Bifrost - An Event-Based Socialisation Platform

In the previous semester, we wanted to see if the pandemic had a negative influence on the sociability of the individual and if so we wanted to present a socialisation platform for kickstarting people's social life again. We conducted a survey (N = 280), where we asked the participants about their sociability before, under and after the pandemic and we showed them a photo of an example of the application we had in mind. Our results showed that the pandemic did not have a great impact on the sociability of the individual, but we still saw a need for this type of application, because there were still a great number of people who did not feel like they had enough social interactions. Therefore, we created a high fidelity prototype you could interact with based on the comments we got from the survey. We also conducted a usability test (N=8) on the prototype.

This semester we wanted to focus on developing the application and conducting a field study to see whether or not the application would help people expand their network and meet new people they would not otherwise have interacted with. Expanding your network and making new friends can be a difficult task. Especially when you are arriving in a new place, such as moving to a new city to study, it can be hard to know where to start. When looking at previous research, it was shown that friendships are often based on similarity and shared attributes. It is also shown that spending time together doing leisure activities can predict the closeness of two people, together with the number of hours spent together. We, therefore, thought that creating a platform where the events are in focus instead of the people would create a good fundament for creating new connections. We were inspired by existing platforms such as Boblberg and Tinder and wanted to create a mix of these. We wanted to challenge the swiping-based technique known from dating applications, but instead of swiping on people, we wanted to swipe on events. By doing this, we would match people on the base of shared interest in the form of the events. In this way, we believe that we are taking a bit of the pressure of meeting new people since you have an activity to do together.

After developing the application, we conducted a usability test (N=5) on the initial version of the application, to see whether there were issues we had to fix before publishing the application. This application contains the parts of the prototype that was important to test the functionality. This included a stack of event cards where the users can swipe on events they might find interesting to partake in. For the participants of an event, we have supplied a chat function where they can communicate about a specific event in which they will participate. The mobile application was developed in Flutter and the back-end was developed in nodeJS with MYSQL to store the data.

We wanted to test our application, Bifrost, to see whether or not the application would fulfil its purpose, we had a test period of 2 weeks where the application would be downloadable on Google Store. To further investigate how the test period would go, we had a diary study (N=2) where the participants would log their experience with the application each day via a Google Forms survey. In the test period, we had a total of 12 active users who made 13 different events in the test period.

After the test period, we also held semi-structured interviews (N=3) with our two participants and one other active user during the test period. The interview consisted of 5 themes: Diary Study, Using the application, Attending an event, Creating an event and Future use. The feedback from the interviewees was positive towards the application and they wanted to use the application again. A concern the participants had during the test period was whether or not they would be able to find the

other participants at an event. Another concern that was also mentioned was whether or not people would participate in their created events. However, despite the concerns, the participants thought Bifrost was a good tool for meeting new people since people using the application would also be open to expanding their network and meeting new people and would also recommend the application to others.

Our users have quickly understood how to use our system and we have had several events which have been created and held. Our participants seem to have made new connections with people they otherwise would not have been in contact with. We have also heard that our test persons from the diary studies have met to redo an event after our test period. The goal of the application was for the users to expand their network, and since that has happened for our two diary study participants we deem this goal as successfully achieved. However, we also see an opportunity to improve the application, first of all, it would be best to expand to Apple's app store as well. We would also need a recommender system when we get more users and we might need to implement an interest option, such that the users can save interesting events.

Bifrost - An Event Based Socialisation Platform

Melanie Selman
Institute for Computer Science
Aalborg University, Denmark
mselma17@student.aau.dk

Cecilie Hyrup Madsen
Institute for Computer Science
Aalborg University, Denmark
chma17@student.aau.dk

Mikkel Filip Jensen
Institute for Computer Science
Aalborg University, Denmark
mijens17@student.aau.dk

ABSTRACT

Making friends and expanding your network can be difficult. In a world where the focus is on digitalisation, many social interactions have also gone from happening in real life to happening on a device. In this paper, we will present Bifrost, which is an event focused socialisation platform. Bifrost offers an application where you can create connections that can go from online on the device to offline in real life. The application is inspired by modern-day dating applications by using the swiping mechanism, but instead of focusing on people, it focuses on events. We believe that taking the focus off the person themselves and matching people by their interest in an event could be a good way to connect people. To explore the concept, we did a diary study (N = 2) during a test period of two weeks, where the application was available for download in the Google Play store. After the test period, we did a post-test interview (N = 3), where we interviewed our two diary study participants together with the most active user we had on the application. The outcome of the study was positive, and all of the interviewed participants would want to keep using the application after the test period if it was still active. In conclusion, we explored the swiping concept and discovered what kind of obstacles and benefits derived from a social application such as Bifrost.

KEYWORDS

Bifrost, Social Matching, Social Network, Diary Study, Friendship, Event Based Social Network.

1 INTRODUCTION

In the fall of 2021, we developed a prototype of an application to get people to socialise more. Our initial thought was to get people back to regular life after the pandemic restrictions. However, we discovered that people were close to being as social after the restrictions as they were before. We also discovered that there was a group of people who needed more social interactions. These people had a lack of social interactions before, during and after the COVID-19 restrictions. Of the 280 participants we had in our survey in the previous semester, 67 said they would be likely to use an application like this and 13 said they would be very likely to use it, which means 28,6% of our participants would be potential users. [6]

Current methods for meeting platforms often have different focuses, this could be matching person to person like Bumble or attending big communities like Meetup. We intend to have a platform where users can meet others in small, spontaneous groups, based on their interests. This means, that if a user is attending an activity or wants to do something it should be easy to publish an event to other users to form a small group of participants. For other users, it should be easy to join an event and start chatting to prepare for the event. We also wanted to explore the swiping mechanism, since

previous research has shown that having a swiping and tapping option instead of a pure tapping option, increased user engagement and gave the user a sense of control [4].

An obstruction to creating an application like this is that we need activity on the application before it is attractive to use. The users might not be interested in using the application if there are not enough events, and we need users to create these events for each other. Therefore, this application was initialised in the Aalborg area, which should give us a better opportunity to get more users in a smaller area and concentrate the number of events. The hope is then that the users in Aalborg will continue and there should be an opportunity to expand slowly.

2 MAKING FRIENDS

Having friends is an important factor in terms of happiness and life satisfaction. The amount and quality of social interactions in early life can predict the well-being of a person 30 years later. When defining a friendship, both children, adolescents and adults mention shared activities as one of the first qualities of a friendship. Previous research has shown that time spent engaging in leisure activities together could predict closeness together with the number of hours spent together. [5] However, before having the option of spending time together with friends, you need to have friends or make friends, which can also be difficult for some. Previous research has shown that friendships form on the basis of similarity. Compatibility makes it easier to cooperate, which will make the interactions more rewarding. Similarity gives a common ground for the initial social engagements, and when two people like each other at first, there is a bigger chance for them to meet each other again. Adolescents that have difficulties in making new friends should therefore be advised to seek companions whom they share attributes with. [8]

2.1 Social Matching

Social matching systems try to introduce users to other people around them, that they might find interesting. We wanted to understand what motivated people to use such a system, and what made people interested in being matched with someone.

