



Norwegian University of  
Science and Technology

# Conductor Hero - Process Report

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## Summary of Project

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Abstract: Experts in Teamwork is a course where students from different disciplines are put together in a team to work on a project throughout the semester. For the course, our group worked on a VR game called Conductor Hero where the player takes the role of a Conductor in a fantasy environment. This document gives an overview of our experiences, thoughts, situations, and feelings.

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# 1 Introduction

The course Experts in Teamwork (EiT) is designed to give students experience with cross disciplinary projects to enhance their communication and collaborative abilities, preparing them for the challenges they will meet in their future work environments [1].

We took part in the village “Virtual and Augmented Reality for Games, Health and Education” which focuses on the exciting new possibilities of virtual and augmented reality. As this is a young field we were given the opportunity to experiment with different ideas, with the potential of shaping the future of virtual reality (VR) and augmented reality (AR).

Our project, Conductor Hero, is a VR rhythm game that introduces the player to the world of ensemble conducting. The project was an exciting first hand-experience of the challenges faced in virtual reality, and also presented us with the requirements of working in a cross disciplinary team. This document will give the reader an overview over the situations, reflections and experiences we encountered throughout the semester.

## 1.1 Group formation

### 1.1.1 Animal Model

The 6-animal model, developed by Simon McCallum [2], focuses on the different roles of group members. The model uses six animal avatars (bear, wolf, cat, puppy, owl, and rabbit) to represent the different roles, creating a cognitive distance between the role and the individual, helping with group organisation and communication. The bear is the group leader, while the wolf is the manager ensuring that everyone in the group is participating. The cat takes on the role of the critic, looking for flaws in proposed ideas, with the puppy being the complete opposite, enthusiastic and supporting of every idea. The owl has the role of the processor and ensures that objectives are met, and finally the rabbit acts as a facilitator, volunteering to get coffee or other resources needed by the group. In this model every animal is considered equally important for group success.

During the first village day each student was encouraged to identify themselves with one of the 6 animals. The people who identified as bears were told to stand up, and the others were told to form groups with the different bears. These groups should ideally have a good mix of the different animals. Through this exercise we ended up with our group, consisting of Per-Morten (bear), Andreas (owl), Yijie (puppy), Rikhart (cat), Sabina (rabbit), and Ellinor (wolf).

### 1.1.2 Assigning roles

After forming groups based on the 6-animals model, we performed a triangle exercise. An image from the exercise can be seen in Figure 1. Here, each group member was given the chance to inform the others what they could bring to the project, in terms of personality, practical experiences and theoretical knowledge. An overview of the skills can be seen in Table 1.

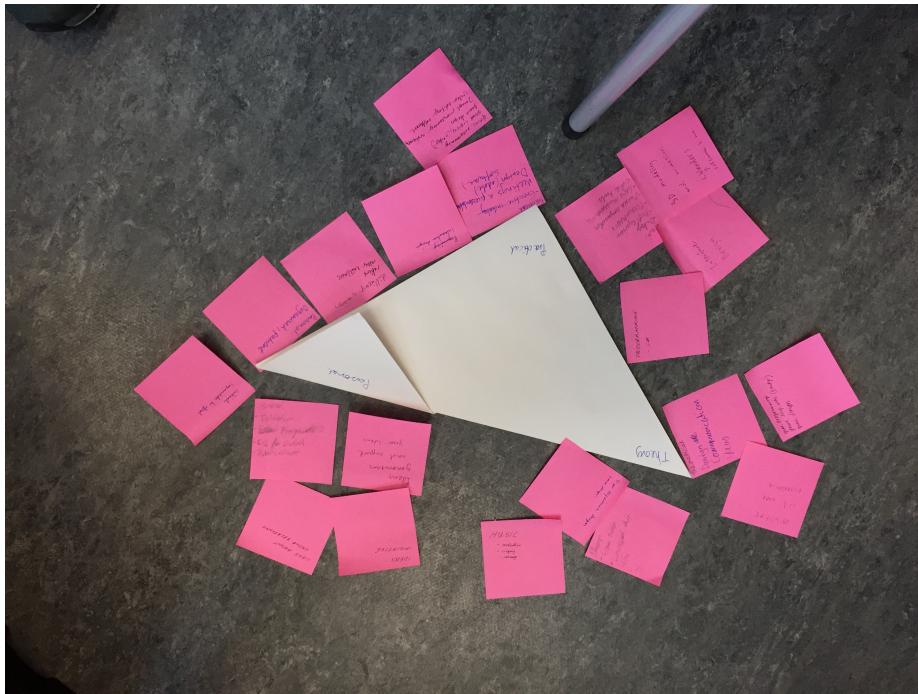


Figure 1: Exercise for surveying skills within the group. Each triangle corner: the type of value. Post its: the values team members contribute to the group. The exercise depicted formed the basis for the table below.

