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**Abstract:**

This report covers the process, analysis and development of a socializing mobile application for the students of the University of Aalborg Copenhagen. We go through the process of developing an application called Meet'n'Eat.

Meet'n'Eat is built on the foundation of user feedback using questionnaires, focus group and user testing. The functionalities of the App were often altered by user feedback, brainstorming and prototyping. All this testing enabled us to design the application and to define the system requirements for our platform. The implementation is where design and requirements all come together.

Lastly we reflect on the project that we built and discuss the future improvements that would be needed to have a finished product.

**By signing this document each group member confirms that all have participated equally in the project work and that they collectively are responsible for the content of the project report. Furthermore each group member is liable for that there is no plagiarism in the report.**



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# Introduction

Aalborg University is the home of thousands of students. The primary focus is their studies, but the campus is also a great place for socializing. Lunch time, breaks and Friday Bars are great places to do so. Aalborg University welcomes hundreds of new International students every year and is blessed with people from multicultural backgrounds who each have their own interests, opinions and stories. By walking through the hallways you cannot only see, but really feel the diversity.

Each day you walk by these students, but you never talk to them. Surely among the 3617 students of Aalborg University Copenhagen<sup>1</sup>, there are some people that have the same common interests and passions as you. But because of the “social conventions” it can be very difficult to engage in a conversation with a stranger.

This begs the question: How is it possible to meet new friends?

Meet ‘n’ Eat is the answer to this problem unfortunately known by way too many students. It is a mobile application designed to help people meet each other. There are many solutions for finding partners (websites, mobile applications, speed dates etc...), but there are actually very few options for simply meeting new friends. Our goal is not to recreate these popular dating solutions and applying them to a friend context, but to provide a socializing tool to university students.

The inception of the idea came from walking around the campus and seeing dozens, if not hundreds of students eating lunch alone. In addition to that, most people are eager to meet new and interesting people.

Are you looking to talk to somebody about the latest episode of your favourite TV-show? Are you trying to learn Danish? Looking for friends to explore the city?

All of this is possible with Meet ‘n’ Eat and it is a very easy process.

This application could change the life at Aalborg University. It would truly reinforce the student community of Aalborg Copenhagen and create a much friendlier environment where people actually know each other. In the end, the reason doesn’t matter, it is just a pretext to help people socialize and create new connections.

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<sup>1</sup> Students at Aalborg University 2015. Retrieved from <http://www.en.aau.dk/about-aau/figures-facts/students/> at December 15, 2015.

## Problem Formulation

**How can we help students to meet each other besides the student society and Ida organized events?**

How can modern technology improve social life?

## State of the Art

Throughout the state of the art we will look at various mobile applications and websites that aim at connecting people together. The first research we did was simply to look at what solutions we could find to find friends online, our result was exclusively websites and we made a selection of the most popular ones. Meetup was a special case since we already knew about it before researching our competitors, and although it operates differently from the previous websites it was still interesting to look into. A big part of our investigation was to look at various dating websites and apps. We were mostly interested to look into the design of them, what makes them different from one another and what makes some more popular than others. As it is a huge market, we knew we could find a lot of resources and information to help design and build our own mobile application. The last part of the state of the art was discovered later into the project and is a special case because in terms of what it wants to achieve, it is the closest to our design. But due to its unpopularity and its complex use it is hard to consider Entourage a strong competitor.

## Real Life example

The purpose of Meet 'n' Eat is to get people together to get to know each other. To make this application effective and successful there is a need to look at the real life experience. What makes it enjoyable and what makes it boring.

People are meeting for pleasure at many places. Cafes, Bars, Restaurants, City squares etc. and they have several activities to spend the time with. One of the places where people meet with great enthusiasm and pleasure is a cafe called Huset. Huset is a place where one can find more than 600 board games, order a beer or nachos and spent nice and competitive time with friends. People are coming in groups or couples and trying to pick the funniest game of all.

Sometimes it happens that the game needs to have a certain number of people and some players are missing. Huset is solving this problem almost in the same manner as the Meet 'n' Eat application. Huset has an announcement which could be placed on the table saying: "looking for more players". These way strangers become friends and play a fun game together.

What Meet 'n' Eat will take from this is that by meeting new faces, people like to have some activity so this application could provide some suggestions. The other thing is that it is enough for them to have a common activity to actually have a good time, so for this reason a random button will be made.

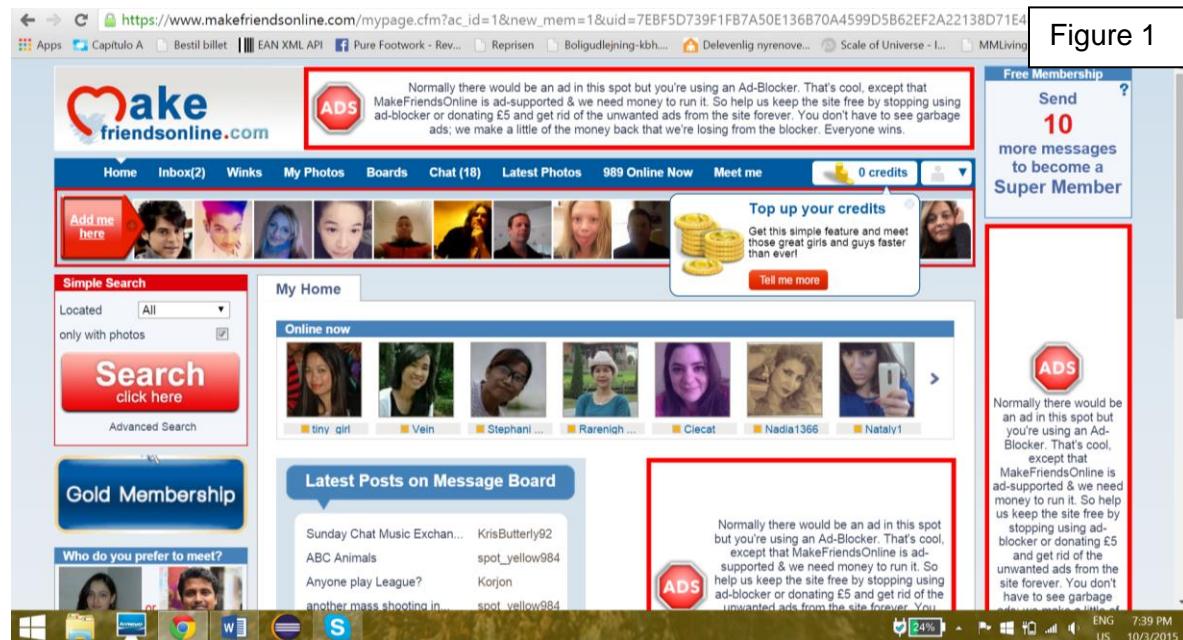
## Friend seeking apps, websites

To make Meet 'n' Eat more intuitive and more customized to our focused group of users it was needed to look at a similar web based application. Meet 'n' Eat is not a dating application, so we needed to find out if there are some application similar to this one and if they are, what makes them attractive and on the other hand we also needed to figure out what makes them undesirable for the users.

For this reason the three most used websites were looked at. These websites were chosen by the keywords "meet new friends" and also according to their amount of members.

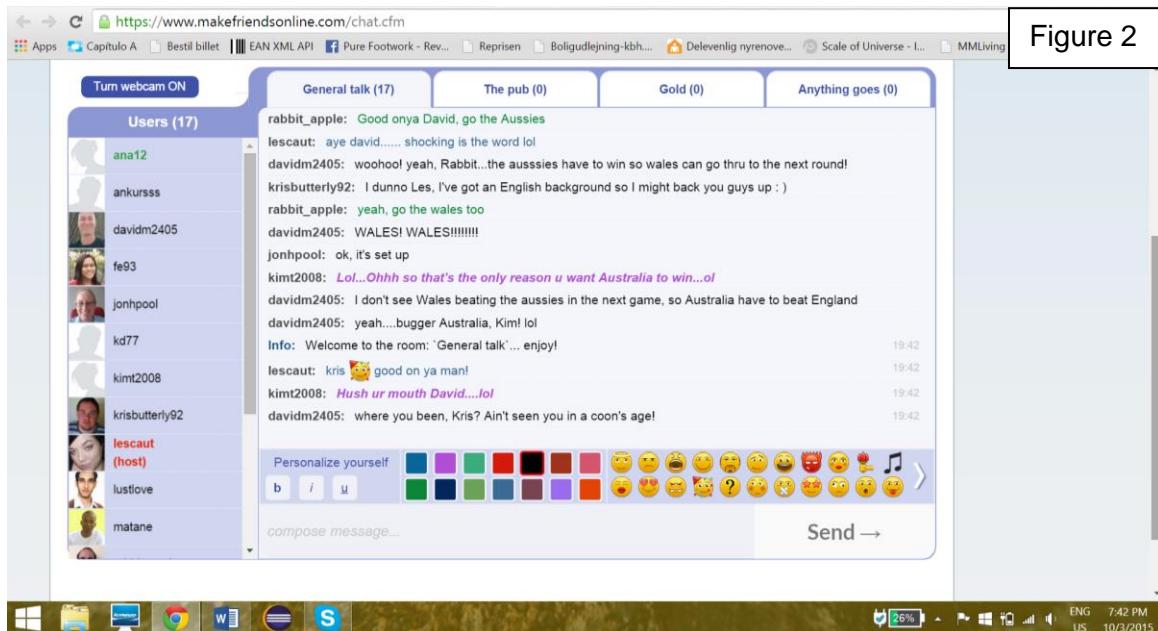
## MakeFriendsOnline<sup>2</sup>

The most popular website with 1.192.728 members is Make Friends Online ([makefriendsonline.com](https://www.makefriendsonline.com)). According to this websites description this tool is used by singles that are looking for a friend or a date as well. This website is used worldwide.



Screen after signing in

<sup>2</sup> Make Friends Online. Retrieved from <https://www.makefriendsonline.com/> at December 15, 2015



Chat room

**Figure 3**

This screenshot shows a private mailbox on the MakeFriendsOnline website. On the left, there's a sidebar with options like 'Simple Search', 'Gold Membership', and 'Who do you prefer to meet?'. The main area is titled 'Mailbox' and shows a list of messages. One message from 'mohamedshemes' is highlighted, showing details like age (21), country (Egypt), and status (Standard Member). There are buttons for 'YES', 'MAYBE', and 'NO'. Below this, another message from 'mohamedshemes' is shown with a message box and 'Send it' and 'Special Delivery' buttons. To the right, there's a red-bordered 'ADS' section with a message about credits and a stop sign icon. The bottom of the screen shows a taskbar with various icons and system status.

Private mailbox

## Pros:

After logging into makefriendsonline, you have the possibility to chat with other members. These people are chosen according to your age and place you live. You can afterwards customize your profile so the selection would be more precise.

Another advantage is that this website provides not only a personal message but also a [chat room](#) where everyone can join and take part in the conversation.

Your private mailbox notifies you that other members are trying to get in contact and you are then presented with three options: Yes, No, Maybe.

## Cons:

The websites is [not consistent](#). There are many colours, advertisements and a lot of disturbing elements.

The starting page states that the service is totally free, but after signing up you are asked to [upgrade from standard user](#) to a golden user to get access to all the features for a small fee.

MakeFriendsOnline accommodates [only one chat room](#). There is not a distinction according to interests or places.

## What is there for us?

We looked into this website with great enthusiasm and big expectations looking at the fact that it is one of the biggest websites in its field. What we eventually found out is that it has more disadvantages than advantages. The design of this website is not sufficient, it is too chaotic and it is not providing an easy navigation to the desirable places. Moreover, it does not provide required customization for the user. What we are taking from this website for Meet 'n' Eat is that it will be developed in a user friendly environment, that the user will be able to decide with whom he or she wants to meet according to more than just on criteria. The good point from MakeFriendOnline is the chat room. The chat room gives people a way to interact with more than one person at the time and can lead to greater fun as well as more pleasant lunch after all. Looking at this website was definitely a step forward in the development of a Meet 'n' Eat application.

## CyberFriends<sup>3</sup>

The second website considered as a baseline for Meet ‘n’ Eat is CyberFriends ([cyberfriends.com](http://cyberfriends.com)).

This website is classified as one of the most safe and secure social media sites. The security is executed within the veracity of the profiles. This website focuses on eliminating the fake profiles and pictures. This website focuses only on people looking for friendships not dating.

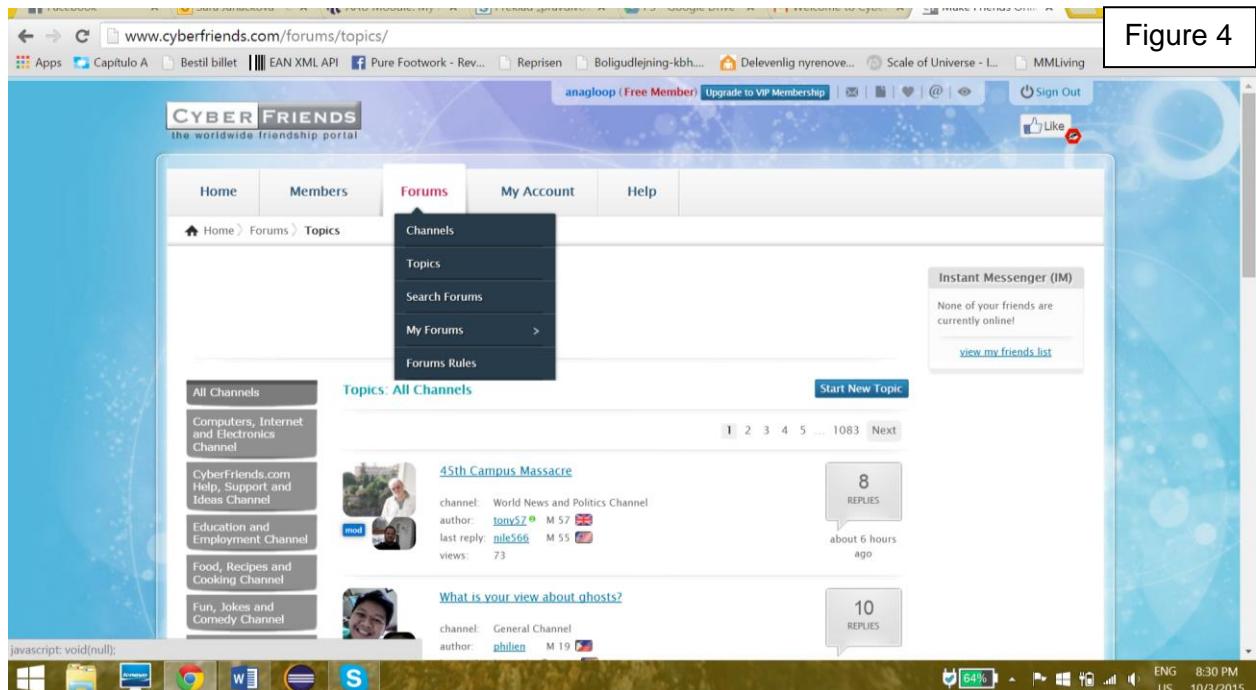
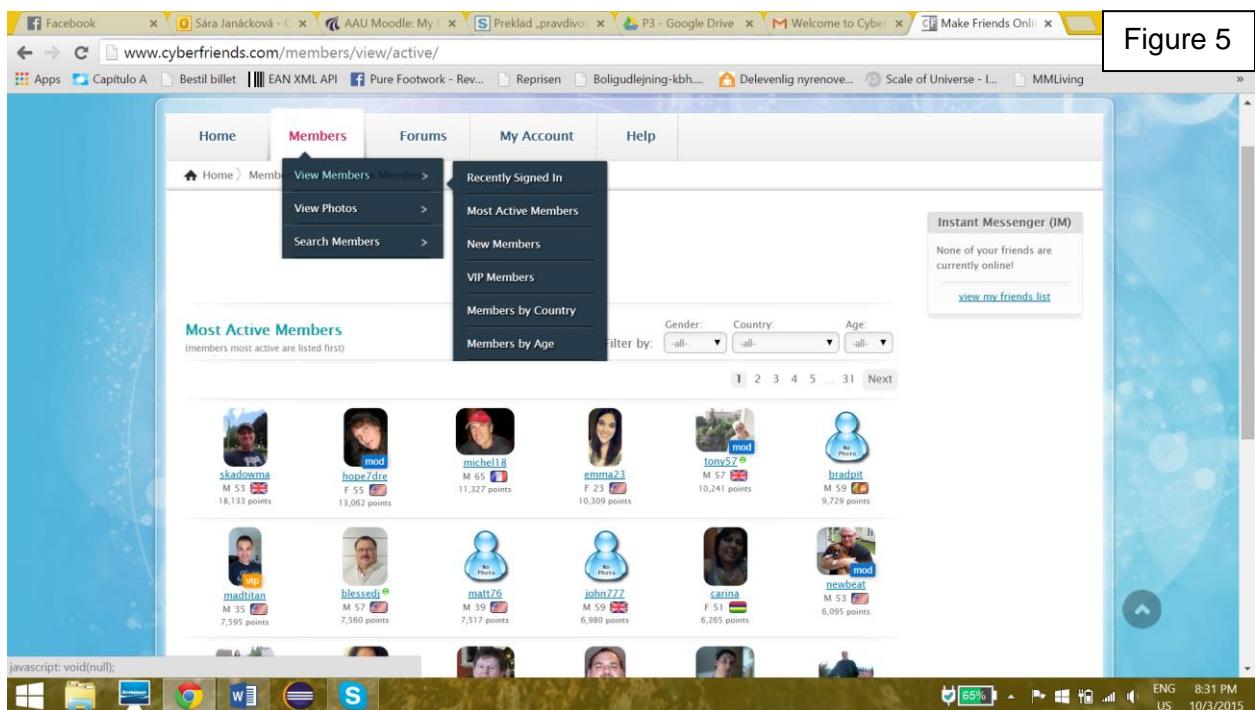


Figure 4

Page for choosing the Topics

<sup>3</sup> Cyber Friends, the worldwide friendship portal. Retrieved from <http://www.cyberfriends.com/> at December 15, 2015

Figure 5



## Viewing members

### Pros:

Cyberfriends is a well-organized website. It is very easy to understand and navigate as well. Even a new user can find its way only by a few clicks.

Users can choose to join several discussions according to their interests (computers, gardening, and food) which can be found under the name – channels or they can participate on a debate according to a topic (Trust, Do you believe in miracles?).

This website is very user oriented and users are very active. All forums and topics are developed or started by the users and only a small mediation from the developers is required when it comes to curse words or nudity in the pictures.

## Cons:

Despite the good organization of the website the section channels is [not developed quite cleverly](#). When you want to join some discussion you need to choose a channel and then you need to choose a topic again. In a lot of cases it happens that there is only one or two people debating.

The discussions are [not perceptible](#). They don't look like chats but more as emails therefore it is harder to join a conversation or get an overview what is going on in the conversation.

This website does not provide any suggestions and [no matching](#) for the user according to the interests. All the searching has to be done by the user himself.

## What is there for us?

CyberFriends is definitely a website which brought us more inspiration and more ideas than the first one. It provides us with a baseline for Meet 'n' Eat. It is well organized, offers more chat rooms according to interests where people can interact and socialize. The organization is an inspiration to us but improvements in design and appearance must be made. The table layout with scrolling takes much time and it is not efficient. The profile creation of Cyberfriends is great, as it forces users to write a little more about themselves, what he or she likes, dislikes and what his or her interests are. It is an idea worth considering because this way the matching and suggestions might be easy to make and people have a summary about others which can be very helpful. This websites will stay in our focus while developing Meet 'n' Eat.

## Not4Dating<sup>4</sup>

The third website is the closest one ideologically to Meet ‘n’ Eat from all three websites. It is called [Not4Dating \(not4dating.com\)](http://www.not4dating.com) and the purpose is to find a friend to go out with, either to play tennis or go to the movies. This application runs only in 6 countries by now. The majority of the users are female of all ages. Everyone can join and find the best friend online according to the area of residence.

The screenshot shows the Not4Dating website. At the top, there's a navigation bar with links for 'HOME', 'MEET PEOPLE', 'FAQS', and 'CONTACT US'. Below the navigation is a section titled 'Recent Users in Your Area' with a 'Basic Search' form. The search form includes fields for 'ZIP / Postal code' (with a placeholder 'United States'), 'Country' (set to 'United States'), 'Distance' (set to '30 miles (48.3 kms)'), 'Gender' (set to '- Any -'), and a 'Search' button. Below the search form is a text input field with the placeholder 'Enter your ZIP Code to find new friends in your area!'. To the right of the search form, there's a descriptive text about the site's purpose: 'Not4dating.com helps you meet platonic friends online that you can connect with in real life. Our members are people like you looking for hiking partners, dining companions, drinking buddies, a friend to go see a movie with, someone to play tennis with, or a great new best friend.' There are also sections for 'Who's on the site?' with statistics (80% female, 20% male; average age about 33; youngest member 18, oldest 85; 64% in a relationship, 36% not), 'Register Now' and 'Login Now' buttons, and a 'Who are we and why did we start this site?' section. The footer contains social media icons and system status information (90% battery, ENG, 9:05 PM, 10/3/2015).