Motivations for Using Tinder. The motivation behind using Tinder was explored in a study by R. B. Kallis. The results showed that the two major motivations were connections and entertainment. Tinder previously had a reputation of being a hook-up application but has since then evolved into being a platform, that people use for various reasons besides dating. The study shows that multiple of the participants used Tinder to meet new friends. Entertainment was one of the major motivations because some participants also implicated that they used Tinder as a game. This can create new issues of dehumanizing behaviour. When a person is viewed as a

profile, the people who are swiping and interacting with others may feel no need to consider others' feelings. [7]

Context-Aware Social Matching. In a study done by a team from the New Jersey Institute of Technology, they explored context-aware social matching through multiple rounds of interviews. From their interviews, one of the most mentioned reasons for connecting with someone was having something in common with the other person. When looking further into what made people interesting for the participants, one of them was activity partnering. It was shown that people were often interested in meeting other people they could do activity with or people that share the same interest as them. Currently, the way they tried to find others, was by going to the specific place where an activity was done, such as going to the tennis court to find a tennis partner. In many cases, this was a problematic and unsuccessful method because they did not know who nearby potentially could be interested. Furthermore, it was also shown that the sociability of others nearby influences whether people are interested in meeting others, and it was proposed that a way to show others that you were open to meeting new people could be through directly stating it on the interface. Another finding was that multiple people mentioned that they were less inclined to meet new people if it was in an unsafe environment. For example, meeting new people that have an affiliation to a certain place, like students on campus or being members of a gym, influenced the participants feeling of safety and made them more inclined to meet new people. [11]

2.2 Offline versus Online friendships

Prior research has been conducted studying the quality of friendships that are started online and offline. Most research has been studying the quality of pure offline and online friendships where research showed the quality of offline friendships are higher, even though, both friendships would increase over time. [3][13] Antheunis' research also covered mixed-mode friendships, where the friendship starts online but is extended to an offline setting. In the research, they measured the quality of a friendship while also checking these 3 factors: Proximity, similarity and social attraction. Social attraction means how comfortable and pleasant is it to be around a person. [10]

The results of Antheunis' research showed that while online versus offline friendships do have a strong difference in quality, offline being better, the mixed-mode friendship and offline friendships were similar in their quality. Therefore, it can be concluded that whether friendships originated offline or online, the important aspect is to migrate to offline commodities such as face-to-face communication for the friendship to become of higher quality. [10]

2.3 Existing Systems

Bifrost can be seen as a mix between some of the more traditional dating applications such as Bumble or Tinder, together with platforms for meeting new people such as Boblberg. When creating Bifrost, we were inspired by some of these existing technologies which we will mention in this section.

Boblberg. Boblberg is a community platform founded in 2011 and is designed for people to create "bubbles" based on interests

or other attributes. It is a danish founded application, with over 445.200 users in Denmark. The idea behind the application is that users can create bubbles, where other people can join these bubbles. It is used for people who want to expand their network if they do not have any friends that for example share specific interests or people who just moved to a new city and wants to create new relations. They brand themselves with a focus on mental illnesses and loneliness, where one can create bubbles to find other people experiencing the same troubles. [1] Compared to Bifrost, Boblberg is more centered around the individuals, where individuals create a post (bubble) with information about themselves and what they are seeking in other people. We aim to create a focus around events instead.

Tinder. Tinder is a dating application based on a swiping system where active users are presented to other users based on their chosen selected configurations, such as age and location. The active user can then swipe to either say they *like* them, *do not like* them or *super like* them expressing more liking for the users and get prioritised on the super like's stack. This gives the active user the possibility to look through the other users quickly or use more time on some users they might find interesting before swiping *like*. [15] In comparison to Bifrost, Tinder is mostly used as a dating application. We want to explore how the swiping-mechanism from Tinder could be used with a focus on events instead.

Bumble. Bumble, like Tinder, is a popular dating application using the swiping technique to swipe on users. However, Bumble also has two other aspects, BFF and Bizz. Bizz is for people who want to expand their network business-wise, where you can match with people who either have an interesting experience or is offering jobs. Bumble BFF is for people who want new friends and to expand their network social wise. All the aspects of Bumble work the same way, as users match with others whom they swiped *like* on and if both swiped right, they can communicate through a chat and eventually meet up. [2] As mentioned before, Bumble and Tinder are very alike, whereas Bifrost would be centered around events and not around the person to person matching as seen in these types of applications.

Meetup. Meetup is about creating communities of people that share the same interests. Within these communities users can create local in-person or online events, however, events can also be made without being a part of any community. In Meetup, it is free to browse and participate in certain events, but not when hosting a community group. [12] The closest we come to a similar system is Meetup if we compare it to Bifrost, as both have the focus on events. However, the user experience would be different from Meetup as we would aim to present the events in a more simple and more casual manner through swiping.

3 OUR APPLICATION

Our application is an event-based social network (ESBN), which is a system that merges online and offline interactions. This type of system includes online interactions as known in other regular social networks, but it also includes offline interactions formed through offline activities. This type of web service helps the user with creating social activities and keeping track of the participants.

To make it possible to communicate between users, this type of network also provides an online social networking platform, so the users can connect with each other. [9]

As mentioned in subsection 2.3, we want to combine these types of systems into our application, like Tinder and Bumble functionalities but with Boblberg and Meetup purposes. This means that we wanted to create a faster and more spontaneous method of swiping on different types of events/activities. We use the swiping concept as seen in dating applications such as Tinder and Bumble. But instead of swiping on people, you are swiping on events created by people. Our application, therefore, has the purpose of expanding your network and meeting new people through events that are created by other people. We want to challenge people to get out of their comfort zone to either meet people they would not have met otherwise or to participate in an event they have not thought about before. We want to focus on proximity and similarity when designing the application as mentioned in section 2, which shows to be important when making new friends. Also, the purpose of our application is to move quickly from an online relationship to an offline one, so we get people out and meeting in real life, as studies show offline friendships are of higher quality.

This is a continuation of an earlier project, where we had created a prototype based on feedback we got from a survey conducted by 280 people. The prototype was tested by 8 people and can be seen in Appendix F. In this paper, we have made an application based on the prototype which contains some changes. [6]

In the prototype, we tried several different designs, based on the ideas we got from our survey, to check what our participants found most motivating for joining events. The two main methods we tested were predefined vs user-defined events. For the predefined events, we made an explore page where the user would be able to find events that have been published by a third party, which for Aalborg could be *Mig og Aalborg*. For the user-defined events, we could keep a track of information about the events and present these to the possible attendees. This could include the number of participants and a chat reserved for that specific event. In order to function as a system, we discussed what would be required before we had a functional application, creating the minimum viable product that includes a profile, the swiping page, a page for creating a new event and a chat function.

Because of this, the explore page has not been prioritised since it was created for people who wanted to do events with their own friends and since the focus is not on doing events with friends but rather to go out and meet new people, we thought it would not be as important as some of the other functionalities. However, this decision made it possible for us to add the create an event in the bar, which solves the create event button placement we had. We also wanted to incorporate a calendar which would give a better overview if you were participating/creating a lot of events since only having the list view can be tedious when filled with a lot of events.

We choose to name our application after the burning rainbow bridge Bifrost from Norse mythology. In Norse mythology, Bifrost is the bridge that connects Midgaard, the land of humans, with Asgaard, the land of gods [16]. In the same way, we wanted to create an application that would build bridges between people and connect people from across different places.

The application that we ended up developing included five main pages: *Swiping*, *Profile*, *Create new event*, *Chat* and *Calendar*. All pages can be seen in Appendix D.

Swiping. The swiping page is the main page of the application. Here you will see the created events in the shape of event cards. The event cards have two sides, a front and a back as shown in Figure 1 and Figure 2, respectively. On the front side, you can see the creator, the location and how many spots are taken/left on the event. When you tap the card, you will see the backside of the card. Here is some additional information, such as the preferred audience and if you need to bring something for the event (equipment). Here you can also see which tags are added to the event, so you can see what type of event it is. On the swiping page there are two buttons, thumbs up and thumbs down. If you choose the thumbs up button you will be added to an event, and if you choose the thumbs down button the event will be removed from your stack of events. A user can also swipe left and right, where left means no and right means yes.