Member	Skill	Background
Rikhart	Design, Programming, Critical thinking	Web Development, Interaction Design
Sabina	Design, Programming, Music	Web application development, Interaction Design
Per-Morten	Programming, Music Composing	Game Programming, International Marketing
Andreas	Programming, Experience with the Unity Engine, Music	Game Programming
Yijie	Design, 3D modelling, animation	Digital Media, Interaction Design
Ellinor	Design, Graphics design, Music	Graphic Design, Art direction, Interaction Design

Table 1: Table of the groups' skillset.

After performing the exercise, we had a better awareness of each others personalities and skills, and established more specific roles for our group. Ellinor took the role of project lead, as she was interested in exploring her leadership potential, and Per-Morten was happy to pass on the role. Yijie had experience with 3D modeling and animation and therefore took the role of art director. Per-Morten, who had a strong leadership skill and an interest in software architecture took the role of technical lead. Andreas took the role of Unity expert as he had the most experience with the Unity game engine. He was also given the responsibility of taking notes to record the process and progress of the group. As Sabina and Rikhart had backgrounds in both development and design it was decided

that they should work as bridges between the designers and programmers. Additionally, Rikhart was delegated the role of UI expert, based on his previous experience within the field. Sabina volunteered to take the role of public relationship manager, as we intended to contact several external professionals.

## 1.2 Group Members

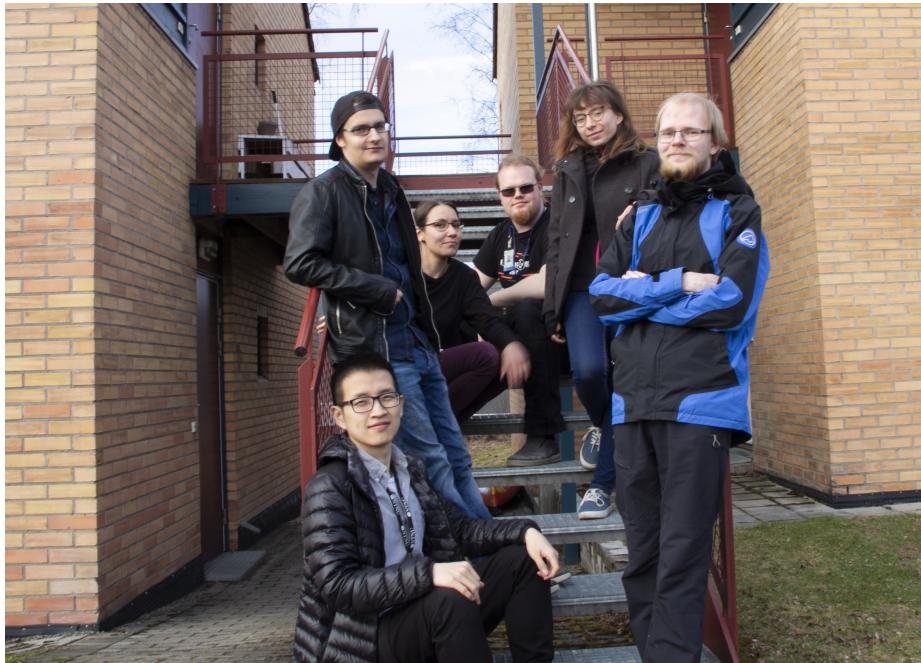


Figure 2: Our group, 24 eyes

Below follows a more in-depth overview of the group members (shown in Figure 2), and our thoughts going into the project.

### 1.2.1 Rikhart Vigdal Bekkevold

**Nationality:** Norwegian

**Study:** Master in Interaction Design

**Background:** Web Development, Interaction Design

**Role:** Cross-discipline communication, UI expert

Entering this project I already knew that I was a very critical person. I have always seen this as a benefit when it comes to seeing the holes in ideas and in identifying problems. I have also experienced that it can be a less positive thing if it is dominating, hindering progress and creating conflicts in groups I have partaken in. Knowing this in advance, it was something I tried to work on, and to make sure it didn't become too dominating in our groupwork. Before this course I had been in many different groups, ranging in success from bad to decent, but never good. Because of this, group work had always been a chore to me.

