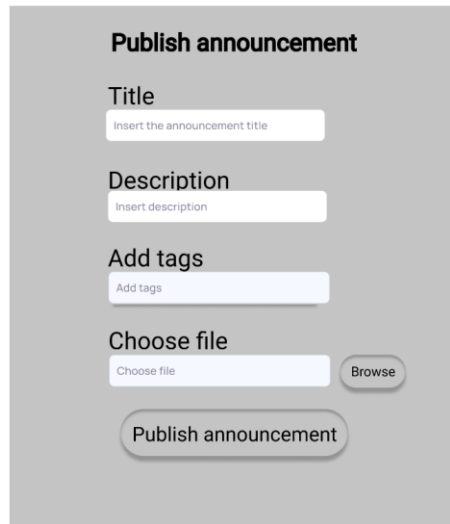
The main purpose of this section is that of allowing users to quickly find some useful **information** and **news** about the main topics of our app, such as **study groups**, **notes**, **suggestions on how to solve some exercise**, and so on.

Starting from now, we will show all actions users can do when dealing with announcements. By clicking on the '**Details**' icon of an announcement, for example the first one, the user will be redirected to a webpage in which all **details** related to that announcement will be shown, such as the **title**, the **description**, **tags** and also a **document**, if available. Below we report the related mockup:

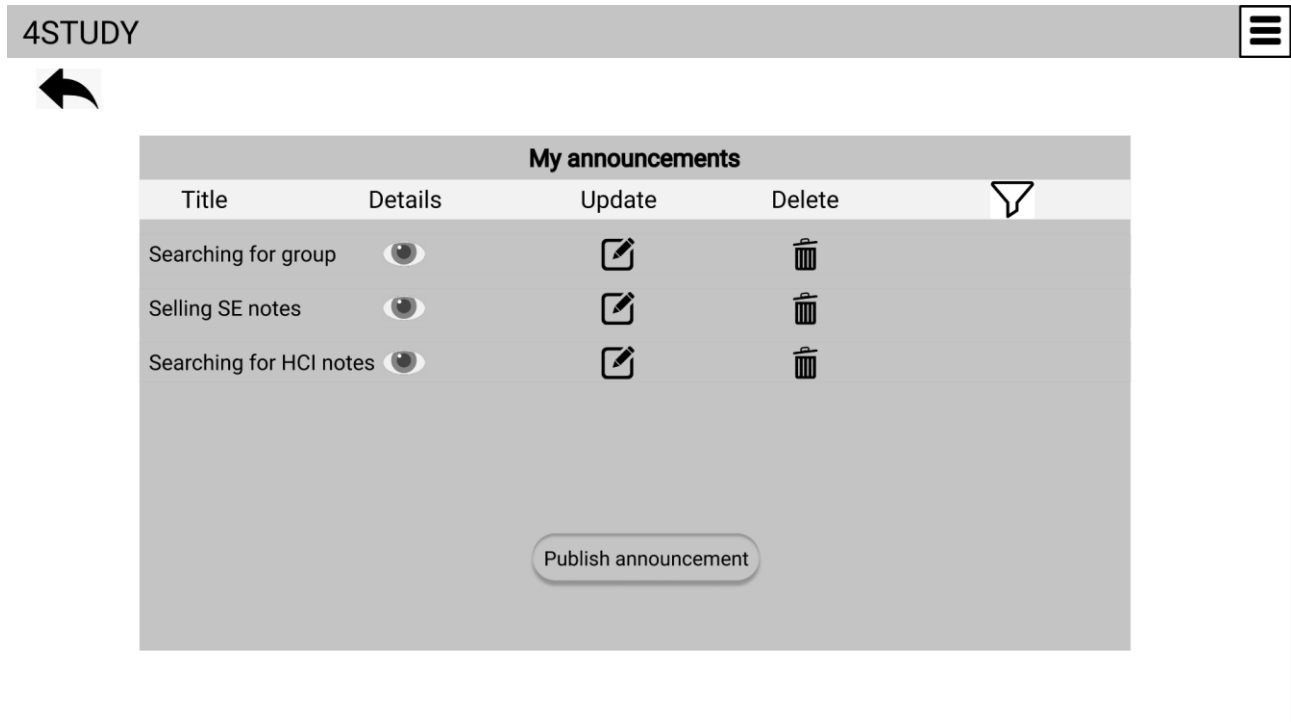


Announcement detail	
Title	Searching for group
Description	I'm searching for a group of at least 3 people
Tags	#group #people #3
Document	

