Perm'App Culture : The app to lean how to garden durably

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Abstract

This article presents the diferent stages and activities during the user-centred designing process for the development of the mobile application Perm'App Culture, it includes a brief description of them.

***Keywords*—** Permaculture, Plant, Garden, Sustentable , User-centered design.

Introduction

Pablo Servigne, a french scientist, has writed a book about the collapse of our society. It's not a fantasy book, it's a scientist book with real fact and the conclusion is : We will have to deal with all the usual thinks without petrol.

Indeed, petrol is the base of all in our society, we use it to make clothe, medicine, ... and **food**.

The question is : *How to feed the planet without petrol and all the advantages this substance can bring to our society ?*

Pablo Servigne tell in the future, the persons in the cities will have to garden to have food, just like in the Paris of the 19 century. He said, it will be persons who don't know a thing about permaculture who will go to this direction.

To deal with this important amount of new gardener, we have think about an application which can help all the news apprentices to develop their skills in gardening.

Main Goal

Our main goal is to make that application a place for all the people who want to learn about permaculture. We have choose a mobile application because the people can carry their phone in any place their want, so to garden is easier. We have think our application like a game to make the learning easier and funny for the user. Moreover, we want also to help the transition between an industrial agriculture and a durable agriculture. There is a better way than to form new farmer ?

Justification

Necessity Like I said up-there, we are facing to the end of our society because of our way of consumption. If we want to avoid a brutal destruction of our society we have to stop to exploit the fossil energies. This decision lead to reinvent our way of consumption including for the food. We have to engage a global transition to a renewable society to repair our planet and avoid an ecologic disaster. One way of doing that in the world of the agriculture is to stop the industrial way of production to pass to a intensive permaculture way. With this method, we can have several harvest during the year, we are more productive in a smaller space and we do not degrade our ground.

Social relevance The social relevance here is obvious. We help the people to take back their way to feed. They eat better because they have better product. In the same time they are healthier, they move more because to garden you have to spend energy. And when you do permaculture you don't use electronic device or motor device, you have to use your hand and your head, so you have to be more than one to garden. It can help people to connect to each other.

Theoretical valour To make our application we will have to learn lot of things about permaculture to synthesise all of this in articles, videos and tutorials. Our documentation will be made with similar articles, books and videos through the world. Of course all of our inspiration will be referenced. So, this made our application a great souce of knowledge about permaculture and it can be use all around the world.

Methodology utility We use a method (for the investigation process and for the user proof) which give complete and detailed result. In the same way it allow to reproduce the investigation for another result validation here an in any part of the world.

Technological utility The final product, the mobile application, can inspire other group to develop other application in the same idea. The idea to help people to make their daily a better daily. This application will be develop to an area specific in the first place, because we will not have unlimited resources to make an application which can adapt itself to whatever place. But we can imagine the idea of our application in another country easily. So, if our application work well, other application can be created so it develop the technology interest.

Theoretical Framework

All of those documents have served as motivation and sources of informations for the development of this application.

Une autre fin du monde est possible (An other "end of the world" is possible)

[7] This book is talking about the collapse of our society as we know it. It's based in scientific fact and Pablo Sevigne wrote it to warn people about what it is going on. He talk about the possible

scenarios of the end of the world but he also speak about how to go out of this crisis. One of this solution is to adopt the permaculture as the main way of production and it's with this book we started to think about helping people to adopt permaculture with our application.

Nourrir lEurope en temps de crise. Vers des systmes alimentaires rsilients (Feed Europe in crisis time. To resilient food system)

[8] This article deal with the necessity to find another way to feed Europe if there is no more petrol to the industrial system of production. Its a call for the European leader to ask them to think about a possible transition to avoid a bad surprise. Pablo Sevigne show in the first place the drawbacks of the actual system, then he talk about the system of tomorrow and the necessity to secure the cities and finally he write about the rural world and the necessity of a transition. This article is a focus in the European system but the conclusion can be extended to the whole world.

Permaculture: Principles and Pathways Beyond Sustainability Revised

[3] In this book, David Holmgren put in the table the basics of the permaculture. He enounces the state of mind a permaculter have to be. He talk about the 12 principles of the permaculture and with the help of this book we try to pass those principles to the user of our app.

Sustainable Agriculture and Resistance

[2] As you probably know Cuba was under United States blocus since date. The government has to find a way to feed his people so they ask to Australian permaculter to come in the country to think the whole system. This book talk about how Cuba managed to turn his industrial food system in a sustainable food system. This book inspired us because it show its possible to apply permaculture to a whole country.

The Earth Care Manual

[9] The Earth Care Manual is more a North Climate Care Manual but at the contrary to the Davis Holmgren book it provides practical council about: How to do permaculture. Its one of the first Encyclopedias of its kind.

Permaculture, a Beginners Guide

[1] This book is for us the paper version of our application. Just like the author we want to make the permaculture accessible for all of us but with a modern medium. This book it a concentrate of technique and council, you can read it from 5 years old to 120 years old without problem. Its full of illustrations and schemas. We have kept the simplicity and the visual aspect of explanations in our app.

