TDT4245 - Cooperation Technology and Social Media
Final Project Delivery

Group 13
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Contents

1 Preface

This report is written as a part of the course TDT4245 Cooperation Technology and Social Media spring 2018; in which the task is to make a prototype of a *serious game*. The game should both increase awareness surrounding privacy, and support cooperation among the players.

2 Introduction

Eria is social application made for the mobile phone. The name is a Norwegian take on the phonetic pronunciation of the word *Area*. Initially the game was thought to be an fun way to interact in the first weeks of the buddy program in universities around the world. After some development, the application showed potential in multiple scenarios, all developing better social connections between the players. It also makes the users aware of the danger that location technology poses for their safety and privacy. As the game goes beyond just entertainment, and goes into a *serious* aspect regarding communication, cooperation and privacy, it can be categorized as a *serious game* [1].

2.1 Team members and motivation

Nicolai Fredriksen

Nicolai is at the 4th year of Computer Science with a specialization in interaction design and game technology.

> *Social media and privacy is a hot button issue in the world right now, and working in an interdisciplinary team surrounding this issue intrigued me from the start.*
>
> - Nicolai

Lars Føleide

Lars is doing his 4th year of Informatics, specializing in interaction design, gaming and learning technology.

> *Cooperative Technology has always intrigued me, so this class is truly fascinating when we are allowed to construct a serious game concept for teaching players more about the many challenges related to social media and privacy.*
>
> - Lars

Herman Hansen

Herman studying Engineering and ICT, specializing in production management. He is currently in his 4th year of study.

As the advances in technology become more rapid and complex, privacy is becoming increasingly important. A synergy when used properly with consent - a threat to society when not. Cooperation is crucial for sustainable innovation which is why I found this class to be very important.

- Herman

Robert Einarson

Robert is studying Computer Science for his 4th year with specialization in interaction design and game technology.

What appealed to me the most was the course's focus on cooperation in di erent work settings. This in combination with game development made the course appeal to me.

- Robert

2.2 Task description

The task at hand can be split into two parts. Firstly, the group should make a game that teaches the user about both privacy and cooperation. The privacy lesson should preferably be related to a smaller subsection of something related to modern technology revolving around privacy. The game should also support cooperation among players. More specifically, the game should support the concepts of communication, awareness, coordination and social interaction. The project is also to be presented in the form of a demonstration, which could be anything from a fully functional game, to a series of screenshots or illustrations.

Secondly, when these requirements are met, the group should proceed by write a reflection about the process. It should describe how the work was carried out, what tools were used, how we solved issues regarding collaboration and a reflection on the finished game.

These two parts can be summarized as seen in Figure 1, where 1 and 2 represents the game, and 3 and 4 represents the process.

Figure 1: Four point learning process

3 Development process

This section describes our development process. The timeline for the project can be seen in Table 1. The following subsections corresponds to each rows in the table.

Table 1: Timeline for the project

27.02.18	Get to know each other
02.03.18	Coming up with an idea
16.03.18	First delivery
23.03.18	Planning for final delivery
30.03.18	Working on the report
20.04.18	Creating a demo
27.04.18	Finishing the report

3.1 Getting to know each other

The first meeting of the group was held in late February. Sickness and change of groups both contributed to a rather late start of the project. Nevertheless, we met up eventually and got to know each other to some extent. We shared some thoughts on the project and what our goals were for the course. We also shared what kind of knowledge we all could contribute with, our past experiences with group work and potential development methods that we had encountered prior to this course. Naturally we also shared contact information and planned our next meeting.

3.2 Coming up with an idea

The group meet up and discussed di□erent ideas for the project. On beforehand each group member were to come up with a couple of unique ideas, and write

them down, before presenting the ideas to the other group members. This to enable the creativity of each group member to flow freely without the influence of others. This creative process is commonly described as a three step activity consisting of getting ideas, proposing solutions and refining these solutions [2]. Both individual skills and experience highly influence this creative process, explaining why we found it useful to begin by doing an individual brainstorming. With this we could then be confident that the decision on a game concept was partially based on everyone's thoughts and ideas.

Finishing this period we held the mandatory pitch explaining the game concept in front of the class. This was a valuable exercise not only for us to set a clear goal and objective to reach in time, but also as medium to get feedback from the community. They told us that it was important to clearly convey in which way our game directs the users attention regarding privacy issues. It was also not too obvious at this stage how all the ways our game encouraged cooperation between players. That being said, we got a great deal of positive feedback surrounding the idea and the game as a concept. This gave us lots of motivation as a group to further develop the idea.

To get more feedback from the community, we contacted the creative oriented student organization *Hackerspace*[1] situated at NTNU. They are an organization made to support creative students and help out in technical student projects. In the later years the organization have grown in numbers and are now able to run and develop more in-house applications and projects. When we then took contact and pitched our idea for the people at the head of *Hackerspace*, they immediately got excited on our behalf. They saw great potential in a project like this, so much in fact that it later was picked out as one of the projects which is being developed over the next two semesters. A fully working version of Eria is set to launch in time for the buddy program late of summer 2019.

3.3 First delivery

This delivery was important in terms of testing the idea and determine if the project had potential or not. We developed a brief description that summarized the ideas we had, not too grounded in the theory given by the supporting literature. This was quickly shown to be lacking in the assessment received from the course sta later on, see Appendix A.2. The feedback served somewhat as an eyeopener in terms of what is not only expected in these early deliveries, but also in the final delivery.

3.4 Planning for final delivery

Prior to the planning of the final delivery, we conducted a few initial semi-structured interviews to map potential flaws in our design and to get an outsider's opinion on the idea. These interviews where conducted on fellow students at NTNU who fitted the target audience drafted from the initial scenario. These interviews gave us some interesting feedback on the game and

[1] https://www.hackerspace-ntnu.no/

shaped how it further developed. The general response from the few we asked, seemed very positive. Some critical parts of the development was nevertheless pointed out. This included how to fully explain the game in a easy manner. How to prevent passive players to play the game in an not preferable way. And, how to ensure that everyone stays engaged throughout the game period, even after being terminated. The full length of the interviews can be found in Appendix A.1.