Profile. In the profile page a user can add a brief description of themselves and also choose some interest to be shown from the tags we have made. Furthermore, the user's name and age will be shown.

Create new event. When creating a new event, the user has to add a photo for the event, give the event a title, description, date, time, location, amount of spots and the preferred age group. Furthermore, there are three optional parts, which are the preferred audience, equipment and event tags.

Chat. When a user is added to the list of participants of an event by swiping right or giving a thumbs up, they will automatically also be included in the chat of the specific event. In this chat, the participants can communicate with each other and agree on further details.

Calendar. On the calendar page you can see an overview of your own events and the events you are attending created by other users.

3.1 Technologies

For the application, we needed to develop a front-end where the user can interact with the system. We wanted this to be a smartphone application so that users could use the system on the go. There are several options on which technologies to use for this part of the build, but we wanted to be able to publish on the two biggest marked places (*Google Play & App Store*). It would be time-consuming to develop native to both IOS and Android and therefore we needed a framework to help us develop cross-platform. After discussing whether to use React Native or Flutter, we ended up choosing Flutter due to more experience.

For the back-end we had a lot of options and did not have any preferences, therefore, we choose to make a nodeJS API. This was fast to set up and did not require a lot of configurations. The API has access to an MYSQL database where we store all the user data. For the chat functionality, we found it easier to store this at Firebase, which offers server-less functions. With Firebase we had a simple way of monitoring new chat messages and sending push notifications to users subscribed to the different events.
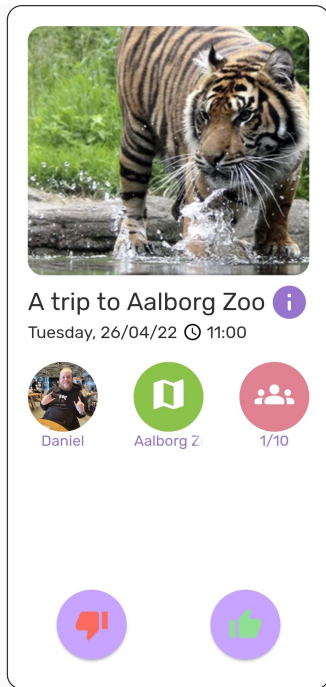
Figure 1: The front of an event card as shown on the swiping page.

Figure 2: The back of an event card with additional information.

We decided not to publish the application to the App Store, since it was time-consuming and we deemed it not necessary for the diary study test since we were able to find Android users.

4 INITIAL TEST

The initial usability test was conducted to discover which part of our system we needed to improve before we could deploy it to Google Play Store. The test was conducted using five participants, all from the Department of Computer Science at Aalborg University. In preparation for the test, we have created a backstory for the participant along with some tasks. The backstory is based on the participant being new to Aalborg city and wanting to socialise and find new acquaintances. With the backstory in mind, the participants were asked to navigate through the application and solve tasks such as joining an event, creating events, contacting other participants, etc. While doing these tasks the participants were asked to talk aloud about what they saw and their thoughts on the application. When the participants had completed their tasks they were asked questions to clarify how we could improve on the experience with the system. Doing the test two of the authors took notes while the last was conducting the test. Simultaneously the phone on which the test was conducted was recording the screen and audio from the surroundings. This was done for the possibility to re-watch parts of the test in parts where the notes were not sufficient. After the test 28 different complications were identified among these comments and critiques. Some of these complications were then improved on, while others were not. The complications that were not improved on were left aside due to less importance.
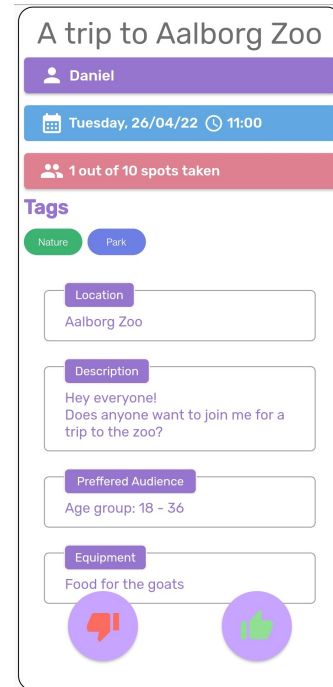
The way we determined whether or not something was important, was by looking at what we needed for having the minimum viable product for the study. For instance, having a third option where you can be interested in an event instead of only liking and disliking is not something we deemed as being necessary for testing the concept. Furthermore, we also looked at how many of the test participants had the same opinion, for example, if one participant found something unclear but all of the others did not, we did not see this as a great issue. Lastly, we also looked at the size of the task, and if a task was easy to implement.

The complications and description of the work done are described in Appendix A.

5 DIARY STUDY

We wanted to conduct a test to see whether or not the application would fulfil its purpose, meaning the users would be more social and expand their social networks. Therefore, a test period with a duration of 2 weeks was conducted from April 22nd to May 6th. To understand the user behaviour and experiences with our application we conducted a diary study with two participants. Both of our participants were 1st-year students at the university and are relatively new in town. In Table 1 an overview is made showing the information of our participants. Furthermore, P1 is self-identifying as a male and P2 is self-identifying as a female.

Our participants log their usage of the application every day for two weeks. They logged their activity by filling out a small survey we created through Google Forms. The survey included four sections: a section for formalities, a section if the application

Participants	Occupation	Age
P1	Software student (2. sem)	21
P2	Data Science student (2. sem)	19

Table 1: A list of relevant information about the participants.

was used, a section if the application was not used, and lastly a section for if our test participants had participated in an event. The questions that were asked can be seen in Appendix B.

6 DIARY STUDY RESULTS

Use of application	Occurrences
Yes	17
No	11

Table 2: Whether or not the participants used the application of said day.

We asked the participants whether or not they used the application each day. As seen in Table 2, they did not use the application every day, and the biggest reasoning for this was that the participants did not have the time to use the application (85%) or did not think about using it (15%). To further investigate what could have made them use the application, the participants mentioned that getting notifications would have helped get them to use the application, but also if they knew they had an event to participate in, they would have been more likely to check the application.

Another issue was the lack of events since there were no events to check out. The participants mention they would have used the application more if there were more events to check out. P1 also mentions: *"If there had been more events on previous days, or if I had already found an event to participate in."* This could indicate the application had a lack of new events since we had a very limited event pool. The swiping page with the different events was the most fundamental feature that the participants would check out, as seen in Figure 3 where it shows the reason why they used the application was to see if there was anything new was showing up.

Both participants also wanted more notifications, so it would remind them of the application, for example they wanted to get a reminder of the events they had liked, or if new events got created, so they could check them out.

6.1 User Behaviour

To further investigate the usage of the application, we looked into the data gathered from the application. As seen in Table 3, the test participants created one event each, however, they were asked to create one event but did not create any further events themselves. Both participants did participate in multiple events, not including their own.

In Table 4, an overview of the activity in our application is shown. Multiple events have been created, also without our support (5) and the test participants (2). There were 12 active users, which means 7 other users other than the test participants and the authors had downloaded the application and made a profile. To gain users,
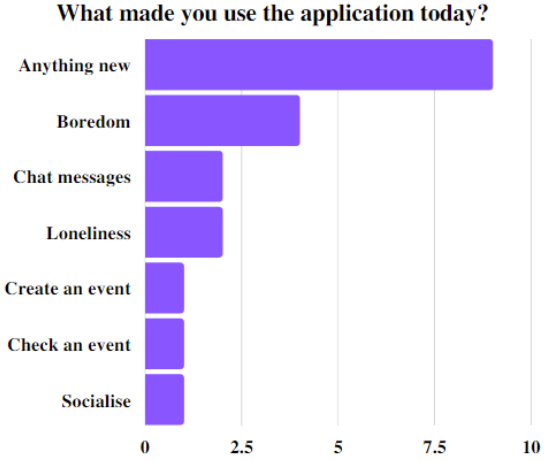

Figure 3: Figure showing what made the participants use the application.