Figure 6

Front page

<sup>4</sup> Not4Dating 2015. Retrieved from <http://www.not4dating.com/> at December 15, 2015

**Figure 7**

The screenshot shows the Not4Dating search interface. At the top, there are search filters for ZIP / Postal code (empty), Country (United States), Distance (30 miles/48.3 kms), Gender (Any), Age (18-120), Relationship Status (Any), and Activities/Interests (checkboxes for various interests like yoga, sightseeing, dancing, etc.). Below these are sections for 'Who's on the site?' (80% female, 20% male; average age about 33; youngest member 18, oldest 85; 64% in a relationship), 'Who are we and why did we start this site?' (two sisters from New York who wanted to meet new friends), and 'Here is what some of our members tell us' (short quotes from members). The bottom of the page shows a Windows taskbar with various icons and a status bar indicating 90% battery, ENG US, and 10/3/2015.

## Meet friends page

**Figure 8**

The screenshot shows the search results page with three member profiles displayed. The first profile is for a single female 18 years old from Salt Lake City, Utah, who is looking for a friend. The second profile is for a married female 28 years old from Salt Lake City, Utah, also looking for a friend. The third profile is for a member in a relationship 20 years old from Ogden, Utah. Each profile includes a small photo, name, age, location, and a short bio. To the right of the profiles is a sidebar with a quote from a member about their desire to meet new friends and form meaningful relationships. The bottom of the page shows a Windows taskbar with various icons and a status bar indicating 91% battery, ENG US, and 10/3/2015.

## Results according to the search engine

### Pros:

Very good idea to find people around the [area you are currently in](#). This way the people can really meet and do the activities together. It is not a social media but it encourages people to meet and socialize in real life

The search engine provides a [wide range of interests](#) and ideas for what you would like to do. They are very precise and the user has a lot of options to choose from but at the same time it is very fast and easy to decide.

The results from searching are [picture oriented](#) which is very eye-catching. It is much more pleasant for the user and moreover it provides the basic information as well.

### Cons:

There is no option for meeting more than one person at the time – [no chat rooms](#), the only information available is the user profile.

This website is [not very active](#) and not very lively. There is no action. Users can get bored easily.

It is not running worldwide so the only people in a [few states](#) are able to use it.

### What is there for us?

Not4Dating provides the best and most effective search engine. In Meet 'n' Eat we will not use it as a search engine, instead the layout of the interests could be used as a layout for the chat rooms. It is very handy, visible and easy to navigate. Another good idea is to show the users not only the usernames but profile pictures as well. This can make the website/application more attractive to users. The idea about the zip code is very good but not very useful for Meet 'n' Eat. Not4Dating is very close to Meet 'n' Eat and it will be used as an inspiration for sure.

## Meetup<sup>5</sup>

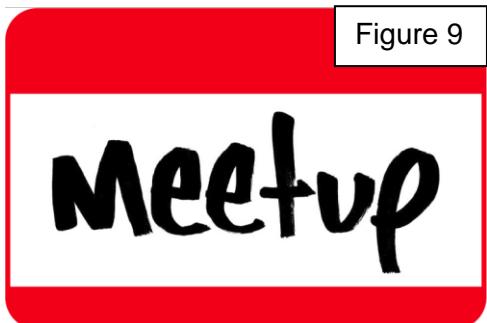


Figure 9

Meetup is a popular social networking platform and is the world's largest network of local groups. As of October 2015, it has over 23 million members across 179 countries. At the start it was a website, and now it also offers an application for both iOS and Android. The idea behind Meetup is very similar to Meet 'n' Eat, our common goal is to create a tool that would help people to connect with one another.

### Pros:

The website and the mobile application are both extremely easy to use, and are available in multiple languages.

The iOS and Android apps have a really nice looking and functional GUI, while at the same time providing all the features from the desktop version.

Meetup in its latest version has some great functionality like an integrated calendar that is updating in real time with the events you are registering to, and a private messaging service.

There is a very interesting filtering system that enables the user to search for events nearby or to set a distance limit when he is searching for new groups.

In addition to the calendar, users can also receive updates by email from their groups to inform them about upcoming events.

Meetup has the world's largest pool of groups, therefore you can find anything from super popular groups (like 20's and 30's Going Out Group), as well as very niche groups.

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<sup>5</sup> Meetup (2015). Meetup. Retrieved from [www.meetup.com](http://www.meetup.com) at December 15, 2015

## Cons:

The enormous amount of groups that are very similar can be overwhelming for a new user.

The high amount of groups divides the community, and a lot of groups are almost inactive, if not completely dead.

Meetup is a great tool for users living in bigger cities, but struggles to find engagement from smaller cities where there is almost no activity.

The low attendance of smaller groups is understandable, but even the biggest groups of Meetup with over 30 000 members have an extremely low RSVP ratio. A lot of their events aren't getting more than 100 users coming, which is less than 1% of their members.

The only negative feature from a technical point of view is the sheer amount of emails you receive from Meetup. A user that is a member of 10 groups can get up to 5 emails daily which can be very annoying, and although it is possible to deactivate these emails, there is no possibility to filter them in order to still get updates but to reduce the quantity.

## What we can use from this:

There are several Meetup users in our group and we all find Meetup extremely useful. It is a great source of inspiration for building Meet 'n' Eat. The mobile application is very similar to the product we want to build and has some great features that we want to implement like the calendar and the private messaging system.

The main drawback from Meetup is the fact that it does not cater to smaller groups, a lot of people can be intimidated by joining events that gather dozens of people and might prefer the cosier atmosphere that arises from smaller groups (2-5 people).

And on the other hand the smaller groups of Meetup have little to no activity and because Meetup doesn't do anything about them (like merging smaller similar groups together), they just end up dying. It is not uncommon to see groups that have thousands of members but the latest activity message is several months old.

This is the main issue that we would like to avoid with Meet 'n' Eat. When building a social networking tool, the most important feature is people, and if people are not actively using it, it is condemned to die. By focusing on one-on-one meetings and smaller groups, we believe that we can keep the users more engaged. In order to also avoid the dying groups problem of Meetup, it would be very important to continuously promote the app through different means like the various Facebook groups of AAU, as well as hang some posters in the canteens and social places like around the coffee machines. And to keep the community fresh it is important to inform the freshmen as well as the new international students.

## Dating Services

For the state of the art, we thought it was important to look at dating websites and mobile applications. Looking at dating solutions seemed obvious to us as it's a popular way of meeting new people these days. Although the goal is different, the functionalities are very similar to the ones we want to implement in Meet 'n' Eat. Because there are hundreds of dating services, it is challenging to find the more interesting ones. The selection we settled for is Tinder, Happn and OkCupid as they are all very popular but also operate differently from each other.

okcupid.com<sup>6</sup>

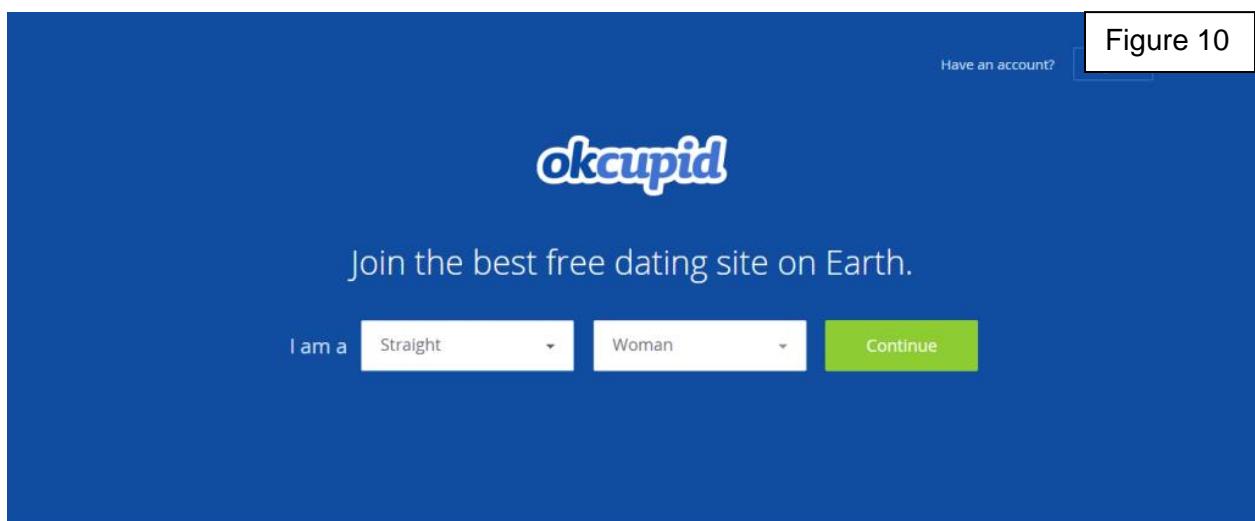


Figure 10

This website is for people around the world, it uses your given location to filter out people who are near, and also you can adjust the search filters to your own preference. But actually what makes this website interesting is the matching system, at the first log-in you will be asked to answer seven quick questions and based on your answers the website will choose matches for you and even show the percentage of the matching and percentage of mismatching. If you like this idea you can further answer around 50 quick questions to get a more precise matching percentage.

<sup>6</sup> Reference: URL <https://www.okcupid.com/> Name okcupid Last accessed 15/12-2015

### **Pros:**

On the main page you can see the recent activity board of other members, followed by a vertical list of matched users and recently viewed profiles or on other pages it gives you suggested people who you might like, all of these features are quite useful.

The website provides two more methods of finding matched users, the first is simply browse through them all and the second is called quick match, it randomly gives you one matched user at a time.

The website has a messaging system, you can view received, sent and filtered messages, and from there you can open up a conversation.

On this website you can like someone's profile instead of writing them right away and you can see who has visited your profile.

When you view someone's profile it shows you all the information and additionally you can see which questions you gave the same answer to and which you didn't, also there is a section called personality which is a graph of personality traits and you can see if it is average or how much it is above or below average.

### **Cons:**

The whole experience of this website is limited by membership restrictions, this is the list of functionalities that non-members cannot access:

- Cannot see who liked your profile.
- Cannot store more than 300 messages.
- Cannot change the username.

Other functionalities that are not that useful, but might give some advantage for members over you.

- Members can boost their profile popularity
- Members can be invisible while searching through other profiles.
- Members can see when the message they send was read.
- Members have more detailed and advanced match and message filters.

## What we learned

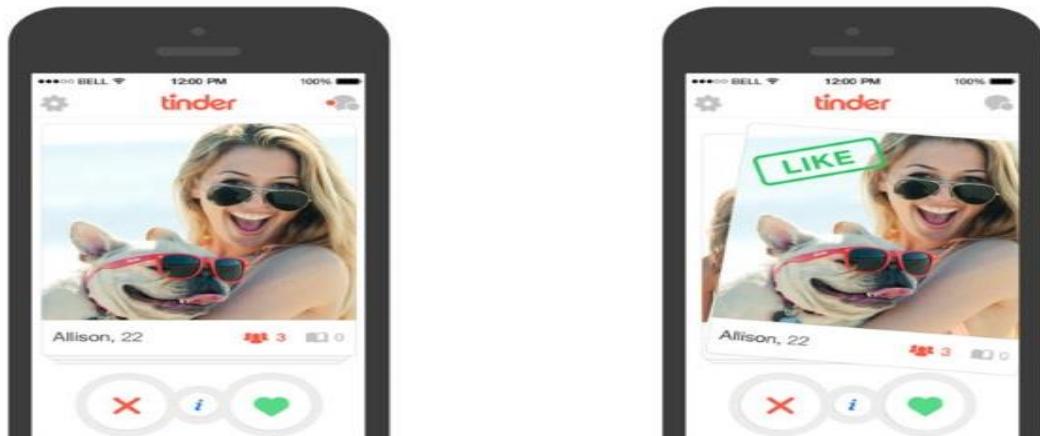
This website works on old fashioned principles that we can find on a lot of websites. It has powerful first impressions, easy and good looking interface and a fancy matching system. After a while comes the “but” part, membership restrictions which can force people to actually becoming one if the subject is hooked on this website’s idea, features or other reasons. We do not know if we can use this kind of strategy with our “Meet ‘n’ Eat”, but what we know for sure is that we can use some of its feature ideas that would make a great addition to our own concept.

## Tinder<sup>7</sup>

Tinder finds interesting people around you...

Figure 11

Anonymously like or pass on each suggestion



Tinder is different from most dating websites and applications, its simplicity is what makes the application so popular. You do not need to spend time on entering your personal information or answering questions that will help you find matching people, all you need to do is log-in with Facebook and have your locations services enabled, on your smartphone, that is how easy it is to set up. Then the application presents, you one by one, users that are near you and you either pass, press like or super like, if the like is mutual the application sets up a chat, also you cannot see who pressed pass on you or vice versa to keep negative emotions away.

<sup>7</sup> Reference: URL <https://www.gotinder.com/> Name Tinder Last accessed 15/12-2015

### Pros

Very easy to use, good solution for people who do not have the time to fill out long sign-up forms, answering questions and searching through long lists, also you always have your phone in the pocket so you can use the application on the go.

Uses the smartphones GPS to track your location every time you turn on the application, so there is no need to enter your location manually when you sign-up or for some reason are in a different location.

### Cons

There is only Facebook sign-up that might be a problem for some people who do not trust this sign-up method.

### What we learned

This application, despite it not having many features, again has the simplest and time preserving concept out of all other websites and applications that we looked into. We should definitely take this concept into account, because our concept is for students to meet new people during the lunch break and make friends, as students ourselves we can say that we do not have the luxury of time to spend on searching and putting effort into finding someone who would be willing to meet up.

## Happn<sup>8</sup>

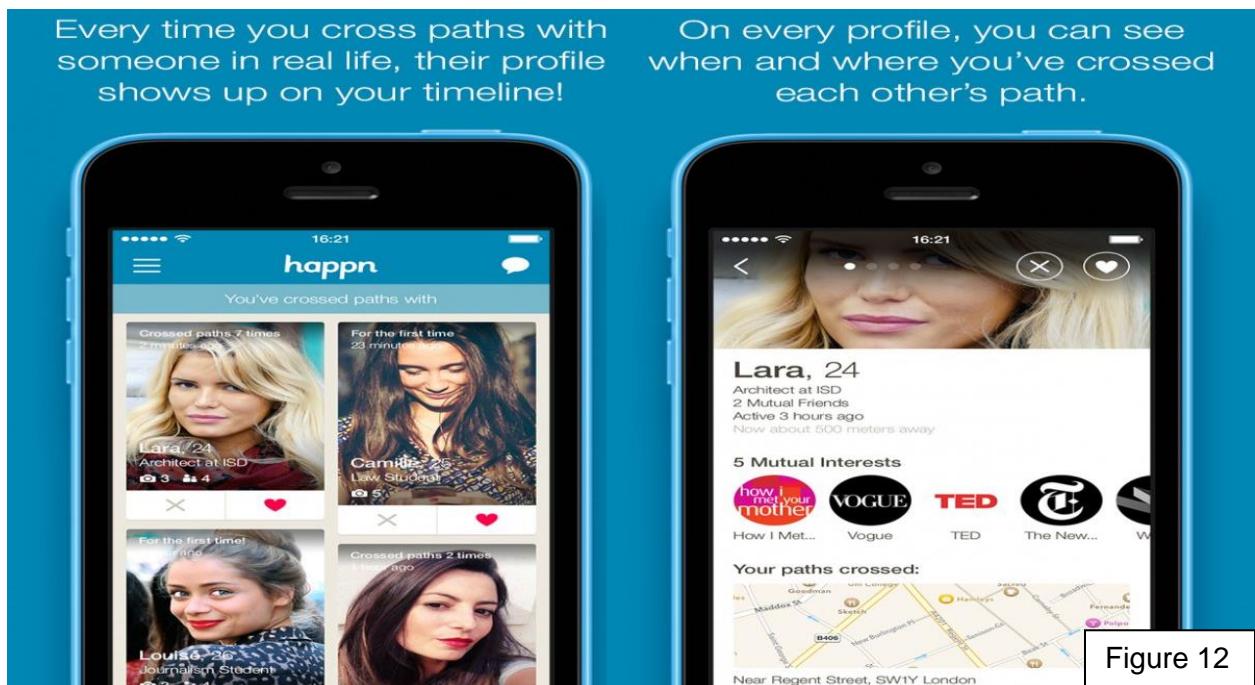


Figure 12

Now Happn with its name and simple interface brings something new with its concept, for example tinder shows people that are around you, what Happn does is it takes it one step further by showing people who you crossed paths with in real life, might that be public transport or across the street. Other than that it is the same as tinder, you can either pass or like, if the like is mutual then you will be able to chat.

### Pros:

Simple to use interface and there are no long sign-up forms and questions to determine your personality.

Very interesting concept that might look more appealing to some people than tinder, thinking that it is the main competitor for this application.

Uses smartphones location services to determine who you crossed paths with, also provides you the information where it happened and how far from you that person is now.

<sup>8</sup> Reference: URL <https://www.happn.com/> Name Happn Last accessed 15/12-2015

### **Cons:**

Only Facebook sign-up, some people prefer not to sign-up with their Facebook.

### **What we learned**

Happn has a really interesting concept that is, like tinder, based on smartphones location services.

This combination of simplicity and smartphones GPS works really well together, as far as the features go, they are few and not something special, but the point is that users will be attracted mostly by the concept itself rather than some fancy feature that developers might compensate for the lack of it.

## Specified Dating Sites:

We also took a look at some more specified sites to see if they had any major differences from the more generalised sites.

ChristianMingle:<sup>9</sup>



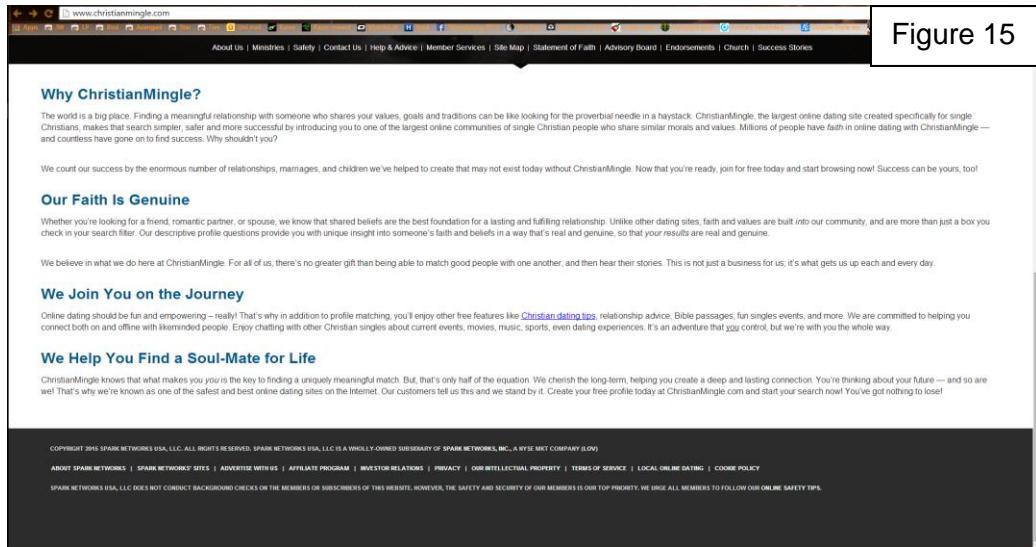
Christian Mingle is as the name gives away a dating site focused on Christian singles.

When you first arrive at the site this is what you will see.

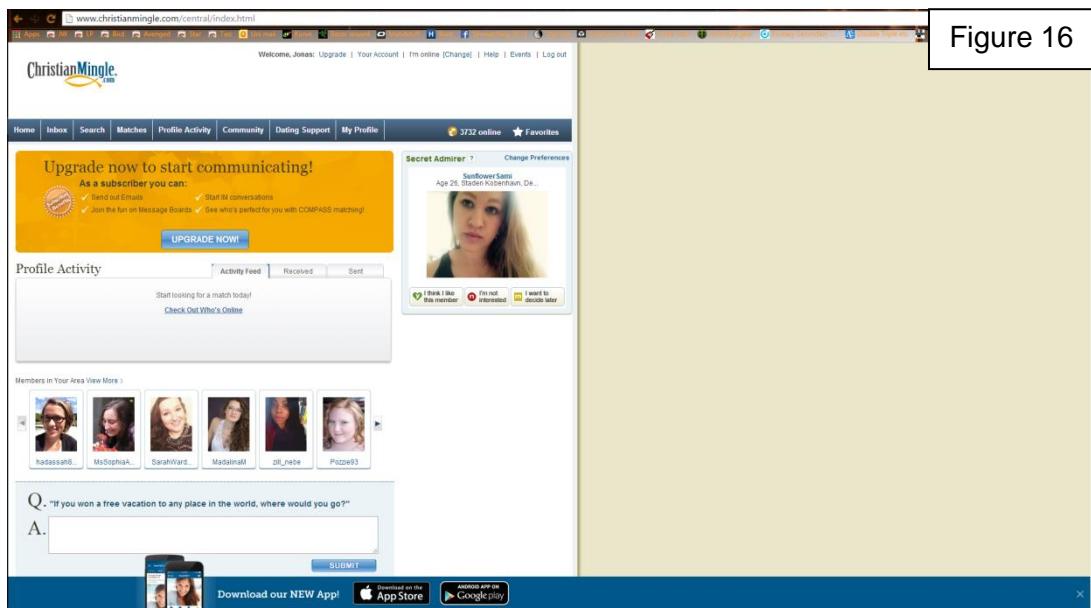
Figure 14

<sup>9</sup> Reference: URL <https://www.christianmingle.com/> Name ChristianMingle Last accessed 15/12-2015

It is rather simple but clean. It lets you see their motto and gives you a direct sign up option, and when you scroll down you see this.



