Tesina - Human Computer Interaction

Together

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1. Introduction

Together is an app whose purpose is to gather people with the same interests and hobbies, in order to socialise with people that are on the same wavelength of yours: all you need is a smartphone and the desire to meet new people.

The app has four main categories: Sport, Music, Videogames and Free Time. These categories were decided through a questionnaire, we will add in the future other categories.
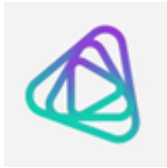
You can decide to publish a new post, specifying the number of users you still need to complete your group or join the ones that seem interesting to you; you can receive the approval from the creator and then start a chat with the others; once you joined a group you can chat to get to know the members better or to organise the event.

2. Requirement Analysis

2.1 Competitor Analysis

Together's competitors are hobby-based meeting apps. In fact, there are only platforms dedicated to a particular activity.

Also, for each topic of interest, there are many apps/websites to find events and/or teams, but there is no main app with a huge distribution. We considered one platform for each of the four main categories provided by Together.

	Description
SPORT	**Fubles** is a social network that allows you to organise **sports** matches and save time and money. Connecting players, matches and sports centres in the same area, Fubles allows anyone to sign up for free and organise matches or participate in matches that have been organised by someone else.
MUSIC	**Vampr** is a location-based social and professional mobile platform which facilitates **music** discovery, networking, and communication between musicians, music industry professionals and music fans.
VIDEO GAMES	**Gamer Link** is a platform for **gamers** to connect with friends and communicate while gaming. Discover teammates, find friends, and grow your clan!

Previous apps offer specialised content for their field of work, but they are dedicated only to that.

"Fubles", for example, records the goals each player has scored in each game, providing insights and more, all focused on soccer.

Together lacks this specific management, because it wants to be a finder of general-purpose amateur groups, with the main goal of connecting people and making friends. Together also potentially allows people to discover hobbies they have never heard of.

	Fubles	Vampr	GamerLink	Together
Create group activity	✅	✅	✅	✅
Join group activity	✅	✅	✅	✅
Chat with activity participants	✅	❌	✅	✅
See other participants profile	✅	❌	✅	✅
Multi category	❌	❌	❌	✅

2.2 User profiles

Using the app there is a user profile who is allowed to join and/or create a new group.

User profile:

● Age: 18-35

● Gender: 61.5% male, 31.5% female, 27% not specified

 ● Category: 66.7% student, 15.4% worker, 17.9% student-worker

● Location: anywhere in Italy

● Technology: great computer and smartphone experience, 4G/5G mobile internet connection

2.2.1 Persona 1

Anna is a 24 years old student that lives in Rome and she's attending a Master Degree in Chemical Engineering at ''Università la Sapienza''.

She is passionate about cinema, so she spends a lot of time watching movies and tv shows. Often in free time she uses her smartphone with 4G mobile internet to share her reviews about movies on social networks and to give some advice to the ones that ask for it. She is also a sunny person, but a little shy therefore has a slight difficulty in meeting new people even though she would like to.

Scenario: It is Monday evening, Anna has finished attending her lessons and she's tired. She wants to watch the next Paul Thomas Anderson at the Cinema, but this time she would like to go with other people so she asked on social media who is interested in watching it.

2.2.2 Persona 2

Salvatore is 18 years old who lives in Napoli where he has been attending the artistic high school for five years. He is passionate about what he 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 he likes to play video games and watch live streams of pro players on twitch.

Scenario: It is Friday evening, Salvatore has finished his homeworks for the week, so he takes the smartphone to contact some of his friends to see if they can organise a Call of duty match. He needs ten people (Salvatore included) and he realises that most of his friends are unavailable. So he needs to find 9 more people if he wants to play and a good way to do that is using his phone to look for people to create two teams on social media.

2.3 Questionnaire analysis

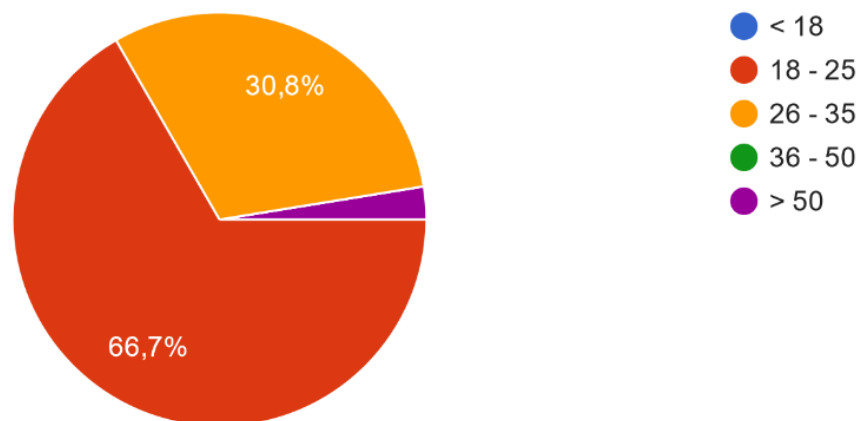In this section there are the questionnaire results used to understand better our targeted potential customers.

We reached 40 people and these data were useful to validate our assumptions and ideas and to improve.

How old are you?

39 risposte

- < 18
- 18 - 25
- 26 - 35
- 36 - 50
- > 50

How long do you use your smartphone in a day? (in hours)

39 risposte

- Never
- < 1h
- 1h - 3h
- 3h - 5h
- > 5h
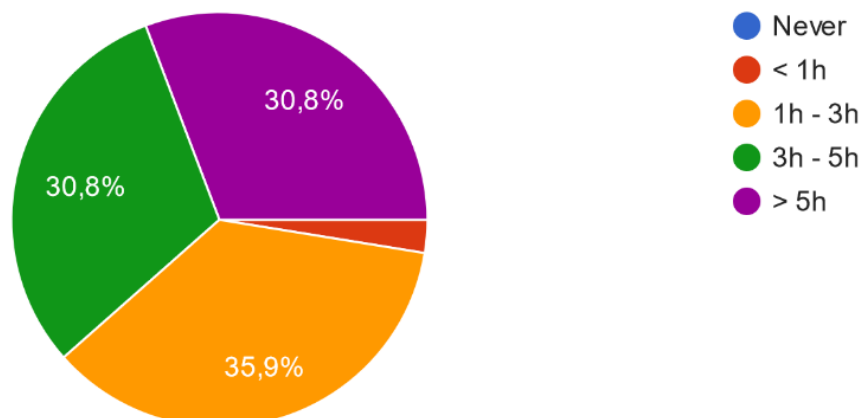
Are you currently?...

39 risposte

- Student
- Worker
- Student-Worker
- Out of work

15,4%

17,9%

66,7%
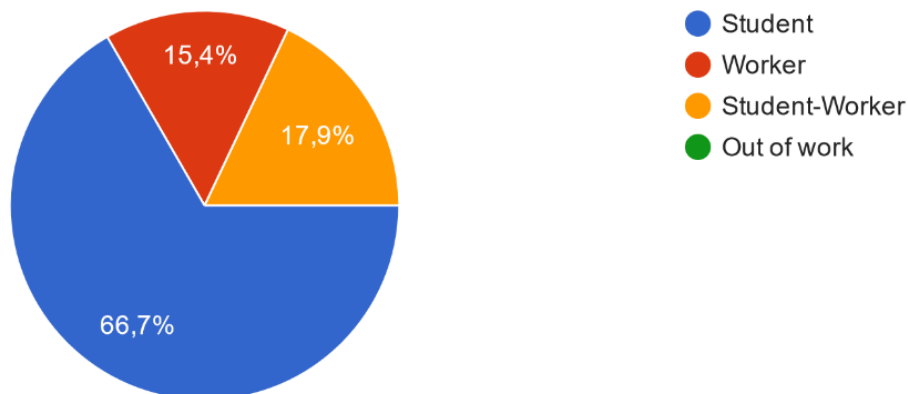
What gender are you?