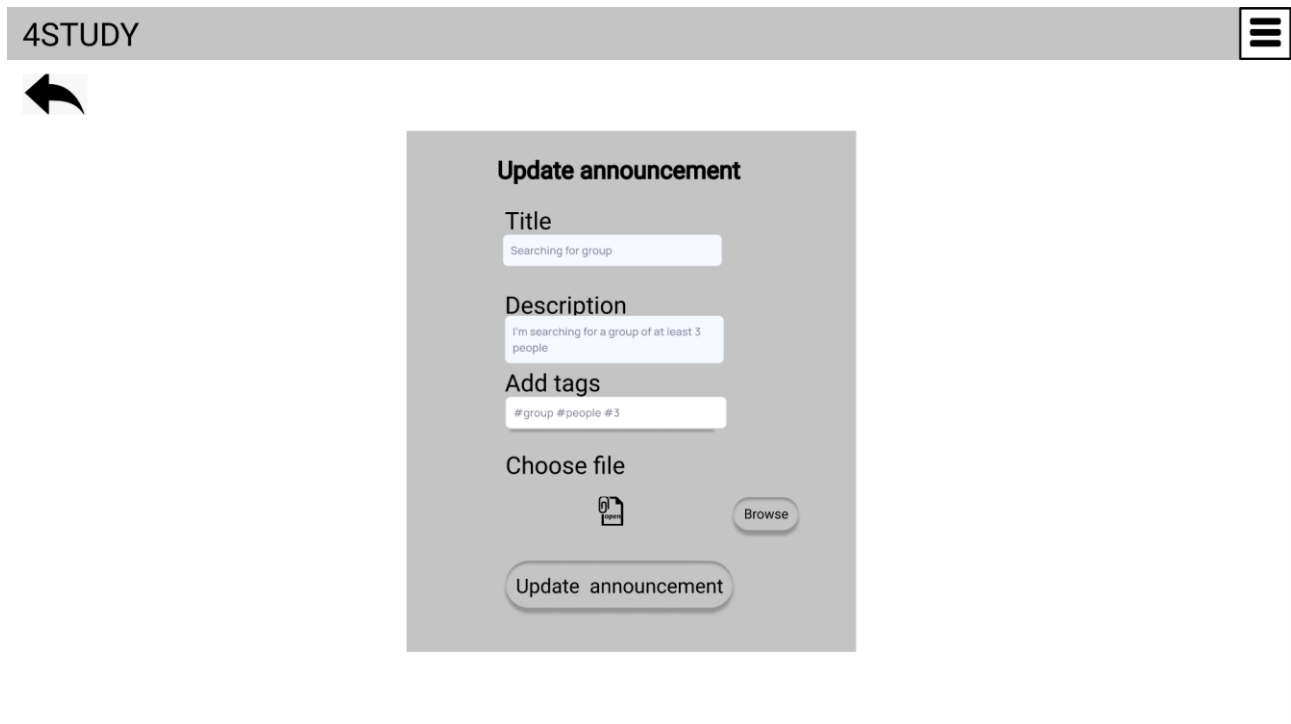
Going back to the previous page, by clicking on the '**Publish announcement**' button, the user will be redirected to a **form**, in which he will have to specify all **informations** related to a new announcement that he wants to **publish**, such as the **title**, the **description**, the **tags** and, if he wants, a **document** with additional details. Below we report the related mockup:



Let's now focus on the **'View my announcements'** button, by going back to the announcements' list: by clicking on it, the user will be redirected to a different webpage, in which he will have the possibility to view in a table all **his announcements**. Below we report the related mockup:



Starting from here, the user can **view the details**, **publish**, **update**, **remove** or **filter** his announcements. The visualization of the details and the publication of an announcement is analogue as before, so let's see the **update** of an announcement first, which will be possible by clicking on the related icon. The user will be redirected to a **form**, which will be already filled up with the current details of the announcement, and he will have the possibility to **update** each field of the announcement. Below we show the related mockup:




Going back to the previous page, the user will also have the possibility to **delete** an announcement by clicking on the corresponding icon. This interaction will make a **popup** appear on the screen, by asking to the user a **confirmation**. Below we report the related mockup:



Finally, the user will also have the possibility to **filter** the announcements, by clicking on the related icon in the table header. He will be redirected to a **form**, in which he will be able to insert some **tags**, in order to quickly filter announcements associated to those tags. For example, in our case we are filtering announcements who are associated with the tag **#group**. Below we report the related mockup:

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Filter announcements

Insert tag

#group

Insert tag

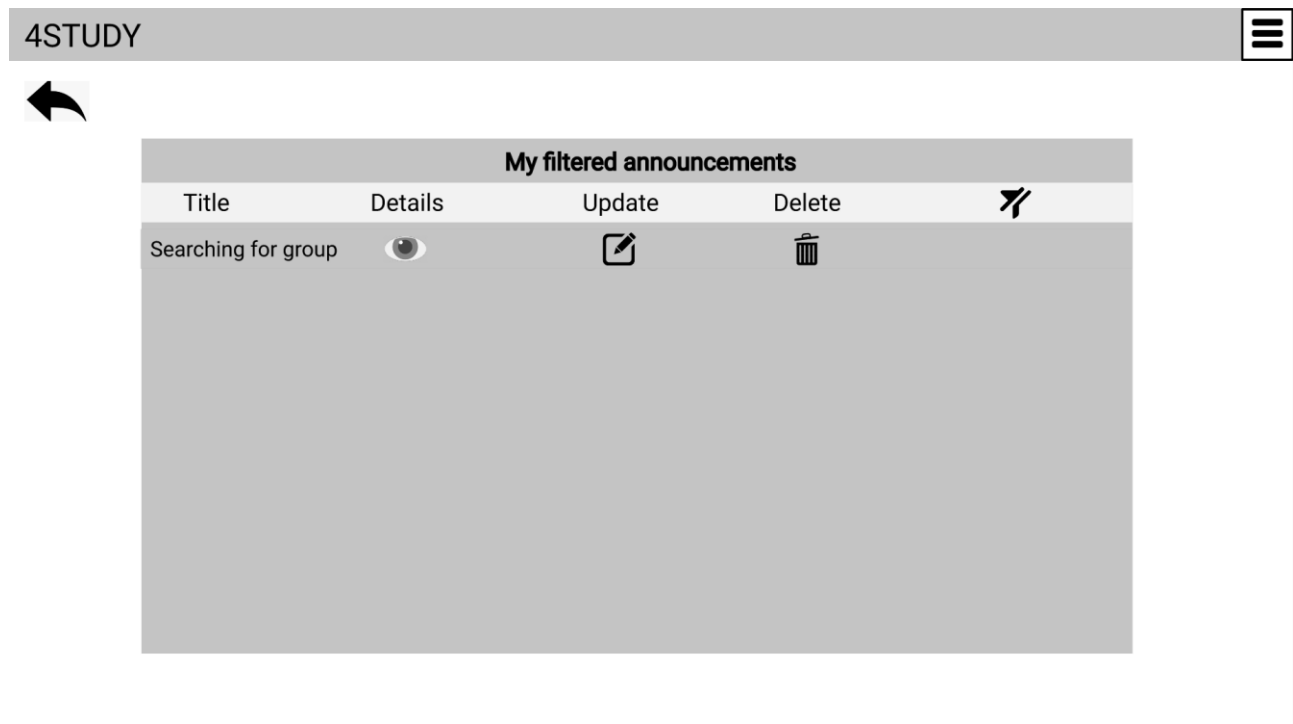
Insert tag

Insert tag

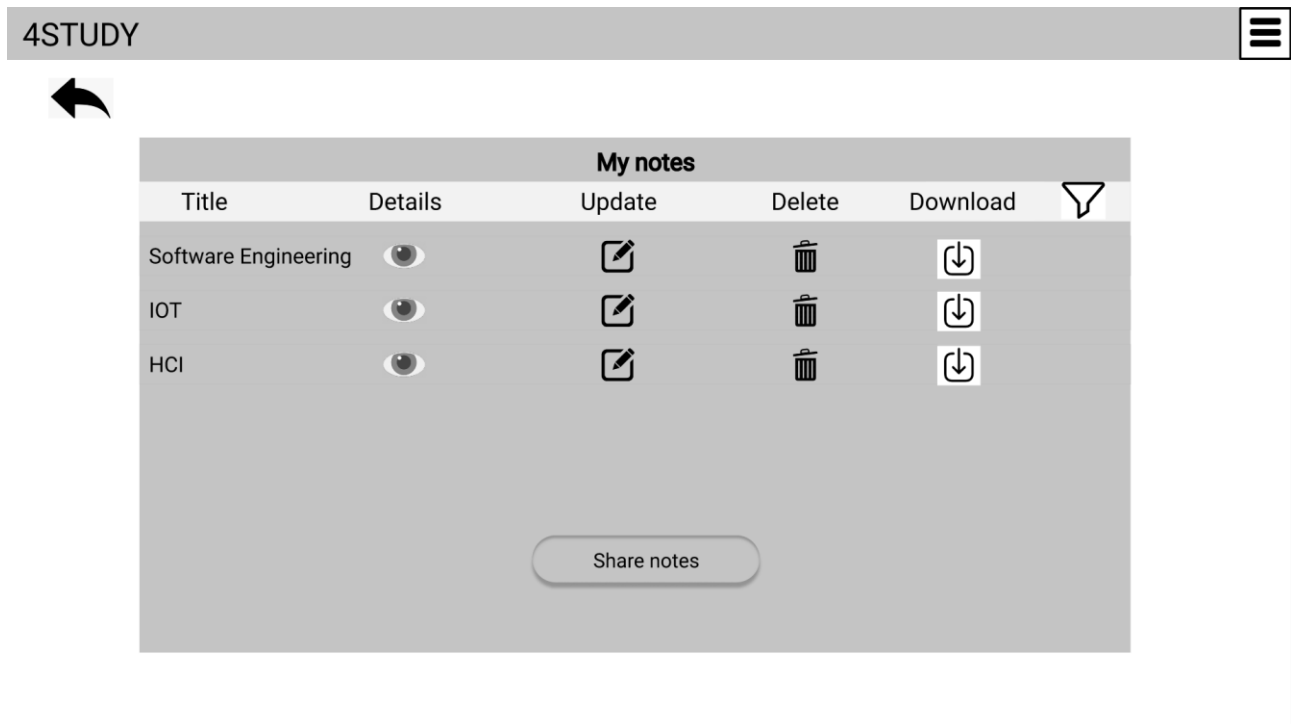
Insert tag

Filter announcements

By clicking on the **'Filter announcements'** button, the application will show only announcements associated with the tag **#group**. Below we report the related mockup:

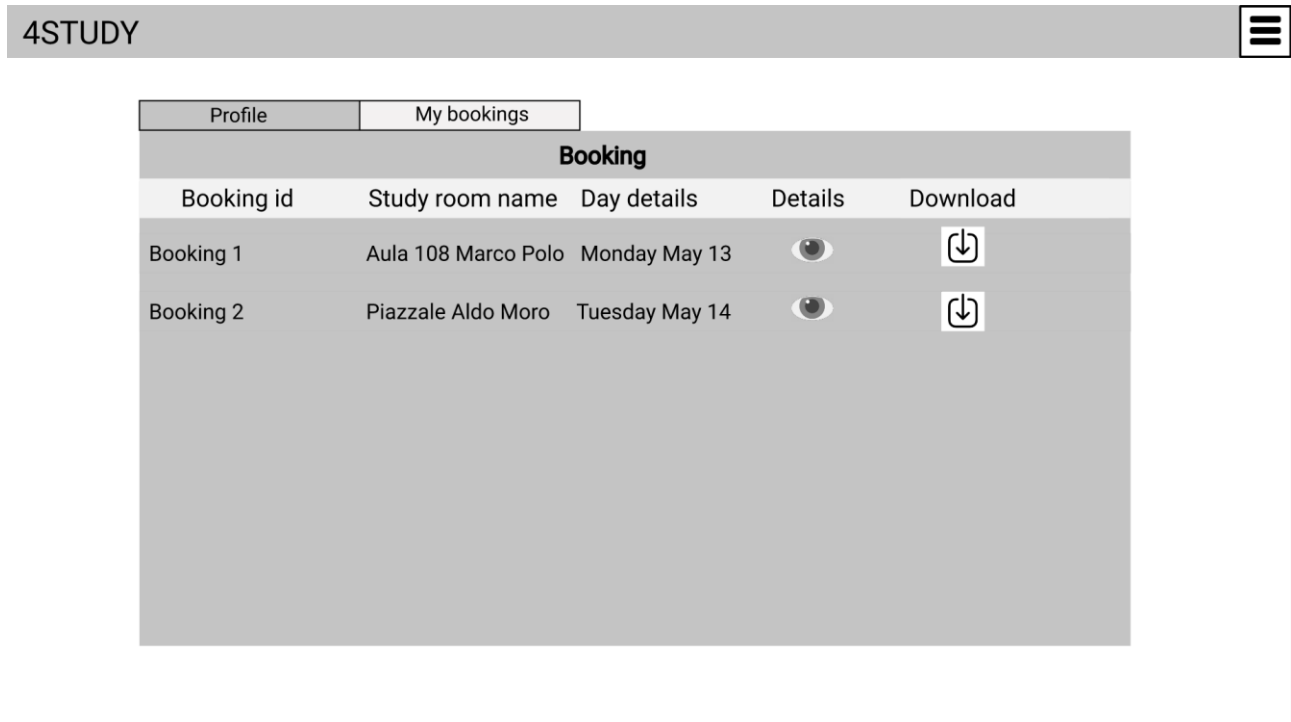


Going back to the Homepage, and by clicking on the **'Notes'** box, the user will be redirected on a new page where he will be shown a **table** containing all **notes** shared by **users** of the application. The main purpose of the 'Notes' section is that of giving the possibility to students to **share their notes** for other students that could get an easy and quick knowledge for preparing a subject or a test. For simplicity, we only report the webpage related to the **personal notes of the user currently logged in the application**, because the management of the notes is analogue to that of announcements.