3.5 Creating a demo

So far in the creative process we had only drawn a few sketches representing the planned application (see Figure 2 and Figure 3 in Appendix A.3). This was done first of all for our own sake and had until now only served as an tool for explaining between each other the concepts of the game. For us to better share our game concept to the rest of the class, we had to create a more visually complete demonstration.

Based on the sketches, we then proceeded by creating an almost feature complete application mock-up of the potential finished application. It was created partially with Adobe Photoshop CS6, the online design and prototyping tool Marvel[2], and Google Slides. It was important to us that the demonstration could explain the game in short, illustrative way, without the need of too many describing sentences. The full presentation can be seen in Appendix A.4. Since TDT4245 is not a course on game development, this part of the project is kept brief.

3.6 Finishing the report

Writing the report was the focus of the finishing period between the creation of the demo and the delivery date. The group had on beforehand divided responsibilities of different topics throughout the report. To better help communication between the team members, we decided to work as much as possible together. Long workdays on campus with stand-up meetings before and after each workday, we managed to deliver in time. The process went better than the earlier work sessions due to the use of discussion session regarding specific game mechanics questions.

[2] https://marvelapp.com/

4 Game Description

4.1 The basics

In the beginning of the game, each player is given an identity with their profile picture, name and a unique randomly assigned billion dollar company name. The company name is what makes up your team. All this information is available on a common map shared by everyone. Each player also gets a person, and therefore also a company, to eliminate. This is a secret mission that only you as a player know the details of. To successfully eliminate your target, you will have to be alone with that person. When you successfully eliminate your target, the target will join your company and therefore be a part of your team. This will create a team spirit in which you will be rooting for your killer. If eliminated, you are now what we call a "ghost". You will be able to do tasks helping your company winning the game.

In the end, there will only be two competing companies left. The company with the most amount of points will then win the round of Eria. You will then be presented with a ranking list showing the number of points and eliminations.

4.2 Game mechanics

To ensure that the players play the game quick enough, some game mechanics may need to be implemented. The interviews pointed out how some players could potentially act too passive for the game to be engaging and fun for the rest, see Appendix A.1. With this feedback in mind, we came up with the mechanic where passive player would be on everyone's target list if they do not act fast enough. Alternatively they could be automatically terminated, but this is something that the group found too drastic and potentially destructive in terms of player spirit.

During the game, players can choose from various modes which enhances a multitude of modes to facilitate the elimination of targets, described in subsection 6.2.

One of the lessons this game is meant to teach, is exactly how some billion dollar companies are acting dirty in terms of privacy and user rights. To make this point more apparent, the game serves you shocking privacy policies and scandals. These appear when the company representing the person who is to eliminate you, succeeds in the elimination, at the in-game "kill screen". These facts could also be presented each time the application is opened, but this could quickly become somewhat of an annoyance, and must therefore be user tested with a working prototype of the game.

5 Privacy Message

As the world around us grows towards using more and more social media platforms and smart devices, your privacy limits are bound to be broken. This happens regardless of whether or not our explicit consent is given, as shown recently in the scandal [3] involving mainly Facebook Inc. and Cambridge Analytica. With the use of an simple personality-quiz app though Facebook, the developers of this app could access large amount of data about both the users and *their friends*. This information was then saved on a private database and later used to create voting profiles, all without any consent. Companies such as Google, Facebook, Tinder etc. store large amounts of data on all its users [4], and what exactly this data is used for and by whom is mostly unknown for the average consumer. You might be sharing your location involuntarily to these large companies every day, but not even Facebook co founder and CEO. Mark Zuckerberg is comfortable sharing what exact hotel he is staying at [5].

As the new General Data Protection Regulation take e□ect [6] and news stories surrounding privacy, such as the aforementioned Facebook-scandal, becomes common knowledge, the general view of privacy concerns should become a larger part of people's lives. But despite this, most users are ignorant as to what they agree to. They consent to the Terms of Service when signing up for any of the large social media platforms. But what are they agreeing to? Specifically, how much does any given platform know about your location at a given time? How can we get people more aware of this important and constantly evolving situation?

5.1 Location sharing

Inspired by Pokémon Go [7] and Snapchat's location feature called Snap Map [8], we wanted to make the user aware of location sharing in regards to privacy. Many applications rely on knowing your location, and some are even entirely based on location to work, such as the dating application Tinder [9]. But since it is so common to request the user's location, is it an issue?

One of the issues regarding location sharing, and other privacy issues, is that it may be done without the consent or knowledge of the user. Applications often force upon the users hundreds of pages of terms and conditions. As many as 98% of all users do not know what the terms and conditions actually entails [10]. This in terms means they do not really know what they are accepting when creating an account on the hot new social media platform. The solution to this may be to make the privacy options more visible. If the user know how or when they are getting tracked, they may be less prone to accepting those terms. By giving them feedback on when and by whom their location data is being viewed by, it may help them actually understand the terms since "nothing" is being hidden from them [11].

The information about your location alone may not seem so treacherous, but when combined with every other point of data that is stored about you, it could very much become so. When requesting to download all data that Tinder has stored about you, you get in return hundreds of pages of your whereabouts at

any given time, and who you were talking to, etc [12]. Tinder responds to this saying the data is just used to create a better experience for their users, and all data is stored safely on their servers so that no harm can be done. This should of course be taken with a grain of salt, as even large international agencies can be hacked, leaking information about millions of users [13].

As more and more data is stored about our every literal move, we are approaching the Orwellian inevitability of our smart phones. So one could argue that just the location data alone would do harm, but with the reality that we are living in, the potential for misuse of people's data are becoming more real for each day. In addition to that, people do not really trust the larger companies, which the World Economic Forum (WEF) describes as a "crisis in trust" [14]. But is there a reason for this distrust, and what are the possible dangers of your personal information, with regards to location, getting into the wrong hands?

