



Escola Politècnica Superior
d'Enginyeria de Vilanova i la Geltrú

UNIVERSITAT POLITÈCNICA DE CATALUNYA



nutrapp

Final Report



Gabriella Rizzo	Kara Jelley	Kim de Boer	Afif Norazmi	Kacper Korona
Age: 22 From: UK	Age: 21 From: USA	Age: 21 From: The Netherlands	Age: 24 From: Malaysia	Age: 21 From: Poland
Product Design at Nottingham Trent University	Engineering Management & International Spanish Minor at Michigan Technological University	Human Technology at Hanze University of Applied Sciences	Electronic and Industrial Automation Engineering at UPC	Telecommunications and Computer Science at Lodz University of Technology

Table of Contents

1. Introduction	2
2. Research	3
2.1 Human Interaction	3
Positive aspects of HCI with mobile devices	6
Interaction design tips for mobile applications	6
Usability of mobile applications: the PACMAD usability model	7
Attributes of usability	8
2.2 Similar Products	12
2.3 Impact of Online Coaching on Users	15
2.4 Target Market Research	15
Project Process	21
3. Managerial Approach	21
3.1. The Project Brief	21
3.2 The Basic Elements Model	22
3.3 Framework and the problem to be solved	23
3.4 Goals Definition	24
3.5 Constraints	24
4. Design Process	25
4.1 Layout Ideas	25
4.2 Sketches	25
4.3 Determining the Design According to Market Analysis	27
4.4 Determination of the Layout	28
5. Programming Process	29
5.1 Benefits of Android	29
5.2 User Flow	29
5.3 Features	29
5.4 Accessing Data from the Web	30
5.5 Chat SDK	30
5.6 Chat SDK Integration into the Project	31
5.7 Custom Interface	32
5.8 Translation	32
5.10 Problems Faced	33
6. Application Interface	34
6.1 Navigating Your Way Through the Application	34

6.2 The Look of the Application Interface.....	36
7. User’s Manual	36
8. Test and Evaluation Results	37
9. Future Improvements	40
10. Conclusion	40
11. Acknowledgements	41
12. Bibliography	42
Appendix I - Nutrapp Customer Survey	43
Appendix II - How to Download Application Instructions	45
Appendix III - Nutrapp Mobile App Questionnaire	46
Annex I - Application Code	47

List of Figures

Figure 1 Mobile Maturity	3
Figure 2: Wonder Workshop.....	4
Figure 3: NetVibes.....	4
Figure 4: Mokey Mojo.....	5
Figure 6: Comparison of other usability model - attributes of usability.....	8
Figure 6: Basic Elements Model.....	23
Figure 7: Layout designs.....	28
Figure 8: JSON is accessible from Dropbox.....	30
Figure 9: Chat database is managed by Firebase.....	31
Figure 10: Comparison between original and custom interface	32
Figure 11: Webpage is converted to WebView	33
Figure 12: Welcome screen	34
Figure 13: Homepage.....	34
Figure 14: Services	34
Figure 15: News	34
Figure 16: Chat login	34
Figure 17: Chat thread list.....	34
Figure 18: Chat thread	35
Figure 19: Chat profile	35

List of Tables

Table 1: Human Interaction and its relation with Nutrapp project.....	11
Table 2: Lark features.....	12
Table 3: MyFitnessPal	13
Table 4: Nutrino features.....	13
Table 5: Comparison between the apps	15
Table 6: Project specification	22
Table 7: Sketches	27

Abstract

It is the responsibility of one group from the European Project Semester based in Vilanova i la Geltrú to work on a brief supplied by the company Nutrapp, a Spanish based country. The company offers support and guidance in the form of nutritional advice for those that seek it- this mainly being people who suffer from weight issues or have restricted diets among other things. Throughout the duration of the European Project Semester, the team work on designing and programming an application that will enable Nutrapp to prescribe advice to their clients. The initial stages of the project focus on research and learning. Several different research methods are used in the project; it was found that there are a considerable number of similar applications on the market, as a result developing something that is innovative is difficult. At the start of the programming phase, it was deliberated and finally decided that Android Studios would be the chosen tool for the project. The process of the project is clearly outlined, from details on how the project was managed, including time management charts to layout designs and prototyping. The group is inexperienced in this field, had to learn about application design and programming, all of which is included.

1. Introduction

The relationship that society today has with food has changed significantly over the last 60 years. Food has become more readily available. Therefore, some individuals have formed an unhealthy relationship with food, while others find making healthy nutritional choices difficult to make. There are many reasons why people may seek nutritional advice, but what is the best way to deliver this information?

Nutrapp is a Spanish based company that is already helping to change people's behaviour concerning their nutrition, by delivering tailored advice to their customers. The company currently achieves this by implementing a coaching system through their online platform, where they aim to encourage their customers to develop healthy eating habits or perhaps completely change their diet. Currently, Nutrapp is only operating by means of a website, making it a very limited platform of communication for their customers. How can Nutrapp expand their current demographic to reach a wider range of people?

The company are keen to broaden their target market by exploring new demographics and thus expand their company. In a view to solving this problem, Nutrapp would like an application that runs alongside and in conjunction with their current online platform. The main specification for the application is that it must be centred around an online chat, where users of the application can talk directly to Nutrapp's nutrition experts and receive guidance and support. It will be down to the European Project Semester group at the University Polytechnic Catalunya (UPC) based in Vilanova I la Geltru to realise a specific brief and produce an agreement that Nutrapp are satisfied with.

The team assigned to solving Nutrapp application problem, consists of five university students from across the world, studying different strains of either Management, Engineering and Design courses. This team diversity will enable Nutrapp to have an outcome that is realised from many perspectives. Additionally, the variety of cultures will allow for new insights into nutrition.

The team consists of:

- Afif Norazmi, from the University Polytechnic Catalunya (Malaysia)
- Kara Jelley, from Michigan Technological University (USA)
- Kacper Korona, from Lodz University of Technology (Poland)
- Kim De Boer, from Hanze University of Applied Sciences (Netherlands)
- Gabriella Rizzo, from Nottingham Trent University (UK)

European Project Semester (EPS), is a program designed and developed to get like-minded students from around the world and from a spectrum of cultures to work together, towards realising a solution for a brief, often set by a real company or organisation. The team working towards finding a solution to Nutrapp problem are a prime example of a culturally diverse team.

2. Research

2.1 Human Interaction

A Business can benefit from having a mobile application

A mobile application can profit the business to prepare for the future and start to see the massive benefits. It will provide more value to the customers and also build a stronger brand. The most important things a mobile application offers to consumers is awareness and communication with ‘your brand’. The regular interaction with your target market, trust is grown. To demonstrate the users why they should trust your business by showing, rather than telling, what the brand stands for.

A mobile application will connect better with customers. Customer service is not just about face to face communication. Since 2.6 billion people now have high-powered mobile devices within arm’s reach at all times, the true game-changer in customer service is now mobile application. Mobile applications are the answer to raising customer satisfaction across the board because customer service is one of the most important priorities in business.

It will also boost profits. When customer satisfaction increases, sales typically do too. In fact, according to Salesforce, 70 percent of buying experiences are influenced by how customers feel they are being treated.

Nutrapp already has a website with a responsive design that can adapt to any of the various mobile devices there are now. This eliminates the necessity of having a frustrating, secondary “mobile” site to manage. By launching a mobile application in addition to a responsive website, the number of users will increase while enhancing the customer experience.

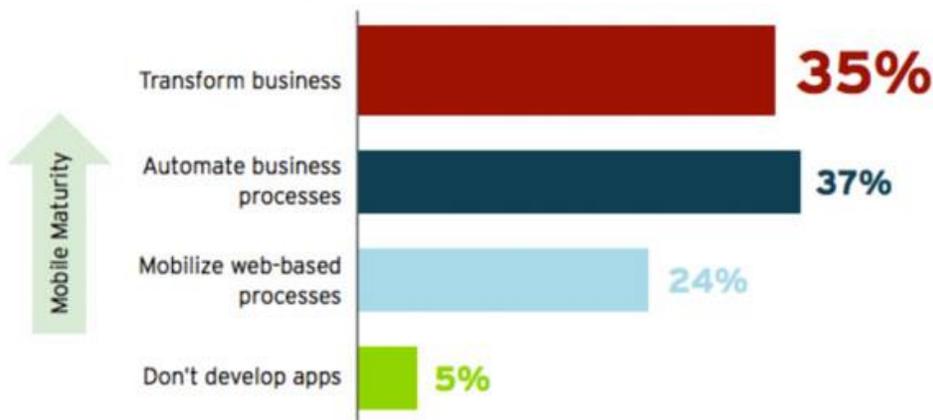


Figure 1 Mobile Maturity

Mobile app designers that change the way of interaction with technology

Good mobile app designers make the most out of technology, but truly disruptive designers fundamentally change the way we use that technology. We are talking about apps that bring out possibilities in a device that nobody had thought of before. Think Siri, who turned the smartphone and tablet into personal assistants (complete with a spunky personality), or Google Maps, which transforms your phone into a turn-by-turn navigator — complete with traffic updates.

These six mobile app designers are completely rethinking the way we use mobile apps and devices:

1. *Wonder Workshop is changing the way children learn with mobile apps and robots.*
Saurabh Gupta is Co-Founder and CTO at Wonder Workshop (@WonderWorkshop). Gupta wants Wonder Workshop's apps to create great mobile app designers and coder, and start them young.

Robots help to get children to want to learn how to code. Wonder Workshop offers four applications – Go, Path, Blockly and Xylo – that teach coding to children through programming physical robots. It is education meets play-time, using technology to bring the two together. “Wonder Workshop's robots, Dash and Dot, not only teach children how to code and program, but they make coding enjoyable and easy to understand for its users, bringing STEM (science, technology, engineering and mathematics) to life for children in grades K-5.”



Figure 2: WONDER WORKSHOP

2. *NetVibes makes the user a god of their own Internet of Things.*
Dashboard of Things is an online dashboard that allows anyone to automate and control all applications, smart devices, activities and data from a single dashboard – no tech no-how required. To design a custom “Potion” by dictating what action a certain event should trigger, and the rest is magic.

An example: If a Potion is created, that can tell your device to check the weather, and if it is going to rain, to post the forecast on Facebook and send a text telling to bring an umbrella with you.

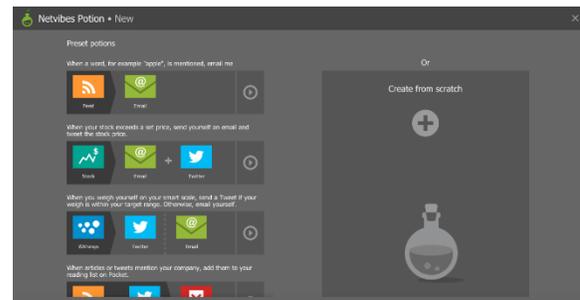


Figure 3: NetVibes

3. *Kaleidescape is disrupting home entertainment.*
Kaleidescape, which makes high-end home-theater video components, uses the iPad in a unique way. It is actually integrated into the user interface of this product. You can use the iPad to order movies (which then automatically download into the video players, which are separate pieces of hardware), and you use the Kaleidescape application as a remote to control the movie players and servers.

The movies are in HD. The movies are extremely high-quality video (same as a Blu-ray disc, which is the highest quality video on the market today). It already exists to set the home alarms, thermostats, music and other home features from mobile devices. In the future, the expectation is that mobile devices will be used to preheat the oven or turn the slow cooker off.

4. *Mollejuo is your whip-smart personal travel guide.*
You know that terrifying feeling of being hopelessly lost in a new city? This application wants to make sure that does not happen again. Augmented reality (AR) is fundamentally changing the relationship with people, their smartphones and the physical world around them. Geolocated AR is a new way of displaying information on mobile phones and tablets. This technology is allowing

people to better guide themselves, by easily seeing in real life where a point of interest (POI) is located. This was of finding a place simply was not available before. “The objective is to help guide people on these cities unknown to them, but these apps can also be helpful to locals.