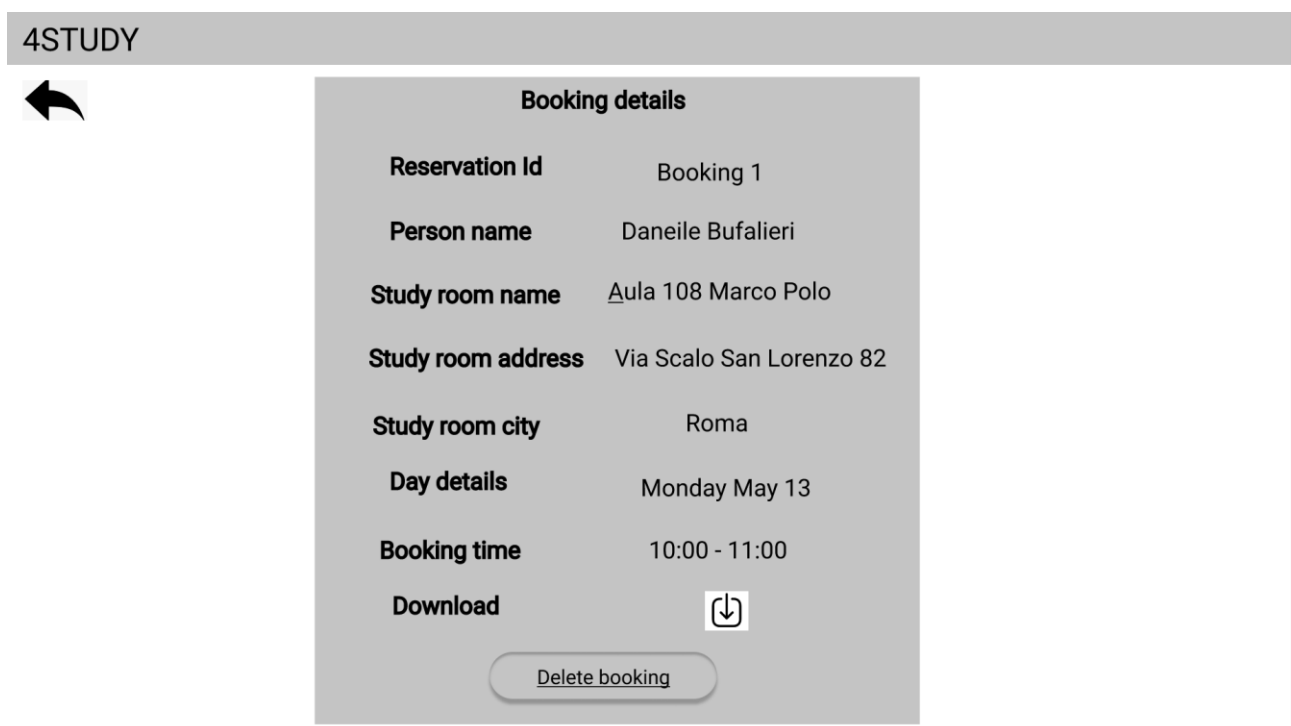


In particular, from the above mockup, we can notice how the user has the possibility to **download** all his notes, by clicking on the related icon.

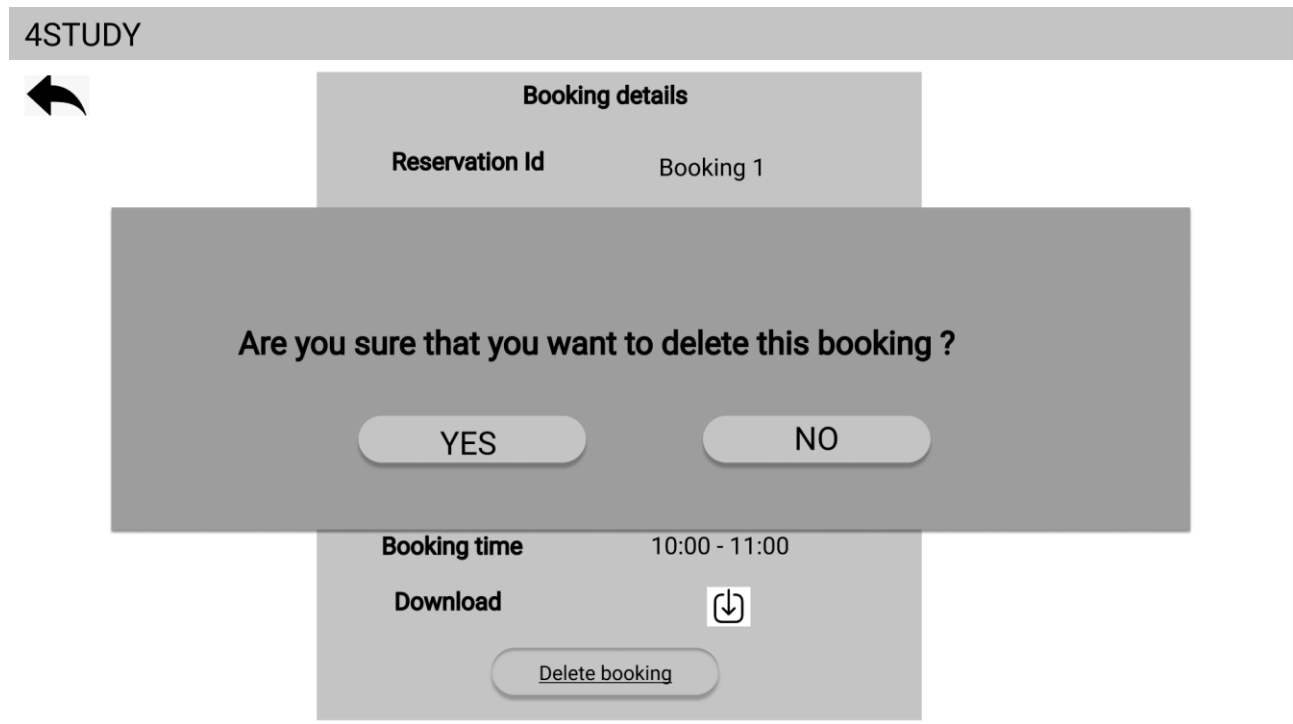
Now, by opening the **drop-down menu** on the top right of the page, and by selecting **Profile**, the user will be redirected to the **profile section** of our application. From there, he can access the list of all his **bookings** related to **study rooms**. Below we report the related mockup:



By clicking on the 'Details' icon, he can view the details of one specific booking, and below we report the related mockup:



From here, he can delete the booking, if he wants, by clicking on the 'Delete booking' button. When he does it, a popup will appear on screen, by asking a confirmation. Below we report the related mockup:



To conclude this section, we want to remember that there are other pages to explore in our system, but we considered them less representative than those reported above, and they are all available for consultation online on the dynamic prototype on Figma [7].

6. Expert Based Evaluation

The next step is to get feedback from an **expert** who is able to evaluate the system usability. In particular we asked Professor Valeria Mirabella for a **cognitive walkthrough** related to one of the tasks of our application. More details in the subsequent section.

6.1 Cognitive Walkthrough

Cognitive walkthrough evaluates design on how well the user is supported in learning task; it's usually performed by **expert** in cognitive psychology, who 'walks through' design to identify potential problems using psychological principles and forms used to guide analysis.

For each task walkthrough considers

- what impact will interaction have on user?
- what cognitive processes are required?
- what learning problems may occur?

Analysis focuses on **goals** and **knowledge**.

The expert needs:

- A specification or **prototype** of the system
- A description of the **task**
- A complete list of the **actions** needed to perform the task
- Indication on who the **users** are

For each action in your list the expert will answer the following questions:

- Is the effect of the action the same as the user's goal at that point?
- Will users see that the action is available?
- Once users have found the correct action, will they know it is the one they need?
- After the action is taken, will users understand the feedback they get?

For our system, the **goal** chosen to be evaluated is: **use the system to share notes for a specific study course**.

Below we report the **complete list of actions** needed to perform the task:

ACT 1: click on the "Log in" option in the onboarding page

RESP 1: you now are in the login form

ACT 2: correctly fill in the required "email" and "password" fields and press on the "LOGIN" button

RESP 2: you now are in the home page

ACT 3: click on the "Notes" box

RESP 3: the notes' table is shown

ACT 4: press on the "Share notes" button

RESP 4: you now are in the share notes form

ACT 5: correctly fill in the required "title" field, select the required "course" field, if wanted fill in the tags field, upload the required file and press on the "Share notes" button

RESP 5: the note has been correctly added in the system, and you are redirected on the home page

The **user profile** is the following:

- Age: 14 - 35
- Gender: Female/Male
- State: Worldwide
- Techonology: Laptop/Computer/Desktop Browsing
- Education: High School / University
- Occupation: Student / Working student

The received feedback is generally positive except for two questions. The first is the third question of the fourth action: " I'm not sure. I'll probably look for some function for adding a new note before sharing it "

In order to make this action more clear for users, we changed the text embedded in the buttons from 'Share notes' to 'Add notes'.

The second is the fourth question of the fifth action: " I think not. I suggest to put an explicit confirmation ".

In order to give an explicit feedback to the user we added a confirmation page just after the sharing of new notes.