Participants	Events Created	Events Attended
P1	1	2
P2	1	3

Table 3: How many events the participants created/attended in the test period.

we got a digital poster up on campus with a QR code attached for people to download, which can be seen in Appendix E. We also sent an email to prior survey participants who said they wanted to help us with testing the application [6].

Downloads	13
Active Users	12 (3)
Events Created	13 (5)
Chat Messages	64

Table 4: Overall activity by all users including ourselves. The numbers in parentheses are the authors and their created events.

7 TEST PERIOD RESULTS

In Table 5 an overview is shown of events created in the test period. We tried to create some events during this test period to help the application kick start and also for the test participants to have something to look at and swipe through. Looking at the overview 12 events were created where some of the events were not held since no one joined the event. We also experienced some problems with users joining events but not responding in the chat which resulted in them not showing up. Also, some of these events were university oriented like *"Foobar"*, *"ADSL Boardgame Night"* and *"Seminar on Machine Learning"*, which makes sense since most advertising was done out on campus, but would limit who could join the event. Another observation is the tag *"Games"* is a very popular tag with

Created Event	Date	Participants	Tags	Preferred Audience
Poker Dice	25.04.22	0	Games, Comedy, Culture, Nature	Big titty goth girlz + Age group: 18-32
ADSL Boardgame Night	26.04.22	1	Games, Culture, Creative	Student + Age group: 18-40
Play CS:GO online*	26.04.22	1	Games, Online	Age group: 13-89
Play Phasmophobia online	27.04.22	0	Games, Online	Age group: 15-100
Guldhornene Quiz*	27.04.22	4 (2)	Games, Music, Nightlife, Drinks	Age group: 18-38
Pub in London	29.04.22	0	Nightlife, Food, Travel, Culture, Walking	Jetsetters :sunglasses_emoji: + Age group: 18-30
Foobar (Friday bar)	29.04.22	5 (3)	Nightlife, Drinks	F-Klubben members + Age group: 18-40
Play Pacify online*	01.05.22	0	Games, Online	Age group: 18-30
Climbing in Street Mekka	02.05.22	1	Sport	Age group: 18-30
Play CS:GO online*	02.05.22	2	Games, Online	Gamers + Age group: 13-79
Beerpong Tournament*	05.05.22	5 (2)	Nightlife, Drinks	Age group: 18-40
Play Europa Universalis IV	08.05.22	1	Games, Online	Age group: 0-100
Seminar on Machine Learning	08.05.22	2	Educational	Master students + Age group: 18-50

Table 5: The different events created in the test period. The numbers of participants in parentheses are the authors themselves and the events created by the authors are marked with *. The person that created the event is not counted as a participant.

4 out of 8 events, where 2 of these *"Games"* events are facilitated online.

We had some problems with a small amount of the events, where we had one making an event multiple times, so it showed the same event on 4 different cards, which ended up being a bug that got fixed. Another problem we had was that when users made events, for example, the event *"Poker Dice"*, it was unclear whether or not the event was a real one taking place since some of the descriptions would sound like it was a joke. This could potentially ruin the application if users just make events that do not take place or make them seem like they are fake.

8 POST TEST INTERVIEW

After the test period, a semi-structured interview (N = 3) occurred with the test participants. Besides our two diary study test participants, we also interviewed a third person because of their high activity on the application. This person will be referred to as P3, and the information about the participant can be seen in Table 6.

Participant	P3
Occupation	Software student (4. sem)
Age	24
Events Created	2
Events Attended	4

Table 6: Information about third interviewed person.

The interviewing questions consisted of 5 overall themes: Diary study, Using the application, Attending an event, Creating an event and Future use. For our two diary study participants, we also had some clarifying questions we asked them at the beginning of the interview to understand some of their diary study entries a bit better.

8.1 Using the Application

To understand how the concept of the idea was perceived by our participants, we asked them if they could explain to us in their own words, what the purpose of the application is. It is worth mentioning that both P1 and P3 mentioned Tinder when explaining the Bifrost application. P1 said: *"It is like Tinder, just for events, where you can meet new people and hang out.".* P3 also used Tinder as a reference when explaining the swiping mechanism: *"Bifrost is an application for setting up and joining social events in the Department of Computer Science, but could of course also be expanded for more ... Then you can swipe like on Tinder, where you like or dislike, and if you like, it will be added to your calendar."* P2 mentions the fact that the purpose of the application is also to try new things and also take away the burden of having to come up with activities yourself every time because there were events that you could just attend: *"I see the purpose as meeting new people and trying some things that you would not have thought of yourself. Like, if something was happening in Aalborg that I did not think of myself, where someone else had taken the initiative, then it is easier to just attend an event, than trying to go out and ask your own friends if they want to go out."*

All participants had an overall good experience with the application, and they all also liked the design of the application. To get a deeper understanding of the experience with the application we asked what the participants thought were the biggest issues and what were the best parts of the application. When asked about the biggest issues both P1 and P3 mentioned bugs in the application. P1 had issues with the notifications and P3 had issues with sending emojis in the chat. P2 on the other hand mentioned the biggest issue as the fact that there were not enough people on the application, and therefore not enough events to choose from.

In regards to the best parts of the application, P1 mentioned that they enjoyed the chat a lot because you could chat with other participants about further details on the event. Both P2 and P3

mentioned the concept of the applications as the best part. P2 said: *"The best part is also that the other people who are using the application are also people who like the concept, meaning they are open to meeting new people and talking with them."*

8.2 Creating Events

As a part of the diary study, we asked our two diary study participants to each create at least one event. They both created one event each in the test period, and we then asked them in the interview if they think they would have created an event if we did not tell them to do it. P1 said that they probably would have, and P2 said that they also think they would have, so they had something to tell us about when doing the entries in the diary study. The third participant that we invited for the interview (P3), created a total of 2 events and also added one more after the test period. The events that P3 created were events that were hosted at the university by some of the student unions (F-Klubben and ADSL).

Concerns*.* We asked the participants if there was anything that held them back in terms of creating events. P2 mentioned that it could be difficult to come up with event ideas and that some of the activities they were doing in their daily life were not suitable for creating events. For example, P2 expressed concern about creating events that required something from the participants like a membership: *"I often workout in DGI Nordkraft, but there you have to be a member, so it is a bit harder to create an event for it because then people need to be members to join."* P1 mentioned that creating online events was a bit strange, because they did not know where to put their contact information for where they should meet up with the people online, so they ended up putting their contact information in the description of the event.

8.3 Attending Events

When asking our participants if they felt like they were socialising more than they would usually do, all of them said yes. Furthermore, they all agreed that they met people they would normally not interact with. When we asked whether or not they would potentially meet up with some of the people they have met from the application again, P1 and P2 said that they had already met up again after the test period. After they had been out climbing together the week before, they had agreed on meeting up the following week to go climbing again.

We also asked what they thought was the best event they had participated in, and both P2 and P3 said that it was when they went to a quiz event at the Guldhornene bar in Aalborg. They enjoyed it the best because it was possible to sit and talk to the other participants, whereas some of the other events had a different focus, such as climbing or playing beer-pong, where it is harder to just sit and talk and get to know each other. P1 liked the gaming event where they played CS:GO the most because it was something they would not have done otherwise.