5. *Textpert; can't find a wingman for Friday night?*

Could crowdsourcing improve your dating game? The app designers at Textpert think so – but they are not stopping there. Falling in love does not get much more sci-fi than that. Most people do not have a full day to sit around and help you, but many people have 30 seconds, 5 minutes, or an hour — and that is where Textpert comes in. Textpert allows you to get on-demand advice on what to text back your crush, whether you met them at a party, a bar, a dating app or church.

6. *Monkey Mojo Games is helping kids catch air.*

“Games that move you” is the tagline for these mobile app designers, and they mean that literally and figuratively. Educator Marc Major, co-founder of Monkey Mojo Games, wanted to build something to bridge the gap between mobile gaming and physical fitness. To make it fun. This application proves that mobile gaming needs to glue one to the couch. Getting your children to be more active may start with a simple app store download.



Figure 4: Mokey Mojo

Great mobile app designers do not necessarily have to push the boundaries of technology, but as these game-changing apps prove, it certainly doesn't hurt. [1]

Human Interaction is very important because informatics applications are created to be used by people via human interaction. Nowadays mobile applications are more used so is necessary to talk about mobile human interaction.

Mobile devices present Human-computer interaction (HCI) designers with five main challenges:

1. *Designing for mobility*

As users are mobile they will not have many of the props around them to support work (e.g. notes on desks), will need to work with small devices, are likely to have a far from ideal working environment, and this environment will change drastically as the user moves;

2. *Designing for a widespread population:*

Users will not normally have any formal training in their technologies and consider them as devices to be used rather than a computer to be maintained.

3. *Designing for limited input/output facilities:*

Screen sizes will improve in resolution regarding colour support and pixels per cm, but will always be small due to the need for portability. Sound output quality is often very poor with restricted

voice recognition on input. Keyboards are limited in size and number of keys, and other pointing devices are often hard to use when on the move.

4. *Designing for (incomplete and varying) context information:*

Through various sensors and networks, mobile devices can be made aware of their context (e.g. current location through the Global Positioning System). This gives new information to the systems but brings problems of implying task and user level activities from sensor information and unreliable or patchy sensor coverage. Work on position aware tourism guides, for example, highlight many of these problems.

5. *Designing for users multitasking at levels unfamiliar to most desktop users:*

Multitasking and support for task interruption is one of the keys to successful desktop design, with mobile devices the opportunities for and frequency of interruptions are likely to be much higher given the environments in which the devices will be used. [2]

Positive aspects of HCI with mobile devices

Society

User interfaces on consumer products such as computers, mobile phones, tablets etcetera, are designed with ease in use in mind. User Interface designers try to ensure that the input and output processes are as simple and easy for the user as possible. An example of this is touch screen technology.

In the last five years, it has become very popular in portable devices like mobile phones and tablets. Another example is voice recognition. Siri service but it has not become as widely used as touch screen technology. The technology still has problems with accurately recognizing what the user is saying, and many people do not want to use the technology because asking your phone to do things in public may seem odd to others.

All of these developments are designed to move towards making electronic devices friendlier to users. Specifically, people who are not experienced with devices like this and usually find them too complicated to use. These developments are designed to make these devices more accessible for these people and to increase the number of people that are able to use these products.

Culture

HCI is greatly changing our culture, electronic devices are becoming a bigger part of the everyday lives of people, with more features than ever to help us during the day. Moore's Law states that computer power will double every two years. This means that the number of tasks that electronic devices will become more varied and complex as time goes on. They will continue to become more and more integrated into our lives.

Interaction design tips for mobile applications

The best apps – the ones most carefully constructed and thought out – feature such an intuitive setup that most users might not even recognize how smooth and easy to use they are. Great interaction design helps a user figure out how to operate a mobile app. It's welcoming and instructive. It should feel

second-nature. These qualities don't come easy, however. They take hard work, lots of practice, and plenty of patience during the design development process.

This article 'Five Interaction Design Tips for Your Mobile app' provides to keep in mind when striving for an outstanding application. These tips can help the Nutrapp team to development the application for Nutrapp.

- I. Lead the user toward the next step.
- II. Match your interactions to your platform.
The Nutrapp group who programmed the application, studied and researched the specific interface conventions in the operating system, and then modified the application's design to take the best advantage of the specific platform. The users will thank you for that. The Nutrapp application is made in Android Studios.
- III. Use clean, simple icons.
A picture is worth 1.000 words, and a visual interface icon is worth 10.000 lines of code. When designing a mobile application, pictures are your friends. Icons take up less space than the text that would be required to explain a function, giving more room onscreen.
- IV. Reduce, reduce, reduce.
Mobile applications became the most frequently used, most user-friendly piece of technology people ever owned, but they also have very small screens that can't display much information at a time. As a designer, these limitations need to be kept in mind.
- V. Make life easier for international users.
Users worldwide, speaking hundreds of languages, are an increasing segment of the smartphone and tablet software marketplace. The Nutrapp application is translated in English, but the application language is in Spanish or can be in Catalan. [3]

Usability of mobile applications: the PACMAD usability model

The PACMAD (People at the Centre of Mobile Application Development) usability model is depicted in the image (Figure 5) below side by side with Nielsen's and the ISO's definition of usability. The PACMAD usability model incorporates the attributes of both the ISO standard and Nielsen's model and also introduces the attribute of cognitive load which is of particular importance to mobile applications.

The following section introduces the PACMAD usability model and describes in detail each of the attributes of usability mentioned below as well as the three usability factors that are part of this model: user, task and context.

1. **User.** It is important to consider the end user of an application during the development process.
Nutrapp end users of the mobile application are middle-aged women that possibly struggle with obesity or eating disorders. For these women, the mobile application should be as simple as possible to use.

2. **Task.** The word *task* refers here to the goal the user is trying to accomplish with the mobile application. During the development of applications, additional features can be added to an application in order to allow the user to accomplish more with the software.

For example, for the Nutrapp application, if the consumer wants to talk with someone in the chat, their online nutritionist/coach, they have to accomplish this task without being too difficult. Only consumers who pay, have access to the chat.

3. **Context of use.** The word *context* refers here to the environment in which the user will use the application. Context not only refers to a physical location but also includes other features such as the user's interaction with other people or objects and other tasks the user may be trying to accomplish. As mobile applications can be used while performing other tasks it is important to consider the impact of using the mobile application in the appropriate context.

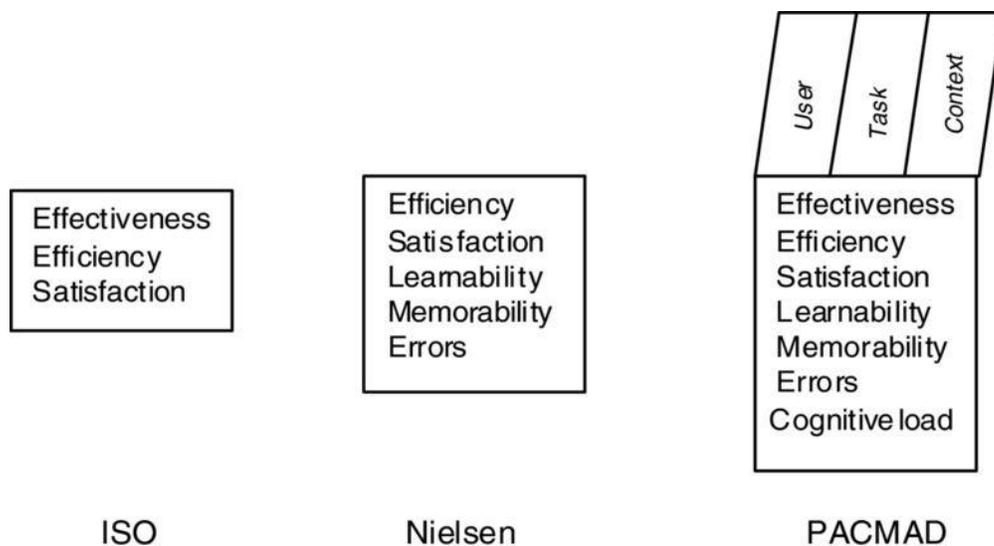


Figure 5: Comparison of other usability model - attributes of usability

Attributes of usability

The PACMAD usability model identifies seven attributes which reflect the usability of an application: *Effectiveness, efficiency, satisfaction, learnability, memorability, errors and cognitive load*. Each of these attributes has an impact on the overall usability of the application and as such can be used to help access the usability of the application.

1. **Effectiveness.** *Effectiveness* is the ability of a user to complete a task in a specified context.
2. **Efficiency.** *Efficiency* is the ability of the user to complete their task with speed and accuracy. This attribute reflects the productivity of a user while using the application.

3. **Satisfaction.** *Satisfaction* is the perceived level of comfort and pleasantness afforded to the user through the user of the software. This is reflected in the attitudes of the user towards the software.
4. **Learnability.** *Learnability* is the ease with which a user can gain proficiency with an application. It reflects how long it takes a person to be able to use the application effectively. There a large number of application available on mobile platforms and so if users are unable to use an application they may simply select a different one.
5. **Memorability.** *Memorability* is the ability of a user to retain how to use an application effectively. It is necessary for users to remember how to use the software without the need to relearn it after a period of inactivity.
6. **Errors.** The PACMAD usability model extends the description of Errors, first proposed by Nielsen, to include an evaluation of the errors that are made by participants while using mobile apps.
7. **Cognitive load.** *Cognitive load* refers to the amount of cognitive processing required by the user to use the application. In traditional usability studies a common assumption is that the user is performing only a single task and can therefore concentrate completely on that task. In a context of mobile users will often be performing a second action in addition to using the mobile application.

Understanding Human-Device Interaction patterns within the context of mobile nutrition

A number of apps currently exist to aid users in finding a better lifestyle or to control their food intake by having better nutritional advice at their fingertips. The mobile nutrition area is widely popular with thousands of people around the world accessing information related to nutrition and wellbeing. However, mobile nutrition apps still can offer more to their users by providing better overall Human Device Interaction (HDI).

As nutrition apps are used daily, it is imperative to ensure that users can easily grasp their concept, thus allowing them to quickly understand and receive the information they require to achieve a better lifestyle. [4]

Define How Users Can Interact with the Interface	<p>What can a user do with their mouse, finger, or stylus to directly interact with the interface? This includes pushing buttons, dragging and dropping across the interface, etc.</p> <p>What commands can a user give, that aren't directly a part of the product, to interact with it? An example of an "indirect manipulation" is when a user hits "Ctrl+C", they expect to be able to copy a piece of content.</p>
---	---

<p><i>Relation with Nutrapp Project</i></p>	<p><i>The user can interact with the application by using buttons, in the main menu. By using their fingers to navigate through the application, users already interacting with the interface. By using the whole application, users interact with the interface.</i></p>
<p>Give Users Clues about Behaviour before Actions are Taken</p>	<p>What about the appearance (color, shape, size, etc) gives the user a clue about how it may function? These help the user understand how it can be used. What information do you provide to let a user know what will happen before they perform an action? These tell users what will happen if they decide to move forward with their action. This can include meaningful label on a button, instructions before a final submission, etc.</p>
<p><i>Relation with Nutrapp project</i></p>	<p><i>On every button there is a meaningful label which include the name, so the user should know what is going on and what their next action is.</i></p>
<p>Anticipate and Mitigate Errors</p>	<p>Are there constraints put in place to help prevent errors? The Poka-Yoke Principle says that placing these constraints forces the user to adjust behavior in order to move forward with their intended action. Do error messages provide a way for the user to correct the problem or explain why the error occurred? Helpful error messages provide solutions and context.</p>
<p><i>Relation with Nutrapp project</i></p>	<p><i>There is an error in requesting permission to use the phone camera in the latest Android build. Extra permission is required and the users have to allow access at the runtime of the application. This request will only be shown the first time running the application.</i></p>
<p>Consider System Feedback and Response Time</p>	<p>What feedback does a user get once an action is performed? When a user engages and performs an action, the system needs to respond to acknowledge the action and to let the user know what it is doing. How long between an action and a product's response time? Responsiveness (latency) can be characterized at four levels: immediate (less than 0.1 second), stammer (0.1-1 second), interruption (1-10 seconds), and disruption (more than 10 seconds).</p>