5.2 Dangers

How dangerous could location sharing really be? As mentioned earlier, some companies are sitting on large amounts of data, and this could be misused, or used smartly if seen from the company's perspective. If Facebook knows you visits McDonald's every other day, in addition to that you are working out less than before, based on that you have not been visiting the gym the last couple of months. Then they could sell this information to Health Insurance companies, who could in response increase your monthly fees based on higher chance of illness due to the worsen lifestyle. This might sound like a conspiracy theory, but in some cases, the world is already at this point as the scandal mentioned in beginning of section 5.

Steering away from Big Brother conspiracy theories, what could happen if someone with viscous intent got hold of your location history? One could possibly and easily know what your daily habits are, based on where you are at different times of the day. If someone sees you are always away from home at specific times, this could be used as valuable information if the said person with viscous intent was for example a thief.

Let us take the focus back to Snapchat's Snap Map, maybe the worst offender of location sharing. One could easily see how stalkers, rapists, or even murderers, could use this live updated map of victims for their intent. With giving your location away to all your added friends on Snapchat, which is updated relatively often, you can quickly become a sitting duck for someone with these unpleasant intents. This may be the needed hyperbole to make users aware of the possible dangers of location sharing.

5.3 Privacy awareness in the game

Our goal with our game is not to scare the user into never using a social media or never using any form of location sharing ever again. Rather, our goal should be more in the lines as said by Crabtree [15]:

> *(...) providing 'users' with enhanced control mechanisms to manage the flow of personal data in the digital economy and thereby protect their privacy.*
>
> - Andy Crabtree

This could be used as a general guideline as to how we portray the privacy issues, and how we make the players learn what we want them learn. It is after all a *serious game*, as described in section 2. It might seem counter intuitive, as the game has put the dangers of location sharing into an extreme. By putting the game into a fun environment with some competitive aspects known from regular games, we hope to get our points regarding location sharing across to the players in a less "serious" way.

The main activity in the game is going around in your local area and eliminating other players without any witnesses. We hope that by having this as the main activity we are teaching the players, both consciously and subconsciously, about the dangers surrounding location sharing, as explained in subsection 5.2. If the interface of the final product carry some resemblance to existing applications, the user may be able to connect the dots more easily. It may be a long step, especially considering that our game promotes the most extreme dangers surrounding location sharing. But, if the user is aware of the extremes, this might subconsciously carry over to the day-to-day issues regarding privacy. As mentioned in subsection 5.1, the users are maybe not aware of everything that is going on behind the scenes, and we want this game to make this information more prevalent.

Another step we take to promote the issues surrounding large companies and their data gathering, is the "kill screen" of our game. A "kill screen" is what you see in-game after getting eliminated by another player [16]. In addition to showing who eliminated you and what company they work for, we want to show some additional facts about the real world equivalent of that company. These facts will mainly be related to location sharing, but may also be something else e.g. regarding their stance to user privacy, how much information the companies are gathering or earlier judicial proceedings'.

We want the users to be aware of what these billion dollar corporations are doing with the data they gather about users, not just in regards to location data, but in general. By having our main focus on what the corporations are doing with your location data, we can ease the players into heavier subjects such as the morality behind sharing user data to advertisers.

By not forcing the learning upon the players, but instead cater towards their potential curiosity about the subject, we hope in return that a higher percentage becomes invested in the subject surrounding privacy. As said by D.M. Christophel [17]:

> *If learning is associated with coercion it can become a generally aversive stimulus, one that students will go out of their way to avoid. Forced learning today may result in no learning tomorrow.*
>
> - D.M. Christophel

That is our main motivation as to why the presence of learning is the way it

is in the game. We want intrinsic motivation and not extrinsic motivation. The game can still be enjoyed on a entertainment level, but the players might learn something if their interested. The “kill screens” supports this, as players are not forced to read it, but can read them if they want to. Potential future features can also support this, by having more on-the-nose learning for those who it might interest.

The game is supposed to make the users aware of location sharing, location data and the data gathering of billion dollar companies. What is all this data used for, and are there potential dangers in letting the corporations have access to your location? It is said that “nothing is free in this world” so how do Facebook, Google etc earn money? You are using their apparently “free” platforms, but what is the hidden price? We do not want to force this issue onto the players, but try to make them aware of something that is becoming more and more relevant, and still giving the players a fun game to play with their friends.

6 Cooperative Mechanics

This sections aims to explain the cooperative mechanics of our game and why we have chosen exactly these mechanics.

6.1 Communication

There are two important channels of communication in the game – real-time verbal communication between the users and synchronous updates on each players' current position available to all other players.

The game will encourage its players to communicate in real-time through verbal face to face speech. We can consider this to be synchronous and informal communication. To effectively play the game, verbal communication is necessary. This adds another complexity to the game that we believe strengthens the games' main goal of teaching the players about cooperation mechanics and privacy issues. In a study conducted by Covi, Olsson and Rocco described in Distributed Work [18]; the study placed six teams of six to eight members in team rooms as opposed to the regular offices they usually work in. The study refers to this as Collocation. Collocation is the effect of communication between two people as the distance between the two changes. The study concludes that the teams that worked collocated in the same rooms decreased cycle time and increased function points. Collocated communication is a big part of our game as players must communicate verbally. We want the players on our team to communicate verbally in order to collaborate better. This is accomplished by facilitating collocated communication by increasing a team's chances to win through communication between team members. Teams who communicate better will gain a competitive advantage.

As communication is limited to face to face speech, we can also consider the direct communication to be geographically constrained. By geographically constraining the players' communication, we aim to eliminate communication as a distracting factor. This makes the player more focused on their task of eliminating the enemy players.

The second channel of communication, the player's location, can be considered to be real-time (synchronous) and bi-directional among all players. This is a key element of the non direct communication in the game as it is the only way a user can be certain that he or she is with another enemy player. We consider this to be geographically constrained within the boundaries of the game, so that only a player's location is only visible on campus.