Concerns*.* We asked the participants if they had any concerns when participating in an event, and both P1 and P2 said they had concerns about being able to find the other participants. P2 said the following: *"When it came to it, it was not really a problem, but when I was on my way to the event I was thinking to myself "Oh no, what*

if I won't be able to find them or what if I am the first person there?"".* P2 also mentioned the following when talking about what helped them find the participants: *"It was nice having the profile pictures of the participants if it was people I had not seen before so that I knew whom to look for. The chat was also great to have because there you could write where specifically you were seated."*

When mentioning concerns, P3 mentioned that they were a bit unsure about what the meeting time on events really was because their own experience in life was that there are often not strict meeting times when going out with people: *"When you are attending an event for young people around 18-30, the meeting time is not always super strict. It is always plus minus an hour. This is not caused by the application, but this has more to do with the nature of humans."*

8.4 Future Use

After seeing how our application was used in the test period, we started wondering whether it was best to keep our application closed for a specific audience. In the test period, multiple events were created that were only for students at the Department of Computer Science at Aalborg University. Therefore, we saw that the application could have the potential for being an application targeted at students for example. We asked the participants whether they thought it would be a good idea to limit the application to university students instead of having it open for all. To this question, P3 replied that they thought it was a good idea because it could quickly be chaotic and messy if everyone could use it. P3 also mentions that they would not want to join events that were with a completely mixed crowd, because they like to know which type of people they are meeting with. P3 continues to say: *If not only specified for the Department of Computer Science, then you should specify for Aalborg University ... It can also be universities in Denmark, where you could add a location restriction. Then, when adding an event, you could add a tag for which city it was in."* P1 and P2 did not want the application to be closed off from too many but gave suggestions on how they could envision it. P1 said: *You could create different groups where you could create events in them. I do not think it would be necessary to close the application completely for other people."*. P2 did also think it was not necessary to close the application for other people: *"If you would want to go for a walk, go to a cafe or go out in the town, it is not necessary to be an event only for university students. But there are some events where it would be best it was limited for university students."*

We furthermore asked the participants what they thought about the overall idea of the application and if they thought it was useful for the future. All three participants were positive about the idea and all thought that it was something that they can see as being useful. P3 said: *"When I started on my third semester after the pandemic, there was a lack of understanding where and when different things were happening ... It would have been nice if this application had existed in my last semester and I would definitely use it in my next semester if it is still working there. I think it is a great concept and it strengthens the social life if you could create a common place for events."*

P2 mentioned that they could also imagine using the application in the future, because of the way you could find people that were

like-minded: *"You know that the other people that join the events are also people who want to talk and are interested in the event."*

All three participants said that they would keep on using the application after the test period if the application would still be active. All participants also said that they think the application would help them expand their network, and P1 said that it already had expanded theirs since P1 after the test period met up again with P2.

The last question we asked the participants was regarding whether or not they would recommend the application to other students. All the participants said that they would recommend the application, and P2 elaborated by saying: *"I feel like there are many people at the university that are moving to the city from a different place, and maybe they would also think it could be nice to attend some events."* P2 continues to perspective on the recurring climbing event they have together with people from P2's study and tells us that it is nice to meet other people than the people you spend the day with at the university.

P3 as before, could especially see the application being used in a university setting. They followed by saying: *"I could easily imagine this application being used together with the study start for new students and for example coordinate with the rest of the Institute for Computer Science, where you could use it as a form of calendar, because sometimes people think it is hard to figure out where things are happening."*

P1 said they already had recommended the application to their fellow students.

9   SUMMARY

To sum up the test period, a total of 13 events were created for users to swipe upon. Some of the events did not have any participants which is one of the problems that can occur with the application. This can also be in relation to the cold start problem, which is mentioned in section 1. Not having a lot of users was also mentioned by one of the participants being the biggest problem, as more users would also mean more events and more activity on the application in general. However, the feedback from the interviewees was positive and they would use the application again and would recommend the application. Another observation was the whole issue with events that could be marked as fake, which would be a huge problem since people would end up participating in an event that does not exist.

Some of the participants were hesitant with creating events if it required something from the user, such as a gym membership mentioned by P2. Also, one of the bigger concerns the participants had was when they were meeting up in person, as they were afraid they would not be able to find the other participants at the location. Another obstacle a participant ran into was the lack of a contact information box for the participants to reach them on, as seen in the Appendix F specifically Figure 17.

We also asked the participants to explain the application in their own words, which would indicate whether or not they understood the purpose of the application. All 3 participants explained the application correctly understanding the purpose and the participants did also feel like they indeed expanded their network and met with people they might not have interacted with otherwise. One of the

participants mentioned the application was for events at the Department of Computer Science, which is not the intention, but since a lot of events were located and only for university students, it would make sense why the participant would believe so. Throughout the test period, we thought about how useful this application would be for university students in general, since a lot of events get missed as they do not get advertised and are not gathered in one place. With this application it would be easy for new students to see what happens out on campus, however, the same functionalities would still be present so students would still be able to create events. We also asked our participants the question about limiting the application for students in the Department of Computer Science, where the participants had mixed opinions about it, but overall they could see the idea of it to some extent being closed off to university students in general.

10   DISCUSSION

Looking at the test period overall and its obstacles and winnings, the overall issue was not having enough events to swipe on as mentioned in section 8. Another obstacle mentioned in section 8.2 was when one of the participants did not create the training event at a specific gym because they thought no one would join. Both of these issues could be solved by having more active users, which is also the goal of the application since we need more users to get more activity on the application. Another problem was how the events could either look like being fake or actually be fake, this obstacle could be solved by having a report button for users to report if there is a suspicion. However, if the event is fake, either the creator of the event would probably not answer in the chat or if multiple people are showing up to a fake event, they might just continue to do the event without the creator.

In regards to the issues the participants had with the lack of a contact information box, we did consider having a contact information box on the users profile which could solve the problem but was not implemented since it was decided the chat functionality or the description box would be enough for writing about contact information in the minimum viable product. So, since this also is our minimal viable product, some of these issues might arise as missing features or bugs, but would then be developed in the future. One of the participants had a hard time understanding whether or not the questions in the diary study were meant as technical or as the experience they had with the application, which made confusion and can be reflected in the answers in the diary study.

10.1   Limitations

Looking at the diary study, the participants are both from the Department of Computer Science. It would have been more optimal to have at least one participant who was from another department or just not from the university, since the IT students may have a preconceived knowledge of some of the functionality in our application. On the other hand, our users on the application are also primary IT students within the Department of Computer Science, which also makes sense, since most of the marketing was done on campus where IT students are located. It would have been more optimal to have more diverse users to see whether or not people with zero knowledge of or any connection with each other would

use the application. The limitation of only IT students might have been less scary for the users to meet up with since they probably have seen them on campus or might think it was safer to meet up with a student from their study.

Another limitation that has been made, was the choice of only publishing on the Google Play Store as mentioned in subsection 3.1, as only people with an Android phone could download the application. If we had published Bifrost on the iOS store, App Store, we could have gained more active users.

While the test was going on we had to do some updates to the system both for the back-end and for the application itself. Most of the updates were to the application and we, therefore, had to upload a new version to Play Store and wait for Google to accept the new update. This might have had an effect on the users' experience with the application.

10.2 Future Work

In this section, we will discuss what could happen to the application moving forward.

Functionalities. One functionality that has been mentioned multiple times by different participants from our initial tests has been to create a third option besides liking or disliking an event. This could be a third button where you could set yourself as being interested in an event, and in that way save the event for later, when you know whether you want to attend or not.