39 risposte

- Male
- Female
- Prefer not to say

35,9%

61,5%
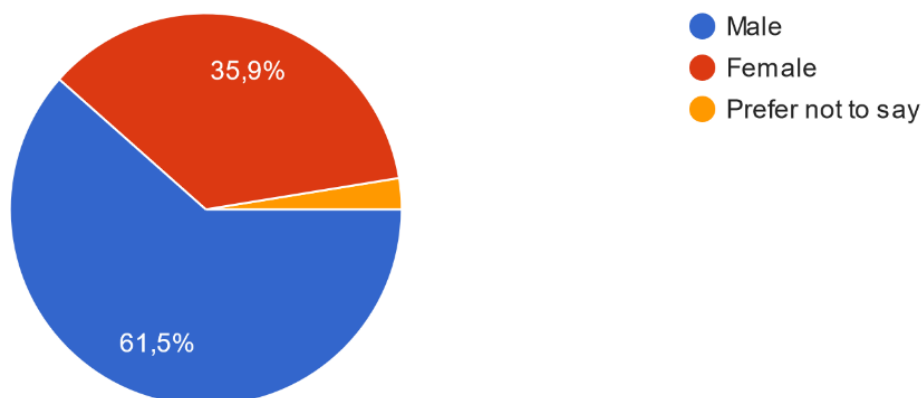
In a range from 0 to 5, where 0 stands for "Don't like at all" and 5 for "I like it a lot", for each of the following activities, how much do you like them?
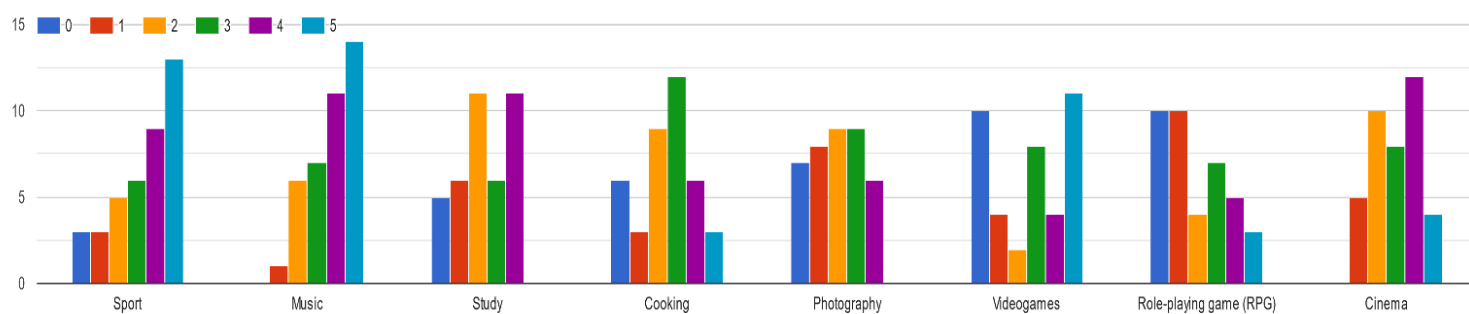
For each of the following activities, do you prefer to do an activity as individual or in group?
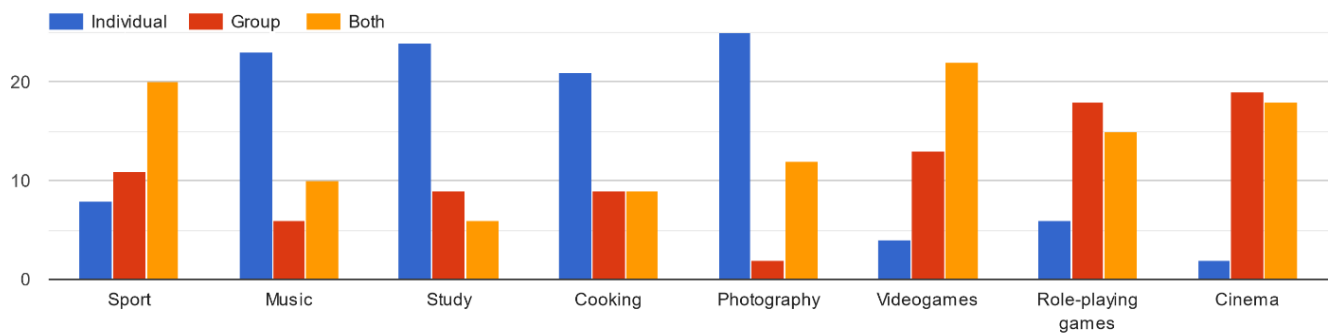
Based on your daily commitments, how much free time do you have in a week? (in days)
39 risposte
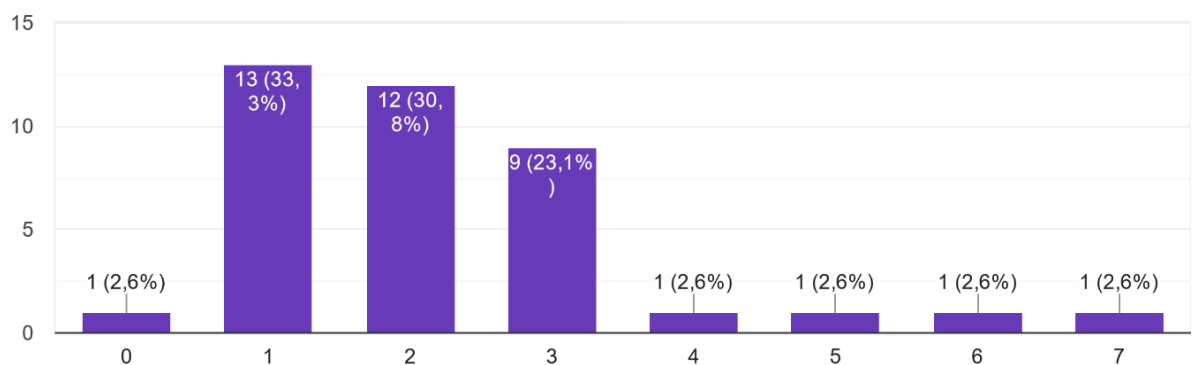
In our application sharing some personal data could be useful to get in touch with other people. Which of the following would you prefer to share with strangers?
39 risposte
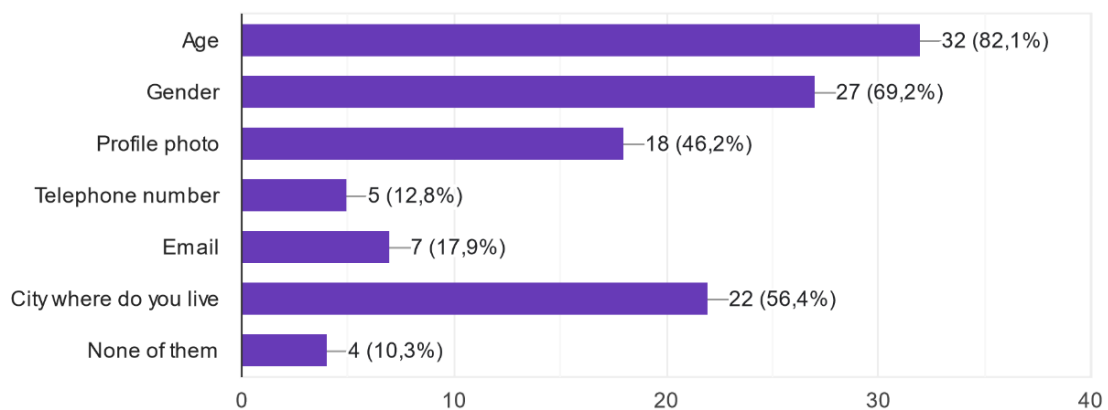
Have you ever used an app (i.e. social network) to organize and doing an activity with other people? (For example to study in group, playing football..)

39 risposte

- Yes
- No

38,5%

61,5%

If you answered yes in the previous question, were you satisfied of the experience?

26 risposte

- Yes
- No

100%

2.4 Questionnaires conclusions

Analysing the questionnaire, we understood the age of our customers is mainly between 18 and 35 years old. The majority of them are students (66.7%) or student-workers (17.9%).