6.2 Awareness

One of the underlying goal of the game is teaching the player to constantly be aware of their own location, the location of their target and how this information can be taken advantage of to win the game. Awareness in the game is created by the two channels of communication; *verbal* and *location*. These two channels in turn create an awareness that is essential in order for teammates to communicate. As mentioned by Carstensen and Schmidt [19] in chapter 3.1:

> *The obvious and fundamental way to coordinate, align, mesh, etc. myriad interdependent and yet distributed activities is to facilitate mutual awareness among actors.*
>
> - Carstensen and Schmidt

Our game aims to fulfill this requirement through mutual geographical awareness of all players.

Awareness of the game state can also be created with visual cues, like making colors go monochrome when the player dies, enter ghost mode and become a member of a new billion dollar company.

The player can also decide between various modes of the app, which enhances a great variety of awareness:

- *Compass Mode* would show direction and distance to your target, showing a red arrow if the person is surrounded by others, orange if only a few other players are nearby and green if your target only has one other player nearby.
- *Vibrate Mode* uses vibrations to create awareness. The user defines a range in the app, so that the player is notified when the target comes into range. The player can also set the phone to vibrate when the target is on the move.
- *Lunch Mode* is custom for attempts of taking out the target during lunch. The app becomes extra sensitive to movement before lunch, notifying the player of any suspicious movements, tries to make a guess of where the target will go for lunch with an estimated time of arrival and an estimated route.
- *Lecture Mode* is similar to Lunch Mode, but rather makes guesses for which class the target might be going towards. The goal here is to intercept the target before arriving to the classroom, in hopes that the target will be alone. If the target is already at a lecture, the player will be notified when the target is on the move during a break.
- *Fruit Card Mode* seek to detect when the target is moving towards Sit Kiosk for picking up the daily fruit. A very useful mode when knowing that the target has a fruit card, especially since it is common to collect the daily fruit without the company of others.
- *Co ee Mode* allow for the player to detect if the target is a co□ee drinker, where the target go to fill co□ee and seek to make predictions of where and when the target will make the next co□ee refill.

- *Stripa Mode* is custom made for a popular passage at NTNU Gløshaugen. Many paths goes through Stripa, and it is the location of both Sit Kiosk and Hangaren. Students go there for crossing campus, find co□ee and talk to organizations looking to get in contact with students for various reasons. A prime location for taking out targets, with plenty of time to get there after being alerted by the app.
- *Student Lounge Mode* is useful if your target has a habit of playing Foosball or table tennis during the break. Conveniently located at Stripa close to Hangaren. Target is typically social and protected while at the Student Lounge, so the player must be prepared for finding a strike opportunity after social activities.

6.3 Coordination

Although not necessary, coordination between teammates is a very important factor for a team to be successful in the game. Without it, a team may risk leaving a player by him or herself, exposing the player to an enemy. For this reason, coordination is a key cooperative mechanic a team must possess in order to play the game e□ectively.

> *The term coordination mechanism can be interpreted, in the most general terms, as any kind of construct that is at least in principle computable and whose aim is to organize activities performed by a group of actors that are called to collaborate for some purpose or reason.*
>
> - Federico Cabitza [20]

The game allows for real-time verbal coordination one-to-one or one-to-many in a situation where two or more teammates are gathered. This form of coordination will help a team avoid leaving a team member behind. This aims to teach the player about the importance of coordinating future moves and positions in order to gain a competitive advantage.

A player is also able to be assisted by “ghosts”, that is, terminated players who are now part of the same billion dollar company.

When for instance entering the various modes, a player can coordinate with these “ghosts” to ensure that the target enters a situation that can be lethal and result in a termination. Players are excepted to connect on Facebook, Messenger, WhatsApp, Signal, Skype, SMS, etc. to coordinate, and rather use the app primarily as a map to locate and monitor targets.

6.4 Information sharing

Dourish and Harrison[21] stated in “Re-Place-Ing Space: The Roles of Place and Space in Collaborative Systems” that information sharing “is fundamental to coordination of Supporting E□ortless Coordination activities and sharing of information, which in turn, are critical to successful collaboration”. We aim to implement information sharing in our game in order to facilitate successful

collaboration.

One of our main objectives of this game is making the players more aware of their own information sharing. What information are they sharing and to whom is it available?

In terms of cooperation, the primary function of the game is to see the location of other players.

One feature that could be interesting to explore is how information of two players can be shared when these are in close proximity. We can define a threshold, for instance 10 people, which could be the numbers of players remaining before allowing information sharing.

When two players meet up all history of both players will be shared, including all ghosts of the two *billion dollar companies*. During this information sharing mode, the two players will be able to cooperate in taking out targets. Which quickly can result in a "sudden death" situation if a successful termination unveil the order to terminate your teammate. In the end there will only be one winner. One *billion dollar company*.

6.5 Social interaction

Dourish and Bly [22] pointed out:

> *Awareness is a basis for further social interaction and should therefore also be maintained over distance: 'awareness involves knowing who is "around", what activities are occurring, who is talking with whom, it provides a view of one another in the daily work environments.*
>
> - Dourish and Bly

This forms an underlying basis upon which we have defined the awareness in our game. This is done in order to achieve the social interaction needed to accomplish the main objective - to teach the player about privacy.

While on a mission of elimination, the player becomes an easy target if wandering around on the campus alone. So being social and surrounded by other players is an important insurance to stay in the game for as long as possible. This encourages the players to always be aware of their own location and most importantly to whom their own location is shared.

A successful elimination, the termination of a target, requires patience. For the most part it will only be possible when the target makes some kind of mistake or takes unnecessary risk. This waiting time is ideal for social interaction, since there is not much else to do in a social setting. A team that uses this time to their own advantage to discuss tactics will often find themselves more successful than teams that do not. This supports our game's main objective of teaching users about privacy and coordination as it rewards teams that use social interactions and awareness in a careful and calculated manner.