Another functionality that could be implemented should be a form of recommender system. Since we already implemented the different tags, it could be great if the application would recommend the user different events based on their chosen interests. This recommender system could also be further developed to recommend events that are similar to the ones the user already has shown interest in. By using a recommender system we could filter the events so the ones that are most suited to the user were on the top of the stack when swiping. Together with this, this application could also use the user's location for recommending them events that were close to them. Furthermore, there should be implemented some filtering for locations so a user could choose a location, such as a specific city, and see all the events in that location.

There would also be a need for a way to deal with people misbehaving in the application. There should be a way for other users to either block or report other users, so we can make the experience with our application good for all. This arises different issues, because what do you do if someone is misbehaving at an event? It can be difficult to find a solution for this that can not be taken advantage of, since people could also just report someone if they did not like them, without them having done anything bad.

Availability. As mentioned in subsection 3.1, we did not publish the application on App Store for iOS users. However, in Denmark, recent numbers have shown that iOS is dominating the market with a share of 55% [14]. Therefore, it would be obvious to start with publishing the application for iOS users.

Additionally, it also needs to be decided whether the application should be available for everyone or be closed off for some. If it is opened up for the general public, some kinds of groups need to be

implemented to avoid the application from becoming unmanageable. If this application should be limited to a specific audience, such as students, then there is a need for some type of authentication, so it is guaranteed that only students can access it.

University Use Case. During our test period, we saw great potential for this application to be used at the university. In this application you could meet people from your study and the student unions could post their events on the application so it would give the students a better overview of what is happening on campus. We also saw this as a great opportunity for the study start, where new students are coming to town and could need some help with expanding their network and meeting new people. Therefore, we have been in a dialogue with the head of the study start planning at the Department of Computer Science, and we have discussed the possibility of using this application for the next students starting in the fall of 2022. To verify that the users are university students, it would be possible to have the users sign up using their university mail and then verify through their mail that they want to utilise the application. This way we can expand which email domain we want to allow if we want to expand our scope later. This authentication might also help with fake events because it could be embarrassing for some to put their own name on an event that is fake.

11 CONCLUSION

In this project we have developed an application called Bifrost, to help people meet new people and expand their network. We have in an earlier project created a prototype which was then tweaked and developed into an application. This application has then been tested upon its design (N = 5) where small bugs and complications were fixed. To test the purpose of the application, we had a test period of 2 weeks where people could download the application to check it out and might find some events interesting to participate in. During the test period, we had a diary study with 2 participants logging their activity on the application, to get a further look into what problems might have occurred. Lastly, interviews were conducted with our diary study participants and the most active user of the application. The results of the test period showed that an EBSN as Bifrost was received well by the users. The goal of the application was for the users to expand their network, and since our two diary study participants continued meeting after the test period we deem this goal as successfully achieved. Previous research showed that people were more inclined to meet new people if they knew that the others were also open to socialising with new people. This was also confirmed in our study since the participants liked using Bifrost as a platform for meeting new people specifically because users who are using the application have the intention and open-mindedness for expanding their network.

To summarise, we see the following as our contributions:

- Exploring the swiping concept for events instead of people.
- Presenting obstacles and benefits of using a swiping-based EBSN application.
- Contributing to the research of EBSNs with a field study on how a swiping-based EBSN functions in real life.

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A INITIAL USABILITY TEST

ID	Complication	Implemented
C1	Emojis in description	No
C2	Do mot show event if all spots are taken	Yes
C3	Reset stack under swiping page	Yes
C4	Change icon from mail to speaking bobble	Yes
C5	Change icon when adding an image	Yes
C6	Add time to event	Yes
C7	Change icon when updating user information	No
C8	Add default image when creating an event	Yes
C9	Add a attribute to event where the creator can add requirements	Yes
C10	Change moon icon for night events	No
C11	Preferred audience box could be more clear	No
C12	Add an asterisk to all required fields on create event page	Yes
C13	Specify the hobbies under profile and event	Yes
C14	Send private messages to other users	No
C15	Show last sent message from chat in the overview	No
C16	Add timestamp to messages	Yes
C17	Have a third option, where you can be interested in a event, and have a overview of all the events you are interested in	No
C18	Insert all events in the calendar	No
C19	A function for colorblind people because we have many colors in our application	No
C20	The *Attraction* tag can be misunderstood as something meant for dating and could be changed	Yes
C21	The *Clubbing* and *Drinks* tags can be seen as the same tag and could be merged into one	Yes
C22	The icon used for attendants can be confusing and could be changed	No
C23	Get more information when you click on a event under list-view of the calendar	Yes
C24	Filter events by a specific date	No
C25	The placement of hobby tags are different on the card and when you view an event	No
C26	The thumbs up and down buttons could be bigger	Yes
C27	Auto completion of location when you add an event	No
C28	The location could pop-up on a map when adding a location on a new event	No

Table 7: Table of the different complications or ideas and whether it was something we implemented or not.

A.1 Changes Made After First Usability Test

C3. In the first version of the application the *Reset stack* option was placed under the users profile. This placement was not ideal for the users and we therefore placed it on the swiping page. The option will be shown when all event cards has been swiped.

C4. As shown in Figure 4 we used the mail icon as the indicator for the chat on the navigation-bar. This icon was not intuitive for our users and they did not associate it with a chat. We therefore asked which icon they would have preferred, and multiple of the uses mentioned a speech bubble icon. We therefore changed the icon as seen in Figure 5.
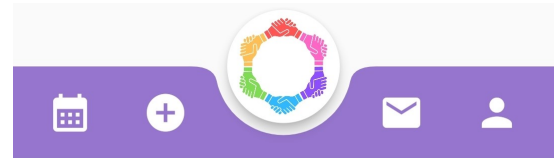

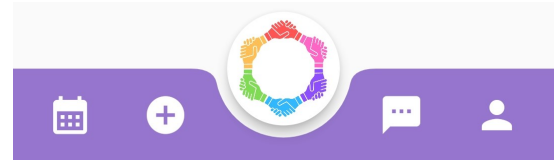
Figure 4: The initial navigation-bar.

Figure 5: The new navigation-bar with new chat icon.

C5 + C8. When creating an event, many of our participants did not initially see that you could add a photo to the event in the top of the page, as seen in Figure 6. We asked them how to make it clearer, and adding a photo icon was mentioned. Furthermore, we changed the default photo from being the Bifrost logo to a default landscape photo, as seen in Figure 7.

C9. Some of our participants mentioned that an extra field for requirements for the event could be added. We called this field *Equipment*, so if an event requires you to bring something specific it can be mentioned in this field.

C12. To make it more clearer which fields were required to fill out for creating an event, we added asterisk symbols as seen in Figure 7.

C21 + C22. There were some misunderstandings in the event tags. Firstly, we changed *Attraction* to *Park*, because some of our participants associated the word *Attraction* as something meant for dating, like a human attraction. The real meaning behind the word *Attraction* was as a tag that could be used for attractions such as amusement parks and zoo gardens. We therefore changed the word to *Park*, because we meant that this word would also encapsulate these. Another change made to the tags were a change in the tag *Clubbing*. This was changed to *Nightlife*, because some of our participants did not know what *Clubbing* meant. The final event tags can be seen in Figure 8.

C23. A feature for accessing an event from the list-view in the calendar was implemented.

