26/03/2023

Low Fidelity prototypes and planning of first usability evaluation

Human-Computer Interaction Project

Team 03

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1 Competing designs

1.1 Introduction to the designs

The two designs differ mainly in the central conceptual metaphor: “your personal trainer” and “your tournament sheet”. The first one is based on a personal trainer/coach that guides the user through the different sections of the app, to take full advantage of the available functionalities. The second design, on the contrary, tries to simulate a sheet in which you note the different results of the games, with a hierarchy menu.

Another major difference will be the interaction styles: for the design of the personal trainer, we have decided to keep a direct manipulation of the elements; and for the tournament sheet, the idea is to be menu and form-based.

1.2 First design: Your personal trainer

1.2.1 Viewpoint

Problem: The user, when organising or joining an activity, must consider a series of factors: the place where it will take place and its conditions, the group of people that will be invited, the level of mastery of the players, if there is the appropriate material... To do this, it uses various unrelated systems such as Google Maps, WhatsApp, the Google search engine... Tasks are slow down because of this, and people not replying to messages is also a problem.

Additionally, we observed during the interviews that the improviser does not like to navigate through the application, so we need to make a platform attractive to this profile.

Opportunity: Users already use their mobile phones to carry out these tasks and, in addition, these devices can host large applications with a wide range of functionalities inside them: they allow communication between different users, navigation with a map, etc.

Moreover, the improvising profile was more focused on playing and discovering than on organising routes to get to the site.

Solution: The idea is to provide an application that brings together all the functionalities needed in the field of sports, so that the user does not need to have different applications installed to perform the different activities required: communication, searching for facilities, finding information about them, creating and registering for tournaments, etc.

Furthermore, if we include some “gamification” through direct manipulation interaction, the improviser user could find the interface more attractive because it contains less information. It requires less mental effort, and thus the user can go directly to the option he/she wants to access. Moreover, the interface is more playful, so some users could think that it is more engaging to use.

1.2.2 Interaction devices and styles

The interaction device that we have decided to use for our application is a mobile phone, but, in the future, it could be implemented for a laptop or computer in the form of a web page as well since, for instance, finding a field and registering for an activity can be done on both devices. However, the mobile phone offers greater benefits such as easy navigation of users from their starting point to the right field; or a renting service for equipment (that also require the use of a mobile phone). Furthermore, during the research, we observed that most of the users preferred using mobile phones.

The first design (personal trainer) will make use of direct manipulation as the interaction style. Examples are dragging an object to select the sport, zooming in and out on a map and navigating through it, scrolling through information, map, and images, dragging a product to the shopping cart to rent it, using the hands of a clock to change the hour, dragging sliders to filter, or scanning a QR code.

1.2.3 Scenario or storyboard

One of the users of the app is called Mark. His goal, in the end, is to find a basketball court that complies with his requirements, create a training session for the team, join an activity and rent a ball when he arrives at the court.

Mark is a free spirit, and he enjoys going around the city carelessly and finding some places where he can play basketball and meet new people on the pitch. Mark likes being part of communities and doing activities with the members. However, he often lacks information about gatherings and most of the time he misses good opportunities to play and network.

The application City Sports Seeker can help him out in this situation. The solution offers him a good overview of the fields in the city. He can have more information about all the public places where he can practise sport, such as the facilities nearby or the state of those places; and meet new people. Also, there is the possibility to see the activities that are registered there so he can easily know when and where they are and join them. On the other hand, he can also create new activities in order to connect with new players.

Most of the time Mark does not bring any equipment with himself and that prevents him from practising some sports. When he enters the field, there is a box with shirts and basketballs. Using the app, he can open the box with a code to rent the ball he wishes to use throughout the training. After the activity, he returns the ball to the box, which recognizes the object using sensors.

1.2.4 Low Fidelity prototype (video)

The link to the video in which we perform the different tasks in prototype 1 is the following one:

Prototype1.mp4

1.3 Second design: Your tournament sheet

1.3.1 Viewpoint

The viewpoint is similar to the one described for the personal trainer design since the problem, opportunity and solution related to the mobile phone do not vary. In contrast, this prototype is more focused on the planning user, as will be described below.