7 Reflection

7.1 Ecology of technology

In order to better the work flow we took advantage of sharing capable technologies. First of all we quickly created a shared Google Drive folder in which every team member could add and edit files. This way could relevant literature, illustrations, sketches and brainstorming notes for the whole project easily be shared among us. The first delivery was created with Google Docs and the presentations was created with Google Slides. This includes both the first pitch and the demonstration at the end.

This very paper is written in ShareLaTeX which is a collaborative online LaTeX tool for writing formal documents and papers. It is a recommended tool at NTNU because of its strong ability to handle both references and general formatting of elements. Unique for the online ShareLaTeX tool is its good live editing capabilities. It is ideal for group projects as it requires no installation. It also o□ers features like commenting, on-site chat and history details, which all have benefited the progress of the paper.

One of the drawback with using these technologies was when using Google Slides for the demonstration. This is a limited tool in terms of features and made the demo non-interactive for the public. The concept though is quite extensive, therefore a fully functional demo would have been unrealistic in the given time frame, although some interactive functionality would have made it easier to get our points across to the audience.

Live editing tools can also be a drawback since it do not require the members to meet face-to-face, but encourages to write from home. This makes for an impersonal collaborative e□ort, where it can be di□cult to get points across to the other group members. People will often write independently, which makes deadlines harder to follow. Our avoidance-plan for solving bad communication during individual work sessions was a common Facebook chat. This worked only partially, as nothing beats actually meeting and planning/discussing the subject manner every time work is conducted.

Despite these hiccups, the tools used in total made the process easier rather than harder. This is not the first time any of us use these specific tools, which complements their usefulness. These are tools that the group members will continue to use in other projects in the future, as they are tried-and-true in these types of group collaborations. Knowing the environment in which you work, popularly referred to as Workspace Awareness (WA), is something this course have thought us to be. Which is why we now have a improved understanding of why some of these tools works better than others [23].

7.2 Collaborative challenges

This was a group where only two knew each other from before. This had some complications for the beginning of the project. It takes time for a group to get to know one another's routines and inner workings. This is an challenge every newly formed group faces. After the first *get to know* session we slowly began

to show more trust and eventually learned how each member tackled the task. Looking back at this critical stage - we should maybe have focused even more on the human part of the project, at least in the beginning. Maybe this process of getting to know each other could be further optimized by doing team building actives. Team building helps motivation, betters communication, improves relations among team member and better productivity [24].

> *A group becomes a team when each member is sure enough of himself and his contribution to praise the skill of the others.*
>
> - Norman Hidle

As team members finished intermediate objectives, we could have had a better system for reviewing and giving both relevant and positive feedback on these. As stated in the Section 7.1, the lack of established system for handling such, combined with the cooperative tools used, made it di□cult to do so in an adequate way. That is why we decided to have stand-up meetings twice a day each work-day, one in the morning and one in the afternoon. These meetings made it possible to share plans for the day which acted as a summary after a days work. This helped focusing on each members contribution, motivated each to give more feedback to one another, which in terms boosted confidence throughout the group.

> *Coming together is a beginning. Keeping together is progress. Working together is success.*
>
> - Henry Ford

Daily stand-ups made the group dynamic better, but it did not solve all communication problems. In addition to this, we needed forums for more discussion about the task. We were not always on the same page concerning the games mechanics. Our solution to this was to pause the work and have an occasional dissuasion session. This is said to promote teamwork, boost confidence and make the team members feel more valued and wanted [24].

7.3 Community cooperation

The group utilized community cooperation to reinforce the concept and development of the game. Firstly the team interviewed people from the target demographic, to ensure that the concept of the game was thoroughly developed. This early feedback identified some issues that the concept had in its early stages, and made the team avoid these issues and pinpointed the direction that the game was headed in. Secondly, by talking with members of *Hackerspace*, the group got a positive a□rmation of the concept. It was in fact so well developed that *Hackerspace* showed such interest that they chose to use the concept as a project for the next two semester, as mentioned in subsection 3.2. By involving the community around us, and by getting positive feedback, the team felt motivated that the game had potential into becoming something more than just another task in a subject at NTNU. If this had not been done, the group would may have been hesitant and not confident in the further development of the game from the start, which would have resulted in

a lesser product than what we ended up with.

7.4 Game design reflection

Section 5.3 described the group's goal for how to portray the privacy issues that we wanted the game to focus on. We feel that this was solved in an appropriate manner, without being too direct, and still getting our point across. An actual commercial game with such focus on privacy may feel a bit preachy, in comparison to other games in the market. To accommodate this - the game is created to make the users more aware of the increasing privacy issues by gracefully introducing the topic. It presents the issue in the best possible way for learning according to D.M. Christophel [17].

We also think that the cooperation aspect of the game is a strong one. Players of the game are enforced to communicate with other players, and the several in-game modes are present to support di□erent kinds of awareness. Especially since the game have a potential release during the buddy program of 2019, we feel that the cooperation aspect of the game can help further develop the life-long friendships that are made during this period. By accomplishing such a feat, we feel that the group solved the cooperation aspect of the game well, since the game might have a potential of becoming a tradition in future buddy programs.

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A Appendix

A.1 Interviews

Interview guide:
Present the course. Presenting our idea for the game, including rules, what we hope the game will accomplish and what the underlying theme of the game is. Presenting also the buddy program as the scenario.

1. What do you think of the idea?
2. Is there any other scenarios were the game could be fun to play?
3. What do you think is the most difficult elements of a development of this game, as in game rules, not technical?
4. Have you played anything like this before?
5. Do you think this game would make you more aware of location based privacy?

I: Male student 20:

1. Interesting idea. Definitely a different way of using the technology and it could be a nice icebreaker for conversation with the people playing.
2. Could probably use this in the student organization after new employments.
3. Hard to ensure that everyone is involved maybe. Could easily be that someone stays engaged.
4. Reminds me sort of some party games you do in groups together, but no, nothing like this online.
5. You know, actually yes. If you have to constantly watch when and where you are going to not get zapped, then I could imagine it being a bit freeing to end the game!