Part 1, A brief history of Permaculture

[4] This website page was created to provide to people a basic knowledge about permaculture. In this part of the website we learn about the history of the permaculture. Its good to know how and why this technique was created to understand why is this technique we have to put in place in our society to provide food to the population.

Part 2, What is permaculture?

[5] This website page was created to provide to people a basic knowledge about permaculture. In this part of the website we learn about : What is permaculture. Those basics informations about this subject helped us to see how to provide simple informations to a beginner about permaculture. As our application is mainly made to people who know nothing to permaculture it was good for us to improve a webpage for beginners.

Materials and Methodology

Throughout the project, it was considered prudent to make a total separation between the requirements of the application and the design of it. This approach allows us to obtain a really focused product in the user. Moreover, the development team can be here during the verification and the validation of the requirements.

Project problem and definition

In the first place we choose the problematic of the production of the food because it will be the main problem of the 21 century and it mix social issues with environmental issues. We started to think about an application because right know it's the thing the most of the people can have quickly and easily. The Paul Sevigne video conference was the start of all our documentation and all our way of thinking. Thanks to him we find other books and articles who are in our bibliography right know. When the theoretical part was getting, we started to write the context of our app, the state of the existing and what we want the app intent to look.

Engineering requirements

It is at this stage where the user-centred design really starts. The software project medium complexity success is given, in large, part by the effort and the time spent in the engineering of requirements. It's essential if you want to have a design which really reflect the users needs. In our case, we spent the more time we have could in the time we had. We studies lots of design of application to take the best of them and offer a unique experience to the user. We have spent also a lot of time in the stakeholders identification and obtaining of requirements through different education techniques.

Definition of the user needs We have define in this section three different type of person who can use our app and three examples of person.

Young gardener	
Age :	18 – 30 years old
Gender :	Male or Female
Marital status :	Alone or in Cohabitant
Location :	City of medium sized to big city
Professional status :	Student or Young worker
Technology Levels :	Good, Used to work with computer and smartphone
Domain Knowledge :	Normal level but very few in gardening
Learning style :	More used to learn on web site or App than old medium like book or review

Figure 1: User 1 type profiles

Medium age gardener	
Age :	31 - 55 years old
Gender :	Male or Female
Marital status :	Cohabitant or Married
Location :	All the French country
Professional status :	Worker
Technology Levels :	Basic to good (Known how to use computer and smartphone but not addict like the young generation)
Domain Knowledge :	Normal to high and good level in gardening
Learning style :	More used to learn on a book and know they start to learn on internet but with few trust.

Figure 2: User 2 type profiles

Old gardener	
Age :	55 years old or more
Gender :	Male or Female
Marital status :	Alone or married
Location :	City of medium sized to big city
Professional status :	Old worker or retired
Technology Levels :	Bad, Difficulty to use an computer or smartphone if they have one
Domain Knowledge :	Good level with a lot of knowledge in gardening
Learning style :	Book or reviews only

Figure 3: User 3 type profiles

For the obtaining of requirements, we have realise an analysis of wishes and necessity. We have detailed profiles for the designing of stakeholders. We have built profiles and scenario from the user type profiles to have an idea of the type of person we have to ask for the proof.

Requirements specification We have design the requirements specification thanks to the work in the profiles and to the documentation we read. The requirements specification document was obtained thanks to the IR process. This document give us a good base to start to design the application.

Graphic interface design

We actually know what we want to put in our application and what type of user we will meet. The first thing we have made is to find the number of button we need to provide to the user the application we have imagines. Then we have define a colour set to make an anchor in the spirit of the user to make him thing about our app when he will see a garden. You can see in the figure 4 what the app look like.

[*We only will take the main page to show you the difference of design between before and after.*]

Figure 4: First design of the main-page

Development of the Application Prototype

As you have probably seen, there is lot of interaction possible in this first design and as we want to make an application to new gardener we have decide to simplify a lot the main-page. We have also drop some specifications such as :

- Community tutorial
- Forum
- Articles
- News

All those interaction wasn't necessary or add non-useful complexity to the app.

At the end, we have re-centred the application in the user and made a second version more in adequacy with the user expectation.

You can see it to the figure 5.

Figure 5: Second design of the main-page

At the end we have had a little headband at the top of the screen to keep an item all along the operation of the app. The rest of the buttons stay at the same place but arranged differently.

Proof of Usability

The last step of our project was the proof of usability. After a reflection about how many user we will need to make it. In accordance with Jakob Nielsen [6] we will done it with 5 Users. Three of them will be our young gardener profile and the two remaining will be the medium age gardener profile. Proof main's goal will be to verified that the production made is in adequacy with the user's utilisation. Different characteristics of the App will be evaluate by our proof. The main one will be of course the navigation and how it's easy or difficult for a user to realise a task in our App. A second but not less important is for each menu, information page to know

if it's user friendly with the information and possibility given. After viewing some usability tools one the web and the functionality they offer, we've decided to make our on proof base on existing type of test. For software reason we haven't made the 5 seconds test, which we found very interesting. The alternative test we've decide to done are :

- **First Click test:** Ask to the user with one task, or not to say where they will naturally spend there first click. This test will allowed us to know if for a beginner our App is good design to make the user encounter the good information.