<i>Relation with Nutrapp project</i>	<i>When the user has to wait for the application to respond, they will notice it by the loading icon >> ☺ . The response time is at maximum 1-10 seconds if something has to upload (called interruption). When the user is talking in the chat, and they are no new messages, the application will let the user know.</i>
Strategically Think about Each Elements	<p>Are the interface elements a reasonable size to interact with? Fitts' Law says that elements, such as buttons, need to be big enough for a user to be able to click it. This is particularly important in a mobile context that likely includes a touch component.</p> <p>Are edges and corners strategically being used to locate interactive elements like menus? Fitts' Law also states that since the edge provides a boundary that the mouse or finger cannot go beyond, it tends to be a good location for menus and buttons.</p> <p>Are you following standards? Users have an understanding of how interface elements are supposed to function. You should only depart from the standards if a new way improves upon the old.</p>
<i>Relation with Nutrapp project</i>	<i>The buttons are big enough to click on them. The application is as simple as possible to use for the users. That's why standards have been followed.</i>
Simplify for Learnability	<p>Is information chunked into seven (plus or minus two) items at a time? George Miller found that people are only able to keep five to nine items in the short-term memory before they forgot or had errors.</p> <p>Is the user's end simplified as much as possible? Tesler's Law of Conservation notes that you need to try to remove complexity as much as possible from the user and instead build the system to take it into account. With that said, he also notes to keep in mind that things can only be simplified to a certain point before they no longer function.</p> <p>Are familiar formats used? Hick's Law states that decision time is affected by how familiar a format is for a user to follow, how familiar they are with the choices, and the number of choice they need to decide between. [5]</p>
<i>Relation with Nutrapp project</i>	<i>For the customers from Nutrapp it should be easy to use the application. The team members tried to use as much as simplicity as possible, to use the same patterns from the website. That's why users should use the application without too many errors or bugs. This means that familiar formats are used, users can follow the format without taking too long to make a decision.</i>

Table 1: Human Interaction and its relation with Nutrapp project

2.2 Similar Products

1. Lark

About the application: Lark is a nutrition and fitness based app, that was voted one of the top 10 apps by the app in 2015, along with the likes of Uber and Airbnb. Behind Lark, there is a team of nutrition and fitness experts, together with their expertise help to guide and coach their app users to improve their lifestyle. The app is simple regarding format, it is essentially an online automated chat, where the user can ‘chat informally’ about nutrition, sleep and fitness. The app utilises data from the user’s device to this, for instance, the app uses the accelerometer data that helps to gather activity and sleep amounts. The app then uses the data and relays it back to the user in a visual format.

What the user gets with the application:

<i>Free application</i>	<i>Premium application</i>
- Automated activity tracking and coaching	- Individual Challenges
- Unlimited 24/7 text based coaching	- Simple meal logging and nutrition coaching
- Data analytics and reporting	- Automated weight logging and coaching
- Sleep, Nutrition, Activity	- Medication logging and reminders
	- Health monitor logging and feedback (blood pressure)
	- Stress management CBT coaching

Table 2: Lark features

What the application promotes: The application states that users that text the coaching service for a little as 3 minutes each day will be approximately 23% more active than usual. Additionally, the application provides users with 24/7 support. The application has now seen over 300,000,000 text messages.

2. My Fitness Pal

About the application: My Fitness Pal is ultimately a weight loss application that is designed for the main intention that their users are encouraged to lose weight healthily, the app location is a support tool for this process. The application enforces the idea that to lose weight and maintain it, is easily achievable if the user tracks their diet. The applications main feature is their diary or logging system that allows the users to input meals and snacks and calculate the calories and other factors. It advises its users how much or how little of this food group they should be eating. The application has implemented features that allow their users to input this information for efficiently, for instance: Scanning barcodes from food packing.

What the user gets with the application:

<i>Free application</i>	<i>Premium application</i>
- Blog/ News Feed	- Advert free version of the application
- Nutrition and exercise diary/ log	- Helps users to customise their meal plan with healthy, low carb, macronutrient recipes
- Visual progress graphs	- Goals can be easily customised daily
- Uses internal tracking devices to help calculate the user's level of activity	- Food analysis carried out by experts
- Community forums for support and general chat	- Priority customer support, allowing customers to jump to the front of the line with priority support
- Available on android and IOS	- Exclusive content

Table 3: MyFitnessPal

3. Nutrino

About the application: Nutrino specifically a nutrition based app, that has additional features that allow the app to connect with more specialised fitness applications (e.g. Runkeeper, Fitbit, JawBone). The first encounter with the application the user can interact and inform the application why they are using this app- If it to eat healthily? Lose weight? Reduce fat? Living with diabetes? Specific diet? Pregnancy nutrition? Gain weight? Gain muscle mass? Custom diet?

<i>Free application</i>	
- Sign in/ Set up account with social media such as Facebook	
- Nutrition diary/ log system	
- Breakdown of health and nutrition statistics	
- Plan meals based on taste preferences, special dietary needs and allergies	
- Find recipes and recipe suggestions	

Table 4: Nutrino features

As part of our primary research, we investigated similar existing applications. Testing 5 applications across a two-week period, we rated each application based on six features which we felt were necessary to make a Nutrition application successful.

These six features include:

1. **The overall design** - Specifically how aesthetically pleasing the application is to the user
2. **The ease of Navigation** - The general flow of the application and whether this is coherent to the user
3. **The time requirement** - How much time the user needs to invest in the application to make full use of its features and the benefits those features propose
4. **Does the application offer a premium version?** - Is there an additional version of the application that offers more features than the free version
5. **Does the application offer a messaging service(s)?**
6. **Does the application offer other innovating features?**

The table (below) shows how each of the tested applications ranked in each category. In each category, the application could have been awarded between 1 to 5 points. If awarded 1/5 points, it indicates that the application did not meet expectations in the category. If awarded 5/5 points, it indicates that the application did meet expectations in the category. To easily identify this, the table has been colour coded. **Green** shows that it is the highest scoring application in the category and **Red** shows that it is the lowest scoring application (it is possible to have more than one application scoring the same). The final column totals the overall score for each application.

We identified that Lark was the top scoring application, ranking the highest in 5/6 of the categories. Overall, we concluded that the application was the best as it had a modern aesthetic and was incredibly simple to use. Lark is mainly based on an automated chat feature, the advice that is delivered is done in a manner that is innovative, offering the user visual charts that monitor the user's progress. Other closely ranked applications include Nutrino and Lifesum scoring 25 and 24 respectively. Again, the reasons why these apps also follow a similar success to Lark is due to the simplicity of the application, each application has a main feature and has managed to execute this feature well.

Whereas on the other hand the application Nutritionist + ranked the lowest as it generally looked dated, was complicated to follow and navigate, and meant that the user had to invest more time into the application to understand its functionality. Another application that ranked similarly was Nutrition scoring just one more additional point, together these two applications tried to do too much, and the result ended up being chaotic and confusing for the user.

Application	Overall Design	Ease of Navigation	Time Requirement	Offers a Premium version	Offers Messaging Service	Offers Innovating features	Overall Score
1. Lifesum	3/5	4/5	3/5	5/5 Yes	5/5 Yes	4/5	24/50
2.Lark	4/5	4/5	5/5	5/5 Yes	5/5 Yes	3/5	26/30

3.Nutritionist +	2/5	2/5	1/5	5/5 Yes	0/5 No	1/5	11/30
4.Nutrition	1/5	3/5	2/5	0/5 No	5/5 Yes	1/5	12/30
5.Nutrino	4/5	3/5	3/5	5/5 Yes	5/5 Yes	4/5	25/30

Table 5: Comparison between the apps

2.3 Impact of Online Coaching on Users

Online nutrition education can benefit the traditional in-person group education to promote healthy breakfast (meal) behaviours in women, infants and children participants (Lauren et al., 2016) [6]. This online nutrition education enhanced participants' breakfast (meal) related knowledge, attitudes, and behaviours and was maintained over several months of time. Generally, the breakfast lesson enhanced most breakfast related behaviours for all participants. Positive changes in knowledge were seen where participants were able to keep the information they learned at follow-up.

Fruit and vegetable intake after an online education contributed to a higher consumption compared to in-person education (Bensley et al., 2011) [7]. Besides, the online education also increased knowledge in nutritional status as well as increased the exercise time.

Both clients and therapist said that convenience is a principal reason for choosing online counselling (Mallen et al., 2005) [8]. Numerous barrier such as language barriers, time availability and limited mobility due to physical disability can be overcome because of the availability of online counselling (Rochlen et al., 2004) [9]. Thus, online coaching is more convenient to the users.

The majority of online counselling are done through text-based communication. Participants appreciated that they could re-read the responses received from the therapist. They feel that this online counselling can give them more time to process the content than verbal communication would have (Cook and Doyle, 2002) [10].

2.4 Target Market Research

Nutrapp is aimed at those people who need a change in their food life, a change in their diet even improving it. Also, the service offers nutritional advice to school groups, associations, companies and the option to resolve doubts instantly. The operation of Nutrapp is basic, based on Whatsapp messaging, social networks and an interactive web nutrapp.es / nutrapp.cat. The user acquires the service that fits his characteristics (Nutrapp Coach, Nutrapp Flash of Nutrapp Educa). Afterwards, a nutritionist connects with him and proposes some weekly challenges. From there, a system of daily monitoring and online coaching is implemented to achieve the desired goal. [11]

Tens of thousands of middle-aged women are suffering from eating disorders in a hidden crisis brought on by divorce, financial problems and bereavement in mid-life, new figures suggest. It was traditionally thought that eating disorders were most common among the young, but new research from University College London suggests around three percent of women in their 40s and 50s have a recent eating problem.

In contrast, around 1 in 100 women between 15 and 30 years have been diagnosed with an eating

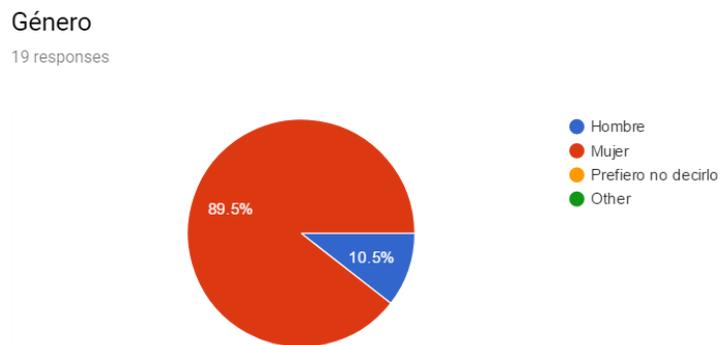
condition, such as anorexia, bulimia or binge eating, although much more may be suffering in silence.

The researchers assessed factors that may be associated with the onset of an eating disorder including childhood happiness; parental divorce or separation; life events; relationship with parents; and sexual abuse. [12]

2.5 Nutrapp Client Survey Results and Information

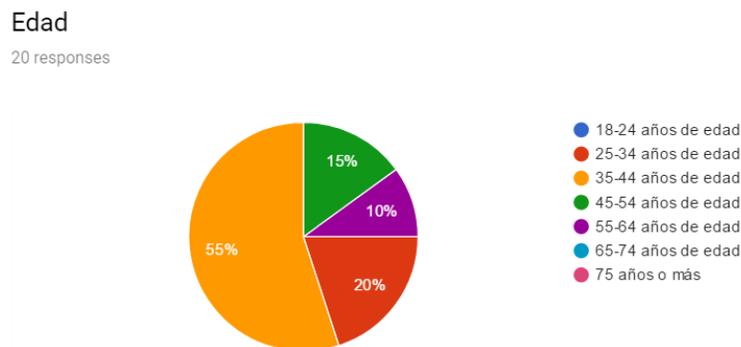
We devised a survey to help us understand more about Nutrapp’s existing customers. At the beginning of this process, we knew little about their customers, expect that we are helping a small number of people and that the largest proportion of people that they were helping were classified as ‘middle age women.’ As a team, we need more information to help us progress in the project.