They spend a lot of time on the smartphone, so we confirmed the idea of developing a mobile application also given the fact that a high percentage of people (61.5%) have tried a similar application in the past and were satisfied.
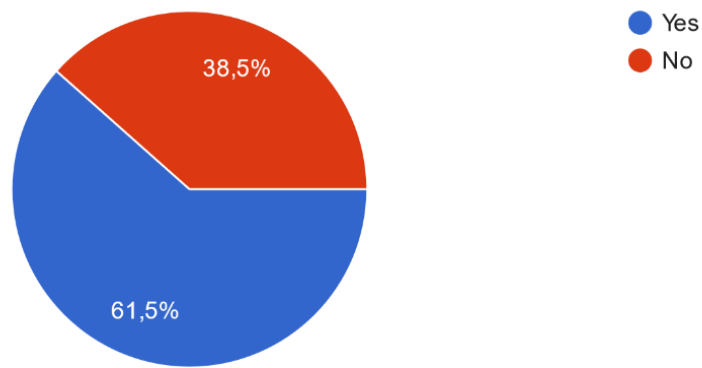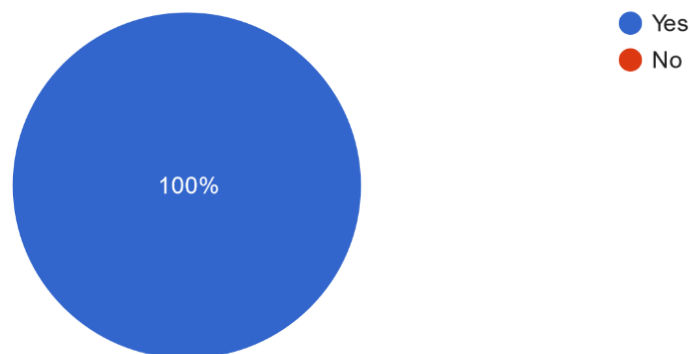
We understood that a great amount of people like to play multiplayer video games, sports, music and to go to the cinema. They also prefer to do these activities in groups rather than individually.

So we decided to focus only on these activities and exclude others like studying, playing RPG games, photography and cooking.

Regarding the sharing of personal information, we understood that the majority of people don't want to share the telephone number, so we didn't add this information in the personal profile of the user.

3. Task and Dialogue Analysis

With task analysis we mean the branch corresponding to studying people and their jobs, what they do, how they do it and the basic knowledge needed to carry it on. In general to distinguish the main tasks we first start from user observation and requirements collection, then we organise these data into suitable diagrams. So the main difference between a task analysis and a cognitive model lies in the focus on the user, on the external action instead of the internal mental state, on the complete job instead of the singular specific units. In order to achieve this analysis, the most common tool is the **Hierarchical Task Analysis (HTA)**, used to produce an exhaustive description of tasks in a hierarchical structure of goals, sub-goals, operations and plans, where tasks are broken down into progressively smaller units.

On the other hand, the dialogue is another extremely important factor to consider. On the human-computer side of things it is even more difficult to analyse and carry on, given its more complex yet limited nature, but we cannot back off from it since it helps us understanding the the capability of the system, separate lexicon from semantics and better understanding the design and its consistency. On this front the most common tool is the **State Transition Network (STN)**, a directed graph indicating system states through nodes and progression through edges, which also tell the corresponding user action and system feedback, being the core of the dialogue itself step by step. Now, in the case of this system, three representative tasks were chosen, in the next sections it is possible to see them and their corresponding HTAs and STNs.

3.1 Hierarchical Task Analysis

3.1.1 Add a post (group)

This is an essential task of Together: in this way the user can create his own group.

In order to add a new post the user, after the login, has to go to the homepage, press the "plus" button, then select category, insert title, description, city, date and number of people in the group. At the end there will appear a confirmation pop-up.
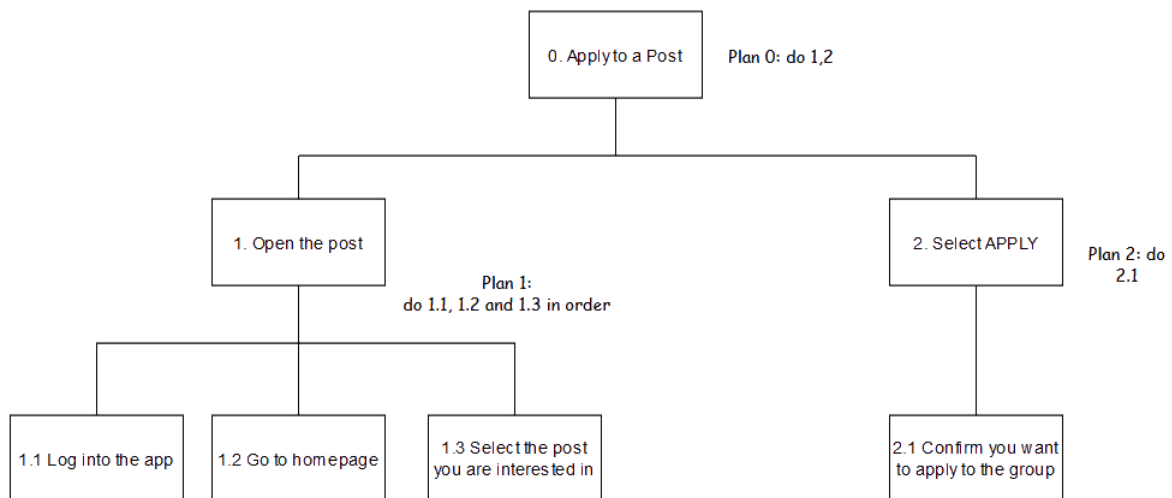
It follows the HTA diagram:
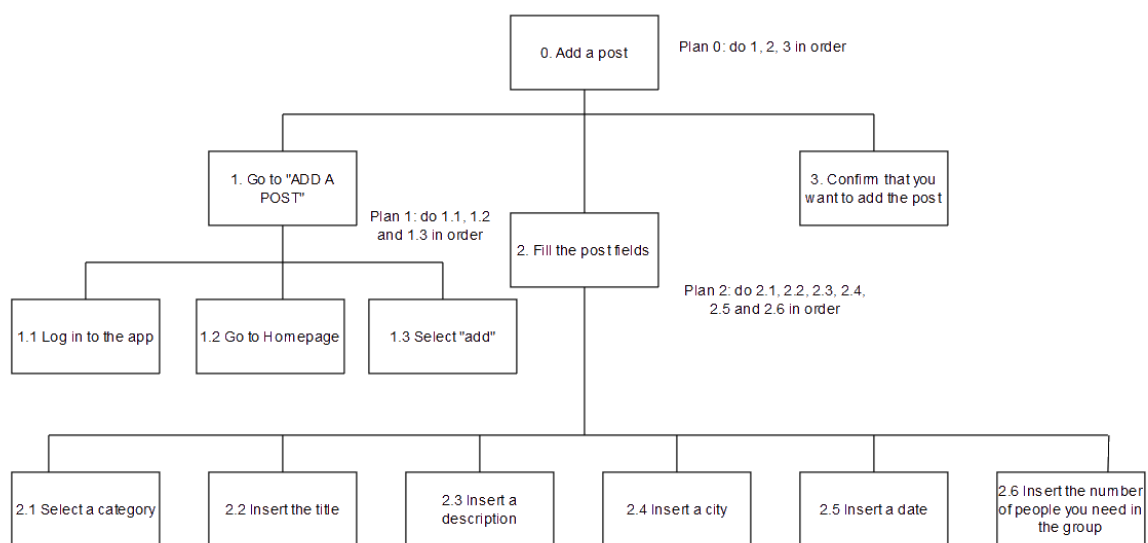
3.1.2 Apply to a post (group)

The second essential task of Together is applying to a post (group).

If the user wants to join a group, after the login she/he has to go to the homepage, tap on the post she/he is interested in and press the apply button. At the end there will appear a confirmation pop-up.

It follows the HTA diagram:

3.1.3 Edit a post (group)

Another important task of Together is the editing of the post.

It can happen that a user who created a post wants to edit some information about it.

To do so, the user, after the login, has to go to the "My Group" page, press the "Edit" button and then she/he can edit the desidered fields. In the edit page the user can also remove a user in the group. At the end there will appear a confirmation message.