II: Male student 22:

1. The basis for the idea is definitely compelling. Strange that nothing like this is all ready made, or at least not what I know of.
2. Could possibly use this on our basketball team on the next time we accept new members.
3. The most difficult? I don't know really, presenting the rules in an easy manner maybe?
4. Never played anything like this before, no. A bit like Pokemon Go maybe, but still not at all as this game includes people much more.
5. Maybe? I personally don't have Snapmap turned on for instance, so by playing this game, I would have pushed what I'm comfortable with.

III: Female student 20:

1. Sounds difficult, but probably fun!
2. On all newly formed groups of people really. Everything from longer

company presentations, band practice, sports teams, and so on I think.

3. I instantly thought of those who maybe don't want to engage in activities like this. They have to be sort of forced to do so. Maybe punish those how don't play enough somehow? You could for instance let them lose health if they stay out of combat or away from people. Because the point of the game is to get to know each other, so you can't have players who don't interact.
4. Nothing like this, no. But I hope I'll soon do!
5. Absolutely, it is all ready a hot topic in the media, but I don't think the people I know really think of the dangers. So this little fun activity could fire up the paranoia somewhat. In a good way that is!

A.2 Feedback on deliverable 1

The game description is brief but complete. The learning objectives are relevant. The constraints should focus on how the participants mitigate limitations introduced in the game with coordination mechanisms. The mechanisms to support cooperation and social interaction are not grounded in the literature and can be improved.Reflection in the game is present.The description of the technical platform can be more detailed. The reflection notes are too short and should include tools used, an idea of the future plans and the roles. No literature is used to support any of the sections, which is an important requirement for the course.