1. Gender



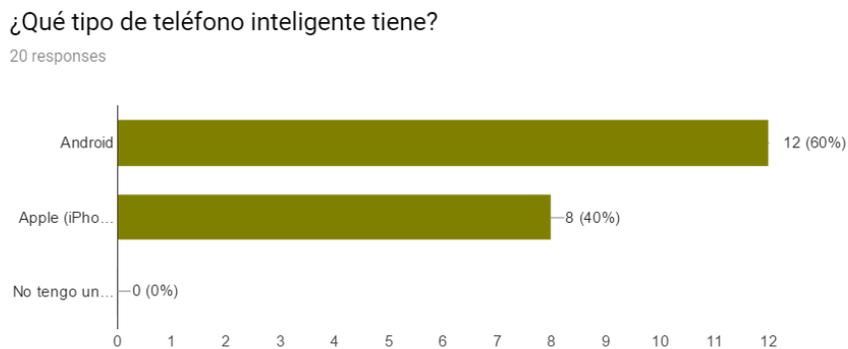
Although understanding the ratio of women to men gender may seem irrelevant, in fact, it does help us to understand what target market we are targeting the application towards. Based on the responses we now know that the ratio of women to men is 9:1, at almost 90% being women. This figure shows us that most of their existing customers are women and this must be considered along the process of the project.

2. Age



Age was a factor we were very interested in knowing. Initially this information was unknown to us and it made targeting the application difficult. As a team, we discussed and eventually concluded that the application must be simple to understand and use, allowing people across different age range to use the application with ease. Based on our team's discussions with the company Nutrapp we had an understanding that their clients were considered 'Middle-aged,' however the results to this survey question present findings that are surprising. As we expected there were no people aged between 18- 24 years old. However, the clients that responded are in fact aged across the 25-34 yrs, 35-44 yrs, 45-54 yrs and 55-64 yrs age categories, with the majority at 55% being the 35- 44 years category. The findings show that the company's clients are younger than the impression first given by Nutrapp.

3. Type of Phone

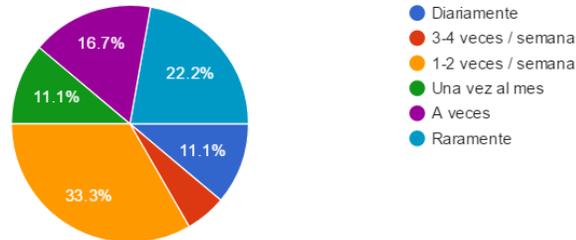


Our project is focused on designing and programming a nutrition based application, and initially, our team had very little to no knowledge of how to program an application with the main specification to incorporate a chat feature, this being our major challenge. We understood quickly during our research phase that when creating an application, it is possible to design for either IOS or Android (possible to do both). The reality is that designing for IOS operating systems is far more challenging than that for Android, we eventually decided for our first application prototype it would be carried out in Android. To support this, we asked Nutrapp's existing clients what operating system their smartphone works in and it was supported by their responses that 60% have an Android working smartphone.

4. How often do you use Nutrapp's services?

¿Con qué frecuencia usa los servicios de Nutrapp?

18 responses

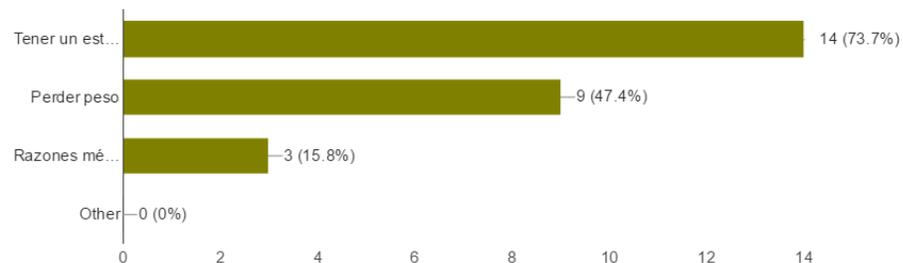


Unsure on how much their existing customers rely on Nutrapp's services, we asked how frequently they interacted with the company. It was interesting to see that 50% of the people asked answered that they interact and use the company's services at least a couple of times a week, with 11.1 % of those using the services daily.

5. Why do you use this service(s)?

¿Por qué utiliza este servicio(s)?

19 responses

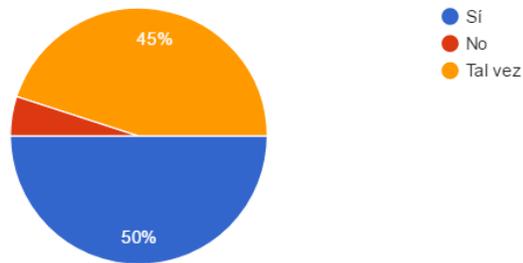


Following on from the previous question, we asked Nutrapp's clients 'What is the main reason why they use the company's services?' The data indicates that the biggest reason is to help maintain health, followed by losing weight and lastly for health reasons. Although it is important for us to understand the reasons behind why the user interacts with Nutrapp, we are not looking to change their services in anyway, expect only to add to their existing business model.

6. Pay for the services

¿Está dispuesto a pagar por un servicio de la aplicación de Nutrapp?

20 responses

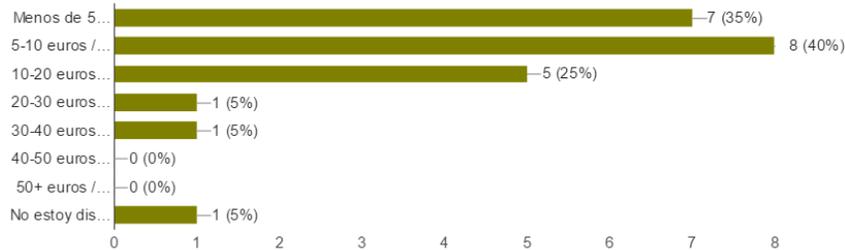


Nutrapp has identified several things which they require, for instance, they would like a free and premium version of the application. The response from their existing customers is somewhat positive with 50% saying they would pay for a premium version and only 5% stating that they would not. The remainder is indifferent to the idea. This result suggests it is worth considering designing an application that is suitable for people who do not want to pay as well as the possibility that others are willing to pay to get something extra from the application.

7. How much are users willing to pay for a premium application?

¿Cuánto?

20 responses

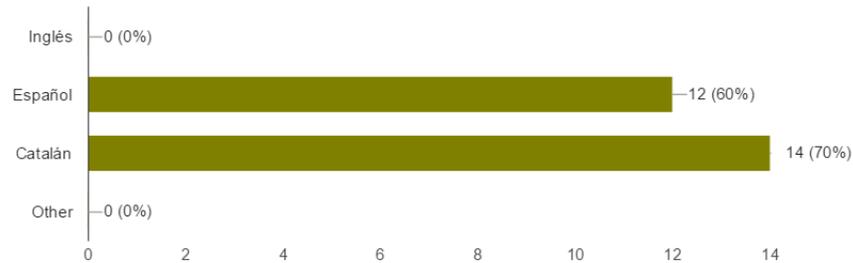


Leading on from the following question we asked how much they (existing clients) would be willing to pay for Nutrapp's premium version of the application. The outcome was as expected, people are not willing to pay a significant amount for an application, and this is primarily because applications are only fashionable for a brief period, just like everything else they get forgotten about and eventually deleted. Although it is interesting to know that 7/20 users said they would be willing to pay somewhere between the range of 10 to 40 euros.

8. What language would you prefer?

¿Que idioma prefieres?

20 responses



Nutrapp is a company based in Vilanova I la Geltrú where the primary language is Catalan, followed by Spanish. Currently, the company only deals with both Catalan and Spanish-speaking clients, the company has not yet reached a wide enough range of people to need to have information given out in English. The results show that Catalan and Spanish are almost on par with each other, with Catalan just edging ahead. It would be wise to invest time in ensuring that the application is available to customers in both Catalan and Spanish, perhaps with the intention to translate it into English later.

9. How frequently do you use another chat-based services (such as WhatsApp, Telegram, Facebook Messenger, etc.)?

¿Con qué frecuencia utiliza otros servicios basados en chat (como Whatsapp, Telegram, Facebook Messenger, etc.)?

20 responses

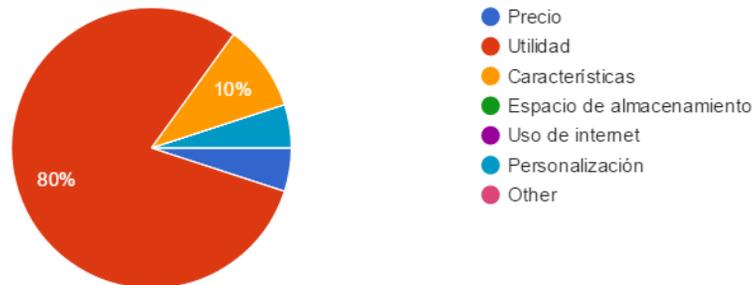


The application we are designing and programming will feature a chat system, this will allow Nutrapp's customer to interact with Nutritionists and receive personalised advice. Chats are featured on many social media platforms, so this can help inform us what chats are used

10. What aspect is the most important part of the application?

¿Cuál es el aspecto más importante de una aplicación?

20 responses



Without a doubt, the 'usefulness' of any application is what the users of Nutrapp find to be the most important feature, with 80% of people asked thinking just this. To achieve this, our application must provide customers with relevant information that they can harness and use quickly and efficiently. Part of making an application 'useful' is through good planning, this includes planning of the application layout, the content, design and so on.

Project Process

The following sections outline the main process stages undertaken by the team to complete the project. The stages include the following: Planning and Time Management, Designing, Programming, and Testing and Evaluation.

3. Managerial Approach

3.1. The Project Brief

The main brief specified by Nutrapp requires the EPS team to create a mobile application that will incorporate an online chat feature. This is an essential feature, and the application should be based around this. The online chat must allow for customers to receive advice and support easily.

As a team, we have realised our project specification. Using keywords to aid our specification we would like the application to 1) Motivate, 2) Support, 3) Encourage Nutrapp's customers.

Motivate	To motivate users of the application to think about their nutrition and be proactive
Support	To support users of the application with their nutritional needs, by providing them with essential and tailored information that will help them make educated decisions
Encourage	To encourage users of the application to be proactive in their daily life/routines and consciously think about nutrition to make better life choices

Table 6: Project specification

Other possible features of the application could include:

- Free vs. Premium version of the application
- In-app purchasing features
- Translation of the application into Catalan, Spanish and other languages.
- Android vs. IOS version of the application
- Incorporate social networking sites
- Application suitable for various devices

3.2 The Basic Elements Model

The brief set by Nutrapp is vague but broad. As a team, we had various thoughts and ideas on how the project could progress. We organised initial thoughts in a core elements model, that enabled us to organise these initial thoughts logically. Categories such as Brief, Purpose, Company and so on were used to list what we knew and questions on areas where more information was necessary.



Figure 6: Basic Elements Model

3.3 Framework and the problem to be solved

Obesity is increasing in developed countries along with other obesity-related health issues such as cardiovascular diseases. Nutrition education is vital to prevent these diseases, and it has been shown that 81% of Spaniards fail when they should follow a prescribed diet. We propose an online nutritional service that uses coaching techniques. The use of smartphones and Apps is increasing and is accessible to a clear majority of the population. More than 97,000 health Apps already exist.

Moreover, text messaging has been demonstrated to be a useful tool in effecting behaviour change. Recent publications on text messaging and health behaviour changes highlight the need for interventions that are not limited to spread information and content but also incorporate social context, cultural values and strong elements unique to the intended population. Therefore this project is unique because we will use health coaching techniques to motivate, support and encourage and the text messages from the virtual nutritionist/coach are tailored to each patient's individual needs and concerns.

3.4 Goals Definition

It is important, as a team, that we specify what our goal definition is, based on the brief from Nutrapp. Our goals and objectives must be realistic for the project to be realised within the given timeframe.