C26. The size of the thumb up and thumb down icons on the swiping page were made bigger because of a request from the participant.
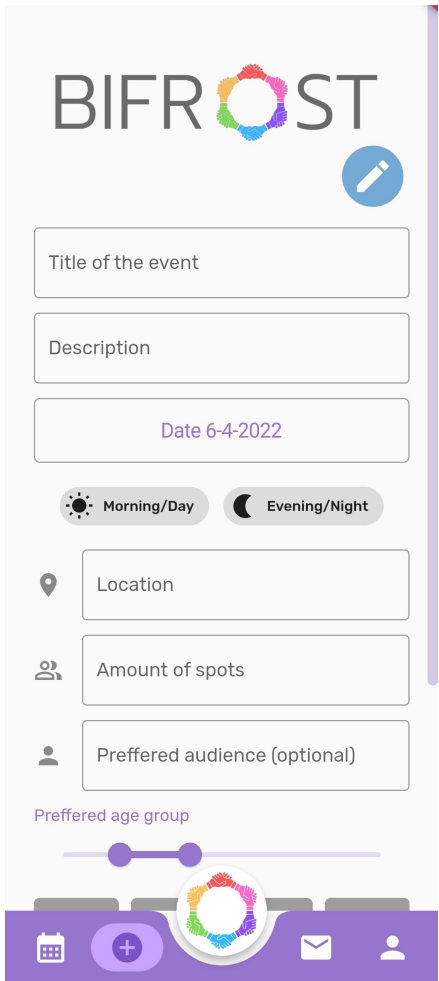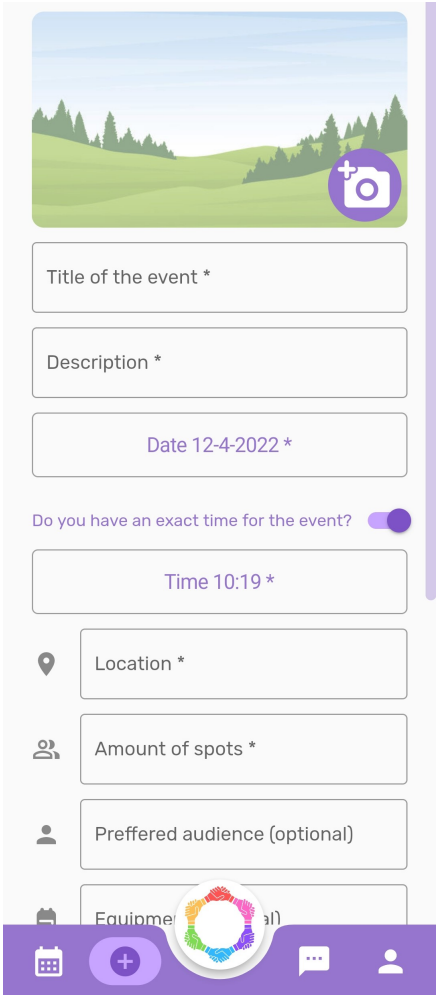

Figure 7: Create event page after changes.
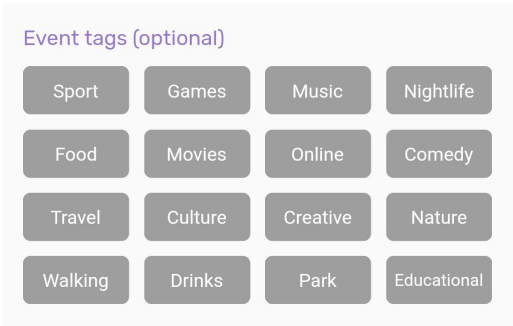

Figure 6: Initial create event page.

Figure 8: Event tags after changes.

B   DIARY STUDY QUESTIONS

Formalities. In the beginning of the survey we asked the following questions to identify which our participants had answered the survey and which day they were referring to:

- What is your name?
- What date is it?
- Have you used the application today?

Application not used. If they answered no to the question regarding if they used the application today, they would be redirected to this section.

- Why did you not use the application?
  - I did not have time
  - I forgot about the app
  - I was not in the mood
- What would have made you use the application today?

Application used. If they answered yes to the question regarding if they used the application today, they would be redirected to this section.

- What got you to use the application today?
  - I was bored
  - I felt like I had to
  - I felt lonely
  - To see if there was anything new
  - I wanted to go out
- How was the overall experience using the application?
- Have you encountered any problems using the application?
- What have you used the application for?
  - Creating event
  - Joining event
  - Chatting with other participants
  - Browsing events
  - Checking the calendar
  - Other
- Have you participated in an event?

Participated in event. If they answered yes to the question regarding if they participated in an event, they would be asked the following questions:

- Did you know any of the participants prior to the event?
  - Yes I knew someone
  - Yes I knew everybody
  - No
- Did something surprise you during the event?
- Did you encounter any issues during the event?
- Did you have any concerns before meeting up with the participants?
- Any further comments on the event?

C INTERVIEW QUESTIONS

In this section we will present the questions we asked our two diary study test participants and the active user from the application. The first part subsection C.1 was only asked our two diary study participants, otherwise all questions were asked for all three.

C.1 Diary Study

- Was there any information about your experience that we did not ask about in the diary study?
- Would you have made an event if you were not asked to?

C.2 Using the Application

- Can you explain to us what the application is about/is used for?
- How was the overall experience with the application?
- Are there any features that you were missing when using the application?
- What are some of the best parts of the application?
- What were the biggest issues you have encountered?
- What did you think about the design of the application?

C.3 Creating Events

- How many events did you create?
- Did anything hold you back to create events? Why or why not?
- Did you have any precautions when making an event?
- Did you think you could give all the necessary information to the other participants in the event you created?

C.4 Attending Events

- Do you feel like you were socialising more than normal?
- Did you meet people you would normally not interact with?
- Do you feel like you could potentially meet up again with the people that you met in the events you attended?
- Did you have any concerns when you participated in an event?
- What was the best event you attended?

C.5 Future Use

- Do you think it would be best to limit the application to only university students or have it open for everyone?
- How do you feel about the overall idea of the application? Is it something you think could be useful?
- Would you continue using the application after this test period?
- Do you think the application could contribute to expanding your network with new people?
- Would you recommend using Bifrost to other students?
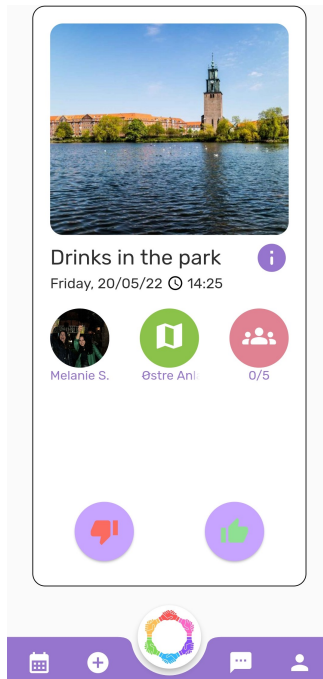
D FINAL APPLICATION

Figure 9: Design of the calendar page in our application
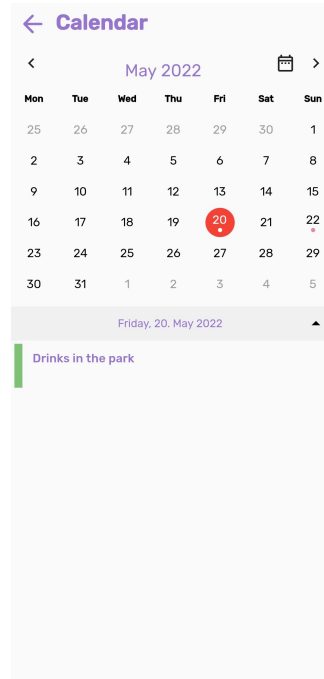

Figure 10: Design of the calendar page in our application
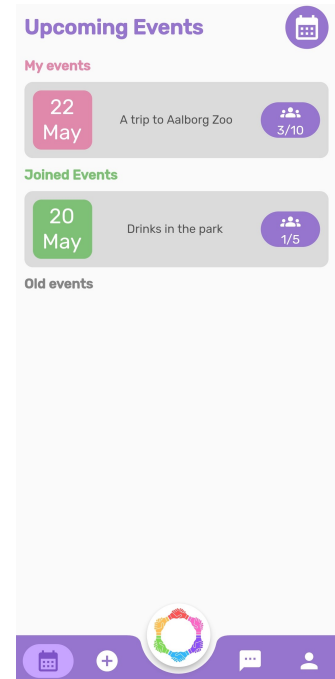