A.3 Sketches

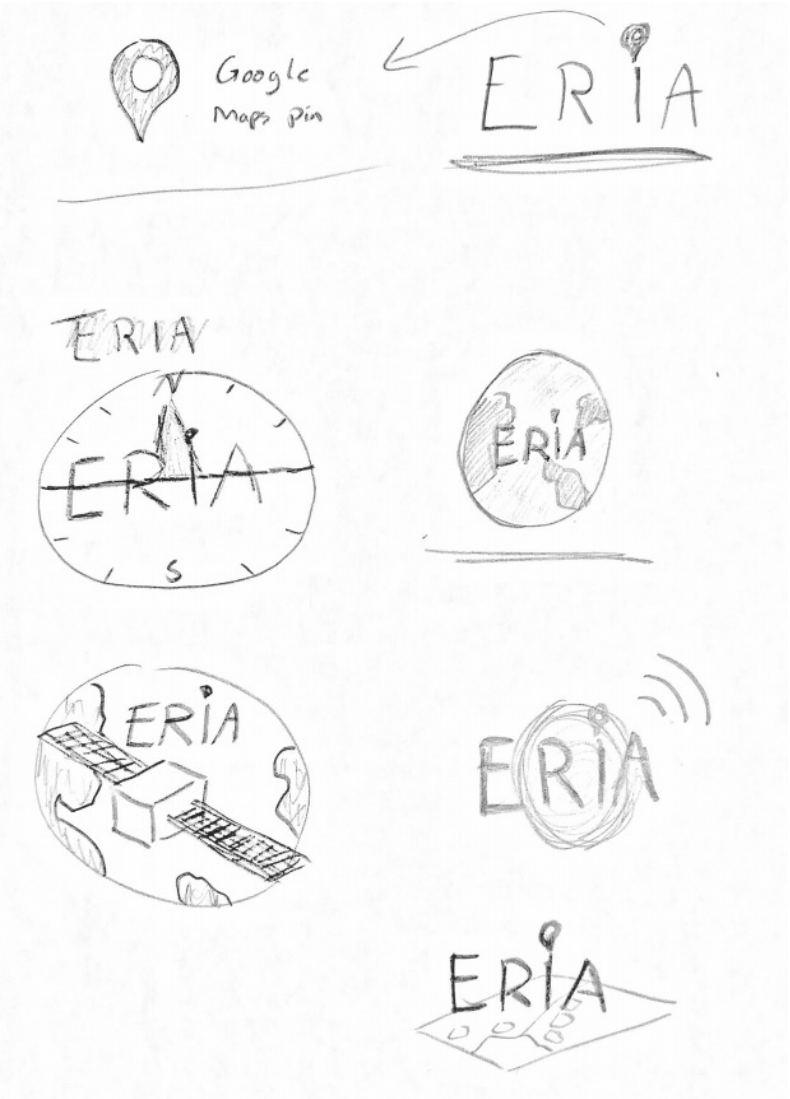


Figure 2: Multiple logo designs where discussed

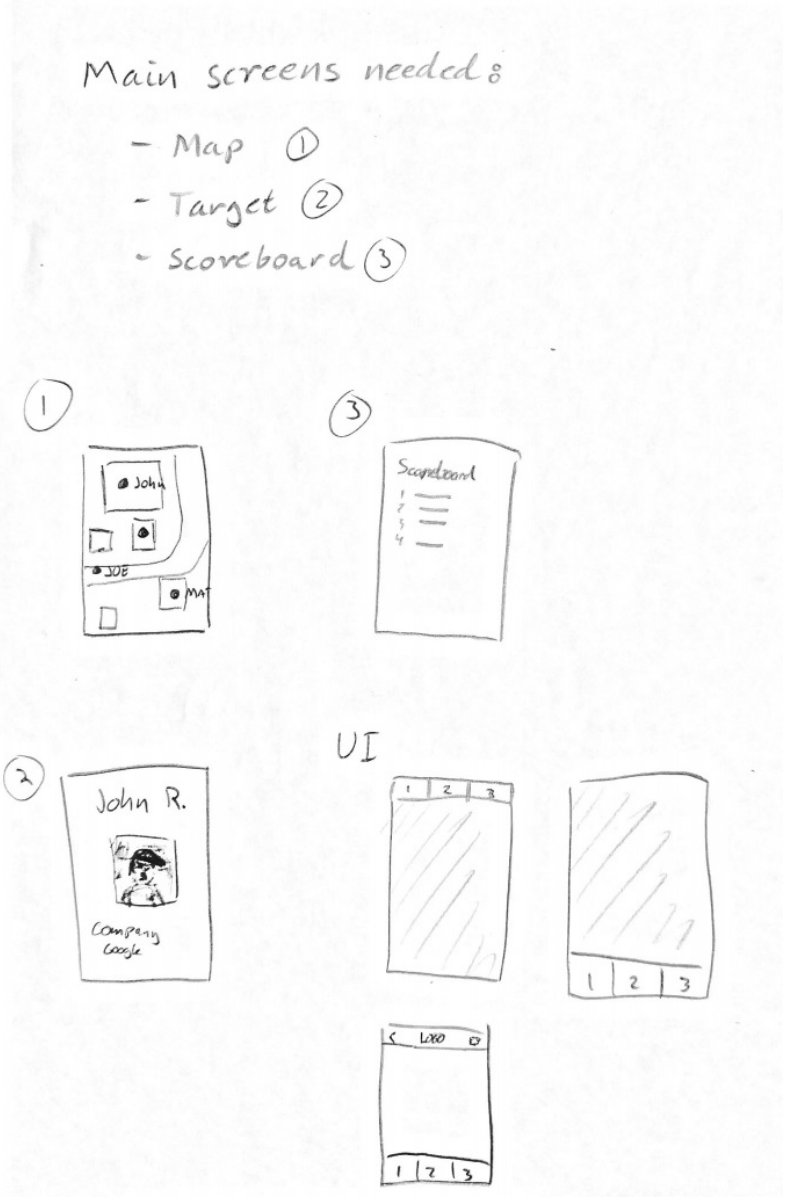
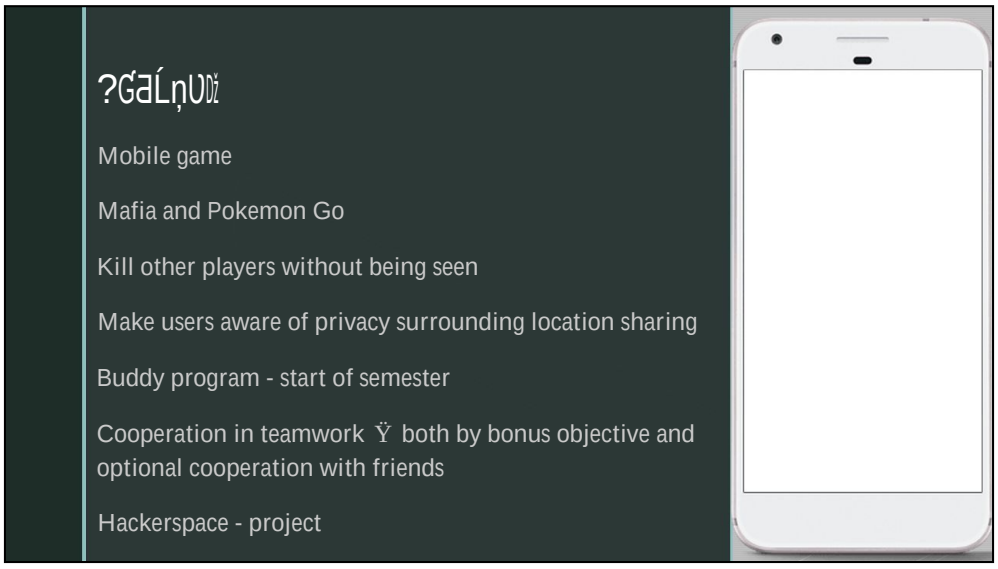