Our project goal is to develop a prototype of an Android mobile application for Nutrapp. The application will include an online chat or messaging system, login database, connection the website's blog as well as general settings of a mobile application. We will start researching the human interaction and impact of online coaching to the users, and then we continue with designing the application according to the company's specifications and program it with Android Studio. The application will facilitate users to connect and receive nutritional plans from Nutrapp's website. The final version of the app will be released by the end of May 2017.

3.5 Constraints

Every project has its constraints, and this one is not an exception. There are several boundaries which determine the general shape of the final result. Every specified limit was assigned to the group. The division of groups is shown below:

- Business
 - Type of the company does not allow project team members to change an industry specification. NutrApp already has an existing base of around 80 customers. Due to that fact, the challenge is to write an application which will fit current ones and encourage more people.
- Design
 - The company's colours are variations of green hence the layout of an application should use them. The graphics are not provided therefore the challenge is to design all of them.
- Facilities
 - The company provided facilities that should be inserted into the application. All the rules that must be followed can be found in the report.
- Human Resources
 - Team members are not experienced programmers, and this is the first contact with Android Studio environment.
 - Team members are not familiar with the security of web applications techniques.
- Methodology
 - For proper working on the project, techniques learned during seminars will be used.
- Physical
 - The application should be as compact as possible - it should take the smallest possible size of memory.
- Process
 - Meetings with supervisors and the company.
 - Seminars and courses at the University.
- Procurement
 - All the official papers should be followed.
- Quality
 - The application will be a prototype. It allows the team to release updates. However, it should be fully usable application.
- Resources

- The consultation with experienced programmers or professors is necessary due to the lack of practical skills by the team members.
- Risk Tolerance
 - Risk tolerance is on a high level because the app could be updated.
- Technical
 - There is only one tool for the programming that the team will use - Android Studio.
- Time
 - The deadline for the release of the prototype is the end of May.

4. Design Process

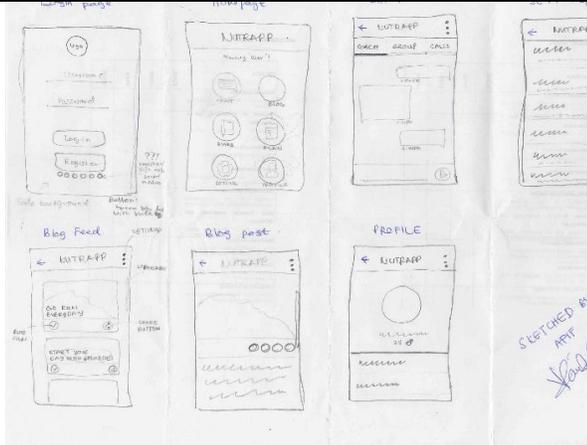
4.1 Layout Ideas

The design process starts with research and individual brainstorming of each team members to get the best ideas of the Nutrapp app layout. There are a few criteria the team needs to fulfil. First, the concept is flat, simple and visible, following Google Materials design guidelines [1]. The colour scheme of the app is required to comply with company’s existing general colour scheme which is green and black. Team members can modify the fill and transparency of the colour and company’s logo. Lastly, the design should have a fluid user flow, and easy accessibility to the users avoiding clutters of graphic and information. These criteria are discussed and agreed in the second meeting with the company.

Each team member needs to propose their ideas within a week and discuss it with the team. The required pages are a login screen, homepage, blog feed, chat interface and setting.

4.2 Sketches

All the sketches are uploaded digitally, and we received different concepts from each team members.

No	Concepts	Sketches
	<ol style="list-style-type: none"> 1. A simple login page 2. Homepage with circled icons to access the features 3. A WhatsApp look-alike chat page. 4. Default android settings 5. Blog feed with articles thumbnails 6. A profile page which includes personal information 	 <p>The sketches show several screens for the Nutrapp app. The top row includes a login page with fields for email and password, a homepage with a grid of circled icons for navigation, a chat interface with a list of messages, and a profile page with a circular profile picture and text fields. The bottom row shows a blog feed with article thumbnails and a detailed blog post view. A handwritten note on the right side of the sketches reads 'SKETCHED BY [signature]'.</p>

<ol style="list-style-type: none"> 1. Simple login page 2. Homepage with circled icons. Assorted colours for paid and free features 3. Chat bubble 4. Calendar-style page allowing user to input their information 	
<ol style="list-style-type: none"> 1. Login page with language and social media options 2. Circled icon homepage 3. Slide menu for easy access to other features 4. Speech bubble-style chat 5. Summarise article in the news feed 6. Statistic screen 	
<ol style="list-style-type: none"> 1. Nutrapp logo in the background 2. Simple login page 3. Homepage with lists of rectangle buttons 4. Rounded chat bubble with user's icon 5. Settings that include user's information 6. Blog feed with scrollable articles 	

<ol style="list-style-type: none"> 1. Homepage with login and register buttons 2. Register page with text fields for users to fill in their information 3. Blog feed with categories 4. Setting page include user's profile, diary, activities and notification setting 5. General chat design using Lark app concept 	<p>The sketches show four app screens. The 'Blog feed' screen has a menu bar with a back arrow and a 'setting' icon, followed by a 'today' section with an 'all' filter and categories like 'health', 'news', and 'food'. The 'Home page' features the 'nutrapp' logo, a tagline 'Your nutritionist in your pocket', and 'log in' and 'register' buttons. The 'chat' screen shows a conversation bubble with a plus sign and the text 'Something like "Lark"'. The 'setting' screen lists options: Profile, Diary, push notifications, my activities, share & privacy, and log out.</p>
--	---

Table 7: Sketches

The common ideas among the team members are:

1. Simple login page
2. Circled icon on the homepage
3. Speech bubble style in chat
4. Settings screen will include user information and general settings
5. Every screen equips with menu bar that has back button and Nutrapp logo

4.3 Determining the Design According to Market Analysis

To get the best from the ideas, the team decided to design the layout according to market research. The app will be designed relative to users' characteristics, including their age, nutritional background and location. This method of designing the app ensure the interface will be user-friendly and easy for users to access.

From our target market analysis, we summarised that the users of the app have the following characteristics:

- People who need a change in their food life, a change in their diet and improving it
- The service offers nutritional advice to school groups, associations, companies and the option to resolve doubts instantly
- 15 to 50-year-old men and women suffering from eating disorders such as anorexia, bulimia and binge eating

Our approach is to be motivational and encouraging. The design must be psychologically attractive to users and avoid using any design that will lead to negative vibes. Light green and white are

chosen to be the overall theme of the design as they will provide the positive mood for the users. We are avoiding using unpleasant coloured graphics such as red and dark. To comply with the company's colour scheme, the colour of the font will be black and white.

As the users are ranging from 15 to 50 years old, our graphics need to be as simple as possible yet informational without sacrificing the attractive design. We are designing the user flow to be minimalistic and use less number of pages to avoid screen confusion to the users.

4.4 Determination of the Layout

The results from both method, brainstorming from team members and market research, we create the general layout of the login page, homepage and blog feed. Other pages will be based on these three pages.

The layout has five common criteria:

1. Follow material design guidelines that have been released by Google.
2. Every page has a top bar with page's title and back button (except homepage) with a fix green background (#93C01F). This colour has been chosen from company's text logo.
3. Every page must facilitate on-screen Android navigation buttons (back, home and menu).
4. Fix dimension of the top bar.
5. The name of the font used is Roboto. The colour and boldness of the font can be modified to differentiate the styles format.

The design team produced the three screens by using Adobe Illustrator. As Google provides the template of the icon, stickers and basic mobile layout, the team using these templates can comply with Google guidelines (www.material.io). Then they change it to the agreed colour scheme and layout. The measurement of the layout is unchanged. These are the produced design:

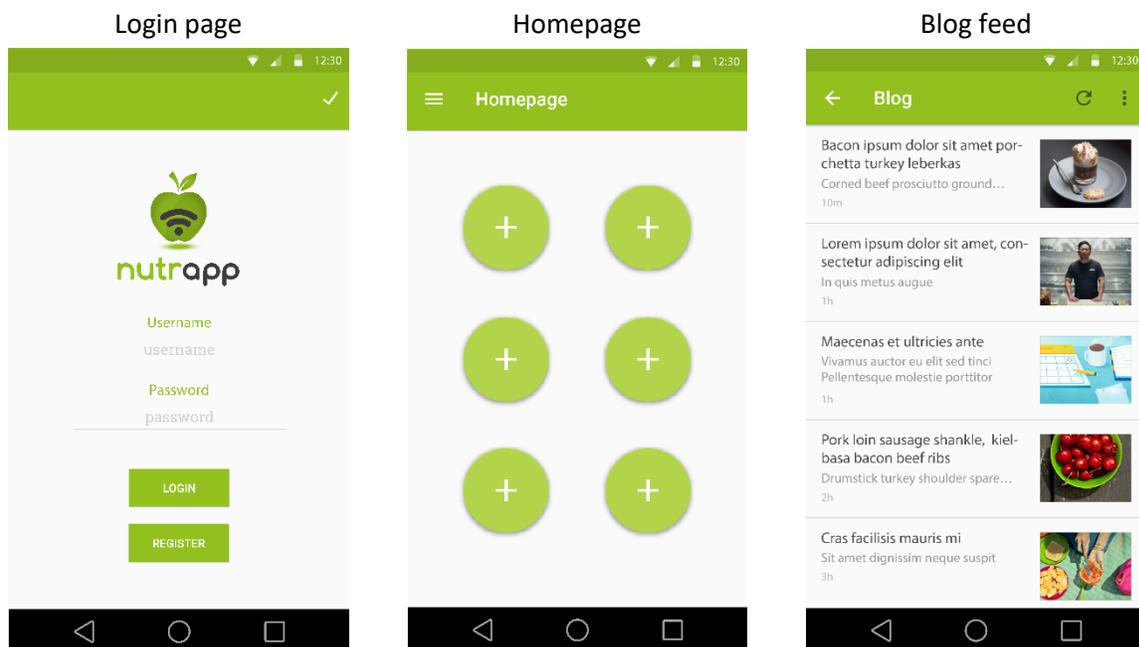


Figure 7: Layout designs

5. Programming Process

5.1 Benefits of Android

The application will use the operating system of Android. It will be written in the programming language, Java, using the software, Android Studio.

We chose to program using Android operating systems (OS) rather than iOS (the operating system used on many Apple products) due to its open source platform and the ability to immediately publish applications [13]. Open source platforms allow developers to use the previously existing code in their applications, therefore eliminating some of the work and making advanced programming available to those lacking the skills. As most of our group members are only beginners in programming, we felt open source programming was a must for this project. However, although only beginners, a few group members have used the programming language Java. As Android is programmed in Java, and with limited time to familiarise ourselves with the software, we felt it would make for a shorter learning process to move forward with an operating system that used a familiar programming language. To improve the group's programming knowledge, one group member took an online class on application development using Android Studio, while other members continuously updated their knowledge of Android development using online resources (videos, articles, etc.).

In addition, the hardware for iOS is somewhat limiting. To install the hardware to develop iOS applications, you must have a Mac. Whereas Android Studio is compatible with many major machines such as Windows, Linux, or a Mac [14]. To avoid this constraint again, we chose to program in Android rather than iOS.

5.2 User Flow

We designed the application to have a simplistic layout and easy navigation. The application would open with a splash screen or a screen that is shown for a small period (a few seconds) before it automatically moves to the next screen. The splash screen introduces the company name and its logo. This screen is followed by the application homepage giving the user access to the various features of the application.

5.3 Features

The application includes chat, blogs, services, login page, survey, and about page. The chat allows users to chat with their nutritionist as well as other Nutrapp users. It uses open source code.

The blogs connect users to the three different blogs available on the Nutrapp website, these include information on news, education, and recipes. They use a programming feature called WebView to link users to the Nutrapp website page that is associated with each blog.

The login page uses the same WebView feature and connects the users to their Nutrapp login page. The survey works in a similar fashion, using WebView to link the users to a survey on the Nutrapp website. This survey helps Nutrapp's nutritionists discover more information on their client's healthy habits or lack thereof. The About Nutrapp page links the users with the Nutrapp information page found on the website.

Finally, a services page is available to users. This provides the user with information regarding each service Nutrapp offers. A description as well the price per month of the application can be found here.