It follows the HTA diagram:
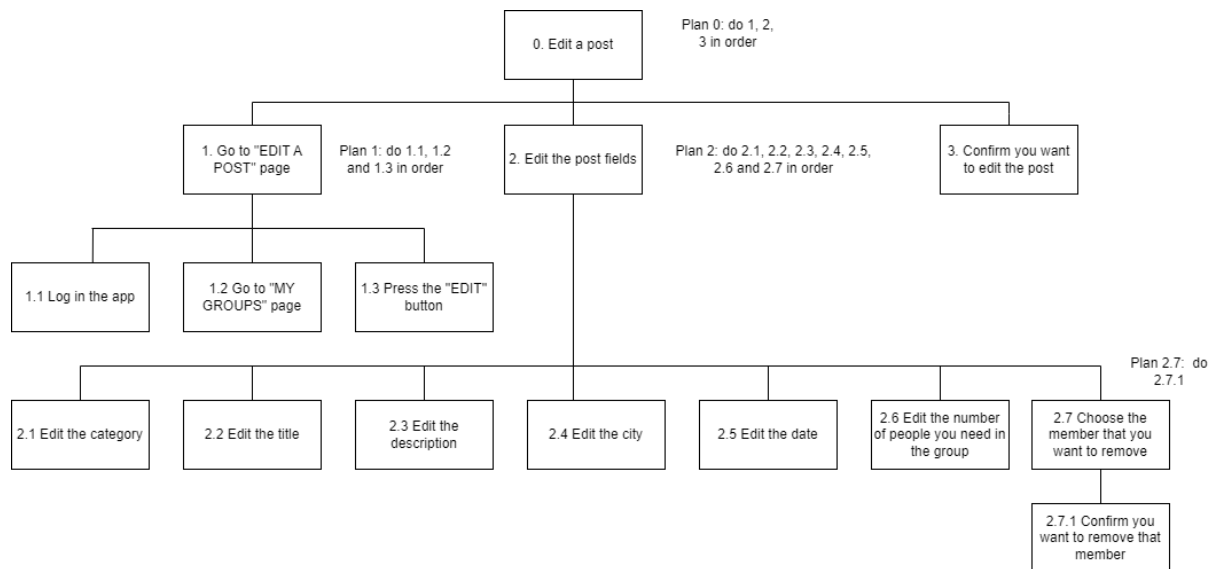
3.2 State Transition Networks

In this section we will see the STNs corresponding to the exact four tasks we already analysed through the HTAs in the previous section. The tasks and their importance are the same as we described beforehand, but this time we take a look at the dialogue between the user and their actions and the system and its responses.
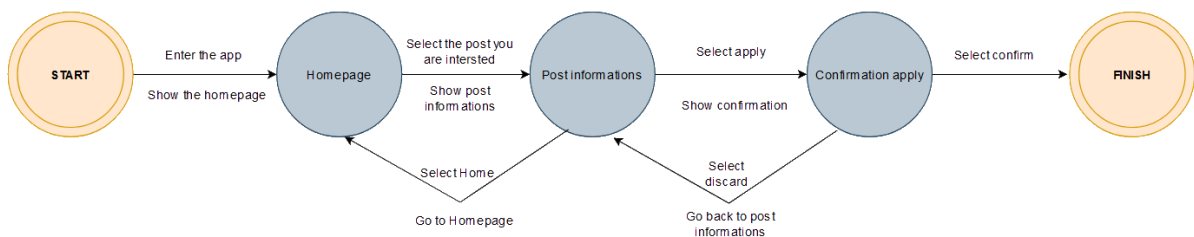
3.2.1 Add a post (group)

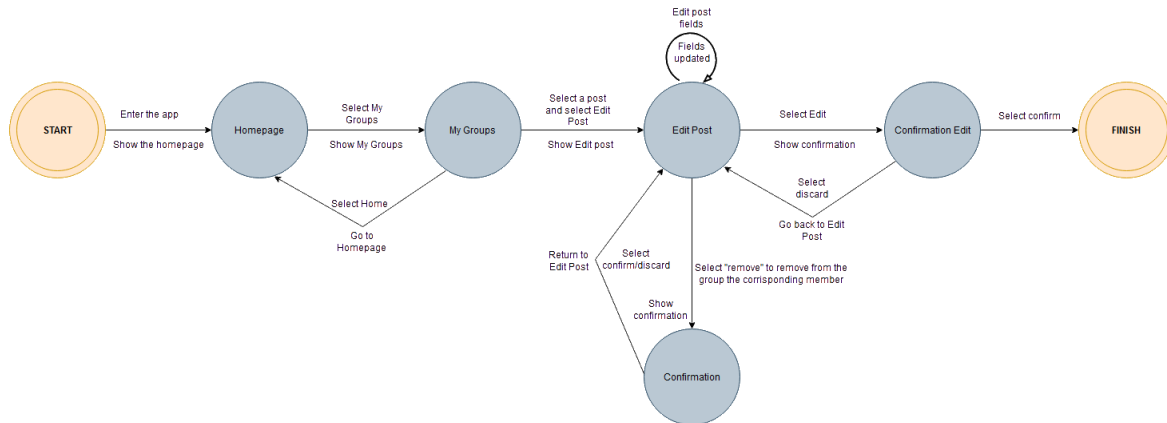This is an essential task of Together: in this way the user can create his own group
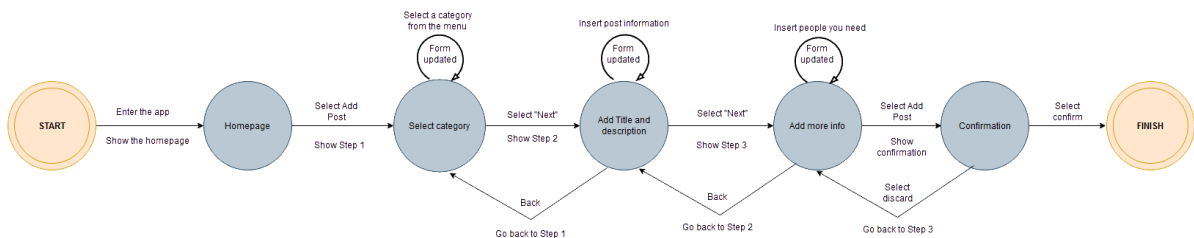
3.2.2 Apply to a post (group)

The second essential task of Together is applying to a post (group).