As can be seen there is a lot of information about what the site holds and it is all tailored to Christian people. After logging in this is the screen that you see.



It has a compact menu design at the top but it is simple and direct. The section with “Members in Your Area” doesn’t seem to work properly since it is suggesting Canadian and American people for a Danish person. Below this there is a Q&A section giving the user a single question but below this you can see answers to this same question from other users so that you might find people that share the same view on the question as you.

Figure 15

### Pros:

The site shows that it is most definitely **Christians only** by the way they write their text and their motto shows that it is a religious site. On your main page after you have logged in there is a “**users in your area**” section which would be a great and easy way to find others around you if it worked properly. Further down on the same page there is also a **global question and individual answers system** which lets you see other user's answer to the same question that is shown to you and thereby lets you find people that share the same answer as you.

### Cons:

Being **Christian only** could be a possible limit even though there is a lot of Christians out there. If you want to chat with other users you have to pay a **premium subscription** and also when you arrive at your page after login there is a big box telling you to upgrade.

### Conclusion:

What we could use from this might be a “question of the day” section and a “these people share <user specified amount> interests with you” section since ChristianMingle is quite a popular site and they don't seem like bad ideas.

VictoriaMilan:<sup>10</sup>



to cheat on their significant other. Figure 17

VictoriaMilan is a Danish dating website for people that are already in a relationship or are married, so basically this is a dating website for people wanting

When you first arrive at VictoriaMilan's website you see this.

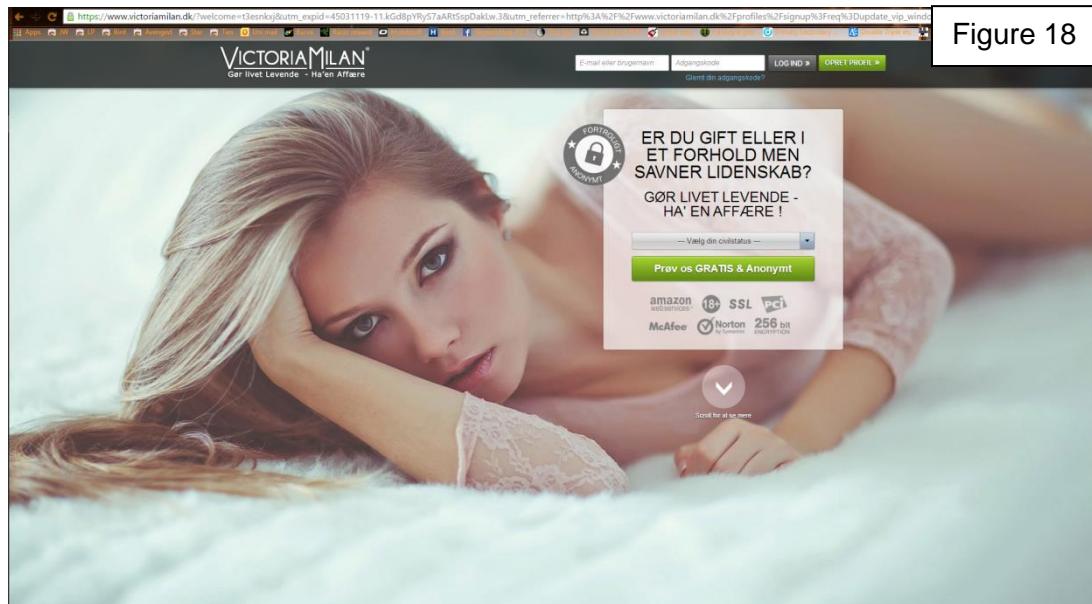
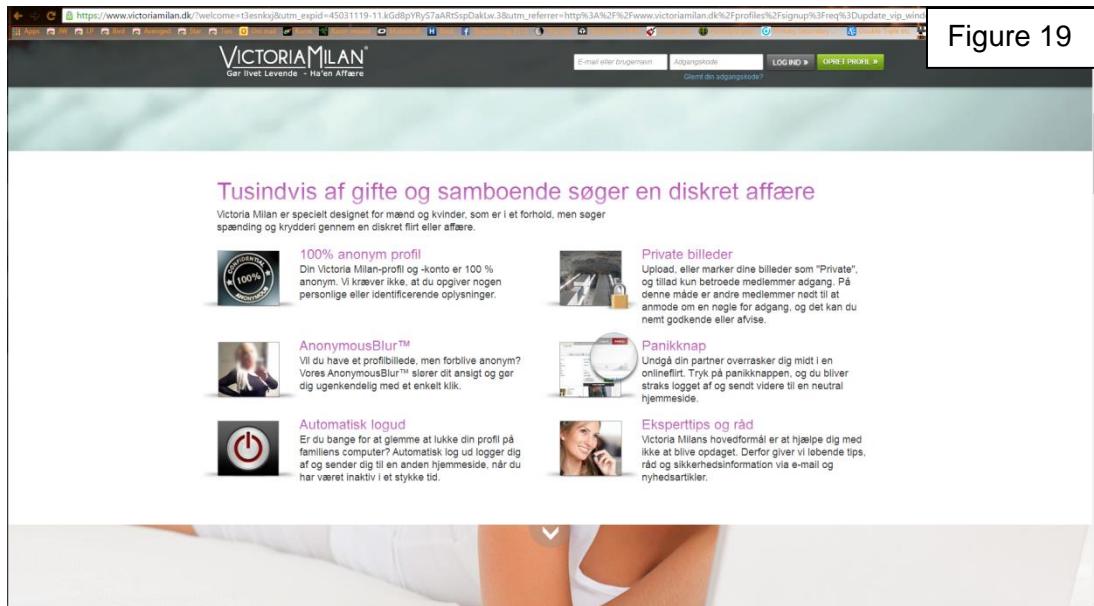


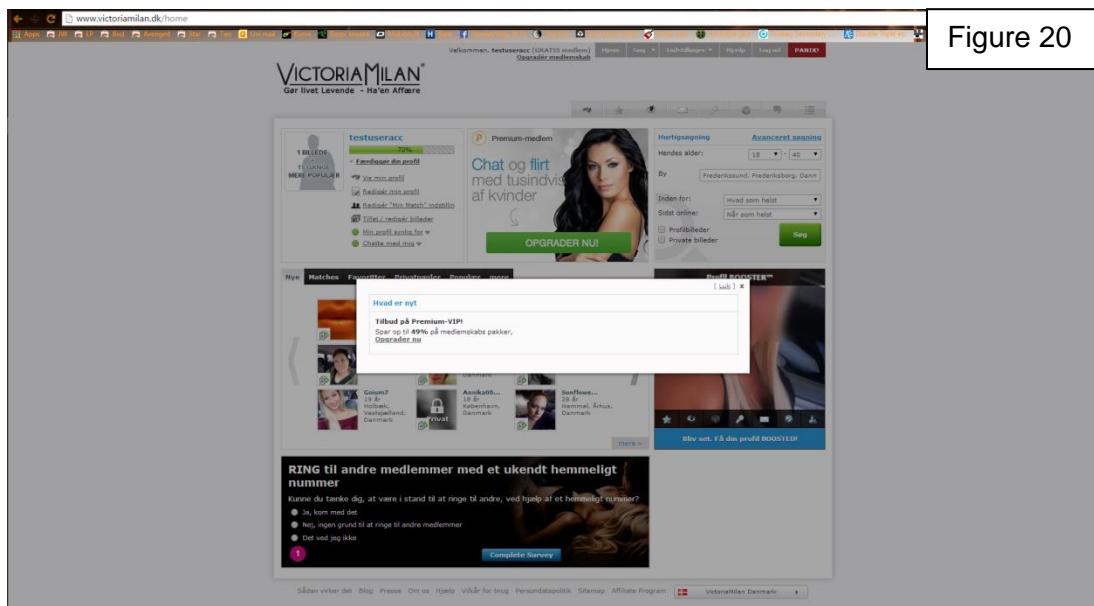
Figure 18

It is pretty straight forward a login section at the top right and a sign up button just below with a message for the new user “Are you married or are you in a relationship and missing passion?” “Make life living – have an affair !” so basically it is enticing users that might be missing a bit of passion in their relationship. Scrolling down a bit on the page you will see this.

<sup>10</sup> Reference: URL <https://www.victoriamilan.dk/> Name VictoriaMilan Last accessed 15/12-2015



"Thousands of married and cohabiting people are seeking a discreet affair" is the top message that you meet when you scroll down a bit and it goes on to tell you about how secure this site is and how you can avoid your partner finding out about your affair on this website. After you have created an account you are met with this screen.



So the first thing you are met with after the account creation is the site trying to get you to pay for a premium membership by giving you a discount and behind this it can be seen that "chat and flirt with thousands of women" and the button says "upgrade now" so it seems that on this site you also need to be a premium user if you wish to chat directly through the site.

Figure 19

Figure 20

### Pros:

VictoriaMilan **makes it very obvious** that this site is for people looking to cheat on their partners. They claim that the site is **very secure** all over the main page and how they have a lot of different features to help you avoid your partner finding out about your profile though it was reported to have been hacked. The **profile creation is rather comprehensive** it lets you choose between lots of interests so that you are basically ready for the site to match you the moment you are done signing up

### Cons:

The **site promotes cheating** since the site is for people looking to cheat on their partner. There is a **premium to pay** if you want to chat directly with other users.

### Conclusion:

I'm not too sure what we can take from this except that you can find niche crowds if you focus on them. This doesn't apply to us though since we are creating a friend finding app which can be catered to a much broader audience.

## Entourage<sup>11</sup>

Entourage is a mobile application that we discovered several weeks after our initial state of the art research. The concept behind it is very similar to what Meet 'n' Eat aims to do but it focuses on group meeting, whereas we want to offer both one-on-one encounters, as well as group meetings.

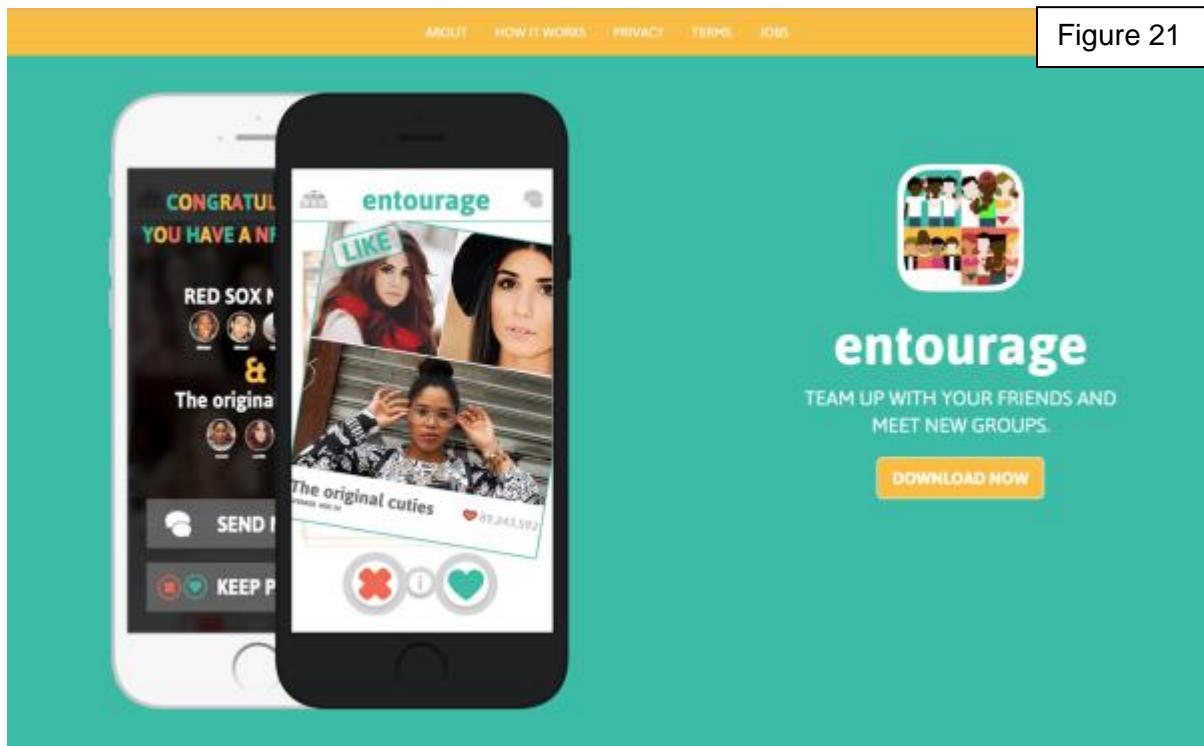


Figure 21

### Pros:

Entourage has a very sleek aesthetic, an original concept, works in a lot of different languages and still receives updates. Users feedback overall on the iTunes stores is very positive, but it concerns an older version of the app.

<sup>11</sup> Entourage (2015). Entourage. Retrieved from [www.goentourageapp.com](http://www.goentourageapp.com) at December 15, 2015

### **Cons:**

Entourage defines itself like a social network more than a standard application, and people are already having a hard time keeping up with all the existing popular ones. Even big names like Google failed to create a social network, and Entourage is another failure in this department. The app is only available on iOS and has 0 user review in its current version. We were unable to test Entourage because it requires multiple persons using an iPhone to create the initial group, and even then the probability of meeting other groups would be extremely slim due to the unpopularity of the mobile application.

### **Conclusion:**

Entourage is the closest in terms of features to what we aim at building with Meet 'n' Eat, it focuses on creating connections between people. But it failed because of its goal to be another social network and the necessary requirement of already knowing at least 2 other people to start a group. We want our solution to be a service for the students at AAU and we want everybody to be able to use it, even the ones that don't already know people, we also want to offer a one-on-one interaction to the people that might be intimidated by bigger groups.

## Market Positioning Map:

This market positioning map represents all the competitors we looked at during the state of the art, as well as positioning Meet 'n' Eat in comparison to them. A clear pattern appears with the popular dating solutions where the ease of use and design are at an all-time high. Except Meetup, most of our other competitors have a lower quality and design standard.

Being a mobile application exclusive to Aalborg University Copenhagen right now, our target reach is very small, but we hope that our ease of use and design approach will push our app to a high quality standard.



## **State of the Art conclusion:**

We looked at a lot of different solutions that connect people together, and although we couldn't find any direct comparison, we were still able to gather lots of information of what we wanted to implement into Meet 'n' Eat. From the ease of use of apps like Tinder, to the sleek aesthetics of Entourage, the multitude of features of Meetup or the chat rooms of MakeFriendsOnline. The state of the art helped us to gather all these ideas that we didn't think of in our initial concept and really shaped a better version of Meet 'n' Eat.

## **Methodology**

In this chapter we will go through the different methods that we used throughout the project and explain how they helped us shape our ideas. We will also describe the various tools that were used for the development of the iOS mobile application.

The focus of this 3rd ITCOM project is Distributed Systems which involves us building a program that has a client-server interaction as well as users. Our mobile application is connected to a server (Parse); clients are registered on this server via the Parse Framework. Parse creates a token for each device, which identifies it and enables the communication between it and the server.

Meet 'n' Eat is a product developed by the users for the users. When building the application we always had this motto in mind, we wanted to really involve the users as much as possible and create a tool that caters to their needs.

Doing a project that involves the University and students allows us to get a lot of feedback and really build on that, instead of making wild guesses and assumptions. In order to deliver a product that is as close as possible to the AAU students wishes, we had to involve our users as soon as possible into the project and we did so by using various testing methods.

## **Research:**

We looked at a lot of different options when researching for our State of the Art. Even though there really isn't any similar concept to ours (the closest one being Entourage), we were still able to gather lots of information to help us build a better version of our initial idea.

In terms of features, there were some very interesting ideas that we hadn't thought of like adding a location service to the app, or adding group chats. We were also impressed by the ease of use of the popular mobile application Tinder and we definitely got inspired by its very minimalistic and straight to the point design which makes it very user friendly.

By having such a broad State of the Art, we definitely got a lot of inspiration that helped us building and designing Meet 'n' Eat. And although some features like a GPS localisation is not something we were able to implement in this version of the app, it allows us to have plans for future improvements.

## **Requirement Specifications:**

### **-Questionnaires:**

As stated previously, we wanted to deliver a product that caters to our users. We conducted the questionnaire two weeks after the start of the project, it was very important for us to get quick and broad feedback in order to have a foundation for our assumptions.

Quickly after establishing the bases for our project with the State of Art, we established 10 questions in the form of an online questionnaire in order to give us guidelines for our project. We felt like the number of responses we received was not enough to make solid design decisions, we printed the questionnaire and took it directly to the cantinas. We asked over 50 students to fill in our questionnaire, and with these responses we were able to make solid design decisions.

The information gathered really helped us in major ways to define what the users wanted and had an extremely important role in our development process. The big one being mobile application or website, just discussing in our group there were an equal amount of Pros and cons for both, but as we received over 90% of requests for a mobile application<sup>12</sup>, we had to go with our user's feedback. Our login options and profile creation were also dictated by the responses to our questionnaire. A point that was also controversial in our initial talks was group or one-on-one meetings, there are valid arguments for both cases. Our results told us that 74% of people would prefer group meetings, but can we really ignore 26% of our users? Due to technical limitations, the service only offers one-

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<sup>12</sup> Questionnaire page 45

on-one meetings for now, but due to the overwhelming response for group meetings, it clearly is something that we would need to introduce in future updates.

### -Focus Group:

A focus group was organized during the second week of November. This timeframe corresponded more or less with the halfway mark of our project, and at this stage we were able to have a low-fi prototype to show to our testers. We also felt like we needed more in depth feedback, which cannot be gathered through questionnaire. Having a focus group really helped us to gather detailed information and guidance about what users wanted in the app.

We contacted different students that were not in ITCOM in order to get a different perspective on our project. Our focus group consisted of five students from various fields. We planned some questions regarding different points of the app that we wanted feedback on. The Focus Group was crucial in making our last adjustments for the final version of the presented mobile application. We took into account the most praised ideas like having almost no information for the user's profile, reformulated our answers for the profile creation and made a random button.

### -Low-fi Prototyping:

It was important to create a low-fi prototype in order to visualize what our app would look like, not only for us, but also to show our users (during the focus group for example). Our software during its early stages wasn't able to showcase all the functionalities we wanted to implement. We also needed feedback early to make adjustments for the Meet 'n' Eat app, so projecting our ideas on a low-fi prototype helped us envision the app.

The first part was to draw sketches of the different frames of the mobile application. As a group we expressed our ideas on how the app should look like: menus, colours, profile creation etc. and we drew our ideas on paper. The second step was to recreate these sketches using Photoshop in order to obtain a proper low-fi prototype that we could show users.

### -Hi-fi Prototyping:

A hi-fi prototype was created towards the end of the project. We took screenshots of the Meet 'n' Eat working application from an iPhone and printed them. These prints were used during a thinking aloud testing. Another similar test was conducted but this time we asked the user to download the app and test it directly on his phone.

### **-Thinking aloud**

Two thinking aloud tests were conducted during the last week of the project. One using the hi-fi screenshots and the other using the app directly. For this final testing phase, we asked users to interact with the screenshots and the app. We had prepared tasks that we wanted the users to do like “select a time slot for lunch”; we analysed their behaviour and saw how they reacted.

### **-User scenario**

We created a user scenario to describe a typical use case that one of our users could find itself in. This user scenario helps to understand when and how a user would use Meet 'n' Eat, as well as describing some core functionalities of the app like the multiple login options.

### **- Storyboard**

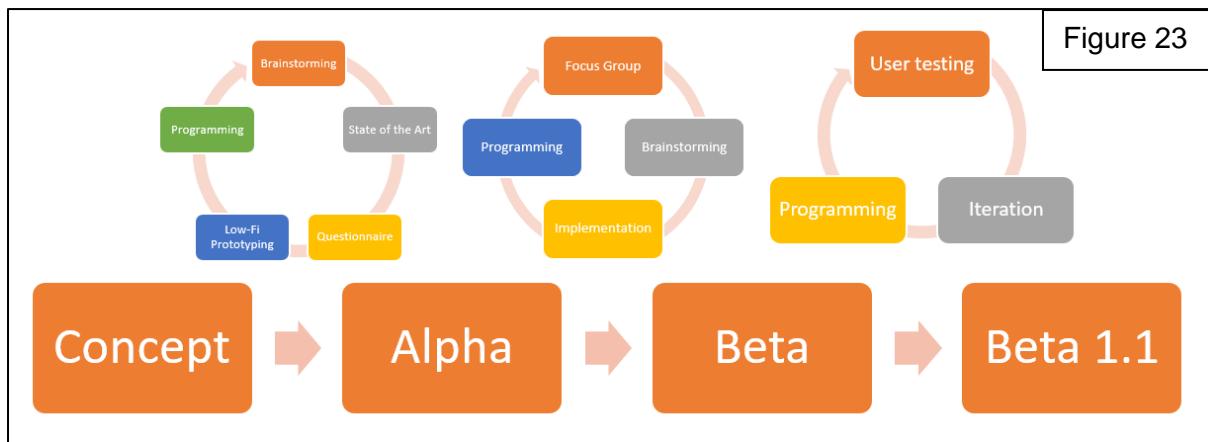
Storyboards are a great way to visualize an experience or an interaction between people and objects. We created one based on the user scenario that we wrote.