5.4 Accessing Data from the Web

The group faced some potential issues when trying to access data from the web. We originally planned to incorporate the information presented on the company's website, as well as to have those who register a Nutrapp account online and through the application, to be linked. It has been discussed that the best way to connect both the website and the application is using an Application Programming Interface or API. This allows the functions and data from the already existing website to be linked to the application. However, an API must be developed for each internet site, and as one does not currently exist for the Nutrapp website, another approach had to be taken.

The group's solution to this problem was creating our own form of an API. To link the content on the website to the application, one must take the code used to create the website and make it readable on the application. To do this, you must convert the website code (which is formatted in HTML) to a form readable by the application (this is known as JSON). We used a web page, jsonformatter.curiousconcept.com, to convert the HTML code to JSON. Once the JSON code was available, we put the code in a document in Dropbox. Dropbox was used in order to make the file accessible and easy to change and/or update. This allows employees from Nutrapp, future application developers, and our group members to easily edit the content of the application at any time.

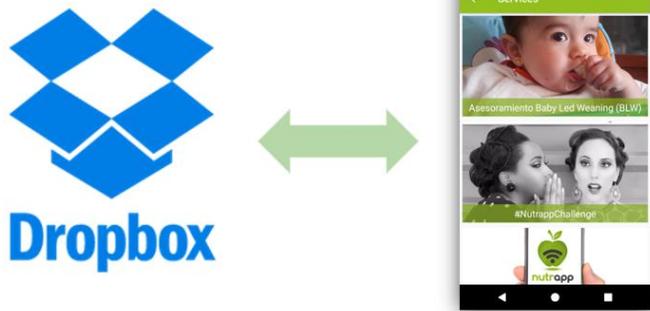


Figure 8: JSON is accessible from Dropbox

As this process is somewhat advanced for our group's programming knowledge, we only used this method in one section of the application. It can be found under the 'Services' button. We aim to further improve the application by adding this method to all sections of the application in the future.

5.5 Chat SDK

As the planning is to use an open source chat, three criteria are taken into consideration before we choose the projects.

- a. Free commercial license
- b. Expandable database owned by the company
- c. Customizable

The reasons these criteria are chosen are Nutrapp wants the app done with minimum cost, protect users' data, not sharing it with the third party and follow the design theme that Nutrapp has established.

After a thorough search of a few software development kits, Chat SDK is the perfect candidate for the project. Chat SDK is developed by chatsdk.co team and published publicly under MIT license. It is an open source project that provides instant messaging framework for Android and iOS and has their key principles that satisfy our criteria such as free, full data control and quick integration. [15]

It contains a simple chat system that has a private thread for both individual and group, public group thread and user profile. Users can access the chat feature by using email, Facebook and Twitter to register. It has the ability to share images in the thread either by accessing the phone's camera or uploading from the gallery. Besides, it uses a familiar interface as other instant messaging app on the market so that the users can adapt to it in a matter of seconds.

Chat SDK are using Google's Firebase to manage the cloud messaging system as well as authentication and storage. Nutrapp will be able to administer all the data in the cloud without involving another party thus will protect the security and privacy of the user. In addition, Chat SDK is modular. It can be added to an existing Android project and has a number of additional modules that can be installed in the chat itself such as typing indicator, audio and video messages and read receipts. All the modules can be purchased and installed by the developers of Chat SDK.



Figure 9: Chat database is managed by Firebase

5.6 Chat SDK Integration into the Project

Chat SDK is designed to be integrated into any project. The SDK is imported as a module to the Nutrapp project that already has a homepage. As a module, it is accessible via one of the programmed circle buttons in the home page.

After that, the current project's build tools need to be the same as Chat SDK's to ensure it will function properly. The minimum Android API need to set to 15, build tool is 21.1.0, Android build target version is 21 and compile SDK version is 25. Failing to follow these steps will lead to errors in running the chat. Then, a few lines of the configuration of Google services and Android tools are added to establish the compatibility of the app with the current Android system.

Initial configuration of the Firebase is linked to the developer's test account. As this project owned by Nutrapp, a new Firebase account is created and linked to the project. The important steps are when setting the root folder of the storage, importing the app's JSON file from the Firebase and enabling the authentication method. All of these steps are described in detail in the Chat SDK documentation. [16]

To enable the Facebook and Twitter authentication, developer accounts for both platform are created, and they are linked by providing the app's hash keys. Then the accounts generate secret API keys to be used in the project.

5.7 Custom Interface

The interface provided is not consistent with the current Nutrapp theme which is black and green. Hence, a few items need to be changed to satisfy the company's needs.

First, the colour is set to the same as homepage's colour scheme. As a result, the page title and the buttons that are situated in the action bar at the top of the screen are not in contrast. So, these items' colour is changed to white to be consistent with other pages.

Another item that needs to be designed is the speech bubble in the chat thread. The original speech bubble is blue in colour, but it has been changed to a modern design which is green and light green for the sender and receiver respectively. The padding of the text in the speech bubble is also modified to provide the appealing appearance to the users by minimising the blank spaces. Small details such as the logo in the login page, tab slider and text size are altered to follow the material design guideline.

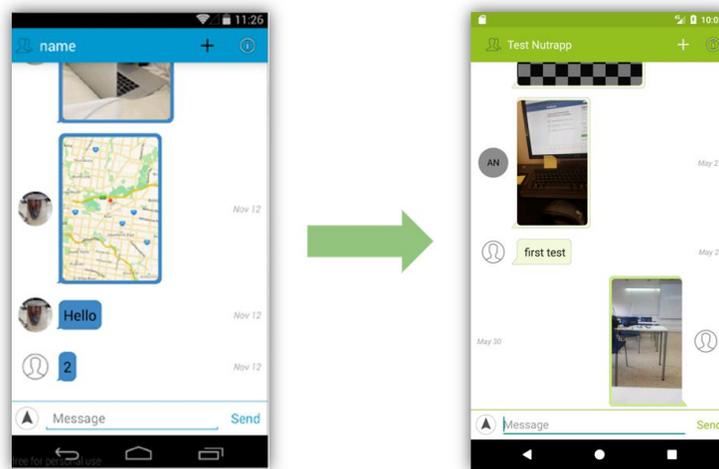


Figure 10: Comparison between original and custom interface

5.8 Translation

Nutrapp is a local Spanish company, and their clients are Spanish and speakers, so it is important to make Spanish the default language of the app. Although the initial default language of the app is English, with the help of team's supervisor and one of the team members, it is translated to Spanish and Catalan by using language editor in Android Studio.

The app will change the language according to the phone system. When it is different from those three languages, the app will opt to use the default which is Spanish.

5.9 WebView

Programming in Android Studio provides a handy tool to deal with websites within the application. This tool is called WebView. Due to the fact that the project was based on the website of the company [17] the team decided to implement WebView into Nutrapp application. It was required to give access to news pages (actualidad nutrapp, cocina saludable nutrapp and actualidad: nutrapp educa), login page (with access to private part of the website), questionnaire page (with survey provided by nutritionists to help user choose the best service) about page (with information about the company).

First, learning about this tool was necessary, and the official tutorial was used to become familiar with WebView [18]. After the learning process, a draft was designed for each page in which WebView was to be implemented. WebView has the ability to protect the application from closing when clicking another link presented on the webpage. Users can easily navigate in nutrapp.es domain, however, they are not able to go to a different domain inside the application and are asked to use a browser.

Another improvement gave users the ability navigates to the previous screen using the 'back' button (located at the top left of the screen), adding a browsing history to the WebView.

The last implemented WebView feature allowed the refreshing of the page by scrolling downwards. This is indicated by the rounded circle at the top of the page.



Figure 11: Webpage is converted to WebView

5.10 Problems Faced

1. Lower the target API

As Chat SDK is developed with the older Android system, the Android target build version needs to be lowered to ensure the functionality of the app. One of the items that will be affected by this downgrade is the material design features such as elevation (a graphical shadow effect of an object) and ripple effect animation when a button is touched.

2. Permission

Android has changed the level of a few permissions to dangerous in their current API, for example, the permission for camera and location. As a result, a method needs to be added in the Java file to request permission at the runtime of the app.

3. Login database

At the beginning of the project, the company requested for a combined database between the chat's and website's login database. However, it appears to be impossible because both databases are stored on different platforms. With this reason, an agreement to use different database was achieved with the company.

6. Application Interface

6.1 Navigating Your Way Through the Application

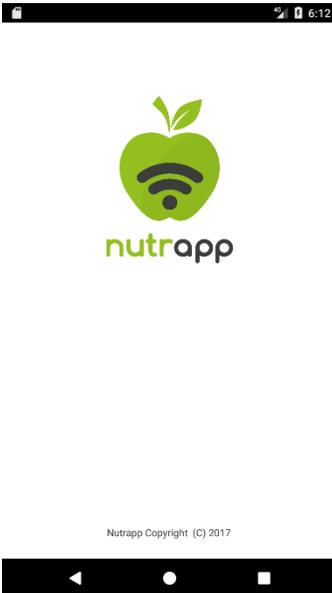


Figure 12: Welcome screen

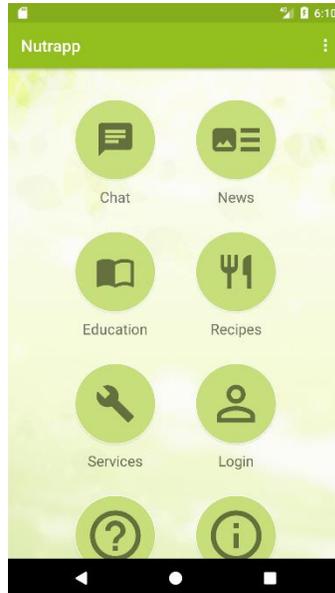


Figure 13: Homepage

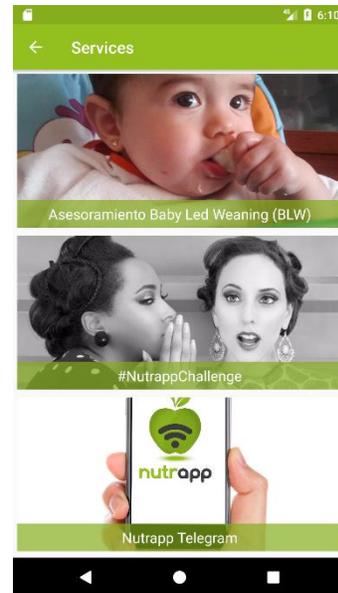


Figure 14: Services



Figure 15: News

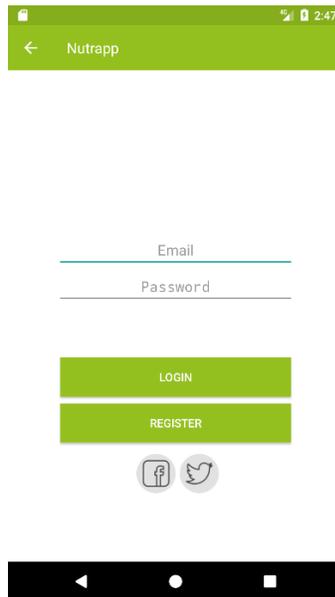


Figure 16: Chat login

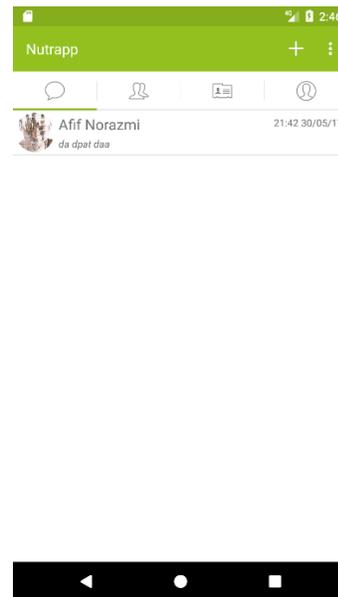


Figure 17: Chat thread list



Figure 18: Chat thread

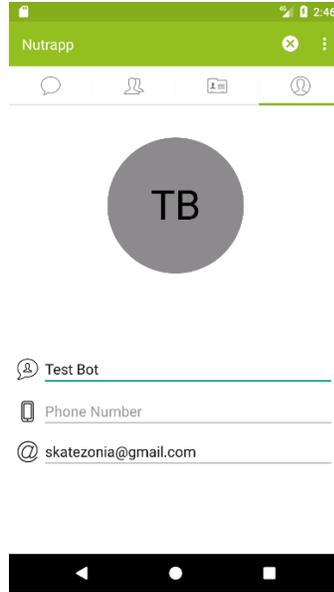


Figure 19: Chat profile

The final product was designed to be simplistic yet, useful and informative. Users will find that the application opens with a three-second view of the company logo and name. This is followed by the application homepage. The homepage is designed with six buttons. These buttons consist of the following categories:

- Chat
- News
- Education
- Recipes
- Services
- Login
- Survey
- About

All, but three buttons use a programming feature called WebView. WebView allows the user to access a website page straight from the application. This is an easy way to connect the website with the application. The News, Education, and Recipes buttons take the user to the website page associated. The News buttons is connected with the news blog on the website titled "Actualidad Nutrapp". Similarly, the Education button takes the user to the website page titled "Actualidad: Nutrapp Educa", as well as the Recipes button, which gives the user access to the recipes blog titled "Cocina Saludable Nutrapp". The user can now access each of these blogs right from the application.