3.2.3 Edit a post (group)

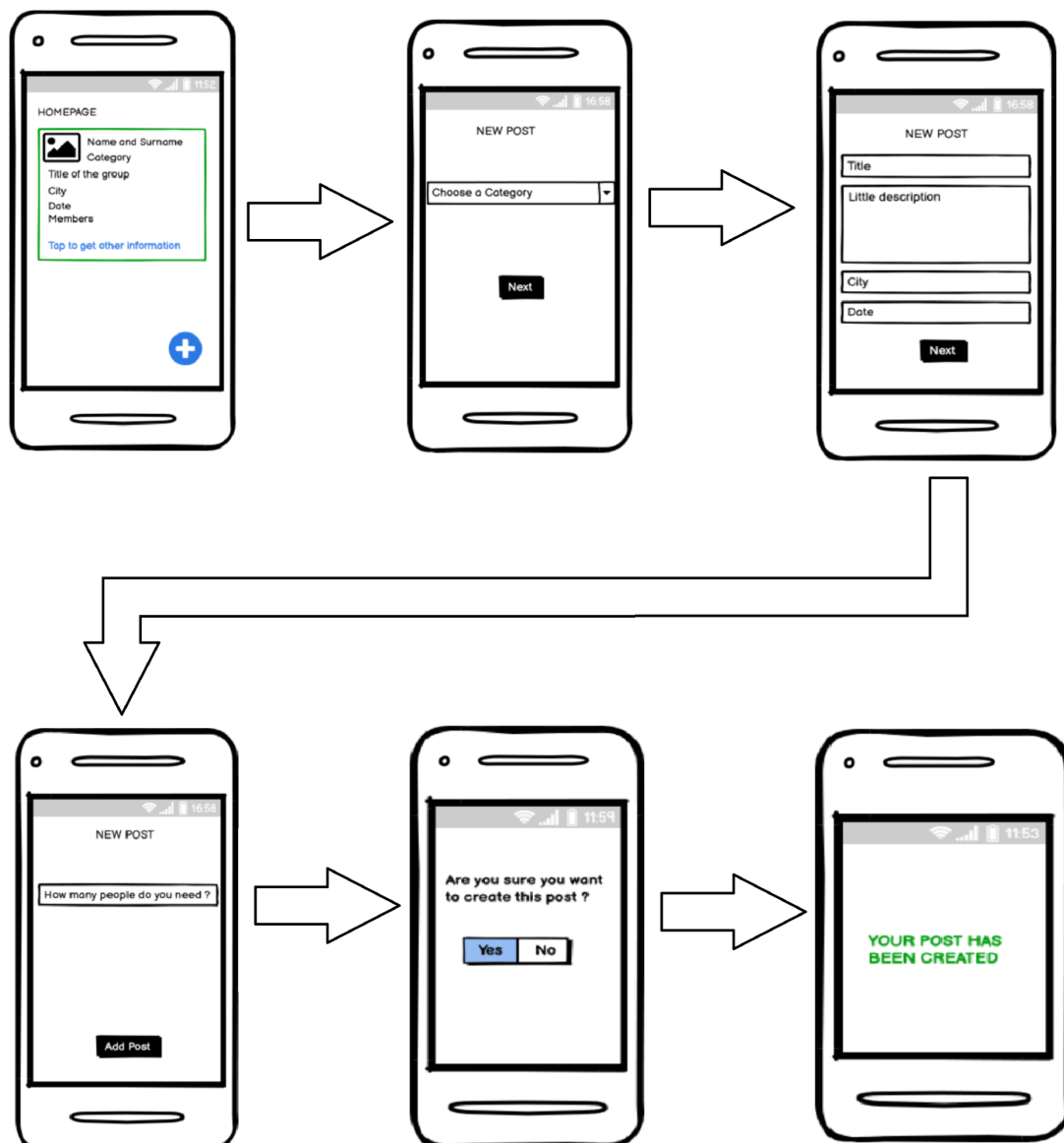Another important task of Together is the editing of the post.
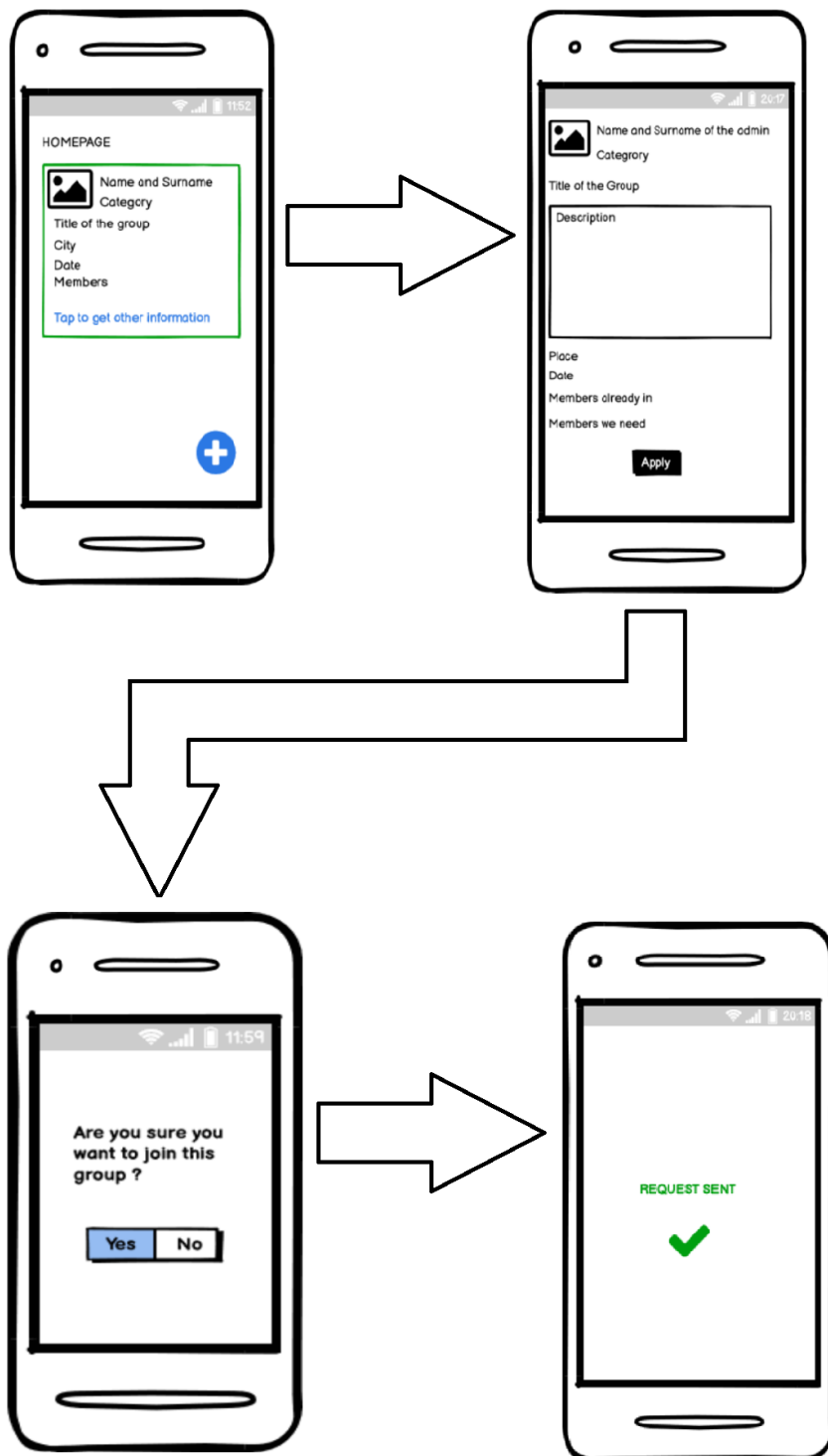
4. Mockup

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. Create new post (group)

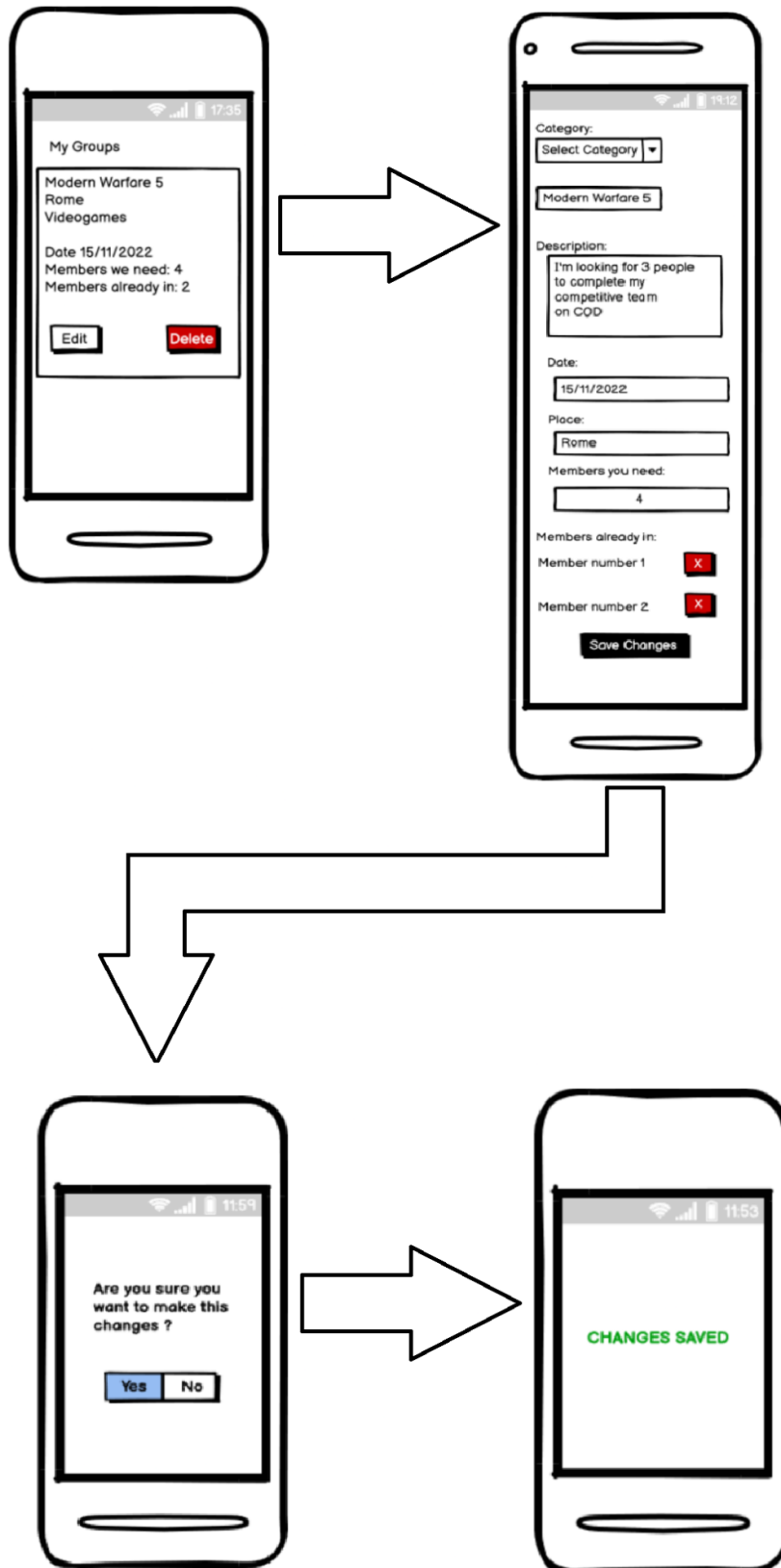2. Edit post (group)

3. Join post (group)

4.1 Create a new post (group)

4.2 Join post (group)

HOMEPAGE

Name and Surname
Categrory
Title of the group
City
Date
Members

Tap to get other information

Name and Surname of the admin
Categrory
Title of the Group

Description

Place
Date
Members already in
Members we need

Apply

Are you sure you want to join this group ?