## **Development**

In this part, we will discuss the method and idea process which we went through in the development of the Meet 'n' Eat project. Explain the milestones we reached and the thoughts behind the various iterations of the app. We didn't follow precisely a popular requirement engineering process, but our approach was a combination of the Prototype (user centric product, lots of changes, user feedback, user involvement, prototyping at different levels) and SCRUM<sup>13</sup> (development phases sprints, lots of testing, fast paced). Both these process models are part of an Agile Development Process, which means that they are flexible.

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<sup>13</sup> SCRUM(2015). Scrum Methodology. Retrieved from scrummethodology.com at December 15,2015



This flowchart represents our own model and the one we followed during the project. Most of the popular models named previously are made for longer projects and relates a lot on software iterations. The only software iteration we did was after the user testing was done when the app was in Beta phase. We always followed the guideline of doing some user research and testing, then brainstorming on the results and deciding on what we wanted to implement into the app. When building Meet 'n' Eat we wanted to build a product for our users, by our users. This means that we wanted to get as much feedback as possible and in various forms: Questionnaires, Focus Group, and low-fi prototyping. All this user testing lead to multiple iterations on various prototypes as well as on the software. Our concept idea for the app was truly changed by the user involvement and testing that we did throughout the project.

## Testing

These milestones described below were achieved after user testing and system testing. We did a combination of both unscripted and scripted testing to either simply analyse how the users reacted to the app and ideas, as well as performing specific tasks. This testing helped us to discover problems and refine the design of the Meet 'n' Eat application.

### Concept Idea

In the beginning the app was designed to be very similar to the popular dating solutions, we didn't plan all the functionalities that we have in our current version, nor did we anticipate what we could be incorporating in the future. It was mostly profile based and was supposed to only have one-on-one interactions.

## Alpha

This version is the vision we had for Meet 'n' Eat about 6 weeks into the project, we had settled on a mobile application due to the overwhelming response from our questionnaire. We also iterated on the design of the app and the functionalities during our group meeting and got feedback during the semester meeting. None of these functionalities were tested directly from a software perspective, but the ideas behind them were already very different from our concept idea. We considered multiple chat rooms, group meetings etc.

## Beta Version

This represents the current version of the application and includes the final decisions based on our user testing, as well as our vision of Meet 'n' Eat. The functionalities are much more advanced than our concept idea. We changed our detailed profile to a very bare-boned one which only includes a picture and the name. We added an “emergency button” which allows students to meet other each other at any time of the time by simply pressing one button. We added time slots that people can join without requiring contacting people individually. And finally we included a giant chat room. All these changes and evolutions are the result of our iterative development. We were very open to feedback and were willing to make very important design changes. The lack of user involvement is one of the top reasons for project failures, which is why we insisted heavily on having a strong user involvement throughout the entire project.

### Beta 1.1:

We had a final user testing during the last week of the project using hi-fi prototyping with users testing the app directly or from screenshots taken from the application. Due to time constraints we weren't able to incorporate some of requested changes into the app like changing the colour scheme or some user interface tweaks. The only change that we did on this new iteration was to add a user onboarding process, which will help the new user understand how the application interface works. This update was important to implement as the user testing indicated that some elements of the graphical user interface weren't clear enough, like the emergency button and the suggestions at the bottom of the screen.

## Tools

### Mobile Application

When we had our first idea in mind for Meet 'n' Eat, we weren't decided on making a mobile application or a website, there were Pros and cons for each. What truly made us settle for a mobile application was the overwhelming number of responses from our questionnaire. Our users really wanted to use our idea on a mobile platform. The next step was to decide between making an iOS application and an Android application.

### Software

#### IDE

The used IDE for development is Xcode<sup>14</sup>, version 7.0.

#### Programming language

The programming language used for coding Meet 'n' Eat is Swift<sup>15</sup>, version 2.0.

#### iOS Software Developer Kit (SDK)

The iOS SDK is included with Xcode, when Xcode is downloaded from the Mac app Store. The iOS SDK includes an iOS Simulator, which facilitates testing an app on a computer, instead of an iOS device.

#### 3rd party frameworks

For our project we used the following 3rd party libraries/frameworks:

- Parse for iOS<sup>16</sup>
- Facebook SDK for iOS<sup>17</sup>
- StarWars by Yalantis<sup>18</sup>

To manage the libraries (installing, updating) we used Cocoapods, which is a dependency manager.

#### Hardware

#### Apple computer

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<sup>14</sup> Reference: URL <https://itunes.apple.com/dk/app/xcode/id497799835?mt=12> Name iTunes Last accessed 15/12-2015

<sup>15</sup> Reference: URL <https://developer.apple.com/swift/> Name Apple Last accessed 15/12-2015

<sup>16</sup> Reference: URL <https://github.com/ParsePlatform/Parse-SDK-iOS-OSX> Name Github Last accessed 15/12-2015

<sup>17</sup> Reference: URL <https://github.com/facebook/facebook-ios-sdk> Name Github Last accessed 15/12-2015

<sup>18</sup> Reference: URL <https://github.com/Yalantis/StarWars.iOS> Name Github Last accessed 15/12-2015

In order to program native iOS applications, Xcode 7.0 has to be installed on an Apple computer, (iMac, Mac mini, Macbook (Pro)) running minimum Mac OS X 10.9.

#### iOS Device

In order to test the application besides the iOS Simulator, an iOS device can be used. The currently supported iOS devices are: iPhone 4s, 5, 5c, 5s, 6, 6 Plus, 6S, 6S Plus. The devices from the iPad family can run Meet 'n' Eat, but the application will be scaled up, as it is not intended to be used on screens larger than 5.5".

## Getting to know the user

### Introduction

Nowadays people are not only surrounded by the technology but they are also overwhelmed by the number of different applications, websites and services to choose from. From the development point of view, the application needs to be different, needs to be attractive for the user. The user experience needs to be satisfying. The question is how to make this application successful? The answer is user involvement. It is a common trend now that the users are part of the development process. There are many ways how to include them and get a feedback, analyse the results and make the application according to the user's needs.

We decided to involve the user very early in our process. The reason why we decided on that was that we wanted to get ahead and involve users which allow us to make more effective solutions from the beginning. One more reason why it is very important to include users from very beginning is that it broadens our vision or perspective on the project. Thanks to the users, we can implement totally new ideas or discover that our ideas do not match the user's needs and wishes.

Before even involving a user we need to make assumptions about them as well as the application. This process is the first from all the other methods we will use. The reason is that it sets boundaries, so we know exactly what we need to count with and what we expect from the user and the application.

As it is mentioned before these are assumptions made by the developer, so they need to be compared with the feedback we get from users if they were correct or they need to be changed.

## Assumptions<sup>19</sup>

- More than half of the people feel lonely at the university
- Students would like to meet new people, get to know each other
- Under current conditions it is hard for students to meet new friends
- People eat lunch at the cantina, or at least at school
- Students are using mobile phones and applications

These are the five most important assumptions and they make the base for the application. From these assumptions we can move on to the problem space. Problem space analysis is a set of tasks that the application can improve for the users. It is important to set the problem space, because by problem space we also define the problems which already exist and also at the same time they represent goals for the systems. These goals can then be presented to the user and be critically evaluated.

## Problem space analysis<sup>20</sup>

- Problem: people do not come into contact in a way that is sufficient to make new friends and get to know new people.
- Why does this problem exist: students have classes at different times, they know people only from the same studies and social life is not well organized.
- How to overcome this problem with Meet 'n' Eat: Meet 'n' Eat would be a platform used only for Aalborg University students in Copenhagen, where they all get a chance to meet each other during lunch or even breaks.

After the assumptions and the problem space analysis there is a need to get to know the possible user. It is very important to know who the users are, in what situations might they be while using the application. This all is represented in a user scenario where there is already a persona included, so we will get a very complex overview of the user but also about the context.

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<sup>19</sup> Preece, Rogers and Sharp (2015): Interaction Design. Beyond human-computer interaction (4th edition). Wiley and Sons

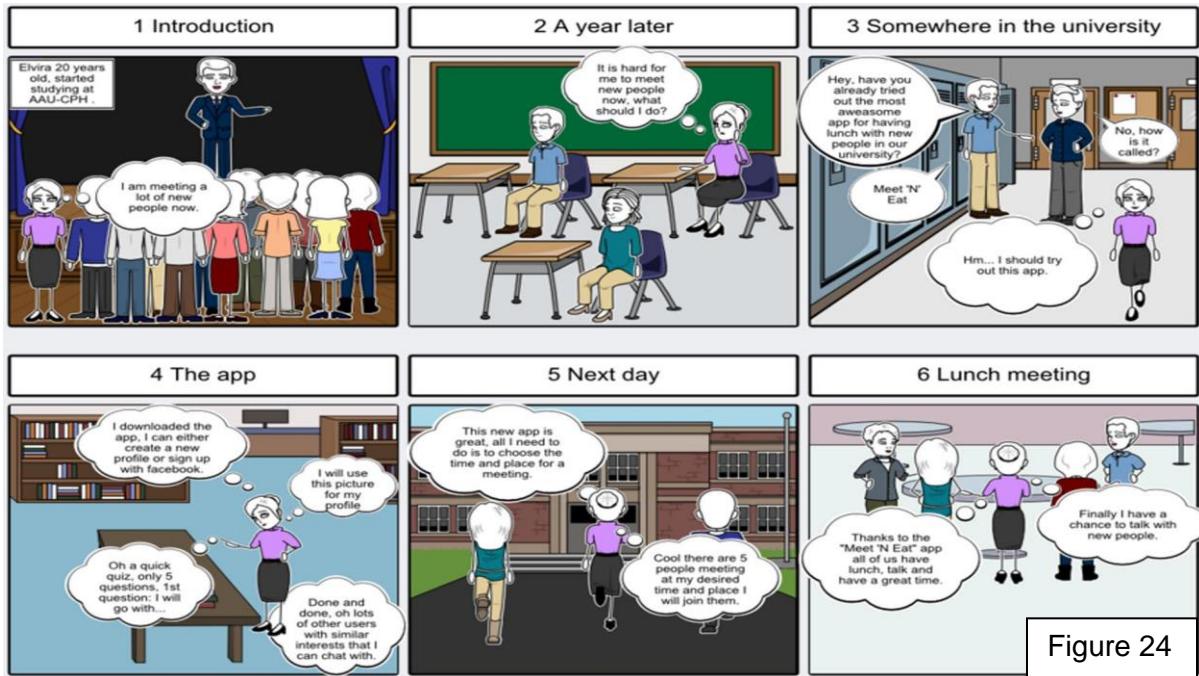
<sup>20</sup> Preece, Rogers and Sharp (2015): Interaction Design. Beyond human-computer interaction (4th edition). Wiley and Sons

## User Scenario

Elvira is a student at Aalborg University in Copenhagen and she studies Medialogy. She is 20 and she comes from Randers. Elvira came to Copenhagen in the year 2014 to start her studies. In the beginning it was all great. There were lot of events in the beginning of the year so she met some people. After some time she got to know people in her study and she had a working group. A year later she is sitting in the class and thinking how hard it is to get to know some people at the university. People she knows are only from her studies and that is really not enough for her. She wants to know more people at the university, find some more friends. She heard some guys talking about an application for meeting new people. She is trying to remember the name... Oh yeah, it is called Meet 'n' Eat. She finds it on the internet and downloads it. She opens the application and there are two options. She does not want to sign up with her Facebook account so she creates a new account. She puts her name in there, her email address, her age and she adds a picture as well. After that some questions show up. They are funny so she answers them. There were only 5 so that is not so bad she thinks. After answering the question she sees a homepage. There is her picture and she also sees pictures from other people. They are suggestions for her to meet. "That is amazing" - she says. Then she remembers she said it out loud during a class... Then she sees some times: 11:00 - 11:30, 11:30-12:00, etc. They are times when people have lunch breaks. She has lunch break at 11:00 so she presses the time which matches hers. In there she sees 5 other people who are going to meet in the big canteen at that time. So she enters and connects with them. She will go and have lunch with them. As she connects with them, a profile picture of one girl pops up. It will be her buddy during lunch.

The class is over and she is heading to the big canteen to meet the people. It is good that there were profile pictures so she knows who to look for. She spotted her buddy so she comes to her and they start to talk. Then they join the group and they have a great lunch together and Elvira knows more people and she is having fun.

## Storyboard



To make the user scenario more visually presented, storyboard was used. It helps to capture the most important parts of the scenario and to simply see how the use of the application would look like in a possibly real situation. Furthermore storyboarding is used to find out what kind of interaction is required to achieve a certain goal for the user, this observation allows to make the interaction as easy as possible.

Users are a crucial part in developing a piece of software and it is very important to get feedback to the perspective which was made by the developers. The assumptions need to be tested and evaluated.

Users can be included in the process in many ways. We have chosen three ways of involving users during the process.

## Questionnaire

When we were first thinking about the idea we needed to have feedback on many levels. It was very important for us to get user feedback in an early stage and that is the reason why we have decided to run a questionnaire. Questionnaire is a way to do quantitative research and get answers from a lot of people.<sup>21</sup> Our product is designed for Aalborg university students so we asked for help from our fellow students here on campus.

We have designed a questionnaire with 10 questions to get simple feedback. The goal was to discover if our application as Meet 'n' Eat could be used full and moreover what should be the basics in the application.

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<sup>21</sup> Lene Sørensen 2015. POPBL: Method in POPBL. Retrieved from <https://www.moodle.aau.dk/mod/folder/view.php?id=251482> at December 15, 2015

The questionnaire looks like this:



## LUNCH Buddy

Meet n'Eat allows you to meet other students from AAU by bringing them together for lunch or a coffee break.

The concept is very similar to a dating App where you create a profile with your preferences, interests and hobbies. The next step is for you to choose a time and date and the app will connect you with students that have a matching profile. We hope that this service will help students find new friends and create new relations.

### Does the University feel lonely sometimes?

Do you have enough social contact within the university? During breaks, lunches?

1 2 3 4

Very lonely     Not lonely at all

### Are you interested in meeting other people at the university?

- Yes  
 No

### Where do you usually eat lunch where you are at school?

- Canteen  
 Classroom (bring my own lunch)  
 Pizzeria near by  
 Grocery store (Fakta...)  
 Other:

Figure 25

**Are you participating in social events organized by Student Society?**

- Yes
- No

**Imagine that you are using the LUNCH Buddy service, would you rather use it as....**

- Mobile application
- Website

**You are looking for someone to meet and have lunch with.**

Is it important that you can choose from criteria as for example age, sex, interests, study programme?

- Yes
- No

**Would you prefer to meet for lunch with one or more people?**

- One person
- Group of people

**Should this service be anonymous (no profile picture) ?**

- Yes
- No

**What sign up option do you prefer?**

- Make a new profile
- Sign up with facebook profile

**Have you used a dating app or app for finding friends before?**

- Yes
- No

**Submit**

*Never submit passwords through Google Forms.*

**Figure 26**

We got answers from around 60 people who fit our user base for the application. The results from this questionnaire are as follows:

- 32% respondents feel lonely and 68% does not. Only 17 people feel not lonely at all
- 86% are interested in meeting new people compared to 14% who are satisfied with their friend circle
- 94% of the students eat their lunch at the university and from this percentage a majority of them eat the lunch in a canteen
- 52% of asked people do not participate in events organized by the student society
- 92% would like to see Meet 'n' Eat as a mobile application
- 72% of respondents say that it is important for them to choose the people by criteria
- 76% of people would rather meet groups than individually
- 20% of people think that the system should be anonymous and should not provide an option of a profile picture

- 58% of the people prefer to sign up with creating a new profile while 42% of people would like to sign up with Facebook
- 76% did not use any dating apps or even friends app to find some new connections.

From these answers we can see that people do not feel really lonely but they have a desire to meet new people anyway. Lunch break would be a great time for meeting new people because the majority eats the lunch in school and in the canteen. There is a need for a service or for some kind of a different opportunity to meet people beside the event organized by student society because from our research we can see that only approximately half of the people take part in them. This other system could be Meet 'n' Eat and this system should be a mobile application. On this platform people can arrange a meeting according to the criteria and they should meet as a group. It seems that it is much more comfortable for them than meeting just one person. Only 20% don't want to see a profile picture on the profiles so this option must be integrated so the people would have a possibility to choose. Another place where people should have an option to choose is at the login screen. There will be a possibility to create a new account or sign up with a Facebook account.

This questionnaire showed that there is a desire for this kind of application and that there is a need in people to get to know their fellow students.

All this information helped us to make the first evaluation of the assumptions and stated more questions such as: Why do people feel lonely and some do not? etc..

There was a need to get more in depth information so we decided on a qualitative approach and therefore we have run a focus group interview.

## **Focus Group Interview:**

Developing a piece of software cannot be done successfully without the user's input nowadays. Especially when it comes to developing a mobile application. Development of mobile application can fulfil other needs than development of a website. People must be able to use it on the move, it needs to be quick and easy to use. It needs to be easy to understand and easy to perform the tasks. User involvement is very important for development of such an application.

There are two kinds of information needed to produce a valid and well-functioning product. First method, usually performed at the beginning of the development process is quantitative research, where the developers can get valid feedback from a lot of feedback from a great amount of possible users. We have performed this method already by the help of a questionnaire which brought us very important information.

There was a need however to get more in depth feedback from the user. It is very important that Meet 'n' Eat meet the user's needs and expectations. To make this product successful the user must be involved in the process. It is very important to get feedback on the content part as well as the interface.<sup>22</sup> Meet 'n' Eat is an application which should bring people at the university together. The development of this application should help the students meet each other and get to know fellow students not only from their own field of study. Because of this there was also need to get to know students' opinions about this problem. For developing this application it is crucial to know how people meet, if they meet.

For this purpose 5 people were asked to join two developers and perform a focus group interview. It was very important to run this interview in a quiet and relaxed environment where the users could freely talk and share their ideas.

As was mentioned before there was a goal to receive feedback on the content of the application together with the feedback on social life at the campus and user interface of the application. For this purpose the interview was structured into two main blocks. In the first block the application content and social life was discussed and the second block was devoted to the user interface part.

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<sup>22</sup> Preece, Rogers and Sharp (2015): Interaction Design. Beyond human-computer interaction (4th edition). Wiley and Sons

## 1<sup>st</sup> Block

The purpose of this block is to get feedback on the social life and content of the application. The feedback should be objective without leads from the developers so only the primary idea of Meet 'n' Eat was introduced to the user. No more details were given to the interviewees so they must come up with their own ideas which will then be compared with the ideas of the developers. The goal is not only to compare but to find out if the key points are the same and if there is something which the developers need to add to the content part of the application.

The interviewees were asked to think for a little while and then share their ideas. Firstly, the social life at the university was the main topic. After summing up the key points about this topic the interviewees were asked to convert these ideas into content of the application. These ideas were written on the board so everybody could see them and discuss them. This is what the interviewees came up with:

- The official social life (events organized by the Student Society) is very unstructured, people do not know that something is happening.
- People usually interact only with the people in their own class, in their groups.
- Students have the desire to meet other people in the university but they don't know how and where to meet them.
- The students would like to meet some new people during their free time (breaks, lunch,...).
- Meeting people in the application should be random.
- No categories are needed (people can edit their profiles if they want to but it should not be mandatory).
- The user of the application should get 4 suggestions of people who he/she can meet with.
- The meetings taking place during the lunch time should be divided in the application according to hours.
- The application should not become another chatting platform. There should be only some predefined sentences, e.g. when you are coming late, etc.
- There should be a button – Emergency break. By pressing the button you will see where some available people are so you can meet at that time
- The application should be designed to put groups together but in the group everybody should have a buddy.
- Tips about the event in the campus should be implemented
- Deals with the cantina should be made – discounts

This part of the interview was very educational. The ideas were very similar to the ideas from the developers. The main difference was that the interviewees wanted to meet not by the criteria such as favourite food, sports, hobbies, but at the random level. More functions were mentioned by the interviewees : emergency break, tips of the events, buddy systems in the groups, predefined answers. All these suggestions will be taken into consideration and would be used in the final product.

## 2<sup>nd</sup> Block

This part of the interview was devoted to the user interface. For this purpose the developers prepared a mock up version which should be then compared and evaluated by the interviewees. This mock-up was specially designed to get a feedback from the people about six questions which need to be answered by each user after logging in. These answers then should be used to match people together and provide suggestions. This, mock up, however, was not presented in the beginning. Firstly, the students were asked to draw their own mock up with their ideas and only then the original mock-up was presented and discussed.