The Login and Survey buttons work in a similar fashion. However, instead of giving the user access to a blog, they take the user to an interactive web page. The Login button gives the user the ability to log into their Nutrapp company account. The Survey button takes the user to a free questionnaire the company provides in order to learn more information about a user's healthy eating habits.

The Nutrapp button simply displays valuable information regarding the Nutrapp company, such as contact information and the location.

The chat gives users the access to an open chat with both other users and their nutritionist. The users have the option to create a login or register an account where they can choose a username and profile picture.

Finally, the services button brings the user to a page listing the varying services offered by the Nutrapp company. The user can click on the desired service and learn more information such as the cost and description.

The application uses information from the website. Therefore, most of the text is displayed in Spanish. However, the text not linked to the website (such as button names) will be displayed in the language used on the client's phone. If the user's phone is in another language other than English or Spanish the application will display the text in the default language of Spanish.

6.2 The Look of the Application Interface

The overall look of the application interface has been designed to be clear and straightforward. Nutrapp wanted a new method of delivering their expert advice that would be quicker and more instant than what they are currently doing. To reflect this simplicity, we kept the application consistent, using Nutrapp's green colour from their logo and using crisp white backgrounds to offset and enhance features. Additionally, to keep the application looking professional

7. User's Manual

A simple user's manual on how to navigate the application, and what to expect from each of the features included.

1. Open application.
2. Chat - when you open the chat for the first time you need to login or register. When you close the application, it remembers your data, so next time it will be done automatically. However, you can log out before closing the application. Inside the chat there are four screens:
 - private messages: your private conversations with nutritionists or other users are visible here
 - groups: group conversations are visible here
 - contacts: list of your contacts is visible here (nutritionists or other users that have been added by you)
 - profile: your data are visible here, and you can edit them
3. Three main feeds are present at the main screen:
 - Actualidad Nutrapp - general news about health and healthy food
 - Cocina saludable Nutrapp - healthy recipes proposed by Nutrapp nutritionists
 - Actualidad: Nutrapp Educa - information for families with children
4. Services - every service provided by the company is presented here. You can read description of the product and check the price.
5. Authorised part - it is the page which gives you access to the private files provided by the nutritionists (e.g. plans, recipes).

6. Questionnaire - the survey provided by the nutritionists to help you choose the best service is available here.
7. About - if you want to know more about the company you can find it here.

8. Test and Evaluation Results

To conclude our project, it was essential to test the final and fully functioning prototype of the Nutrapp application. Although we as a team felt as though we had achieved what the company required, we also wanted to know what current and potential users thought about the application at this point. This testing and evaluation process has allowed us to recognise and draft future aims and objections for the application, to essentially improve on what we have already created.

An evaluation questionnaire was formulated and then given to people to complete. The application has been tested by a variety of people, including one professional android developer, existing Nutrapp clients and UPC students. Unfortunately, we only received a total of 7 responses for the evaluation questionnaire, this provides the team with limited feedback information.

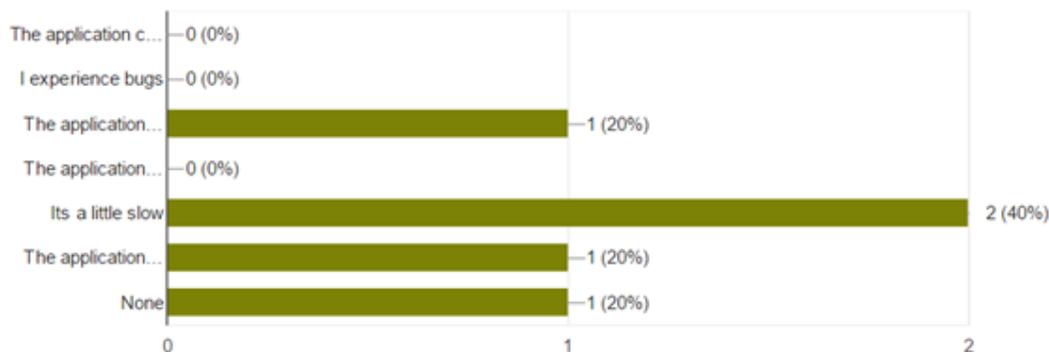
The questions asked in the evaluation are as follows:

1. Which of these issues did your experience during your use of the mobile app?
2. Please describe the problem(s) you experienced in further detail.
3. Which of the following aspects did you like most about the application?
4. Which of the following aspects did you like least about the application?
5. How easy was it to find the information you were looking for in the Nutrapp application?
6. Does the application provide quick response to the touch screen?
7. How likely are you to recommend our apps to others?
8. How many stars would you give this application overall?

Some of the questions and results have been analysed by the team in further detail.

Which of these issues did your experience during your use with the mobile app?

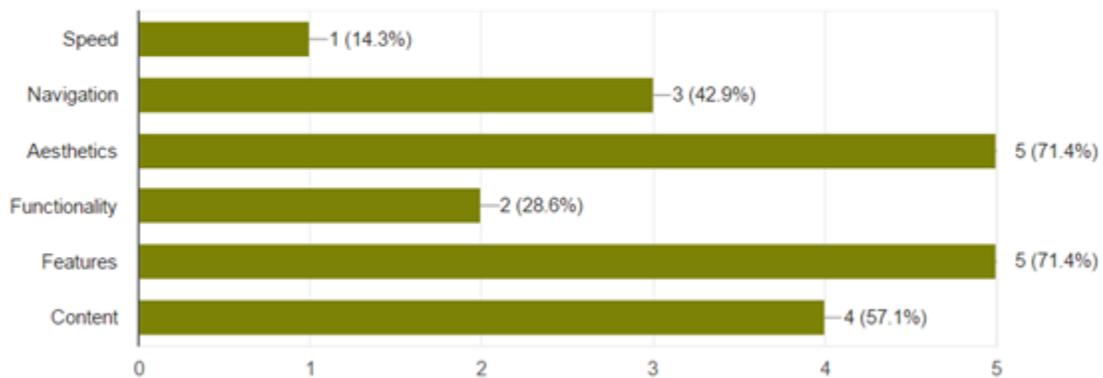
5 responses



One of the things our team was interested in knowing, is whether the user(s) who tested the prototype experience any difficulties. As a team, we were aware of areas and issues that needed more improvement and potential development, we wondered whether the users felt the same with what they were experiencing as first-time users. 'Application lagging' was the issue our team felt could be potentially eliminated with more understanding about application programming. It was confirmed by user's evaluation questionnaire that the application being too slow was the biggest issue, which we agreed with.

Which of the following aspects did you like most about the application?

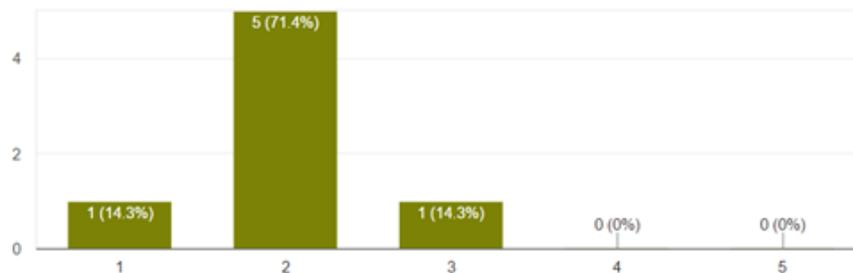
7 responses



The evaluation questionnaire is not only beneficial for us – the team who created the application, but also for the company Nutrapp, as the application was mainly based on their requests when regarding the aesthetics, functionality, content and features. Interesting the aspects which users liked most about the application was varied. The top-ranking aspects included 'features' and 'aesthetic,' these two features were areas that we debated on for some time throughout the project, so the results were very positive. We expected that 'speed' would rank the lowest and this is something that is outlined in future improvements as an area that need more focus on.

How easy was it to find the information you were looking for in the Nutrapp application?

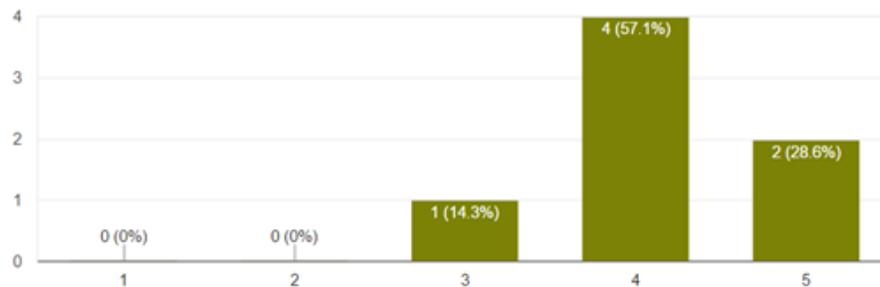
7 responses



One aim we focused on throughout the project was how the application would be navigated and how easy the user would find the application to use. We asked users who tested the application how easy and quickly they could find information. Ranking a 1 indicates that it was easy, and ranking a 5 indicates that it was difficult. Results were positive with no one ranking the application 4 or 5, the majority at just over 70% ranked the application a 2, meaning that it was easy to navigate but there is still room for improvement. The layout of the application could be re-evaluated in future development.

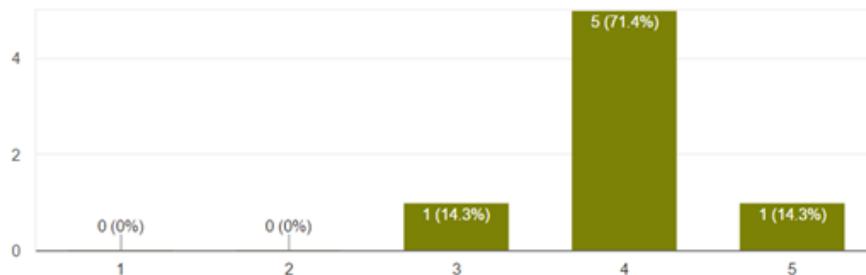
How likely are you to recommend our apps to others?

7 responses



How many stars would you give this application overall?

7 responses



The last two questions in the evaluation are aimed at understanding whether the user testing the application would a) recommend the application and b) overall how would they rate the application. Both graphs display a similar pattern, with 4 being the highest scoring option for both questions. This again is a positive outcome so it seems, however with only the 7 responses that we received this might not be a true indication of what the majority of people may think. For the evaluation to be fairer and more accurate, it would have been to our advantage for more people to have answered the questionnaire. Although we are pleased that we managed to get the feedback in this evaluation from a professional android developer.