Figure 3: Early in the creative process of making a design for the application

A.4 Demonstration



Ünşü5žzěžüĠa âĹzņņa

Game pin

Profile picture

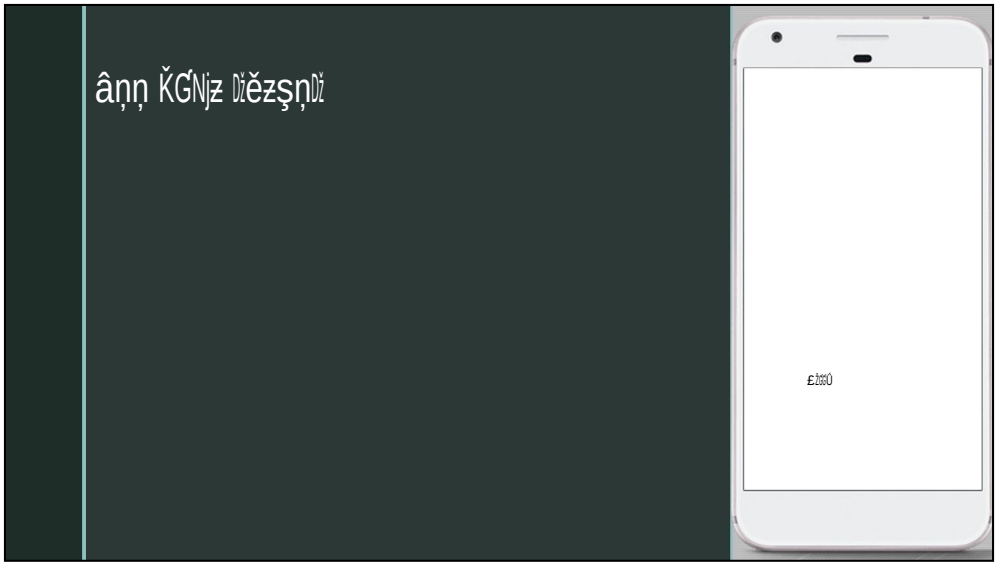
Team/company

Ünşü5žzěžüĠa âĹzņņa

Game pin

Profile picture

Team/company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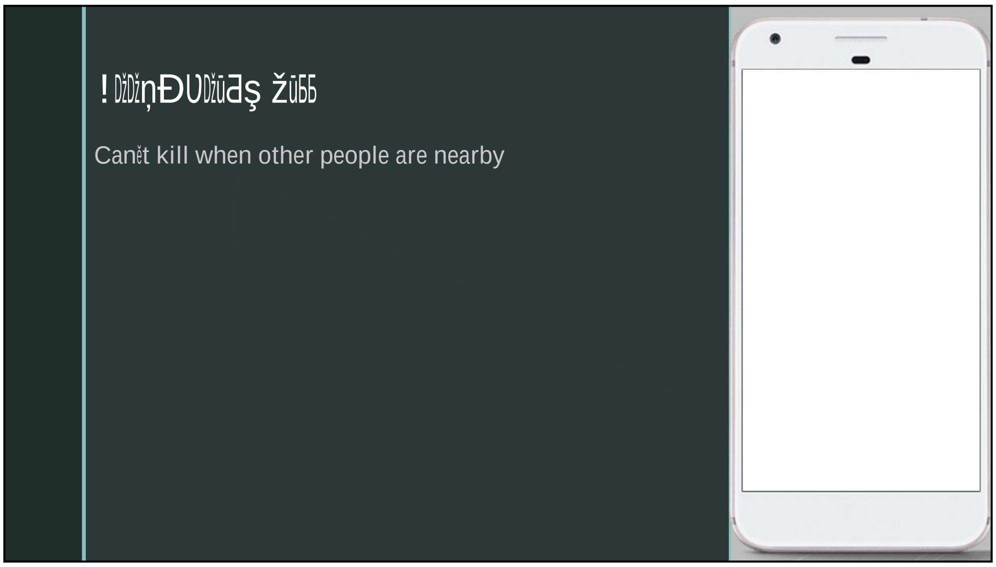
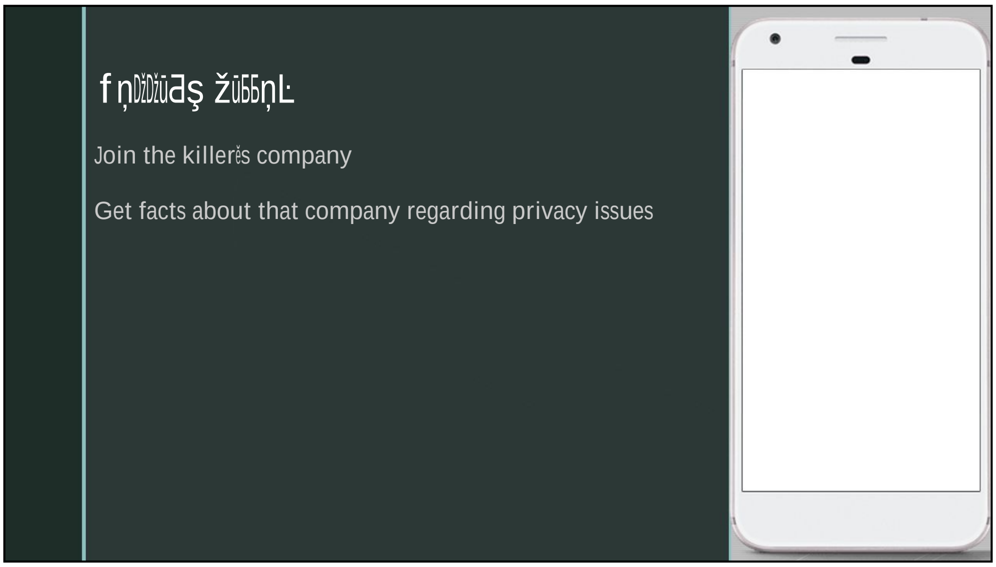
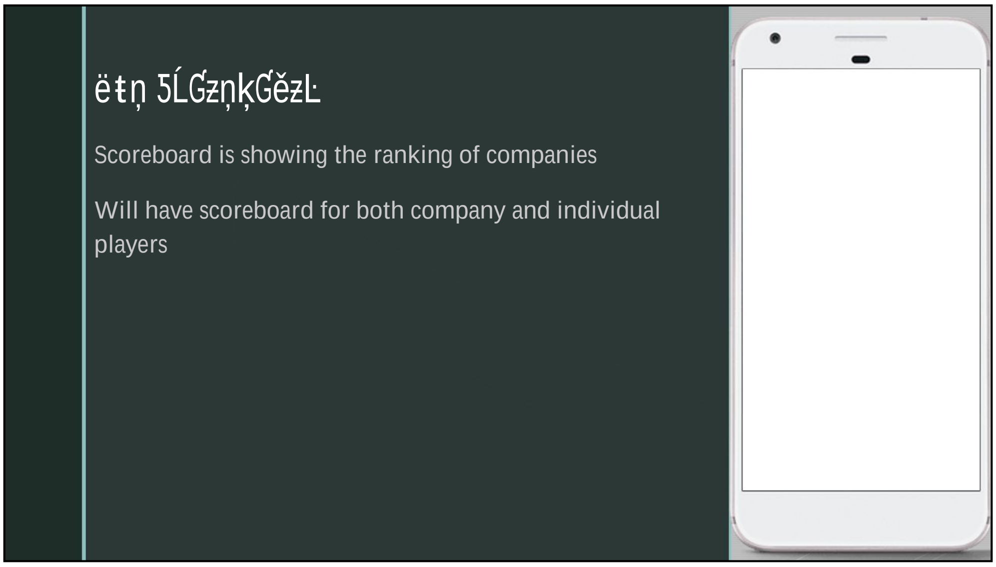
Your position
Position of other players


Can't kill when other people are nearby


Join the killer's company
Get facts about that company regarding privacy issues


Scoreboard is showing the ranking of companies
Will have scoreboard for both company and individual players

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Enforces cooperation in game

Dilema Ÿ helping rival company

AI, machine learning for generating objective