- **Navigation test:** To show the reliability of our flow in order to complete an action. It's important to be sure all navigation step is important and useful for the user.

- **Design surveying:** It's the most basic test but not useless one. It will help us to understand what the user feel in front of a menu and shown user's comprehension and difficulty on each page of the App.

It's with the combination of this 3 test that our proof of usability was designed with a last part designed as a feedback after using the app to know their feeling and what they've remember during off the App characteristic.

Results

The first click test shows us where the user want to go after opening the "How to begin" but combined with the survey designing we find out that 3 of the five users where going to this section for bad reason searching more than instruction and help about how work the App than information and tutorial about permaculture. A reflection about changing the name of this section is now an obligation. The other question about the design shown that's this menu is well design without giving too much information to the users.
To Follow on the How to begin section, The navigation system is find by all the user as a good one with a good side of helping the user to find information they want. The article lecture was find difficult by two users for the size of the Font and for one because of the font choose. Design of article need to be review. The information was find easily but the heart of the lecture was difficult to read, a reflection need to be done to adapt the reading for the platform which of course limit the quantity of text we can show.
The lecture of a video and presentation of them in both category (theory, practical) is well, none problem have been shown through the survey. Tutorial which wasn't part of the test was find by the 3 users which have encounter it as well design and pretty intuitive for following it.
The different test has revealed that's the word "Dictionary" use in our first menu has been well interpreted and user has a well understanding of what is behind this section. The only problem is located in the following screen where three decorating icon are interpreted as possible interaction, by 3 users, to categorise the result of the research in the dictionary. You can see on the following picture, the icon badly understanding with red square around.

The rest of the dictionary part was finding good and without navigation our design problem by most of the users.
Even if the name and the section was goodly understanding by 4 of the users, some of them have use this section for finding information about a plant instead of going in the dictionary, a bad navigation that's correcting by the presence of the dictionary information page about a plant in this section.
Finally a section that's we have very take care off "My Garden" section. Different test realise on this section shown that the menu has been appreciate by all the users. Even if only two users have

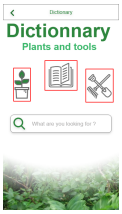

Figure 6: Icon use as UI component in Dictionary page

truly understanding the meaning of the different icon present on the page three of them have find adequate the icon for the plant which have some fruits and only one haven't find it adequate for the plant which need an action. On the information page of a plant, the users was pretty satisfied of the information presented and the design. The reminder haven't been well understanding by most of the users but they have find them useful.

Project Conclusion

The project had shown us the different step of the development of an User interface. Starting from a idea of helping the others people was a good motivation to the project, the specification and the definition was pretty clear after a brainstorming. This profile which doesn't leave us during all the development. Another learning aspect that the project show us was to realise that even if we try to make empathy for the different user's profile during all the project. The final production can have some unclear function and other bad design stuff, the best example was the bad understanding of the How to begin section by all the users. That remind us to always confronted our solution to the real user and not only design it and thinks that's we know better which design are good for the users. Some adjustment need to be done on the User Interface to reach an almost perfect usabilty for our users.

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References

Graham Burnett. *Permaculture, a Beginners Guide*, volume 88. Broch, 2008.

Martin Bourque Nilda Perez Peter Rosset Fernando Funes, Luis Garcia. *Sustainable Agriculture and Resistance*, volume 320. Food First Books, 2002.

David Holmgren. *Permaculture: Principles and Pathways Beyond Sustainability Revised*, volume 280. Meliodora, 2002.

Valentin Kunze. Part 1, a brief history of permaculture. https://thepermaculturecollective.com/part-1-history-of-permaculture/?fbclid=IwAR0GsQh_CBcp − 0A2gpGBkXbFcitcswwYvolbeRoYnUnZqXOjMjtdV8ClKA.Acc 23 − 03 − 2018.

Valentin Kunze. Part 2, what is permaculture? https://thepermaculturecollective.com/part-2-what-is-permaculture/?fbclid=IwAR19P3ZK3$_t Jypt7UFqrixYfTIMdOtFMI6qcxgEe43gwhJdLy5owJBDd2vE. Accessed: 23 - 03 - 2018.

Jakob Nielsen. Why you only need to test 5 users? https://www.nngroup.com/articles/why-you-only-need-to-test-with-5-users/. Accessed: 19-03-2000.

Gauthier Chapelle Pablo Servigne, Raphal Stevens. *Une autre fin du monde est possible*, volume 336. Anthropocne, 2018.

Pablo Servigne. *Nourrir lEurope en temps de crise. Vers des systmes alimentaires rsilients*, volume 208. Babel, 2014.

Patrick Whitefield. *The Earth Care Manual*, volume 480. Permanent Publications, 2004.