9. Future Improvements

1. Integrated to website chat
Nutrapp has a chat built-in in their website. It will benefit the users if both platforms of the chat, mobile and website, can be merged.
2. iOS app
Current development of the app focuses only on Android ecosystem. If iOS app is available, Nutrapp can reach out to a third of their clients.
3. Improve chat functionality
A few features can be added into the Chat SDK such as audio and video messages, location sharing and read receipt. Those features can be purchased at the Chat SDK website.
4. Upgrade database - Firebase and Dropbox
The chat database is stored in Google Firebase with a free account. The database can be enlarged by subscribing to a Firebase premium account so the capacity of the connection per day can be upgraded to more than 10,000 connections. The JSON files for the services is hosted in Dropbox, and as a result, the connection to fetch the data decreases in speed. If the files are moved to another host, the Nutrapp website for example, it can improve the user experience.
5. Team up with certified Android developer
Having an experienced member in the team will improve the app.

10. Conclusion

The team managed to fulfil the requirements by providing the fully functional prototype for the company Nutrapp. During the last four months, many ideas were introduced by the team, eventually, a product evolved. As a team, we feel pleased with the outcome, as we must remember that our expertise did not lie in application development and this was a new skill we had to learn quickly. However, we also recognise we could have finished the prototype to a higher level of sophistication, to have done this we needed to know more about application programming. Furthermore, we have met the specification and done so by teaching ourselves, although we had mentioned to our support figures that help was needed, the help that we requested was not provided.

Additionally, with each team member coming from a different field of study, it has served us well throughout the duration of the project. Although not formally discussed at the start of the project what role each team member would adopt and take on, we quickly learnt what each of our strengths was, and this enabled us to coherently divide work where it was possible. Moreover, coming from different fields of study and universities across the world, we have learnt new methods in how to approach tasks, that we were otherwise unaware of. The experience has taught us to be more open-minded, whether that is concerning work or socially.

As mentioned previously, after reflecting on the project we realise that our efforts were good but could have been better. We would have liked more support from UPC teachers where it was possible, communication at times was lacking, and instead of being more forward as a team and making things

happen, at times we did casually sit back awaiting a reply. Often the phrase 'Spanish way of life,' or 'Spanish time,' was tossed around our classroom and it became familiar that students, as well as teachers, would arrive to class or meetings 10 minutes late. Upon reflection, as a team, we could have had a greater influence on how things are currently operated.

11. Acknowledgements

We wish to express our sincere gratitude to the company Nutrapp for supplying us with the brief that has allowed us to work as a team on a project that enabled us to learn new skills. We are truly thankful for their support which has been shown through various gatherings at meetings and providing us with information that has been necessary to carry out the project. Additionally, we are also grateful for the way in which the company has involved their clients within the project, this has proven to be a great deal of help to us, giving us a better insight into what we needed to do.

Furthermore, we would also like to give our thanks to our tutor Mr A. Catala who has assisted us throughout our time here in Vilanova I la Geltru. Without his efforts communication between the group and the company would not have been possible. His expertise in the application field has provided us with much-needed guidance.

Finally, we would like to express our appreciation to UPC for hosting the European Project Semester and accommodating students from around the world. UPC has provided us with lectures and seminars filled with thought provoking ideas and concepts that have allowed our team to feel more equipped throughout the project. Special thanks go out to Cristina (Spanish teacher), Mr Joseph Barr (English teacher) and Ms Nora Martinez (Project Management teacher) who have all been present throughout our time here and specifically helped towards our team's progress both within the project and socially.

12. Bibliography

- [1] Mark Dunlop, Stephen Brewster, "The Challenge of Mobile Devices for Human Computer Interaction", *personal.cis.strath*. date unknown. [online]. Available: <https://personal.cis.strath.ac.uk/mark.dunlop/research/publications/02dunlopbrewster.pdf>. Accessed at: March 27th, 2017.
- [2] Todd Sliegel, "6 Mobile App Designers That Are Changing The Way We Interact With Technology", *proto.io.com*, Septembre 7th, 2015. [online]. Available: <http://blog.proto.io/6-mobile-app-designers-that-are-changing-the-way-we-interact-with-technology/>. Accessed at: March 26th, 2017.
- [3] Dan Saffer, "Designing for Interaction: Creating Innovative Applications and Devices (2nd Edition)" April 2, 2017. Available: <https://www.usability.gov/what-and-why/interaction-design.html>. Accessed at: March 23rd, 2017.
- [4] Peter Morville and Louis Rosenfeld. "Information Architecture for the World Wide Web: Designing Large-Scale Web Sites." *Usability.gov*, April 2, 2017. Available: <https://www.usability.gov/what-and-why/interaction-design.html>. Accessed at: March 21, 2017.
- [5] UX Booth Editorial Team, "Complete Beginner's Guide to Interaction Design", *UX Booth.com*, Octobre 27th, 2015. Available: <http://www.uxbooth.com/articles/complete-beginners-guide-to-interaction-design/>. Accessed at: March 20th, 2017.
- [6] L. E. Au, S. Whaley, N. J. Rosen, M. Meza, and L. D. Ritchie, "Online and in-person nutrition education improves breakfast knowledge, attitudes, and behaviors: A randomized trial of participants in the special supplemental nutrition program for women, infants, and children," *Journal of the Academy of Nutrition and Dietetics*, vol. 116, no. 3, pp. 490-500, 2016.
- [7] R. J. Bensley, J. V. Anderson, J. J. Bruski, N. Mercer and J. Rivas, "Impact of internet vs traditional special supplemental nutrition program for women, infants, and children nutrition education on fruit and vegetable intake," *J Am Diet Assoc*, vol. 111, no. 5, pp. 749-755, 2011.
- [8] M. J. Mallen, D. L. Vogel, A. B. Rochlen, and S. X. Day, "Online counseling: Reviewing the literature from a counseling psychology framework," *The Counseling Psychologist*, vol. 33, pp. 819–871, 2005.
- [9] A. B. Rochlen, J. S. Zack, and C. Speyer, "Online therapy: Review of relevant definitions, debates, and current empirical support," *Journal of Clinical Psychology*, vol. 60, no. 3, pp. 269–283, 2004. doi:10.1002/jclp.10263.
- [10] J. E. Cook, and C. Doyle, "Working alliance in online therapy as compared to face-to-face therapy: Preliminary results," *Cyber Psychology & Behavior*, vol. 5, no. 2, pp. 95–105, 2002. doi:10.1089/109493102753770480.
- [11] Nutrapp "Your nutritionist in your pocket", date unknown, Available: Available: <http://www.nutrapp.es/que-es-nutrapp/>. Accessed at: March 18th, 2017.
- [12] Sarah Knapton, The Telegraph – News, "Study uncovers hidden epidemic of eating disorders in middle-aged women", January 17th, 2017. Available: <http://www.telegraph.co.uk/news/2017/01/17/study-uncovers-hidden-epidemic-eating-disorders->

[middle-aged/](#). Accessed at: March 16th, 2017.

[13] M. Rajput, "Why Android Studio Is Better For Android Developers Instead Of Eclipse", *dzone.com*, 2015. [Online]. Available: <https://dzone.com/articles/why-android-studio-better>. [Accessed: 01- Apr- 2017].

[14] A. Raza, "Android vs. iOS: Which Should I Learn First?", *Upwork*. [Online]. Available: <https://www.upwork.com/hiring/mobile/android-vs-ios-which-to-learn-first/>. [Accessed: 01- Apr- 2017].

[15]"chat-sdk/chat-sdk-android", *GitHub*, 2017. [Online]. Available: <https://github.com/chat-sdk/chat-sdk-android>. [Accessed: 07- Jun- 2017].

[16]"Android: Quickstart - Chat SDK", *Chat SDK*, 2017. [Online]. Available: <https://chatsdk.co/docs/android-quickstart/>. [Accessed: 07- Jun- 2017].

[17]"Nutrapp", *www.nutrapp.es*, 2017. [Online]. Available: <http://www.nutrapp.es>. [Accessed: 07- Jun- 2017].

[18] B. WebView, "Building Web Apps in WebView | Android Developers", *Developer.android.com*, 2017. [Online]. Available: <https://developer.android.com/guide/webapps/webview.html>. [Accessed: 07- Jun- 2017].

Appendix I - Nutrapp Customer Survey

Nutrapp Customer Survey

Género

- Hombre
- Mujer
- Prefiero no decirlo
- Otro:

Edad

- 18-24 años de edad
- 25-34 años de edad
- 35-44 años de edad
- 45-54 años de edad
- 55-64 años de edad
- 65-74 años de edad
- 75 años o más

¿Qué tipo de teléfono inteligente tiene?

- Android
- Apple (iPhone)

- No tengo un teléfono inteligente

¿Qué servicios/planes de Nutrapp usas?

- Nutrapp Coach
- Nutrapp Planifica Salud
- Nutrapp Coach Mantenimiento
- Talleres presenciales Nutrapp Educa

¿Con qué frecuencia usa los servicios de Nutrapp?

- Diariamente
- 3-4 veces / semana
- 1-2 veces / semana
- Una vez al mes
- A veces
- Raramente

¿Por qué utiliza este servicio(s)?

- Tener un estilo de vida más saludable y nutricional
- Perder peso
- Razones médicas
- Otro:

¿Está dispuesto a pagar por un servicio de la aplicación de Nutrapp?

- Sí
- No
- Tal vez

¿Cuánto?

- Menos de 5 euros / mes
- 5-10 euros / mes
- 10-20 euros / mes
- 20-30 euros / mes
- 30-40 euros / mes
- 40-50 euros / mes
- 50+ euros / mes
- No estoy dispuesto a pagar

¿Qué idioma prefieres?

- Inglés
- Español
- Catalán

- Otro:

¿Con qué frecuencia utiliza otros servicios basados en chat (como Whatsapp, Telegram, Facebook Messenger, etc.)?

- Diariamente
- 3-4 veces / semana
- 1-2 veces / semana
- Una vez al mes
- A veces
- Raramente

¿Cuál es el aspecto más importante de una aplicación?

- Precio
- Utilidad
- Características
- Espacio de almacenamiento
- Uso de internet
- Personalización
- Otro:

¿Otros comentarios?

Appendix II - How to Download Application Instructions

Nutrapp App Evaluation Instructions

Please complete no later than Monday, June 5th. All survey responses will remain anonymous.

1. Your android smartphone must be enabled to download the application. To do this open your settings.
2. Scroll down and find 'Security' under the 'Personal' tab.
3. Under 'Security' scroll down and find 'Unknown Sources'. Switch it on. This allows your phone to download applications from sources other than the Google Play Store.
4. Use this link https://drive.google.com/file/d/OB_-eD_ju4_pxb2hEMzcxSWZwMWc/view?usp=drivesdk to download the application.
5. Please use the link below to take a short survey on your evaluation of the Nutrapp Application. https://docs.google.com/forms/d/e/1FAIpQLSd3nycX2vrtLEww3L7SQKlIhvTdpNreDp0xJiBjTnd5sKxNGUw/viewform?usp=sf_link

For any questions or comments please contact Kara Jelley kdjelley@mtu.edu or Afif Norazmi afif.norazmi@gmail.com.

Thank you for your participation!

Appendix III - Nutrapp Mobile App Questionnaire

Nutrapp Mobile App Questionnaire

Which of these issues did your experience during your use with the mobile app?

- The application crashed
- I experience bugs
- The application was confusing to use/navigate
- The application was missing features I needed
- Other:

Please describe the problem(s) you experienced in further detail.

Your answer _____

Which of the following aspects did you like most about the application?

- Speed
- Navigation
- Aesthetics
- Functionality
- Features
- Content
- Other:

Which of the following aspects did you like least about the application?

- Speed
- Navigation
- Aesthetics
- Functionality
- Features
- Content
- Other:

How easy was it to find the information you were looking for in the Nutrapp application?

Easy

- 1
- 2
- 3
- 4
- 5

Difficult

Does the application provide quick response to touch screen?

- Yes
- No

How likely are you to recommend our apps to others?

Very Unlikely

- 1
- 2
- 3
- 4
- 5

Very Likely

How many stars would you give this application overall?

- 1
- 2
- 3
- 4
- 5

Annex I - Application Code

The application code can be access in an online repository, Bitbucket. For this period of evaluation and development, it has been made public. It will be the property of Nutrapp, and will be made private when this project finished. The link:

<https://bitbucket.org/afifnorazmi/nutrapp>