Yes   No

REQUEST SENT

4.3 Edit post (group)

5. Expert Based Evaluation

Evaluation tests usability and functionality of a system, analysing both the design and the implementation in order to assess the extent of the functionality of a system, the effect of the interface on the user and to identify specific problems.

The expert who performed Heuristic Evaluation is Dott.ssa Valeria Mirabella.

5.1 Heuristic Evaluation

Heuristic Evaluation debugs the design problems analysing the usability of the system following the Nielsen's heuristics, which are usability criteria, and reporting when they are violated and how high is the severity of the violation. This is done testing the interface.

5.1.1 Nielsen's Heuristics

1. **Visibility of system status:** The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.

2. **Match between system and the real world:** The system should speak the user's language, following real-world conventions, using words, phrases and concepts familiar to the user and making information appear in a natural and logical order, rather than using system-oriented terms.

3. **User control and freedom:** Given that users often make mistakes, choosing the wrong system function, they need a clearly "emergency" exit to leave the unwanted state. Because of that, the system should support "undo" and "redo".

4. **Consistency and standards:** Follow platform conventions so that users don't have to understand if different words, situations or actions mean the same thing.

5. **Error prevention:** Having a careful design which prevents a problem from occurring in the first place is better than a good error message, so eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.

6. **Recognition rather than recall:** Minimize the user's memory load by making objects, actions and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.

7. **Flexibility and efficiency of use:** Allow users to personalize frequent actions with accelerators. Accelerators, unseen by the novice user, may often speed up the interaction for the expert user such that the system can provide for both inexperienced and experienced users.

8. **Aesthetic and minimalist design:** Dialogues should not contain information which is irrelevant or rarely needed, because every extra unit of information in a dialogue, competes with the relevant units of information reducing their visibility.

9. **Help users recognize, diagnose and recover from errors:** Error should not be expressed in codes, but in plain language, precisely indicating the problem and constructively suggesting a solution.

10. **Help and documentation:** It may be necessary to provide help and documentation, even if it is better if the system can be used without documentation. Any information should be easy to search, focused on the user's task, so make a list of concrete steps to be carried out, and not be too large.

5.1.2 Expert Report

Heuristic Evaluation

Evaluator: Valeria Mirabella

Prototype: Together

Date: 8 october 2022

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

The evaluator used the following **severity notation**:

0	I don't agree that this is a usability problem at all
1	Cosmetic problem only
2	Minor usability problem
3	Major usability problem
4	Usability catastrophe

Evaluation

Frame	Heuristic violated	Severity	Description / Comment
Intro Pages	Flexibility and efficiency of use	2	Consider the possibility of skipping intro
Sign up	Error prevention	2	It would be useful to see password in clear text
Accept/refuse request confirmation (and other confirmation actions)	Recognition rather than recall	3	In the confirmation page put some information related to the request (i.e. requester name)
Add a post confirmation	Error prevention	3	Consider adding a preview of the post

6. User Based Evaluation

The user based evaluation technique used is the "**think aloud**". Essentially we asked some users to try the application and see if they understand the features of the application, and how they approach it. This can give us important feedback, from the perspective of a non-expert user which, in fact, will be the real ones who will use the application once it is released.

6.1 Think aloud

We chose a group of seven people, aged between 24 and 30. Everyone using the app, we asked them to perform two of the main functions: that of requesting to join a group, and that of creating one. We asked them to suppose they already have an account and skip the sign-up process, just to focus on those two tasks.

We asked participants what they believe the app is doing, noting their answers and any concerns.

We found that all the users found it really easy to perform those tasks. We found no ambiguity between what they think the app is doing and what the app really is supposed to do.

In fact there are some suggestions given by the users, two of them are the same given by the expert-based evaluation. We refer to the possibility to skip the intro (one user proposed it, saying it is annoying) and the possibility to review the post we are going to publish (two users proposed that, saying "since the post is created in different steps, the confirmation is on a page where you don't see the whole post, but only the last step).

Despite those two observations, no one of the users had problems or misunderstanding, commenting the task as easy and pretty intuitive.

After the **expert-based** evaluation and the **user-based** evaluation, the **final prototype** of the project has been created, with the suggested modifications applied.

6.2. Controlled Experiment

6.2.1 About

A controlled experiment is a powerful tool for assessing a design or a specific aspect of it. It offers empirical evidence to support claims or hypotheses and follows a basic structure: selecting a hypothesis to test by measuring participant behaviour. Successful experimental design involves carefully considering factors such as participant selection, variables tested and hypothesis, to ensure reliable results.

6.2.2 Independent variables

For this experiment we considered two different interfaces for executing the same operation as independent variables. When a user decides to create a new post, the first step is to choose a category from a list of four elements. We now show the design differences between the two ideas we had:

A. Interface A uses a **radio button** design. The four buttons fill the frame space. At the beginning they are all four white, but the one selected becomes blue. I user select a different category, the previous come back white. This was our original idea.
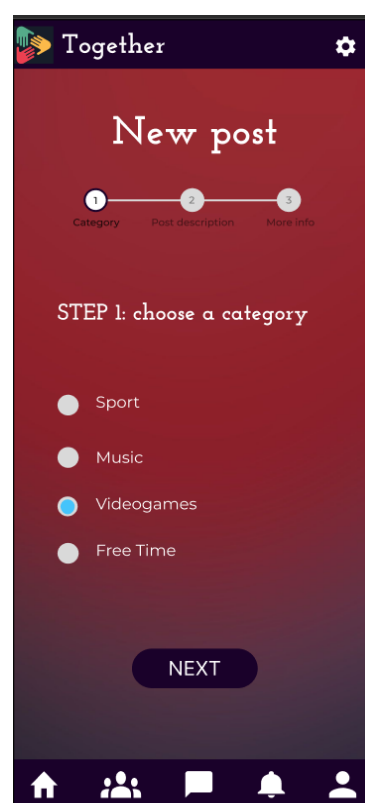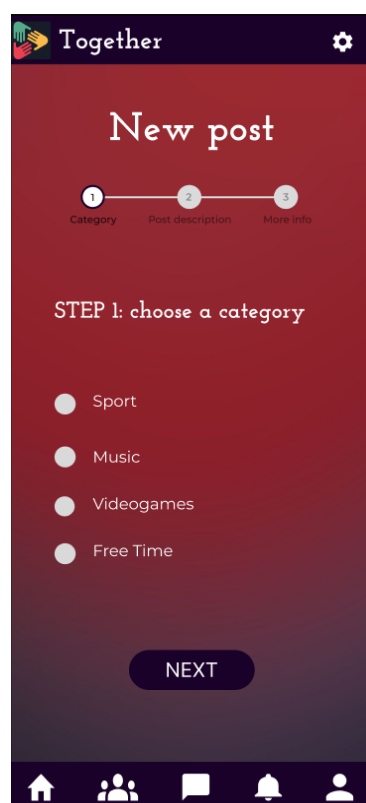
B. Interface B uses a **dropdown list**. This option leaves a big empty space in the frame that becomes fulfilled once the list is opened.
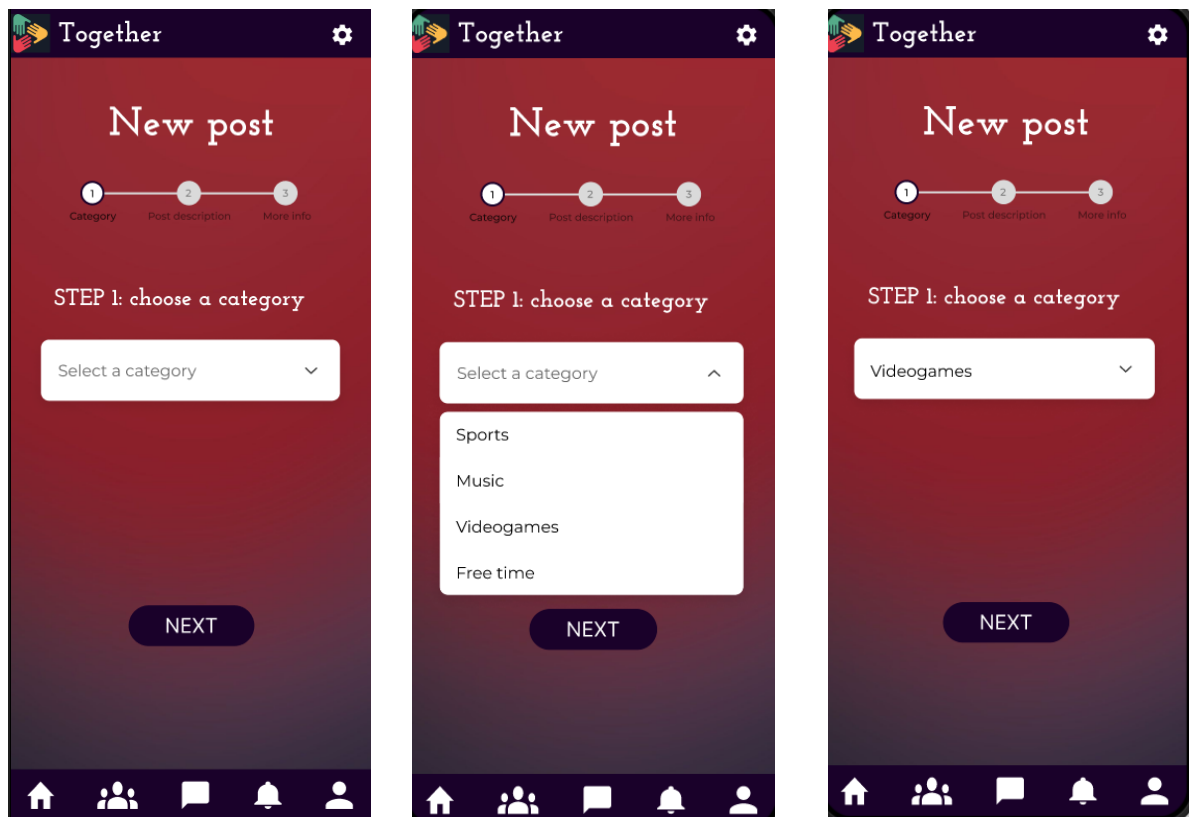
6.2.3 Dependent Variable

As an independent variable we choose the time needed for the execution of the task. Time starts once the user clicks on the "+" button in the home page for creating a new post, and stops when clicks into the "next" button on A or B (with a category selected).

6.2.4 Hypothesis

Our hypothesis is that **A is faster than B**. This is because in A we have all the options clear on the first look, while in B you have an additional click just for seeing the available category. On the other hand B makes it more clear that only one option can be chosen, while in A user can try to select more than one category.
In conclusion our hypothesis was that A is faster than B (the original).

There is also the **null** hypothesis, in which no relevant differences are made between A and B.

6.2.5 Subjects

Two groups of ten people have been asked to do the experiment. The first group on A and the second on B. They are between 18 and 30, and we distributed them in the two groups having the same average age.

6.2.6 ANOVA Single Factor

ANOVA is a statistical technique based on the F-test on variance that can help us decide whether we should consider the null hypothesis or not.

In the first table we represent the results of the experiment. The two columns represent the independent variable, and the value on the cells the related dependent variables.

Interface A	Interface B
9	3
7	5
8	4
8	4
6	3
8	5
10	6
6	1
5	5
3	5
4	7
3	5
4	7
7	2
6	7
3	4
3	4
4	1
7	5
2	3

The following tables are the result of the ANOVA test, giving as input the previous table to Excel

ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	18,225	1	18,225	4,2553	0,046011	4,098172
Within Groups	162,75	38	4,282895			
Total	180,975	39				

SUMMARY				
Groups	Count	Sum	Average	Variance
Column 1	20	113	5,65	5,397368
Column 2	20	86	4,3	3,168421

6.2.7 Analysis of ANOVA results

Since *F > F crit*, we could reject the null hypothesis and use these data to understand that the proposed **Interface B** is easier and more immediate to use with respect to the original counterpart. This result can be explained with the fact that a dropdown list immediately makes clear that only one option is available. Indeed, some users tried more than one button on **Interface A**, someone selecting an option even before the decision on the category. So even if **B** requires one click more than **A**, the experiment shows that it is still faster. A was our initial implementation but, since our hypothesis is not verified, we changed the design.

7. Final Product

7.1 Technological information

The final application was realised through Figma, a collaborative web application for interface design, with additional properties focused on user interface and user experience design, with an emphasis on real-time collaboration, utilising a variety of vector graphics editor and prototyping tools. We directly modified the prototype of the application, by implementing a front-end and a simulated back-end, thanks to the features offered by Figma.
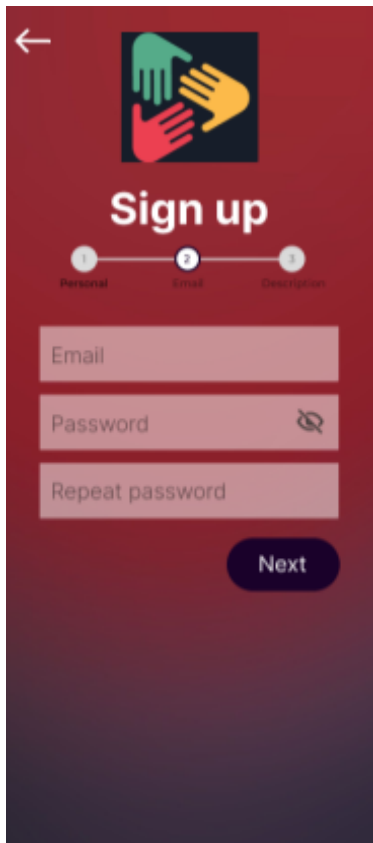
7.2 Finalised product
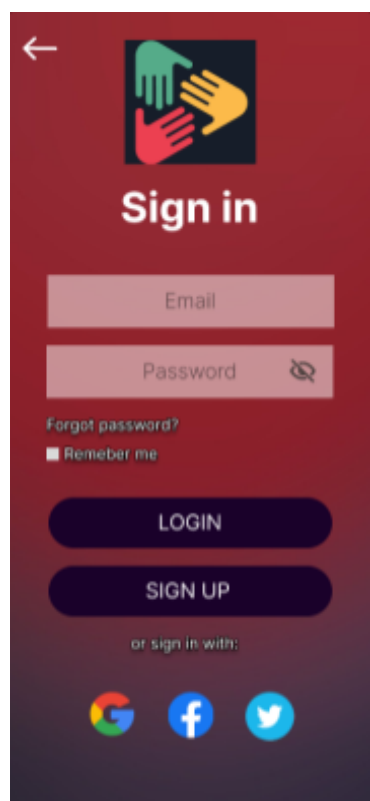
Sign In Page
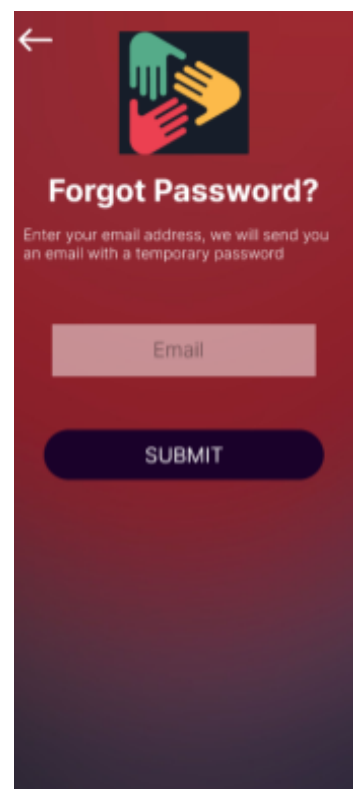
Forgot Password Page