Here are some key points from this block:

- Facebook login needs to be integrated
- There needs to be a possibility of a random button, which will match people up not based on any categorization
- The application needs to include a map of the campus and needs to be able to show where the person is at that exact time and how he will get to the meeting point
- All the users should have a profile picture
- Meeting time should be organized according to time periods, it means that you can enter one time period and connect with the people there only with the predesigned answers
- There should be one general chat room for everyone
- Tips should be done through pop ups
- Emergency Break button should be implemented before signing up/logging in

Here are some drawings from the interviewees:

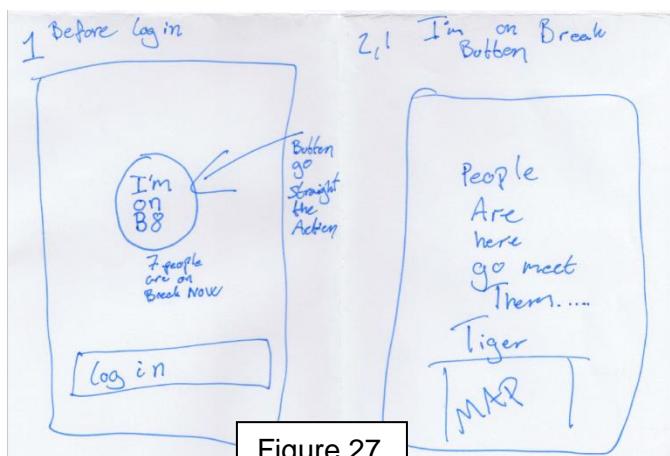


Figure 27

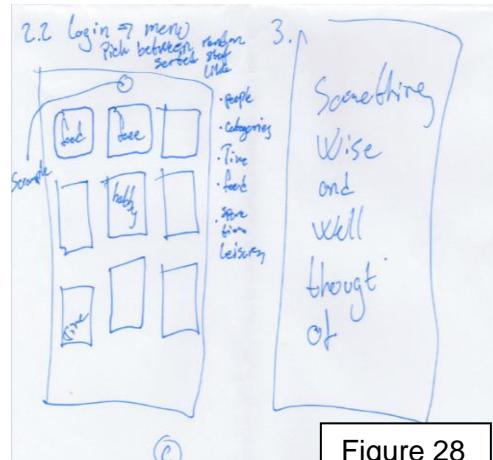


Figure 28

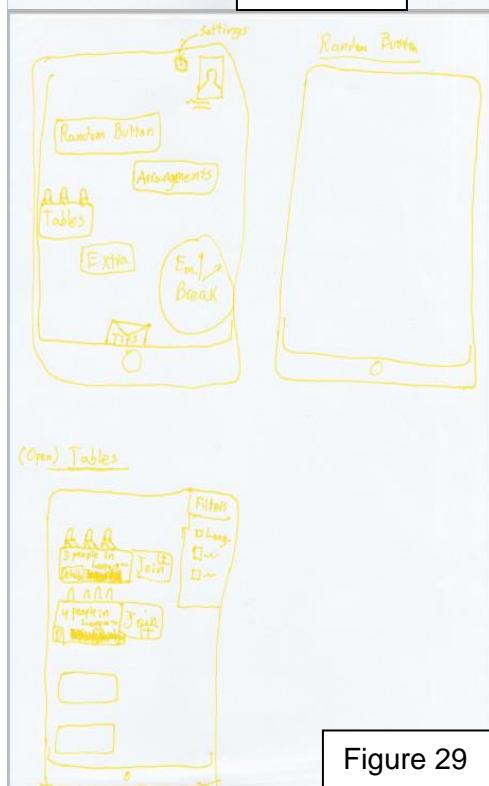


Figure 29

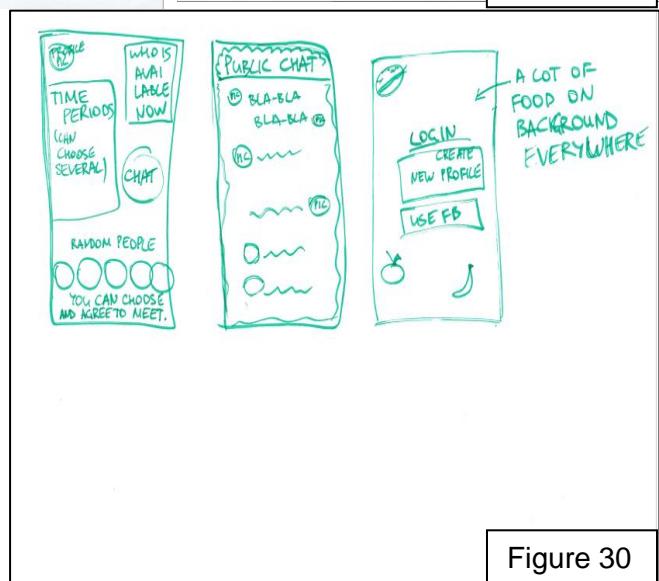


Figure 30

After the drawings were done, the interviewees were presented with the mock-up which should be compared and evaluated. The main focus was the content, not the design.



Figure 31



Figure 32

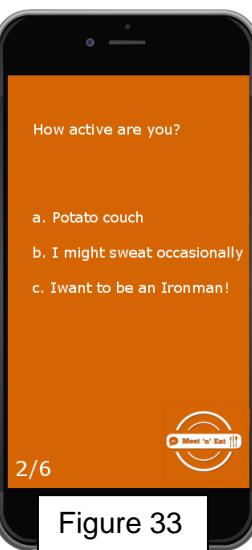


Figure 33



Figure 34

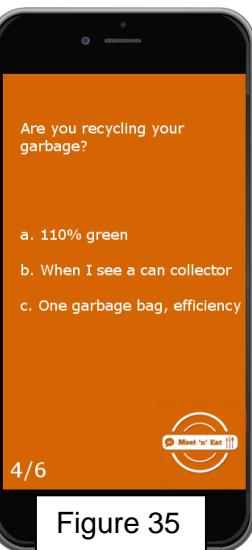


Figure 35

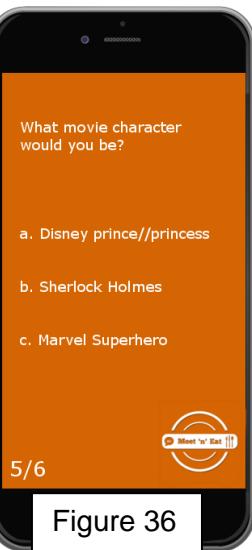


Figure 36



Figure 37

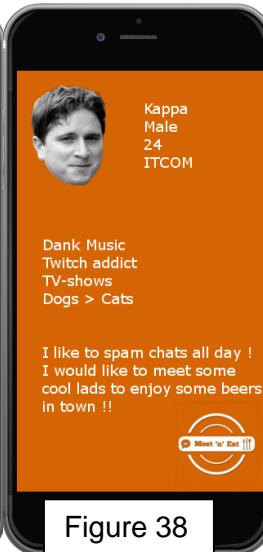


Figure 38



Figure 39

This part of the interview was very helpful with further development. There are more functions to be integrated and some parts need to be changed or at least designed in other way. Main purpose of this part was to compare the layout from the interviewees with the ones from the developer and evaluate the questions in the mock-up. The evaluation showed that the questions are formulated correctly but the answers are not distinguishing enough.

After focus group interview, these changes will be implemented in the working prototype, which will be presented during the exam:

- emergency button, only with the list of places to meet
- random suggestions
- lunch meetings divided according to hours
- one general chat room

These other changes would be implemented in the final product:

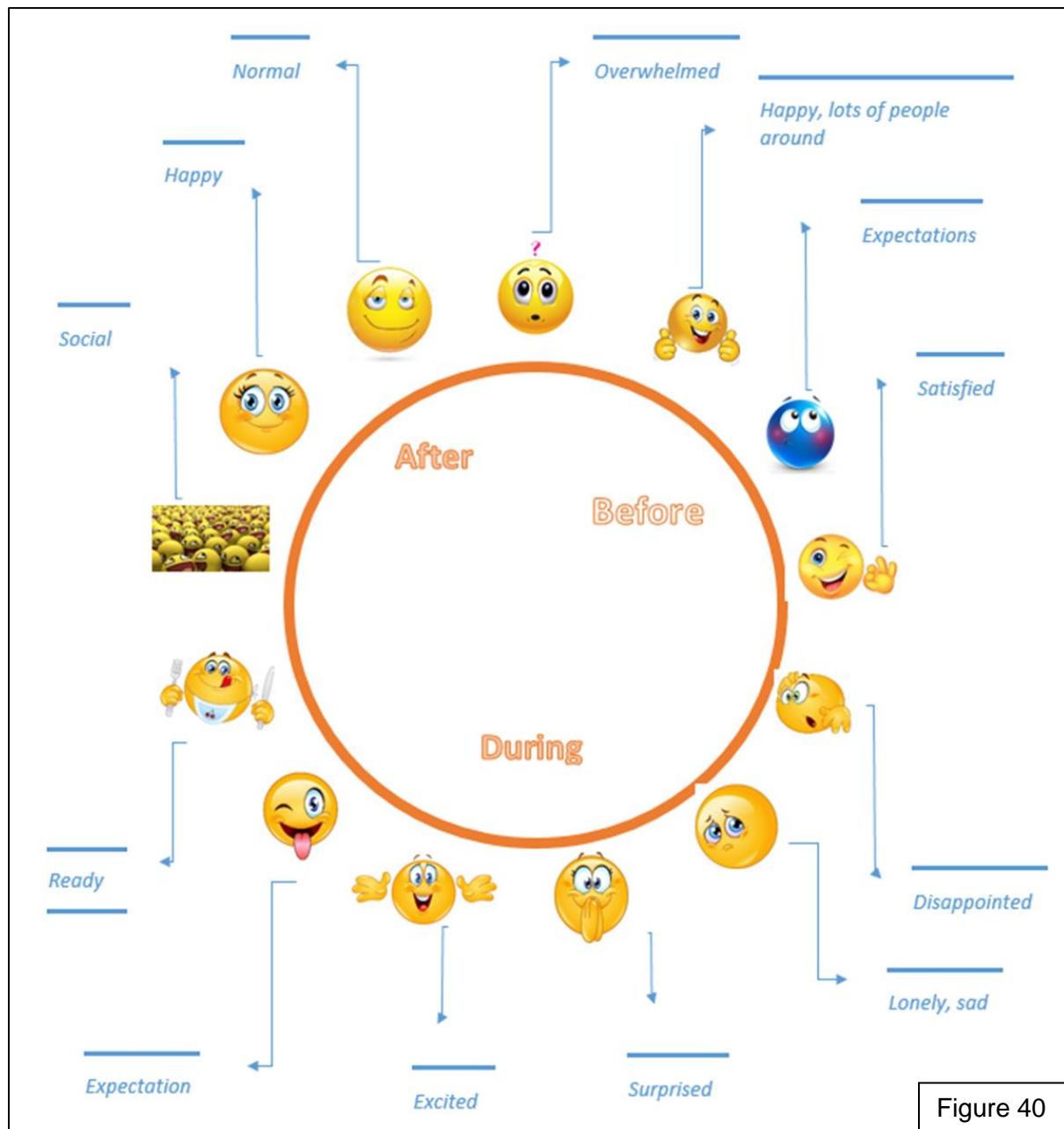
- chats between two persons only with predefined answers
- changed answers of the quiz
- tips about events happening on the campus

Other changes were taken into consideration but will not be used either in the prototype or in the final product. These changes are random button and having a buddy in the group. The reason why, is that the random button does not have a use anymore when the emergency button is implemented and the suggestions are random. Buddy system will not be included because of the technical limitations

Focus group interview is a very good method how to involve a user and how to make the product successful.

After both quantitative and qualitative approaches, the developers gathered enough information and overview how the user think, what he/she wishes for and for better understanding and visualization user journey map as contracted. This user journey map is constructed based on the information from the user so it is the final version which will not be changed.

## User journey map



The user journey map is divided into three parts:

1. Before - this is the time period when students start their first semester and they feel overwhelmed from the beginning, while getting a lot of information, but they feel happy as well because there is a lot going on, lot of social events so they get to know some friends. After the first month they feel expectations, how the classes are, are there any social activities, will I meet some more friends, etc. They are satisfied because there is always something new to discover. After some time, when the second semester is in the middle they feel disappointment. This happens because they have the classmates, they have classes but they feel a bit lonely and that it is hard to get to know someone.
2. During - in this part we can see all the moods and feelings from downloading the application till using it on normal basis. First, the students are surprised that this kind of application exists. While downloading, they feel excited, it is something new so they have expectations as well: "will it help?". They are using the application and they are ready to meet new people. During the meeting they feel social and that they are starting to enjoy the university a little bit more.
3. After - this is the period after closing the application. The students feel happy and satisfied and after some time this "new application, new friends" phase becomes the new normal to them.

This user journey map represents the user context, their behaviour and the situation.<sup>23</sup> After making this map and analysing it the developers have better understanding of the concept and more effective solutions could be implemented into the application. From the user journey map it is obvious that after meeting new friends people are likely to stop using the application so some more attractive solutions and ideas need to be implemented as well.

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<sup>23</sup> Preece, Rogers and Sharp (2015): Interaction Design. Beyond human-computer interaction (4th edition). Wiley and Sons

# System Architecture

While developing a project there is a need to look at different parts. We have a pretty clear idea about the users and we got to know their wishes and needs. Other part which must not be overlooked is the system which needs to be used to fulfil the goal. In this chapter the focus is on the system architecture and distributed system.

From our initial questionnaire, we deducted that people (85% of the people) wanted a mobile application and not a web app for Meet 'n' Eat.

In order to have a mobile application that adhered to the principles of distributed systems, we need a client side (or front-end), represented by the iOS application and a server side (or a back-end). The terms front-end, client side or iOS/mobile app will be used interchangeable. The terms server side, back-end and Parse will be used interchangeable.

## Classical approach

Traditionally a mobile application that uses data exchange could be created using a \*AMP stack and other programs:

- A MySQL database has to be made
- A PHP file that stores the database connection info and is also responsible for performing CRUD (create, read, update, delete)
- Native SDK methods or 3<sup>rd</sup> party libraries to make the connection between the client and the server.
- Sanitize input (at client level, or even at server level)
- Consider database performance.

## Parse.com

Parse takes care of all the above. At its core, Parse is a nice wrapper for the SDK methods responsible for data transfer, but it makes the connection to its own server, with its own database. Parse.com or simply Parse is a framework, which provides a “cloud” back-end for client applications. In recent years, this kind of framework or service became known as BaaS = Back-end as a Service. Parse uses a data-centric storage, where the developer does not know where and how each data object is stored

Parse consists of 3 products:

- Core – the database, which is a MongoDB database, NoSQL database that uses a “document” scheme.
- Analytics – offers the option to track the users, daily active installations, retention, performance, even crashes
- Push – the place where push notifications are managed and can be sent to users, also here is a log of every push notification sent.

Parse also offers integration with social networks (primarily Facebook and Twitter). It supports a wide range of platforms: iOS, Android, Windows Phone/Mobile, OS X, Windows, and Unity.

Each project that uses Parse is given a series of keys that are to be used only in that project. This way developers access only their own project and database, not someone else's.

iOS and Android have built-in methods in their SDKs to take care of communicating with server.

These methods can function with both XML and JSON files. Parse uses JSON-compatible data, containing key-value pairs. This data is schema less, which means that the key does not have to be specified beforehand. If it does not exist on the server, it is created and stored on the server.

Parse uses HTTPS (HTTP Secure) on port 80. The encryption happens at the OS layer.

Parse takes care of saving/fetching (querying) data or logging in, in the background, to free the main thread, which usually is the UI thread in a mobile app. It can save synchronously but also asynchronously.

This is a simple representation of how Parse works:

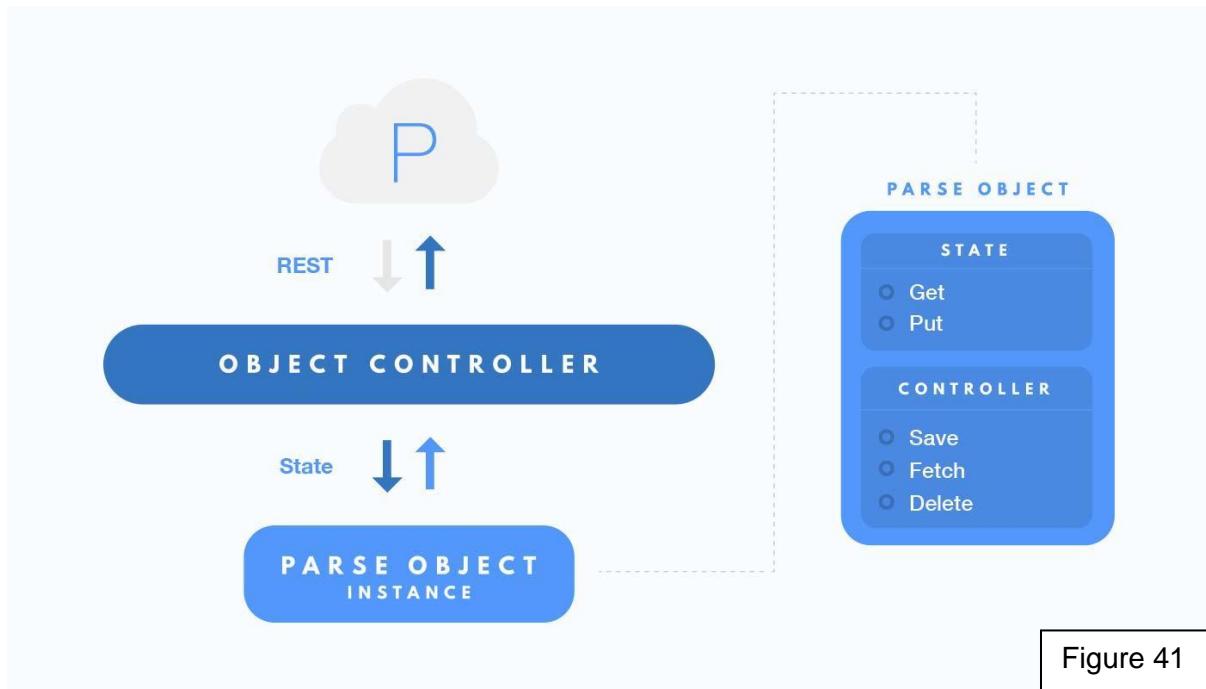


Figure 41

## Side note on Facebook SDK

The iOS application includes also the option for a user to sign up using his Facebook profile. For this, the Facebook iOS SDK has been included in the application to be used in connection with the Parse framework. It uses port 80, with a HTTPS (HTTP Secure) connection to Facebook's server.

Due to lack of knowledge and time for setting up a development environment as described in the Classical approach chapter, we chose to use Parse as an out-of-the-box solution for our project.

## Requirements

After involving the user in the process and looking at the distributed systems we can formulate the requirements according to the user inputs. Requirements are very important for the system to work according to the needs. When discussing user requirements we need to look into functional and non-functional requirements:

## **Functional requirements:**

Functional requirements represent what the system must be able to do:<sup>24</sup>

### **F1. Login / Logout**

Upon logging in the application accommodates the home page according to the user preferences. These user preferences are made based on the answers to the questions after logging in.

### **F2. Suggestions**

The system will suggest the user possible people who can be contacted. These suggestions must be based on criteria specified by the answers from the user and less than half of the suggestions must be random

### **F3. Connecting people according to time periods**

People must be able to choose from the time periods in which they have free time and the system must connect them with the other people who have free at the same time

### **F4. Emergency button**

By pressing this button, the user is redirected to the map with a dot representing the place where he is and then he is presented also with the areas where there are other people who have break or a free time. This way the user can go and spend his/her free time by meeting some nice people.

### **F5. Updating a profile**

There are two ways how to update a profile. First, after registering, a person will answer some questions and the system must update his/her profile according to the answers. Second way on how the person can update the profile is a function call to update the profile where the system must save the changes and update the profile according to the information provided by the user. Both of these possibilities must be implemented.

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<sup>24</sup> Sommerville, I. (2011): Software Engineering. Pearson, 9th edition. Chapter 4: Requirements Engineering, pp. 82-117

## Non-functional requirements

When it comes to non-functional requirements then we talk about the quality of the system. Non-functional requirements specify system architecture not the behaviour of the system. To make our system the best it can be we need to specify some non-functional requirements:<sup>25</sup>

Name	N1: System reliability
Summary	The system will run seven days a week, 24 hours a day
Rationale	If the system isn't running, the users can't get information on meeting points and information about other users
Requirements	The database must be running at all time and update the time periods daily
Furps+	Reliability requirement. Since the system is depending on being online.

Name	N2: Backup solution
Summary	In case of malfunction in the database a backup solution needs to be implemented.
Rationale	The datacentre is in a risk to have malfunction. Having a backup solution can make sure the system will comply in accordance to the reliability requirement.
Requirements	The system and its data needs to be backed up every day to make sure that no data is lost or compromised.
Furps+	Reliability requirement. Since the system is depending on being online.