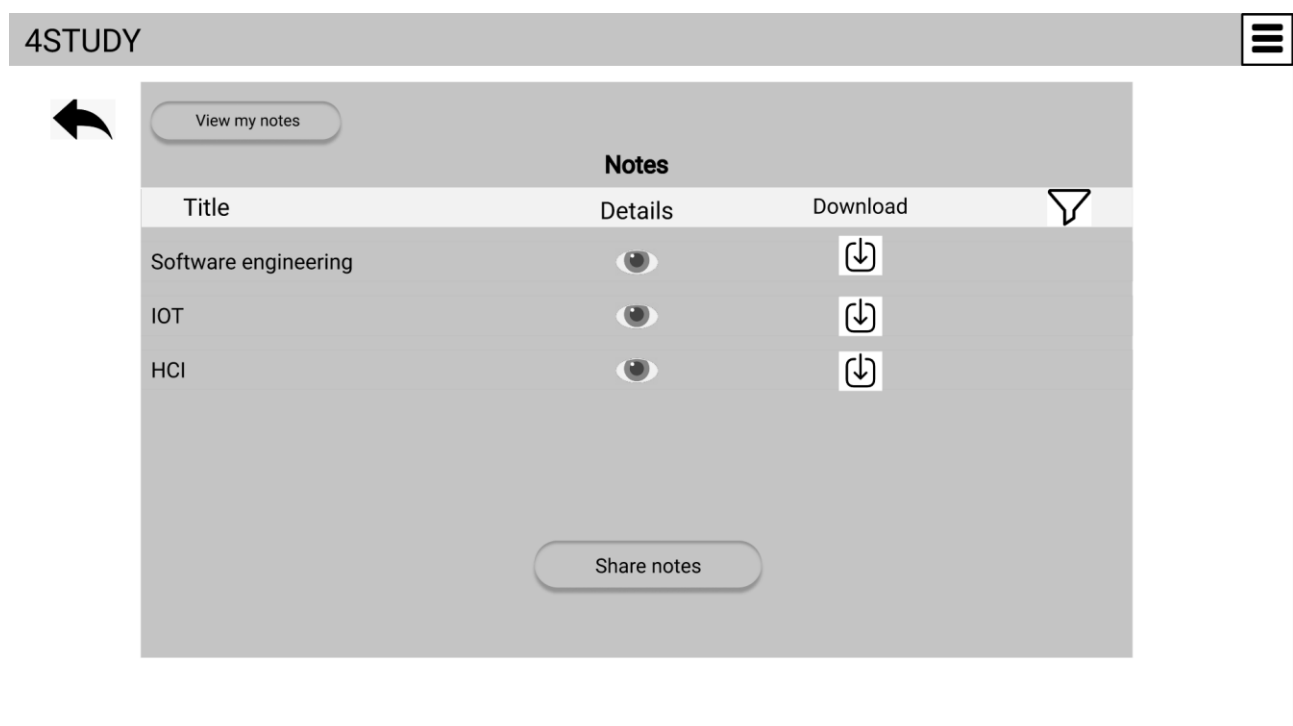
7. User Based Evaluation

After the expert based evaluation, another important step is testing the system with real users, in order to continue improving the application. The users we selected are **target users**. We decided to carry out a **controlled experiment**.

7.1 Controlled experiment



A controlled experiment is one in which everything is kept constant except for a variable: indeed we decided to study the efficiency of the share notes interface, where the user is able to check all the available notes and eventually download them.

Now we will explain our controlled experiment. We used it to test which of two different solutions in a graphical interface was the best one: in particular, we prepared two layouts for the interface that contains the list of the shared notes by users. Below we report the **first alternative**:




Now we report the **second alternative**, in multiple images:



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Notes

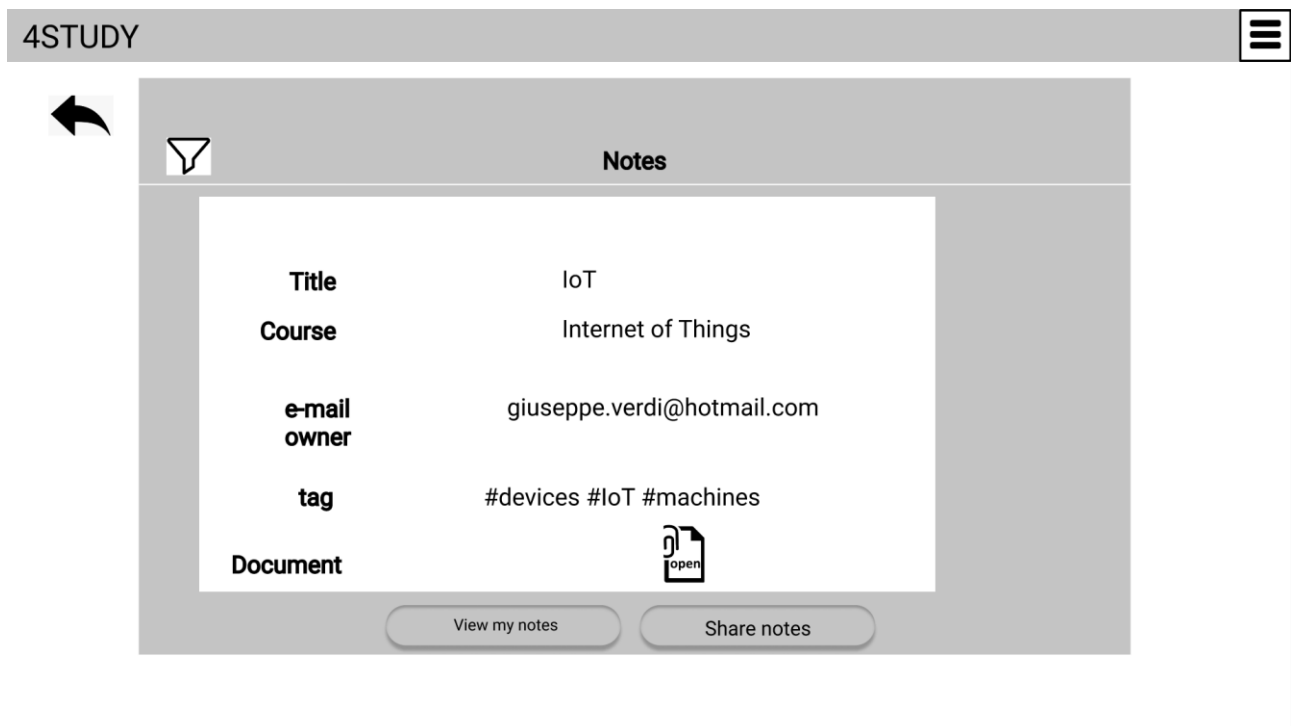
Title	Software engineering
Course	Software engineering
e-mail owner	mario.rossi@yahoo.it
tag	#SE #software #computer
Document	