Problem: The user, when organising or joining an activity, must consider a series of factors: the place where it will take place and its conditions, the group of people that will be invited, the level of mastery of the players, if there is the appropriate material... To do this, it uses various unrelated systems such as Google Maps, WhatsApp, the Google search engine... Tasks are slow down because of this, and people not replying to messages is also a problem.

Another problem is that, for the planner user, as he/she wants to have everything organised, this distribution of information in different applications does not let him/her have everything under control.

Opportunity: Users already use their mobile phones to carry out these tasks and, in addition, these devices can host large applications with a wide range of functionalities inside them: they allow communication between different users, navigation using the search engine, etc.

For the planner user, the opportunity is the inexistence of an application that let him/her get all the information necessary to find a field, join or create an activity, etc.

Solution: The idea is to provide an application that brings together all the functionalities needed in the field of sports, so that you don't have to have different applications installed to perform the different activities required: communication, searching for facilities, finding information about them, creating and registering for tournaments, etc.

Moreover, with this interface where the information is more compact and the interaction does not include as much gamification, the planner will be able to access the data he/she requests, quickly, with the functionalities integrated into one single platform.

1.3.2 Interaction devices and styles

The interaction device that we have decided to use for our application is a mobile phone, but, in the future, it could be implemented for a laptop or computer in the form of a web page as well. Finding a field and registering for an activity can be done on both devices. However, the mobile phone is more advantageous in its use as the app can navigate the user from their starting point to the right field and for renting equipment you also need a mobile phone. Furthermore, during the research we observed that most of the users preferred using mobile phones.

The second design (tournament sheet) will make use of menus and forms as interaction style. Examples are clicking a button to select the sport, selecting a field from a list, using drop-down menus to find more information, clicking a button to add products to the shopping cart, using a calendar to create an activity at the right date and time, selecting boxes to filter, or typing a code to use the equipment rental.

1.3.3 Scenario or storyboard

Another user of the app is called Sam. His goal, in the end, is to find a basketball court that complies with his requirements, create a training session for the team, join an activity and rent a ball when he arrives at the court.

Sam is relatively new to the city of Madrid, and he loves playing basketball outside in the city. He joined a team recently. Sam enjoys being the leader of the group and to organize events to bring people together. He noticed that it can be hard to organize basketball activities due to a lack of clear communication with his team via WhatsApp and as everyone lives somewhere else it can be challenging to find a good place.

The application City Sports Seeker can help him out in this situation. The first solution offers him a good overview of the fields in the city. He can choose a field based on his wishes and preferences. Without the need to go to the field, Sam will know the state and conditions of the field.

Another solution offered by the application is the creation and registration of sports activities. The team players can join the training by registering themselves when Sam created an activity (for example a training). Using this, he will have a clear overview of the attendance of his friends.

Sometimes, Sam does not have the right equipment (e.g., a basketball) to perform the training. In some cases, the ball is not inflated enough for example. When he enters the field, there is a box with shirts and basketballs. Using the app and the QR code attached to the box, he can rent the material he wishes to use. After the activity, he returns the material.

1.3.4 Low fidelity prototype (video)

The link to the video in which we perform the different tasks in prototype 2 is the following one:

Prototype2.mp4

2 Planning of the usability testing

2.1 Evaluation goals

Perform a usability testing of the two low-fidelity prototypes, with special interest in how well each prototype fits the mental models of the participants. The usability testing will be performed using the "thinking-aloud" technique. During the test, we will measure effectiveness, efficiency, and user satisfaction.

2.2 Dates, places, and roles

Test	Date and time	Place	Comments
1	28/03/2022 18:00 – 20:00h	IMDEA building, booked room	We are going to perform the test with **2** users, and each of them will take around 45 minutes, but we will schedule one hour in case someone needs more time
2	29/03/2022 15:00 - 19:00h	IMDEA building, booked room	We are going to perform the test with **4** users, and each of them will take around 45 minutes, but we will schedule one hour in case someone needs more time
3	30/03/2022 16:00 - 20:00h	IMDEA building, booked room	We are going to perform the test with **4** users, and each of them will take around 45 minutes, but we will schedule one hour in case someone needs more time