<sup>25</sup> Sommerville, I. (2011): Software Engineering. Pearson, 9th edition. Chapter 4: Requirements Engineering, pp. 82-117

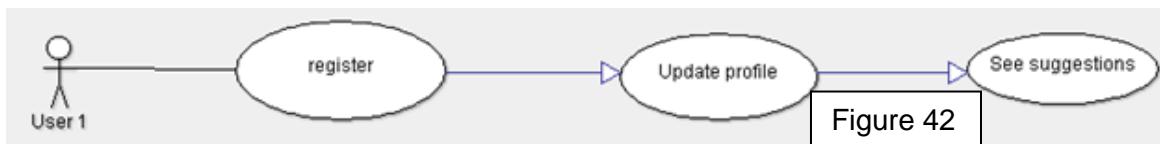
Name	N3: Processing time
Summary	The user must be able to answer the questions get suggestions enter a time period and chat in the chat room in a short period of processing time
Rationale	When the questions are answered the database must store them and give back suggestions in short time
Requirements	The system must be able to import and export data as fast as the device's internet connection allows it.
Furps+	Performance Requirement

Name	N4: GUI requirement
Summary	The GUI has to be simple and clear for the user, in order to make the application a pleasant experience.
Rationale	A simple and clear GUI makes the application pleasant to use, so that it doesn't interfere with the experience of the functions.
Requirements	For the GUI to be simple and intuitive for the user, it has to be discreet and easy to understand.
Furps+	Usability Requirement

Name	N5: Scalability
Summary	The system must be able capable of running on many devices and handle expansions if the amount of users and devices running the app is increased.
Rationale	The system must handle an increased output as the amount of users rise.
Requirements	It has to be possible to add hardware and increase data output.
Furps+	Performance Requirement

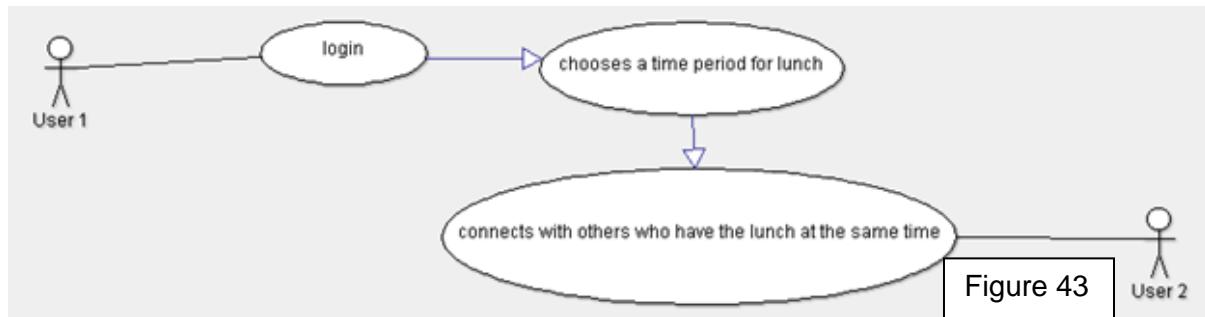
After specifying both, functional and non-functional requirements, there is a need for better understanding how the system should work and this better understanding is provided through Use Case diagrams. These diagrams can be evaluated while user testing.

### Use Case Diagram 1 representing F5 + F2:



In this first use case diagram we can see the path from registering to suggestions. This scenario starts with opening our application for the first time. There is a screen waiting for the user with two possibilities: login or register. In this scenario user must register. After registering he/she must update the profile. This is done with the help of 5 questions, which the user needs to answer. After answering the questions a user is introduced to a home page screen where he can see people who are suggested to him/her. This way he can start already making contact and meet new people.

## Use Case Diagram 2 representing F1 + F3:



The purpose of Meet 'n' Eat is to meet other people. In this second use case diagram we can see how the user connects with other people. After opening the application the user needs to login. After logging in, there are time periods presented. These time periods stand for the lunch breaks students have. Some can have lunch break from 11:00 to 11:30 or from 11:30 to 12:00. The user chooses from the options and then he connects with other users who have lunch at the same time.

# Implementation

## Flow chart diagram



Figure 44

The picture is taken from Xcode, depicting how our application is laid out. It has all the different screens present in the app.

The different connections between the screens are called segues and each one is given a name, to make it easy to refer to that segue in code. Not all screens are have these segues as some of the screens are created from code.

The Login screen has 3 segues: one to the forget password screen; one for the emergency button menu, which is a separate screen, but displayed as a menu in the app; and the login action which links to the home screen.

The Sign Up screen has an indirect connection to the Quiz screen, which in turn has a connection to the Home screen. We call them indirect because the next screen that has to be shown is created in code.

The Home screen has 6 segues: one to the Profile screen; one to the Chat screen; 3 connections - one for each time slot which present the same screen but with different information based on the chosen time slot; one to the emergency button.

## System requirements

System requirements refer to certain hardware or software components needed to be present in the used system, in order to have the software product work without problems.

From our user requirements we derived our system requirements, so that we make sure the Meet 'n' Eat app works without problems.

Here are the System Requirements:

**S1:** Must run iOS mobile operating system.

The software for the system is compatible with "Apple iPhone", from older iOS version 8.x to the newest iOS version 9.x. This is to cover older (iPhone 4s) and the newest devices (iPhone 6S) that run iOS, because both are used by the students in the campus.

**S2:** Must have an internet connection (Wi-Fi, cellular data).

The system is based on database-server-client interaction, which requires internet connection for transferring the data between these entities. The mentioned devices have two types of internet connections: Wi-Fi and cellular data, which will be required for the system to operate. This system requirement is needed for all function requirements.

**S3:** The system needs to have GPS capabilities.

The client software will use a GPS for a functionality that is described in functional requirement F4. From the above, the current prototype respects S1 and S2, meaning that the Meet 'n' Eat application is a native iOS application, it uses Wi-Fi and cellular data, the switch between them being managed by the operating system. The S3 requirement will be available in the final version of the application.

## Technology choice

We started out with an initial idea of making 2 mobile applications: an Android and an iOS version.

During development, we chose to drop the Android and continue the iOS version.

The iOS application is coded in Swift, one of the 2 programming languages available for native programming. The other programming language is Objective-C. Swift is a relatively new programming language, being introduced in 2014 at Apple's WWDC 2014. Syntax-wise is similar to Java/JavaScript.

The IDE used is Xcode, Apple's own IDE. Xcode has the iOS SDK included and offers also an iOS Simulator.

To manage 3<sup>rd</sup> party libraries/frameworks, we used Cocoapods. Cocoapods is a dependency manager for Cocoa (Apple's native object-oriented application programming interface for OS X operating system; Cocoa Touch is the equivalent for iOS). The 3<sup>rd</sup> party libraries used in the project are:

- Parse for iOS<sup>26</sup>
- Facebook SDK for iOS, which consists of 3 frameworks: FBSDKCorekit, FBSDKLoginKit and FBSDKShareKit<sup>27</sup>
- Star Wars from Yalantis<sup>28</sup>

In the next chapter, all the GUI elements will be named as they are named in the iOS SDK. In parenthesis will be layman's name of the elements.

The screenshots are taken from the application running in the iOS Simulator. We further used these screenshots for a hi-fi prototype testing.

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<sup>26</sup> Reference: URL <https://github.com/ParsePlatform/Parse-SDK-iOS-OSX> Name Github Last accessed 15/12-2015

<sup>27</sup> Reference: URL <https://github.com/facebook/facebook-ios-sdk> Name Github Last accessed 15/12-2015

<sup>28</sup> Reference: URL <https://github.com/Yalantis/StarWars.iOS> Name Github Last accessed 15/12-2015

## Application flow

The application starts with the login screen, which consists of 2 UITextField (text fields): one for username and the other for the password, plus 3 UIButton (buttons): Forgot password, Signup and Login with Facebook.

The Meet 'n' Eat logo is a UIButton (button), which has a special functionality, which will be discussed later in the report. Wherever in the app the logo is present, it has this special functionality when it is tapped, except from the sign up screens.



Each button redirects to a new screen:

- Forget password: it displays a UITextField (text field) where the user writes the email he used for sign up and Parse will sent him an email to reset the password. By tapping Reset Password, the requestPasswordResetForEmailInBackground (request password reset for email in background) method is called from a PFUser object (parse user). The method needs a parameter, which is the content of the UITextField (text field). Before calling the method, the text from the text field is sanitized, as a security measure. A UIAlertView (alert screen) is shown to the user, notifying him that an email containing the password has been sent to the indicated email address. Parse.com takes care of generating a unique website whose link is in the email, where the user can change the password.

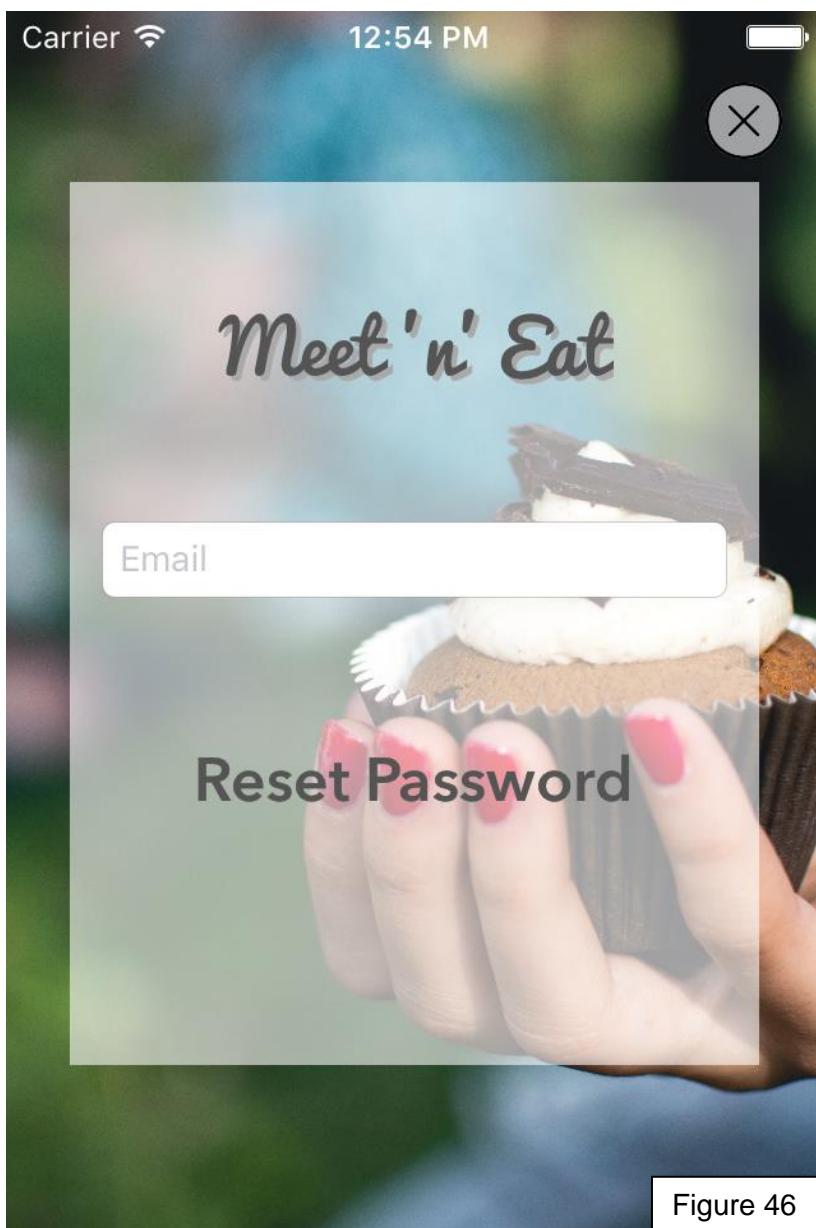


Figure 46

- By tapping the Facebook login button, a browser opens up, loading facebook.com and asking the user to share their personal information (name, email, profile picture, friend list) with the Meet ‘n’ Eat Facebook app. After tapping OK, the browser window disappears and the user is redirected to the quiz screen.

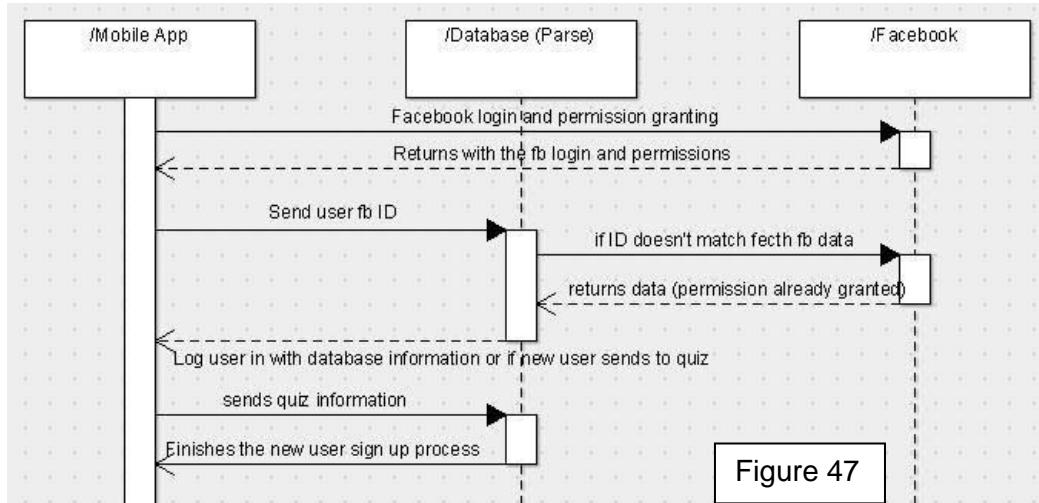


Figure 47

- The sign up screen shows 3 UITextField (text fields): one for username, one for email and one for password. It has an UIImageView (placeholder for an image) and next to it a UIButton (button), named “Profile Picture” which will open another window with the user’s photo library, where he can chose an image as his profile picture, and this selected picture will be displayed in the UIImageView. When the user taps on continue, the system checks that the text fields for name, email and password are not blanks. If the text fields’ conditions are met, then a new PFUser (parse user) is created and its different properties are populated (such as username, name, email, profile picture). The PFUser object is saved in the background, using newUser.signUpInBackgroundWithBlock, on a separate thread, while on the main thread an UIActivityIndicatorView (activity indicator) is shown to the user. The PFuser (parse user) object is saved in the database, in the Users table. If the process is successful and data has been inserted in the database, a UIAlertView (alert screen) is shown to the user, informing him about the quiz.

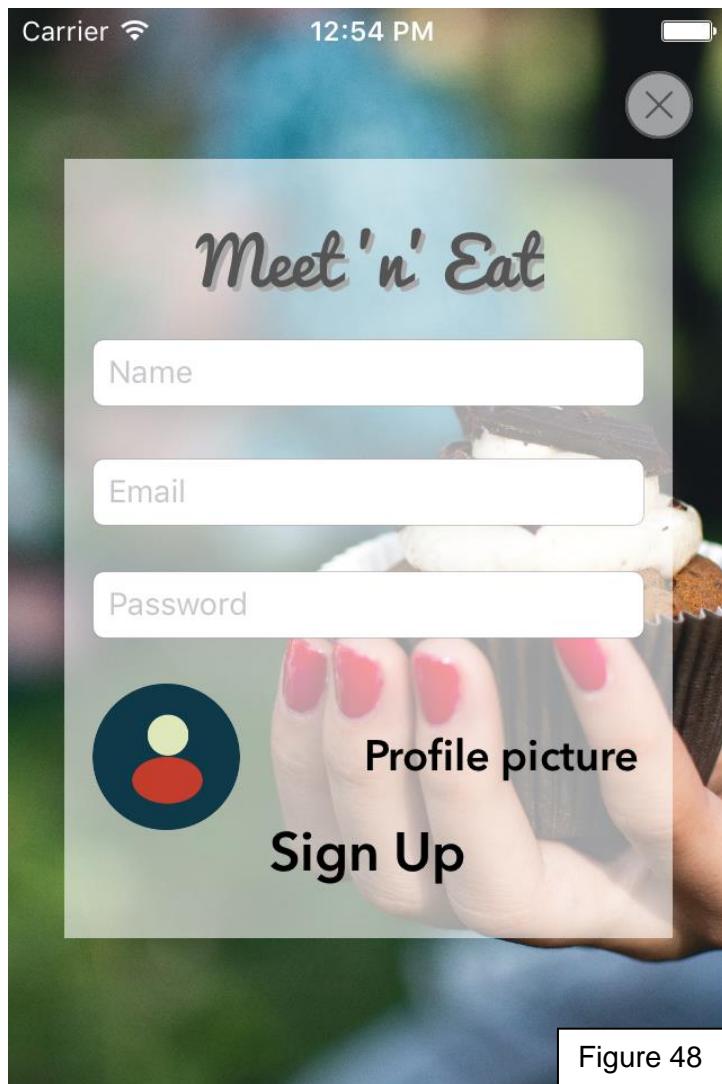


Figure 48

- The user is presented with a “quiz”, a series of 6 questions, each with 3 answers. The “quiz” is a UITableView (table) formatted to look like a quiz. Each answer has a certain value, and these values are stored in an array, which is saved on the server under the key “Hobbies”. This hobbies array is going to be used later one to match people; based on how many common values they have in their own hobbies array. The table has been tweaked to make sure that only one answer is selected for each question. The questions and the answers are stored locally and each one in an array of strings.

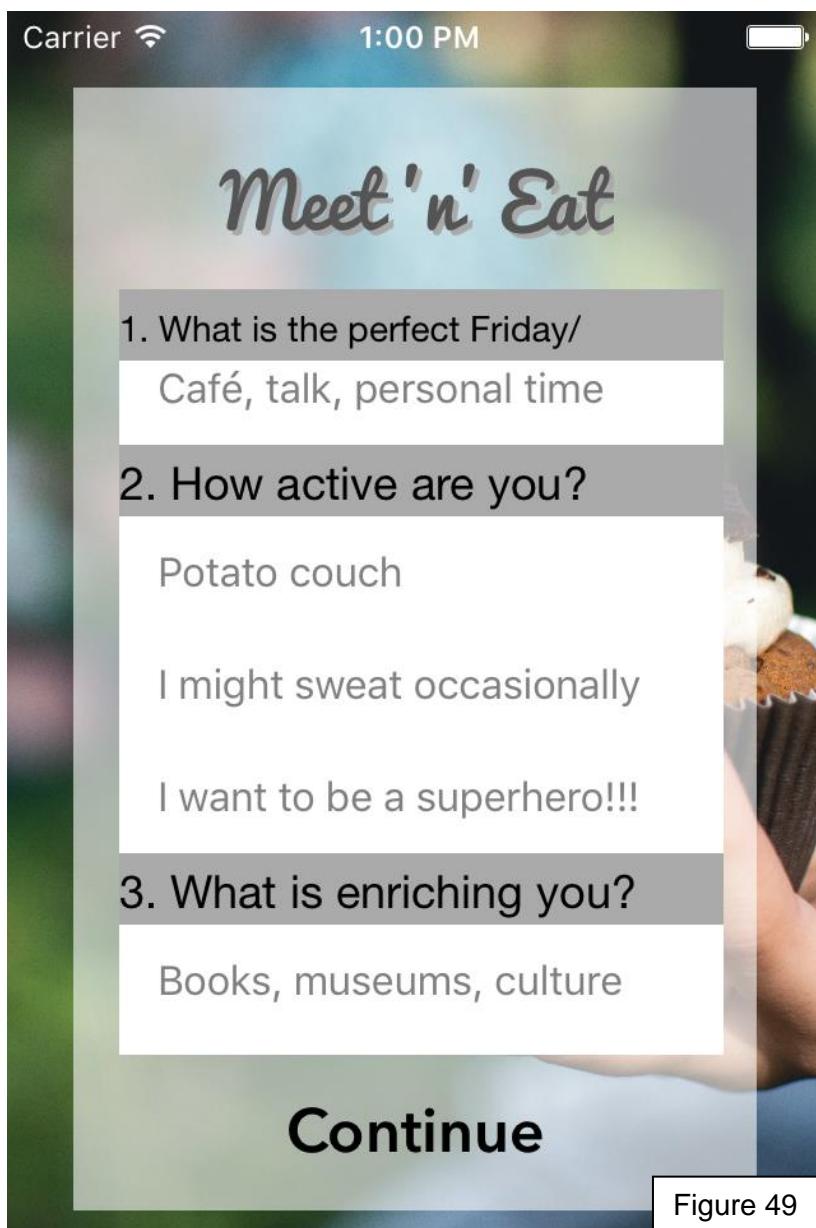
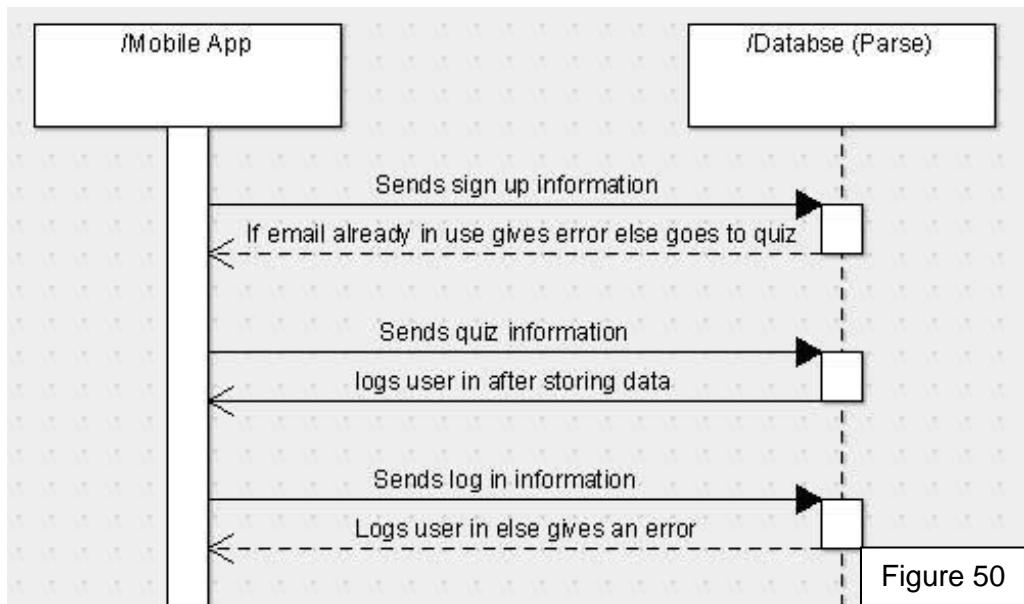


Figure 49

- When the user taps the UIButton (button) named Continue, the answers selected are saved in local array, which will later be saved on the server under the key “Hobbies”. The saving operation happens in the background by calling newUser.saveInBackgroundWithBlock, while in the foreground a UIActivityIndicatorView (activity indicator) is shown. When this is done, the user is redirect to the Home screen.
- Behind the scenes this is how it happens:



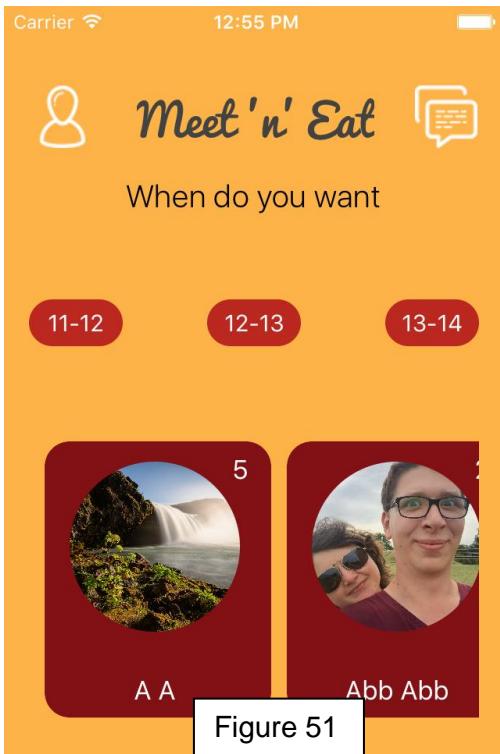


Figure 51

- The Home screen consists of 5 UIButtons (buttons) and a UICollectionView (a collection, similar working principle to a table):
  - Profile picture icon - redirect to the user's profile screen
  - Chat icon – redirect to a general chat
  - 3 UIButtons (buttons) depicting hours: 11-12, 12-13, 13-14. This is where the user can see when other users are having lunch and he can choose to add himself to that time period.
  - The UICollectionView (collection) depicts all the registered users, with their name and profile picture. The small number in the upper right corner depicts the number of matches the current user has with the user he is looking at. Each user is presented as a small card, therefore the burgundy red background colour. The shown users are downloaded from the database, from the Users table, excluding the current user. This is done by a query, to get all the users, excluding the current user. (query = PFUser.query();query!.whereKey("username", notEqualTo: PFUser.currentUser()!.username!); and users = query!.findObjects(); ) They are stored in an array. The download and display process happens on the main thread, giving a small lag perception to the user. The match number is shown in a UILabel (label). There is a separate function that checks for each user the common value between the current user's Hobby array and the ones downloaded from the server.