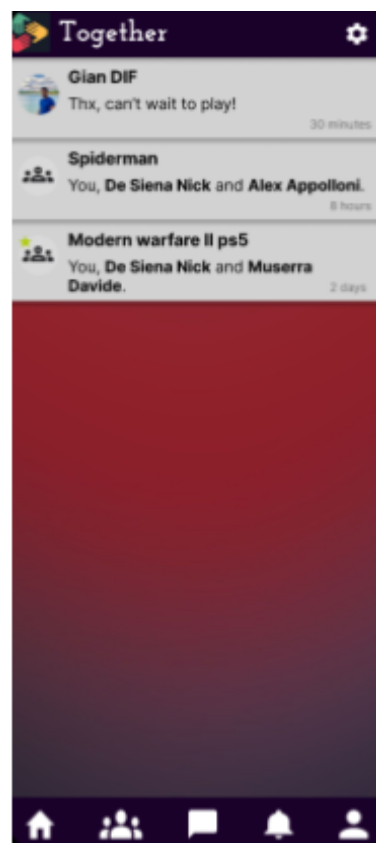Sign Up Page 1

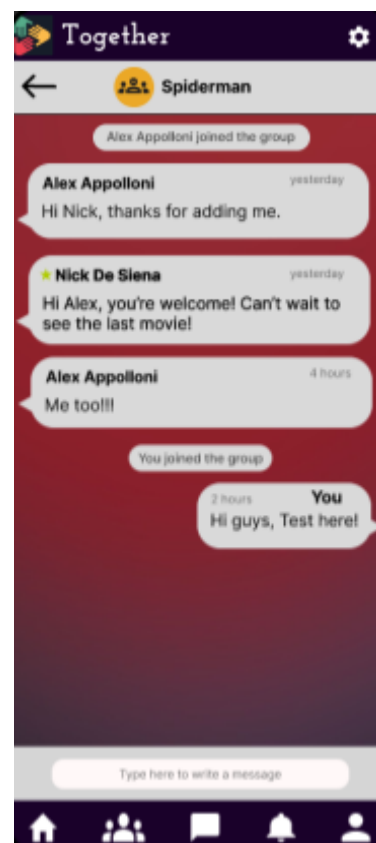Sign Up Page 2

Sign Up Page 3

Home Page

Notification Page
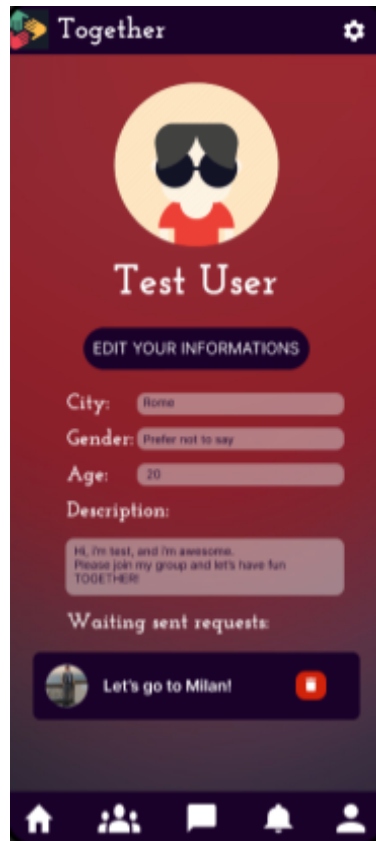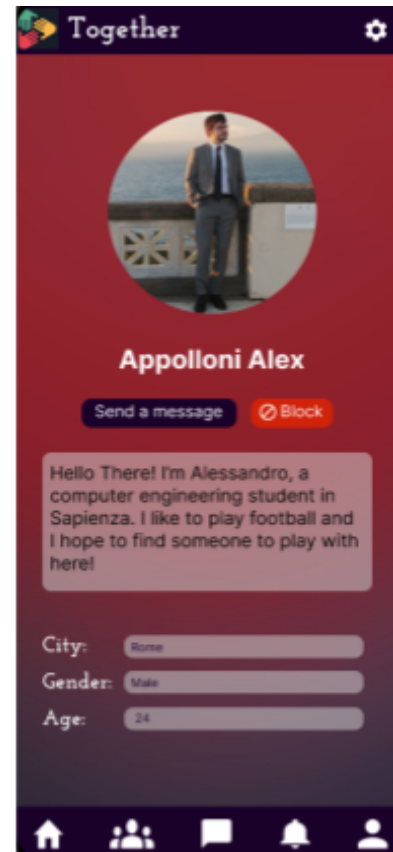
My Groups Page
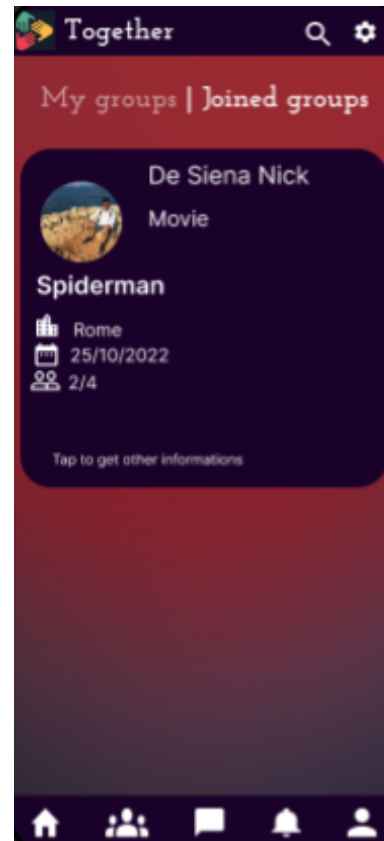
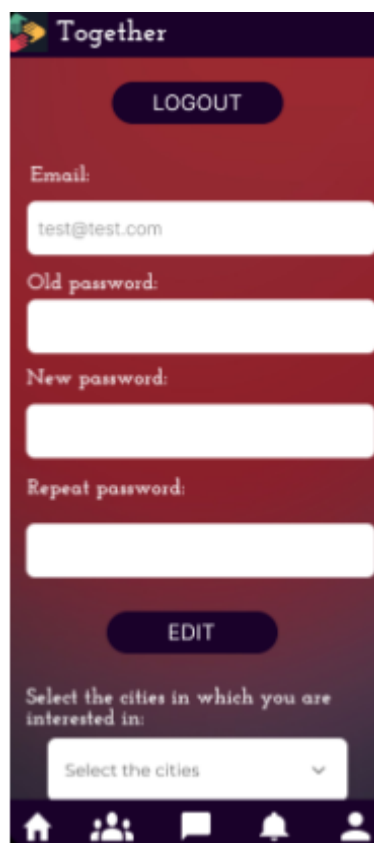

Joined Groups Page

Chat Page 1
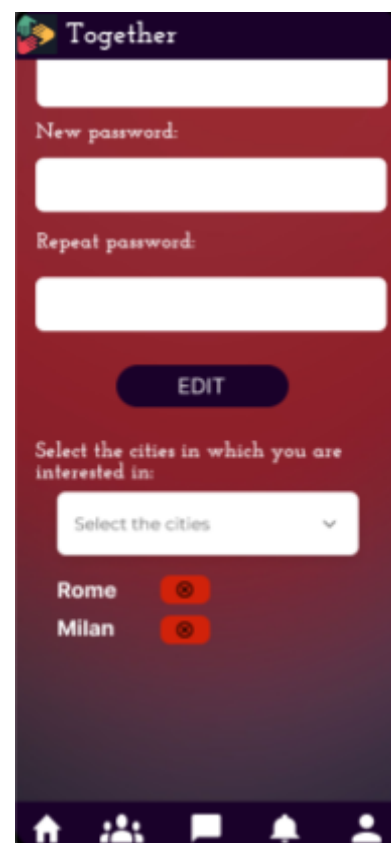

Chat Page 2

Profile Page

Personal Profile Page

Settings Page 1

Settings Page 2

8. Conclusion

This project gave us the opportunity to understand how must be managed the process of creating an application, in order to focus both on the users needs and on the project's team working.
We have understood the importance of basing each step of the development on the collected information about the average users demands, in such a way that the final product of each step was gradually closer to the users expectation. Eventually, by understanding the difficulties of each step, we have been able to improve both our working methods and our approach to the problems.

In the near future, the application will be improved by adding some new features, with the aim of providing a better user experience. We are currently working on the implementation of the idea with a mobile application developed in Android.