Test	"Computer"	Facilitator	Observers
1	Matteo	Iris	María, If
2	Iris	Matteo	María, If
3	María	If	Matteo, Iris
4	If	María	Matteo, Iris
5	Matteo	Iris	María, If
6	Iris	Matteo	María, If
7	María	If	Matteo, Iris
8	If	María	Matte, Iris
9	Matteo	Iris	María, If

10	If	Matteo	María, Iris

2.3 Participants

Participants	10
Recruiting	We will recruit our colleagues from EIT to do the usability testing. Furthermore, we will ask some people who are in a basketball WhatsApp group of the Moncloa court where we conducted the observation. One of our team members is part of that group. In return, we invited them for a drink in Madrid. Before the test, we will ask them some short questions to find out whether they are more a planner or improviser type as we expect to see different results in testing the two different prototypes. We hope half of the group to be of the planner type and the other half of the improviser type, but we do not know beforehand. As the magic number is about 6 for a user test to be useful, we decided to go for 10 participants. As we have a tight schedule, and the testing takes about 45 minutes for each participant, we think we cannot recruit more participants than 10 since we think it will be good enough to find significant results.

2.4 Sequence

2.4.1 Welcome text

Good morning/afternoon/evening.

We are students in a master called Human-Computer Interaction and Design in which we have designed a mobile application and it is likely to contain design errors. We are trying to find out where those errors are and the best way to do it is by undertaking this kind of observation on potential users trying to use the system.

The app does not exist yet, but we have drawn the whole flow as a mobile prototype directly on paper. You should try to use it, proceeding with the goal of finalizing a series of tasks through the system. It is important that you tell us when you think you have finished a task, so we can continue with the next one.

Your feedback is really important to us, so we would like you to explain aloud to us every step, every interaction you are going to undertake with the prototype, all along your attempt, clarifying why you do it and what you are going to expect from the interaction. Do not hesitate to tell us that things are confusing to you or that in your opinion something is not well done or even not right. If you get stuck at some point, we cannot give you any feedback until you finish the task but, if at any moment you do not know how to continue and wish to stop, let us know and we will do so.

These people here with me are my teammates, they are going to take notes and observe what happens, to try to identify every detail during the process. Of course, this information will be confidential, and we are not going to note your name anywhere to maintain your anonymity. Finally, our “computer” here, is in charge to handle the prototype to simulate the various interactions you are going to perform in the system.

We will perform two tests with two different designs and at the end of each one we will give you a satisfaction questionnaire and ask you some more questions.

Before starting, do you have any questions?

2.4.2 Process

1. Say the “welcome text” (2.4.1) to the participant.
2. Gather personal information (2.5).
3. Do the usability testing of one of the prototypes. Ask the participant to perform the tasks (2.6), gather data (2.7) and observations (2.8).
4. After using the prototype, ask the participant to fulfil the user satisfaction questionnaire (2.9) and ask for general impressions (2.10).
5. Repeat 3, 4 for the other prototype.

2.5 Personal information questionnaire

This questionnaire will be performed using the Google Forms platform in order to gather demographic information from participants. The form can be distributed to participants via email or by sending the shared link. The information collected from this form will help the project team to understand the characteristics of the participants, how they interact with technology, which kind of users have difficulties with the prototypes being tested and their profile type (improviser or planner).

Here's the questionnaire in detail:

Participant ID	
Date of test	
Time of test	
Age	
Gender	
Amount of time per day using personal computers (in hours)	
Amount of time per day using smartphones (in hours)	
Do you consider yourself a tech-savvy person? (Yes, No, Somewhat)	
Have you ever participated in a usability test before? If yes, how frequently do you participate in usability tests? (Frequently, Occasionally, Rarely)	
What is your highest level of education? (High School, Bachelor's degree, Master's degree, Doctorate degree, Other)	
Do you usually go to a court/pitch and ask there to play? (Yes/No)	
Do you usually plan where to go and with who, when you want to train/play some sports? (Yes/No)	

2.6 Tasks to be performed by participants

Task	1
Title	Searching for a field and saving to favourites

Starting situation	It is nine in the morning, you are at home, but you want to go out to play basketball at a court nearby your house in Moncloa, at six o'clock in the evening.
Task instructions	Find a field near Moncloa (less than 2 kilometres from the current location) with drinking fountains and toilets nearby; and check if it would be crowded at six. Save the field in your favourites so you can find it back more easily.