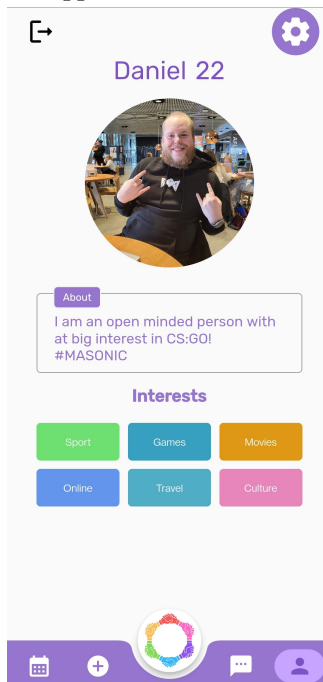Figure 11: Design of the calendar page (list-view) from our prototype
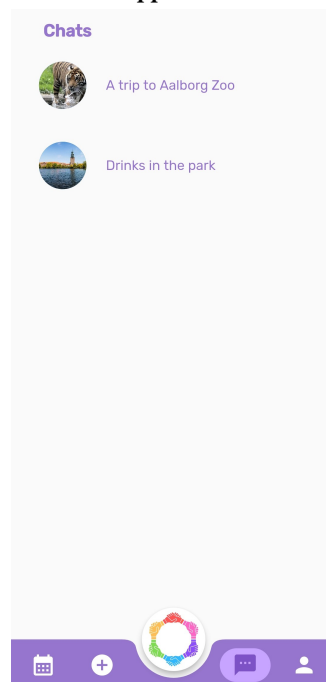

Figure 12: Design of calendar from our prototype

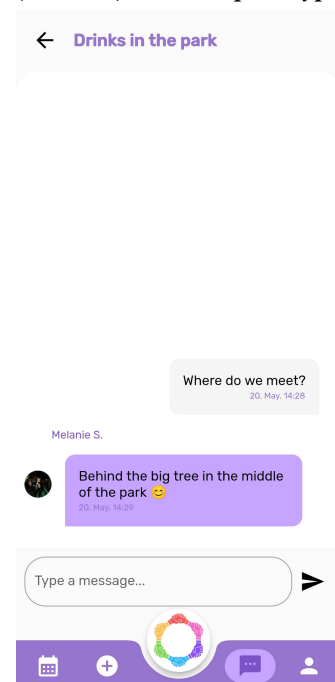Figure 13: Design of create an event page from our prototype

Figure 14: Continuation of the create event

E   COMMERCIAL

The text in Figure 15 translated to English:
"Bifrost is a social event app, where you can meet new people through your same interests. Create your own event or swipe through events and see whether or not there is something for you!

Are you missing participants to a LAN-party, a badminton partner or should the grill party be expanded? Bifrost helps you to expand your network, meet new people with same interests or just try something totally new.

Bifrost is developed by Cecilie, Mikkel and Melanie, 10. semester Software."

Figure 15: Screen advertisement for the university.

F   PROTOTYPE

Shown in Figure 16, Figure 17, Figure 18, Figure 19, Figure 20 and Figure 21 is the previous prototype made in an earlier project.[6]
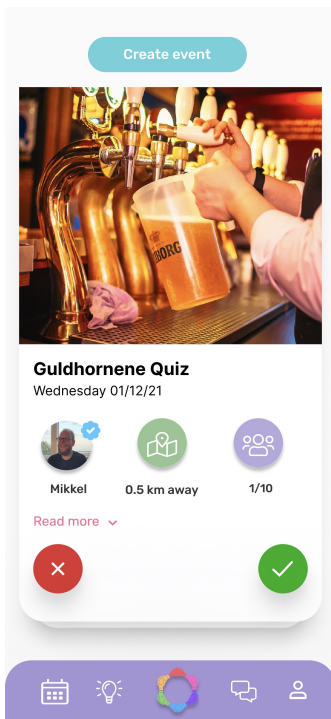
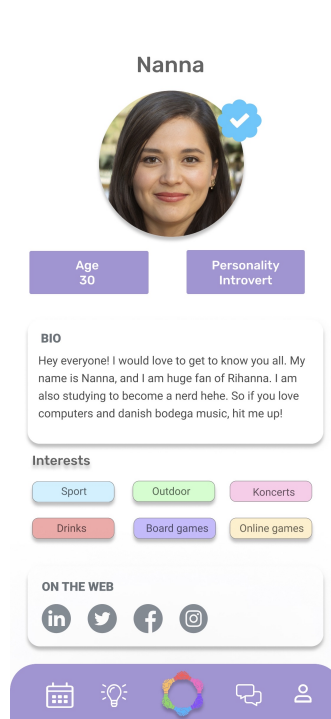**Figure 16: Design of swiping page from our prototype**

Figure 17: Design of a user profile from our prototype

Figure 18: Design of calendar from our prototype
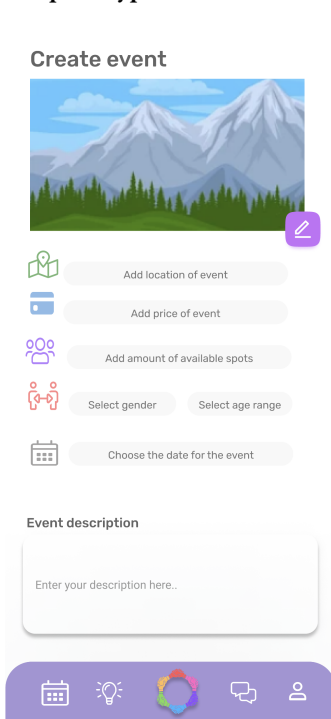

Figure 19: Design of create an event page from our prototype
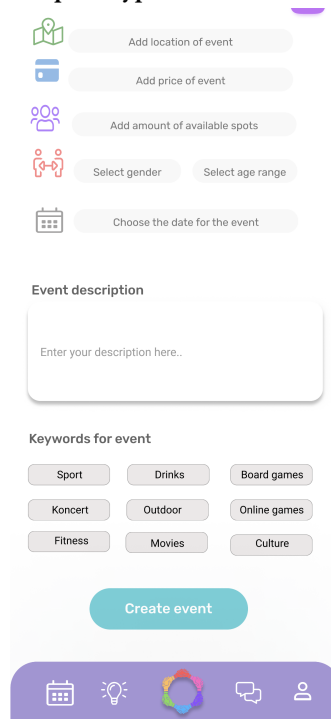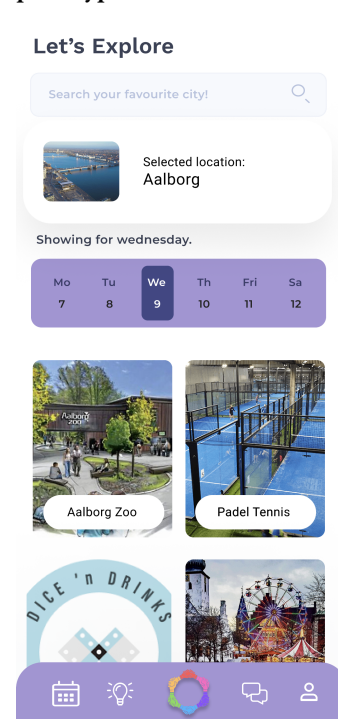

Figure 20: Continuation of the create event

Figure 21: Design of an explore page from our prototype