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Notes

Title	HCI
Course	Human Computer Interaction
e-mail owner	paolo.bianchi@gmail.com
tag	#HCI #software #visual
Document	



These two alternatives represent the **independent variables**.

In the first solution you can see a table where the available notes are listed and there is a button to see the note details. Instead in the second one we used a scrollable page where the notes, with their details, are visible one under the other.

We define the following **hypothesis**: the users will download a specific set of notes quicker by using the alternative 1. We define the **null hypothesis**: there will be no specific differences between the two versions.

We made the task run by **eight different users**, each one a target user for our context, and we used the **within-groups method**, and so each individual tested each one of the two alternatives. Thanks to this, we removed the bias, but in order to remove the transfer of learning, we divided this set of users in two subgroups, each made of four users: one of this subgroup first tested the alternative 1 and then the alternative 2, while the other tested in the opposite way.

So our users gave us the **time** (in **seconds**) they took to perform the task, for both alternatives.

Then, in order to fully conclude the experiment, we performed a **statistical analysis** on these results. We used **ANOVA[8]**, by exploiting **Microsoft Excel**. Below we report the results given by Anova:

1	VERSION 1	VERSION 2
2	13	17
3	12	17
4	15	14
5	11	16
6	9	22
7	16	20
8	13	15
9	12	18

1	Analisi varianza: ad un fattore					
2						
3	RIEPILOGO					
4	<i>Gruppi</i>	<i>Conteggio</i>	<i>Somma</i>	<i>Media</i>	<i>Varianza</i>	
5	Colonna 1	8	101	12,625	4,839285714	
6	Colonna 2	8	139	17,375	6,839285714	
7						
8						
9	ANALISI VARIANZA					
10	<i>Origine della variazione</i>	<i>SQ</i>	<i>gdl</i>	<i>MQ</i>	<i>F</i>	<i>Valore di significatività</i>
11	Tra gruppi	90,25	1	90,25	15,45565749	0,001505905
12	In gruppi	81,75	14	5,839285714		4,60011
13						
14	Totale	172	15			

Given that $F > F_{crit}$, we could reject the null hypothesis, and results highlight that the first solution, the table, is better than the second one, probably because it's more clear, easy to use and efficient for the users.

8. Conclusions

In our work we developed a system to help students in various ways, so we defined which are the most useful tasks: share notes by web, find a study room and a study group where you want and publish an announcement related to study. After the user analysis and the competitor analysis, we started the Task and Dialogue Analysis, by exploiting HTA and STN. Then we used the tool Figma to develop the first prototype of our system and then we evaluated the general functioning thanks to expert-based evaluation and user-based evaluation.

The final product has been developed by using Vue.js [9] framework and Bootstrap [10], and by adopting an AGILE methodology. The code can be found in this Git repository: <https://github.com/IvanGiacomoni98/4Study>.

With this we conclude our tesina.

Bibliography

- [1] Official website of GitHub: <https://github.com/>
- [2] Official website of Google Drive: <http://drive.google.com/>
- [3] Official website of Google Meet: <https://meet.google.com/>
- [4] Official website of Zoom: <https://zoom.us/>
- [5] Official website of Google Form: <https://www.google.it/intl/it/forms/about/>
- [6] Official website of Figma: <https://figma.com/>
- [7] Link to the dynamic Figma prototype:
<https://www.figma.com/file/fy0RDLkNnwnfH2ZrYclGBf/4Study-Project?node-id=0%3A1>
- [8] About Anova in Microsoft Excel: <https://www.goskills.com/Lean-Six-Sigma/Resources/Use-anova-in-Excel>
- [9] Official website of Bootstrap: <https://getbootstrap.com/>
- [10] Official website of Vue.js: <https://vuejs.org/>