Task	2
Title	Joining a training session
Starting situation	Today is 24th of May, and you want to play basketball with other people during one of the next days.
Task instructions	Sign up for a training session in your previously saved search (Moncloa pitch, the one in Los Carmenes) in the next two days, after 18:00.

Task	3 (for the first prototype, the personal trainer design)
Title	Renting equipment: Add balls to the shopping cart
Starting situation	You are on the basketball court in Moncloa and suddenly the ball has a leak. Then, you want to rent some of them to train and, as the court is crowded, you are thinking about renting one or two more to play in the meantime with your small brothers, so you go to the boxes to do so.
Task instructions	Add a professional and a children's ball to your shopping cart, using the following code that you have seen on the surface of the box:

Task	3 (for the second prototype, the tournament sheet design)
Title	Renting equipment: Add balls to the shopping cart
Starting situation	You are on the basketball court in Moncloa and suddenly the ball has a leak. Then, you want to rent some of them to train and, as the court is crowded, you are thinking about renting one or two more to play in the meantime with you small brothers, so you go to the boxes to do so.
Task instructions	Add a professional and a children's ball to your shopping cart, using the following code that you have seen on the surface of the box: 123456

Task	4
Title	Renting equipment: Make changes to the shopping cart and collect items
Starting situation	You change your mind and want to continue with only 2 professional balls instead.
Task instructions	Change your shopping cart and pick up only 2 professional balls.

Task	5
Title	Creating an event
Starting situation	You are thinking of organizing a basketball training game between some of your teammates from your club and other people who would like to play against your team.
Task instructions	Create a training for Friday 10th May of 2023 from 16:00 to 18:00 named "Training for upcoming competition" which will be held at "Moncloa" pitch and invite your two friends "James Smith" and "Will Johnson" in a team called "Padreada".

2.7 Objective measurements

Measurement	**Description**
Actions	Number of elemental actions performed (click, tap, …) to complete one task.
Mistakes	Number of mistakes made during one task.
Success	Yes/no (whether the participant succeeds at completing the task).

2.8 Observation sheet

Our observation template will consist of five repetitions of the table below, one for each of the tasks. We will have a separate template for each prototype to make it easier for us to collect the information.

Participant ID		**Prototype number**		**Task number**	1
Number of actions		**Number of errors**		**Success**	
Observations					

Participant ID		**Prototype number**		**Task number**	2
Number of actions		**Number of errors**		**Success**	
Observations					

Participant ID		Prototype number		Task number	3
Number of actions		**Number of errors**		**Success**	
Observations					

Participant ID		Prototype number		Task number	4
Number of actions		**Number of errors**		**Success**	
Observations					

Participant ID		Prototype number		Task number	5
Number of actions		**Number of errors**		**Success**	
Observations					

2.9 User satisfaction: SUS questionnaire

Participant ID	
Evaluated prototype	
Date and time	

Reply with your degree of agreement or disagreement to the following ten sentences, where 1 means “I totally disagree with the sentence” and 5 means “I totally agree with the sentence”.

	1	2	3	4	5
I think that I would like to use this system frequently.					
I found the system unnecessarily complex.					
I thought the system was easy to use.					
I think that I would need the support of a technical person to be able to use this system.					
I found the various functions in this system were well integrated.					
I thought there was too much inconsistency in this system.					
I would imagine that most people would learn to use this system very quickly.					
I found the system very cumbersome to use.					
I felt very confident using the system.					
I needed to learn a lot of things before I could get going with this system.					

2.10 General impressions

Participant ID	
Evaluated prototype	
Date and time	
1. What are the main problems you have found while using this prototype?	
2. What is the part of the prototype that has been more difficult to understand? Why?	
3. Can you describe your overall experience with this prototype?	
4. Do you usually do tasks similar to the ones you have done in the test? If so, which ones and how?	
5. Which is the prototype that you prefer? Why?	
6. What have you liked the most of each prototype?	

We have included a new question (number 4) in order to see if the user is familiar with this type of task. Questions 4, 5 and 6 are only made when the participant has used both prototypes.