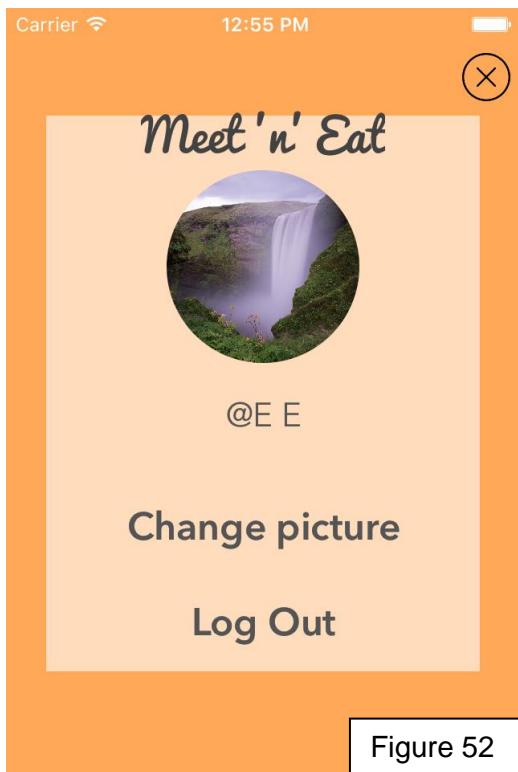
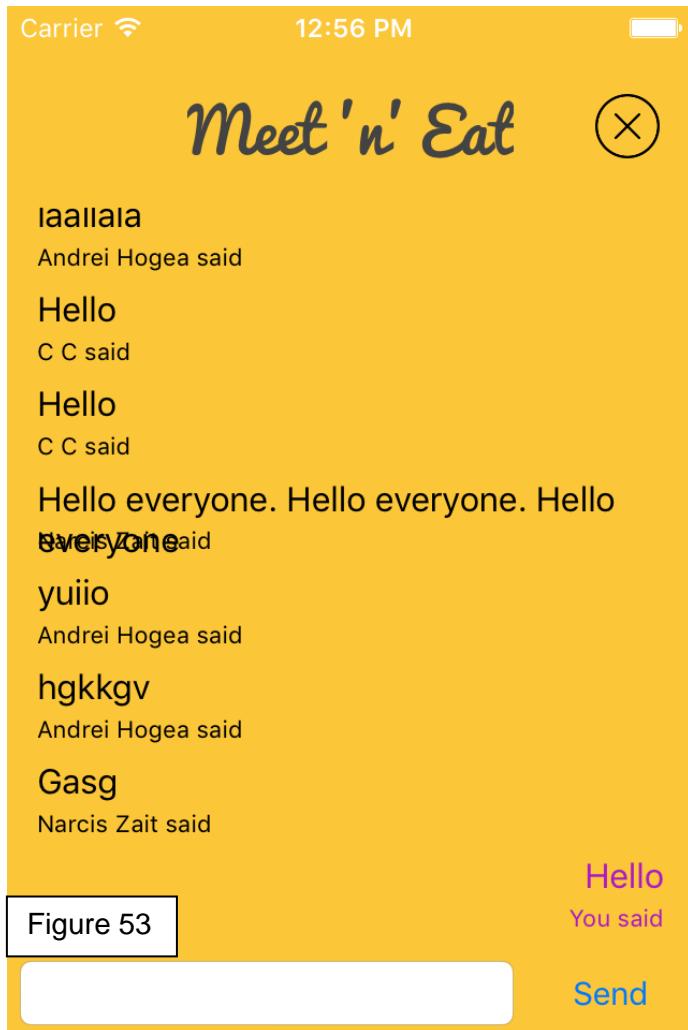
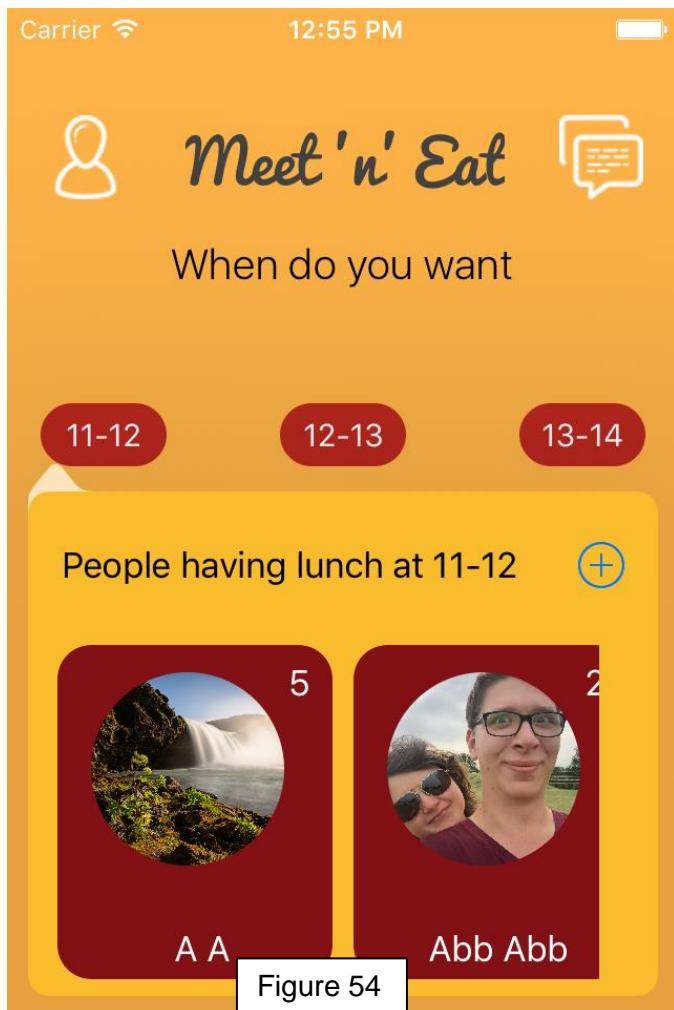


Figure 52

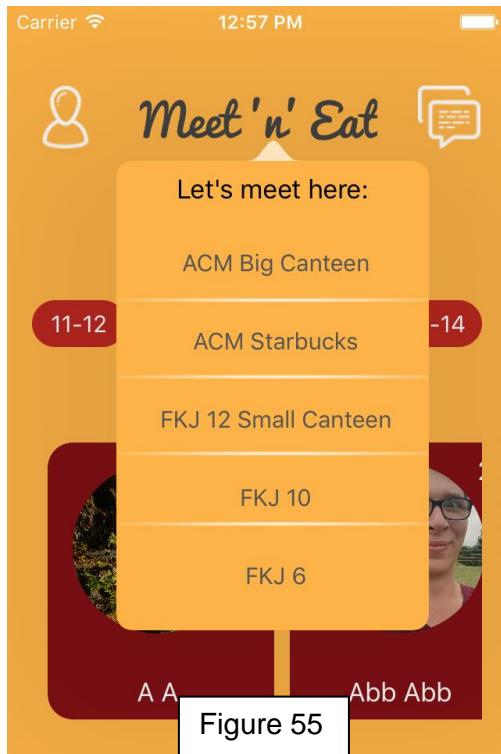
- The profile screen consists of a UIImageView (image placeholder), with the user's profile picture, the logo and 2 UIButtons (buttons): one to offer the option to change the profile picture (the same principle from the sign up process happens here: a new window with the user's photo library opens and the user can choose another picture for his profile) and the other one for logging out. When log out is tapped, the `PFUser.logOut()` function is called and the user is redirected to the Login screen.



- The Chat screen shows a general chat, not a private chat. It contains a UITableView (table), where all the replies are shown. The user's reply is in magenta and formatted to the right, while the other users' replies are shown in black and formatted to the left. There is a UITextField (text field) where the user can write his reply. Next to the UITextField there is a UIButton (button) that sends the reply to the chat. The chat screen has been coded from scratch, and 3<sup>rd</sup> party components were not used. The Send button saves the content of the UITextField (text field) in the database, in the Messages table, together with the user's name. A timer function that executes every 5 seconds loads the whole Messages table from the database in descending order (newest message first), saves the content in an array, which is the data source for the UITableView (table). This timer function gives the false impression of real time chat, as this functionality is not supported by Parse. The messages array is then reversed and then the UITableView (table) displays it. The reverse trick ensures that the newest message is shown last in the UITableView (table) and not first.



- The “time slot” buttons show a preview of other users that signed up to go to lunch at that specific time period. The users’ preview is shown in an UICollectionView (collection), retaining the same appearance as in the Home screen. There is a UIButton (button) with the plus (+) sign. By tapping this button, the user signs up to that time period. The time slot is then saved in the Users table in the “Lunch” column.



- The logo has a special functionality: acts as an emergency button. The logo is a UIButton (button) and by tapping it, a small menu with different locations around the campus is shown. Each location is a UIButton (button) and by tapping it, the user sends a push notification to all the other users that he wants to meet at the tapped location.



- This screen shows what our push notifications looks like. The screenshot is taken from an Apple Watch.

## Application interface

The Meet ‘n’ Eat app is developed for the iOS platform. The iOS platform has a human interface guideline, for developers on how to design their applications. We tried to respect it, by using stock interface elements, such as buttons, image placeholders, tables, collections and labels.

The application has a flat interface, which puts emphasis on the content and not on how it looks. For 3 buttons (profile, chat and add to lunch time slot) we used “metaphors” (suggestive or almost standard pictures) instead of text.

Since the application is developed for iPhones, we tried to make it look and behave the same, no matter the iPhone model. In order to achieve the same look we used AutoLayout, a technology that uses a system of constraints on how to display the interface elements.

## Testing

### System testing

The iOS app has been divided in small parts to make it easier to program: sign up; login; quiz; home screen; profile screen; chat screen; reset password; Facebook login. After each part was coded, it was tested to see if it worked as intended, and if it did not, then logging was used to find out where it did not work.

To test the application we used a tool called TestFlight. It is specifically for iOS. It allows developers to invite people to test their app, before releasing it to the App Store. The invited users are called external testers.

For Meet ‘n’ Eat we had 2 users registered with TestFlight. One of them is named Stefan and he is an iOS developer. The following are his findings in testing the Meet ‘n’ Eat app. His findings are from the perspective of an iOS developer.

Name: B1

Severity: Low

Description: A minor "whitespace" between keyboard and view

Steps to reproduce:

- \* Open the app
- \* Log into the app (Facebook or normal)
- \* Open the chat
- \* Press the text field to bring up the keyboard
- \* If a keyboard without predictive functionality is shown, then there is a whitespace between the keyboard and the last chat message
- If a keyboard with predictive functionality is shown, then there is a whitespace when the predictive functionality is turned off or hidden.

Date: 12/12/15

Version: 1.0(10)

Author: Stefan Veis Pennerup

Name: B2

Severity: Medium

Description: Labels overlap when more than 1 line

Steps to reproduce:

- \* Open the app
- \* Log into the app (Facebook or normal)
- \* Open the chat
- \* Press the text field to bring up the keyboard
- \* Enter a relatively long message (at least 50 characters)
- \* Press send
- \* The long message will now overlap the label of the message author

Date: 12/12/15

Version: 1.0(10)

Author: Stefan Veis Pennerup

Name: B3

Severity: High

Description: App crashes when scrolling profiles

Steps to reproduce:

- \* Open the app
- \* Log into the app (Facebook or normal)
- \* Scroll horizontally through the profiles
- \* Stop when reaching the "E E" profile
- \* Scroll one more profile towards the right
- \* The app crashes

Date: 12/12/15

Version: 1.0(10)

Author: Stefan Veis Pennerup

Comment: This is most likely due to some malformed entry in the database combined with force unwrapping of downloaded data. Still present 13/12/15, but no longer after "E E". It is now present after "Gabriel Louis"

Name: B4

Severity: Low

Description: Possible to send empty chat message

Steps to reproduce:

- \* Open the app
- \* Log into the app (Facebook or normal)
- \* Open the chat
- \* Press the text field to bring up the keyboard
- \* Press the "Send" button
- \* An empty chat message has now been sent

Date: 12/12/15

Version: 1.0(10)

Author: Stefan Veis Pennerup

Name: B5

Severity: Low

Description: Poorly formatted error messages

Steps to reproduce:

- \* Whenever an error message appears, then it hasn't been unwrapped

Date: 12/12/15

Version: 1.0(10)

Author: Stefan Veis Pennerup

Name: B6

Severity: Medium

Description: Slow "no internet" message

Steps to reproduce

- \* Enable flight mode
- \* Open the app≤
- \* Enter "asdf" as username
- \* Enter "asdf" as password
- \* Press login
- \* Approximately 30-45 seconds will pass before an alert is shown that there is no internet

Date: 12/12/15

Version: 1.0(10)

Author: Stefan Veis Pennerup

Name: B7

Severity: High

Description: Broken Facebook login without internet

Steps to reproduce:

- \* Have previously used the app with Facebook login
- \* Logout of the app
- \* Close the app
- \* Enable flight mode
- \* Open the app
- \* Press "login with Facebook"
- \* Safari will open with the message "cannot open page"
- \* Press "Done" in Safari
- \* The questionnaire will appear, where instead an error message should appear

Date: 12/12/15

Version: 1.0(10)

Author: Stefan Veis Pennerup

Name: B8

Severity: High

Description: No handling of "no internet" with questionnaire

Steps to reproduce:

- \* Open the app
- \* Press "Sign up"
- \* Create a new dummy account
- \* The questionnaire should appear
- \* Enable flight mode
- \* Fill in the questionnaire
- \* Press "Continue"
- \* The app will crash

Date: 12/12/15

Version: 1.0(10)

Author: Stefan Veis Pennerup

Name: B9

Severity: Low

Description: Double questionnaire with clean install

Steps to reproduce:

- \* Have previously used the app with Facebook login
- \* Uninstall the app
- \* Install the app again
- \* Open the app
- \* Press "Facebook login"
- \* Safari will open and press "ok" on the Facebook page
- \* The questionnaire will reappear, even though it has already been answered before

Date: 12/12/15

Version: 1.0(10)

Author: Stefan Veis Pennerup

Name: B10

Severity: High

Description: Possible to sign up without answering questionnaire

Steps to reproduce:

- \* Open the app
- \* Press ""Sign up""
- \* Create a new dummy account
- \* The questionnaire should appear
- \* Press "Continue"" without answering a single question
- \* The app will continue to the main screen with a "success" alert
- \* This should have been an error since none of the questions were answered

Date: 12/12/15

Version: 1.0(10)

Author: Stefan Veis Pennerup

Name: B11

Severity: Medium

Description: Profiles are temporarily shown with wrong profile pictures

Steps to reproduce:

- \* Open the app
- \* Log into the app (Facebook or normal)
- \* Scroll through the profiles horizontally
- \* Some profiles will appear with a wrong profile picture for a few seconds before the correct profile picture is shown

Date: 12/12/15

Version: 1.0(10)

Author: Stefan Veis Pennerup

Comment: This is due to the reusable cells, which are not being reset properly before reuse, in combination with a slow internet connection

The bugs listed above are acknowledged as being present in the beta version 1.0(10). fixed. Some bugs are due to the fact that some elements are made from scratch (chat screen) and not having used already existing components<sup>29</sup>.

The final product will have most, if not all of them. This is a condition for submitting to the iOS app Store.<sup>30</sup>

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<sup>29</sup> <https://github.com/jessesquires/JSQMessagesViewController>

<sup>30</sup> Apple App Store Review Guidelines, sect. 2, art 1. <https://developer.apple.com/app-store/review/guidelines/>

## User Testing

User testing or User evaluation is a very important part in the project development. Evaluation brings a new light into the process and can go two ways. Either the usability is evaluated very poorly and the application needs to undergo many changes or the user evaluates the usability very highly and only few changes needs to be performed. It is important for the same reason as the other user involvement methods. The application will hopefully be used by many people, so it is important to get a feedback from potential users. User evaluation is a type of feedback as well. There are many ways on how to make a user evaluation.

We have chosen a method: Thinking aloud mixed with cognitive approach. This is a method where the user gets a task to fulfil and must speak out loud. The words need to be spoken exactly as they come to mind. This way the developers can get direct feedback from the user, but also analyse how he operates with the application like time spent and amounts of clicks.

There are of course some negatives to this method because people are put in unusual situations, where they are not used to talking to themselves, just running a monologue. Another problem is that people are supposed to say things immediately as they come to their mind not say things from their experience or edited commentary.

Even though there are some negatives, this method is very effective and can show the developers what the user thinks. This technique is typically used with the agile development process which is very convenient for us. It can be done at any time throughout the process. We have chosen to run the evaluation with a hi-fi prototype. Screenshot were taken directly from the application and presented to the user.

The purpose of this user evaluation was to get a feedback on design, positioning function keys, number of clicks performed and also time needed to fulfil the task. Of course time will be affected by the talking, so it will be taken into consideration, but will not be evaluated as a fact.

The user was presented with the task to join lunch at eleven. Screenshots were used. Only one screenshot at a time was presented according to users' clicks.

For this user evaluation, the possible user was Amalie, who is 21 years old. She is an iPhone user so she is familiar with the operation system. Her skills are the ones of a normal user, she has no development background which was very important to us. She looked at the application with fresh eyes and she was not influenced by any development knowledge. She was advised and reminded to speak her mind right away and not to rethink the ideas.

First screenshot was presented to her:



Figure 57

Amalie's first impressions were that this page looks very pretty and appealing. She was very satisfied with the design and the font.

First troubles appeared when she was looking for a sign up button. It got lost, she could not find it on the first glance.

After pressing the sign up button she was presented with the second screen.



Figure 58

This part was very neat according to Amalie's description. She knew what she should do and she liked that the application keeps the same design.

When she came to the profile picture she was not sure what to press. "Should I press the icon for profile picture or the text?". She made a mistake here and she pressed the icon instead of the text. Afterwards she pressed the right button and she was taken onto the next screen.

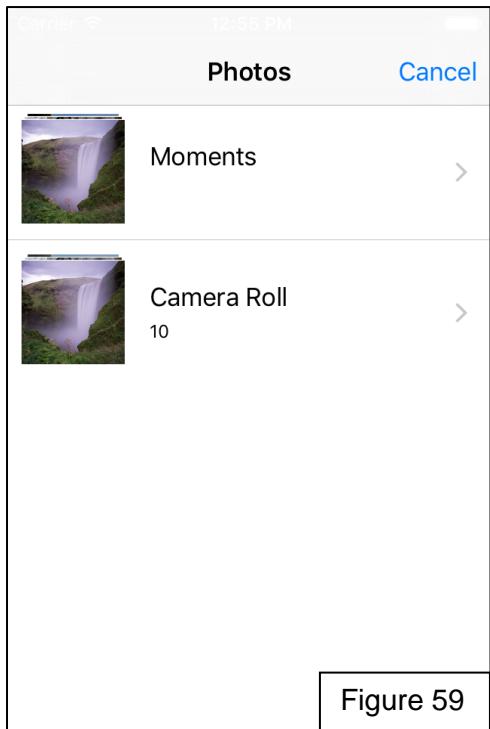


Figure 59

This page was very neutral, very simple and understandable.

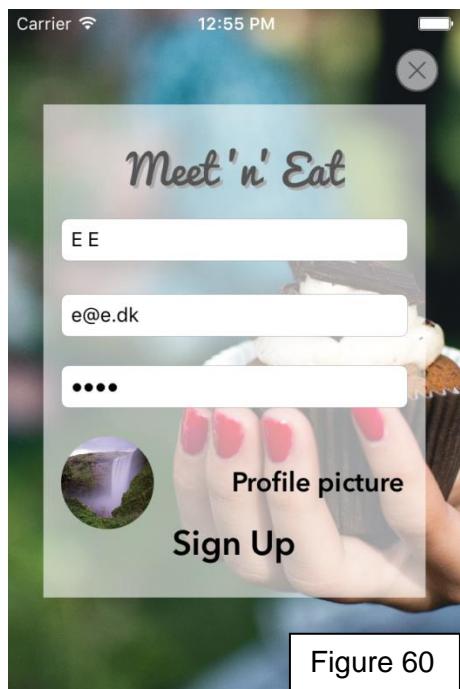


Figure 60

Amalie spent a really short time on this page. Everything was filled out so she only pressed the button which says Sign up.

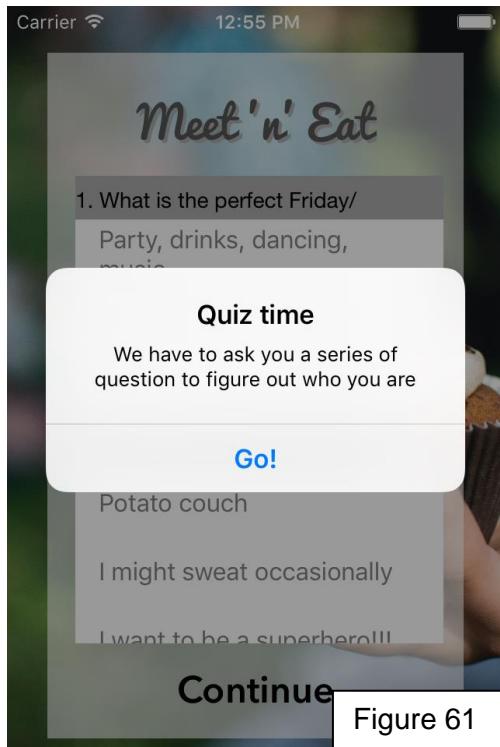


Figure 61

Design was evaluated very highly and Amalie liked very much that the application communicates with her. She was very confident what to do.

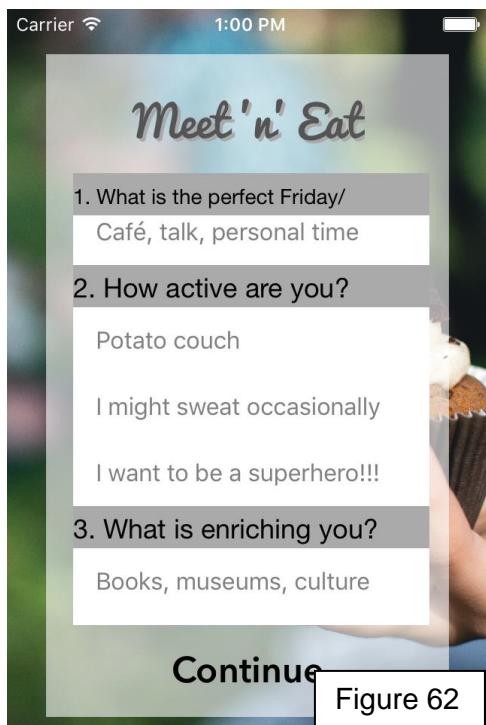
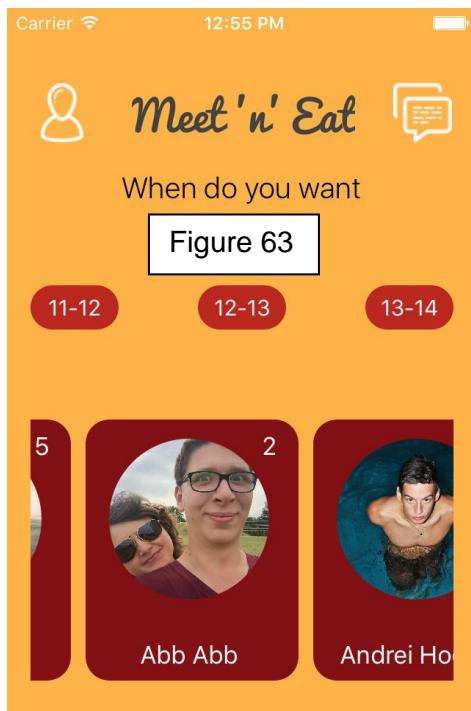


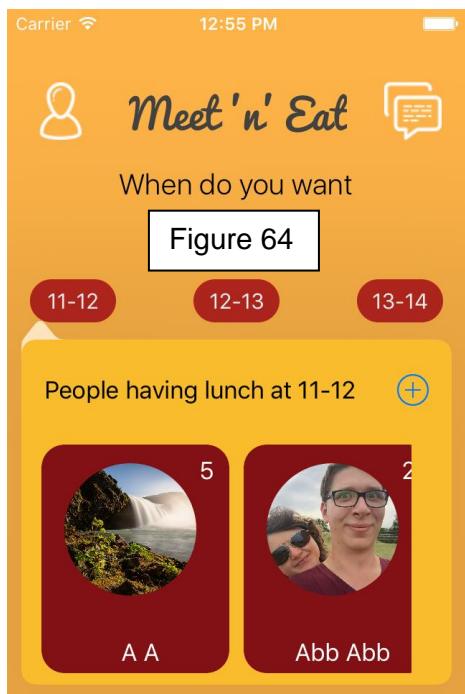
Figure 62

This page was very confusing for Amalie. At the first sight it seemed weird. She started to read it carefully, she was wondering why in the first question is only a one possibility and there are three and again one... In this part she was reminded that these are only screenshots. She discovered afterwards that she is supposed to answer only the second question. She found the questions amusing and the answers weird but funny as well. She pressed button continue.



**Comment:** Because of the screen size the rest of the sentence after the Headline was cut, it was written by a pen. The sentence is: When do you want to meet? The colours were overwhelming. She did not like the combination of orange and red. Amalie was not sure what the people at the bottom of the page mean. It was not clear to her what means what and what all the buttons are for.

She pressed lunch at 11-12 and she was taken to the next page.



Amalie formulated reserved to the colour schemes. It was very aggressive to her. this page looked very easy to her and she was able to understand everything. She pressed the plus icon and added herself to the lunch at 11.

With this action she finished her task within 40 minutes and she used 8 clicks and one wrong click.

This user evaluation showed the developers that there are some changes to make. The colour scheme might be changed for less aggressive colours or at least there is a need to include more of white colour. Other than that the design is really satisfying and the user was very happy about the font and the cupcake picture while signing up. Some screens were very simple to use, e.g.: screenshot 1 or 8, and there were some screens which need to be redone. Some explanation sentences, texts need to be added and maybe a tour through the application after signing in must be implemented.

During the interview, Amalie was advised not to talk about her experience or suggestions a couple times, but there were no major issues running this type of evaluation.

As mentioned before we have had two users registered through TestFlight. The other tester was called Lene and she was doing a usability testing. Lene is a university professor who has background with a lot of user's involvement and methods on how to include the users in the process. Another advantage that she can bring to the testing is that she works with IT students, so she has seen a lot of working prototypes and applications, thus marking her opinion and comments very valid and verified by her experience.

Lene was part of a cognitive walkthrough which is a very useful tool on how to get feedback from new and inexperienced Meet 'n' Eat users. This testing would give the developers ideas if the application is understandable and intuitive or if there are some problems or confusions that need to be resolved.

Lene's task was to login to the application and write a comment in the chat room. here are the screens she went through with Lene's comments or behaviour:



Figure 65

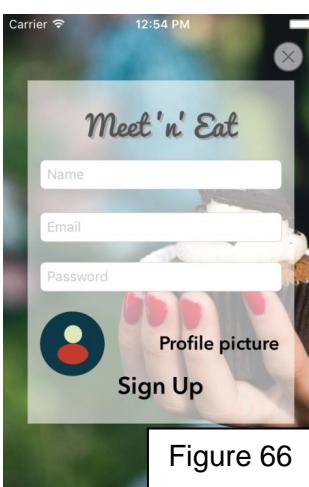


Figure 66

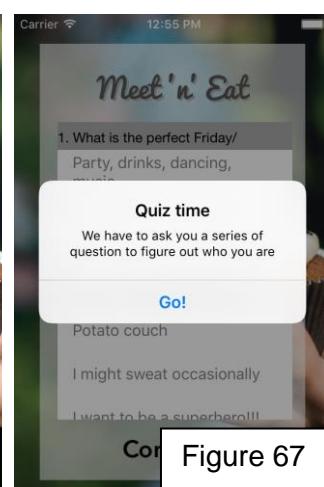


Figure 67

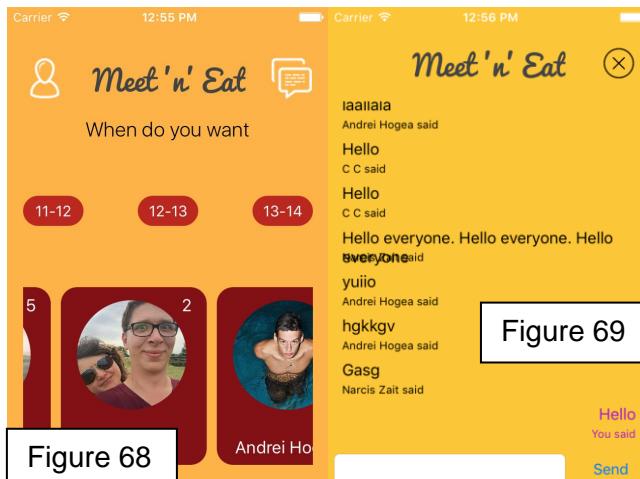


Figure 68

Figure 69

Lene did not have a problem to sign up. According to her screens, everything until the homepage was very simple and easy to understand, while the homepage was confusing for her. She pressed the wrong buttons expecting some functions which are not there. She was not sure what the numbers meant and she was not sure what the icons stand for. She succeeded with her task and wrote a message to the chat room.

According to Lene's comments the application should include an information button where the users can get information about all the functions and icons. That's the only thing Lene would add.

Before running a user evaluation, the developers were considering an idea to include onboarding in the application. The onboarding is a method which is used to introduce the application and the function to the user in very quick and pleasant way. After running this evaluation the need for an explanation was very vivid. Onboarding will be implemented in the final version of the application.

## Discussion

The theme of this semester project was “Distributed Systems and Users”. It was very important to fulfil the criteria and include client and a server. This condition still leaves a wide open pool of possibilities and ideas.

In our group we came up with two ideas. The first one was a fitness tracker, which would help the people exercise more efficiently. This fitness tracker would save data and analyse them with the aim of improved suggestions according to these. The second idea was to develop a platform for university students to meet each other.

The second idea was the one we went with. The reason being that this idea seems to be more current and closer to our environment. We could relate more to this idea and it also provided us with a big user base.

The concept idea was very close to some dating sites like tinder or matchup. Students at AAU should have a profile and they would be matched to other people according to the criteria which should be represented by hobbies, activities after school and personalities. Another important factor for finding a match was the time slots when people are available.

With this first idea in mind, we started to look into the products which are already on the market and according to the findings some other ideas were accommodated.

Multiple chat rooms were included into the concept ideas. This multiple chat rooms would be organized first by a developer according to hobbies and later on could be also modified by the users. This multiple chat room idea seemed a good at first, but then some users started to question it and we looked into more depth and found out that it would make our project and the application go in totally different direction as it was intended. That is why it is good to review and question every decision in the process, so we can conclude that the State of the Art is only a tool to help us to find a good direction and not as a model to take as it is. After discussing this idea, there was a need to get answers on some very important questions, which would lead the course of actions we would take..

To get these answers we have run a questionnaire at the AAU grounds. After running the questionnaire and analysing the results there was need to make the first iteration. According to the results the concept idea needed to be changed. This

Alpha version must be a mobile application, include profile pictures - which is different to the concept idea, where the idea was that the system would be anonymous, and it needs to be leaned more towards group lunches rather than to the one on one meetings. Running a questionnaire made us to do some changes according to the 50 replies we have had. Is that enough people to actually

take their words seriously enough to make changes according to them? When we look at AAU in CPH we have 3670 student at this campus, we took 50 as a sample. That makes 1.3 % of all of the students here. Of course it is a very small number but we have concluded that it is enough for us. Obviously the bigger sample, the better, but we decided to work with the number we had and we also knew that we will involve some other users during the process which will be kind of an evaluation of these results. Most of the results and the decision we made were elaborated as good but some information we have taken from the questionnaire were proven wrong. An example of this kind of information is the criteria based matching system. After all, we have not used it at all even though the questionnaire showed differently. What we are taking from this is that the data which is gathered needs to be strongly looked at and closely evaluated.

After the questionnaire and deciding about the content of the application we have had a pretty clear idea what the project should look like and we could start making progress and organize the work. There are many process models which help organize the work and the whole process. We knew that it was not possible for us to use the plan driven process models such as waterfall model, because they have a very strict structure and do not allow much iterations. To complete the project we had less 4 months and that is too little time to actually follow a strict structure. That is the reason why we decided to go with the agile process models. We looked into more of them and then we took a part from two process models. Was it a good idea? Taking part of more models can be tricky and it can make the work process very unstructured and can lead to disappointment and failure. On the other hand it can be the best way to fit the workflow to the personality of a group. We did not follow strictly any process models, we took something from them and we added something on our own. We did not have anything written down but it was a good thing. We accommodated the work to the group members and that is a very important decision to make. From this reason this type of process worked for us well. Another reason why we did not follow one particular model is that we started to code the application at the same time as we were working with the users and working on the report.

After the questionnaire we decided to start the coding according to some paper based prototypes so we can deliver a functional application. The decision was to focus on iOS and android as well. We decided to use a third party framework, which saved us a lot of time.

We have looked only at one framework - Parse and we have used it. Was it a smart decision? We looked into Parse very carefully and we made a decision which showed as a smart one in a run. It saved us lot of times, which was very crucial to deliver a good working prototype and it allowed us to devote more time into the parts with user involvement.

As mentioned before alongside of the programming we still worked with users and user feedback. This was hard to manage and we discussed it a lot. Sometime this could lead to more work.. In this particular project it worked because no major changes were performed even through the iterations. Although it is always better to have a clear view of the application before coding, this was not possible to do due to time constraints.

To continue with the project in the right direction there was a need to get more in depth information and we organized a focus group interview. After this research method we needed to make another iteration according to the user feedback. This version - Beta version, was more based on randomness, the criteria's were not important anymore. Randomness is more seen in a way that the people/users want to meet all kinds of people and not only people who have the same hobby as themselves, from this point on they will be matched by a random function based only by luck and not on any facts.

According to the focus group interview more functions were implemented and we needed to make some changes to the prototype as well, so the iteration in coding was made.

Along the process we had to drop some ideas such as:

- Multiple chatrooms - this idea was dropped after FGI(Focus Group Interview). More randomness was demanded by the users
- Criteria based matching - Again after FGI, random based matching was initialized
- Website - the platform was changed to mobile application after the questionnaire
- Anonymous profiles - this idea was questioned after the questionnaire and was definitely dropped after FGI
- Android version of the app - this version was dropped because of the time, there was also a need to concentrate more on the report

This decision showed us that the user input is very important. We have included a lot of ideas that the users suggested and there is a need for us to determine if including their ideas was a good decision. The users are from our focus group so their ideas need to be important and in our case they have mentioned ideas which we as developers did not think of. Each and every idea from the users was discussed looked at and was taken into consideration but because not every idea could be used and was valid for our project. In general the users are not always right but they have different point of view and that could be crucial for a product to succeed.

Our vision changed a lot of times and that means that it conflicted sometimes with the vision of the users. As mentioned before we decided to change the application according the user's needs and we believe it will make the project more user oriented and very comfortable and easy to use. These days every product needs to be user friendly and we actually see the user friendliness in the way

that the system needs to be intuitive, simple and pleasant to use and this can be achieved thanks to the user involvement

During the process we needed to change our initial idea and make important decisions according to the knowledge we have from the courses. We have learnt something in the end of each chapter, not only about the content or design of the project but we have learnt also about the methods we have used.

## Conclusion

In the beginning of the Meet 'n' Eat project, we asked ourselves the questions: How can we help students to meet each other besides the student society and Ida organized events? And how can modern technology improve social life?

Throughout this report we answer these questions with our solution, the Meet 'n' Eat mobile application. We developed this app because we believe that we can help the students of Aalborg University of Copenhagen to meet each other and discover new people via the help of modern technology. We made extensive research and user testing to check if there was an interest for our idea and the questionnaire that we conducted in the cantina provided us with a resounding yes of 86% of people interested<sup>31</sup>. The state of the art confirmed our initial assumption that there aren't many great friend finding solutions and that most of the market is dominated by dating apps and websites. We really liked the idea of having a service dedicated to the University and not making a general website or application. To make our idea more unique we focused around the idea of the lunch break where a lot of people have one hour of free time. From start to finish we always kept this main concept in mind but implemented a lot of features that we gathered from various user testing and prototyping. Our current product has most of the desired functionalities wished by the users, but there are still some future improvements that we wish to implement in the future.

One of the first priority would be to develop an Android and Windows Phone version of the app so that every student of AAU could enjoy it. During our user testing, we got some interesting ideas that we wished we had time to implement like having group discounts at the cantina or having tips and information on what other social events are going on at the University. Due to technical limitations we couldn't include functionalities like GPS tracking and maps, but having these services would allow us to guide a new student to one of the spots provided by the emergency button or to allow proximity matching like the Happn app.

Meet 'n' Eat is a concept than can easily be exported to other universities or even companies. Our research proves us that there is a demand in the market for this kind of solution and we believe that our solution could be really helpful to many students that are either new or are just eager to socialize more by meeting new people.

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# Table of References:

1. Students at Aalborg University 2015. Retrieved from <http://www.en.aau.dk/about-aau/figures-facts/students/> at December 15, 2015.
2. Make Friends Online. Retrieved from <https://www.makefriendsonline.com/> at December 15, 2015
3. Cyber Friends, the worldwide friendship portal. Retrieved from <http://www.cyberfriends.com/> at December 15, 2015
4. Not4Dating 2015. Retrieved from <http://www.not4dating.com/> at December 15, 2015
5. Meetup (2015). Meetup. Retrieved from <www.meetup.com> at December 15, 2015
6. Reference: URL <https://www.okcupid.com/> Name okcupid Last accessed 15/12-2015
7. Reference: URL <https://www.gotinder.com/> Name Tinder Last accessed 15/12-2015
8. Reference: URL <https://www.happn.com/> Name Happn Last accessed 15/12-2015
9. Reference: URL <https://www.christianmingle.com/> Name ChristianMingle Last accessed 15/12-2015
10. Reference: URL <https://www.victoriamilan.dk/> Name VictoriaMilan Last accessed 15/12-2015
11. Entourage (2015). Entourage. Retrieved from <www.goentourageapp.com> at December 15, 2015
12. Questionnaire page 45
13. SCRUM(2015). Scrum Methodology. Retrieved from scrummethodology.com at December 15,2015
14. Reference: URL<https://itunes.apple.com/dk/app/xcode/id497799835?mt=12> Name iTunes Last accessed 15/12-2015
15. Reference: URL <https://developer.apple.com/swift/> Name Apple Last accessed 15/12-2015
16. Reference: URL <https://github.com/ParsePlatform/Parse-SDK-iOS-OSX> Name Github Last accessed 15/12-2015
17. Reference: URL <https://github.com/facebook/facebook-ios-sdk> Name Github Last accessed 15/12-2015
18. Reference: URL <https://github.com/Yalantis/StarWars.iOS> Name Github Last accessed 15/12-2015
19. Preece, Rogers and Sharp (2015): Interaction Design. Beyond human-computer interaction (4th edition). Wiley and Sons
20. Preece, Rogers and Sharp (2015): Interaction Design. Beyond human-computer interaction (4th edition). Wiley and Sons
21. Lene Sørensen 2015. POPBL: Method in POPBL. Retrieved from <https://www.moodle.aau.dk/mod/folder/view.php?id=251482> at December 15, 2015
22. Preece, Rogers and Sharp (2015): Interaction Design. Beyond human-computer interaction (4th edition). Wiley and Sons
23. Preece, Rogers and Sharp (2015): Interaction Design. Beyond human-computer interaction (4th edition). Wiley and Sons
24. Sommerville, I. (2011): Software Engineering. Pearson, 9th edition. Chapter 4: Requirements Engineering, pp. 82-117
25. Sommerville, I. (2011): Software Engineering. Pearson, 9th edition. Chapter 4: Requirements Engineering, pp. 82-117
26. Reference: URL <https://github.com/ParsePlatform/Parse-SDK-iOS-OSX> Name Github Last accessed 15/12-2015
27. Reference: URL <https://github.com/facebook/facebook-ios-sdk> Name Github Last accessed 15/12-2015
28. Reference: URL <https://github.com/Yalantis/StarWars.iOS> Name Github Last accessed 15/12-2015
29. Reference: URL <https://github.com/jessesquires/JSQMessagesViewController> Name Github Last accessed 15/12-2015
30. Apple App Store Review Guidelines, sect. 2, art 1.URL <https://developer.apple.com/app-store/review/guidelines/> Name Apple Last accessed 15/12-2015
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