### 1.2.2 Sabina Niewiadomska

**Nationality:** Polish

**Study:** Master in Applied Computer Science

**Background:** Web application development, Interaction Design

**Role:** Cross-discipline communication, Public relations

I joined the EiT course with both experiences from students projects and work. In students projects, it often happened that I become a leader, students with which I was cooperating were describing me as "person bringing initiative" or "good coordinator". In the real work environment, I've never had a chance to become a team leader. In the first classes, we were asked to represent ourselves as a type of animal. Knowing my duties this semester I decided that I would like to take a role of a wolf or an owl. Some people were suggesting that I would be a good wolf (good work coordinator) and some that I would be a good owl (I like to organize group work with tools like Microsoft Planner/Trello/SharePoint). Unfortunately, when I joined this group the positions of wolf or owl were already taken, but it wasn't a problem for me. As a result, I was assigned the rabbit role. Before EiT course I was totally unfamiliar with Virtual and Augmented Reality products and development process. I don't play any games regularly. My programming skills are strong in rapid software development in ASP.NET for financial applications (both desktop and web solutions, but mostly web development). I also have a good understanding of database problems and a strong interest in User Experience issues. One of the biggest challenges of this project was to learn the concept of game programming and Unity for Virtual and Augmented Reality.

### 1.2.3 Per-Morten Straume

**Nationality:** Norwegian

**Study:** Master in Applied Computer Science

**Background:** Game Programming, International Marketing

**Role:** Chief Technical Officer

Before taking the course I already had a fair amount of group experience, both mono-discipline and cross-discipline projects, in professional and academic settings. Because of this I already had some ideas of my behavior in groups, and how it affected group dynamics. I was aware that I can be dominating in groups, and also that I can be quite vocal and honest about my views. However, I always try to be open to others views, and promoting discussions to reach optimal solutions to problems. My wish for the course was that if I was completely wrong about my theories of myself in group dynamics I would be made aware of them.

Throughout my higher education I usually ended up being the leader in group projects, mainly because no one else wanted to. However, I have never been really comfortable with this role, and decided for this project that I did not want to be project lead. One of the reasons for this is that I often struggle with several managerial tasks like structuring and planning because of my ADHD diagnosis. Nonetheless, I did volunteer to be a bear on the first village day, as there were not that many students who seemed interested in the role.

#### 1.2.4 Ida Ellinor Syverinsen

**Nationality:** Norwegian

**Study:** Master in Interaction Design

**Background:** Graphics Design, Art Direction, Interaction Design

**Role:** Chief Executive Officer

At the beginning of the course I decided to keep an open mind to the project, even though I had heard mixed, and often negative, opinions about the course from other students. During the group formation, I picked “wolf” as my primary animal character, with “cat” as a second option. I found this fitting as I am not afraid of voicing my opinion, and sometimes enjoy playing “Devil’s advocate”. I decided to try to join a group where I had not previously worked with any of the other group members, which I managed to.

I already had a lot of experience working in groups before starting this project, both from educational and professional settings. This also includes the first half of my master programme, in which all courses have included group projects. My experiences with group projects have mostly been positive since commencing higher education, and I consider myself to be well versed in teamwork. I am, however, also aware that I am a typical “introvert”, meaning that working with, and also spending time with, others can sometimes make me feel more tired and “drained” than working individually.

#### 1.2.5 Andreas Wang

**Nationality:** Norwegian

**Study:** Master in Applied Computer Science

**Background:** Game Programming

**Role:** Unity Engine Expert

Prior to entering the project I already had a fair amount of experience working in various groups. Some of these were relatively well performing while some also were dysfunctional. I already knew the importance of teamwork for larger projects due it being central for game programmers. It was exciting to hear that we were going to work on VR/AR applications in this course and I was interested in seeing how cooperating across disciplines would work as this is something that has not been a part of my previous education.

#### 1.2.6 Yijie Zhou

**Nationality:** Chinese

**Study:** Master in Interaction Design

**Background:** Digital Media, Interaction Design

**Role:** Art Director

Before the EIT course, I have gotten used to working in multidisciplinary teams both for school projects and in the real working environment, though I never pay attention to the team, theories about teamwork, or my role in the team. During my previous projects and working experience, I used to think that maintaining the team was not my responsibility and just focused on my own work. For conflicts I encountered, I usually just let them go and didn’t try to handle them properly. Generally, I cared more about my personal work than the group work. This made me less active during the group discussion and I sometimes lost the big picture of the group work. I was aware that though I was al-

ways willing to contribute to the group and try my best to accomplish my tasks, ignoring the group is definitely harmful both for myself and the group. I hoped that during this course, I could improve the defects mentioned above and focus more on the group. Additionally, I hoped to be able to have more opinion exchanges with other group members and contribute ideas more actively.

## 2 Creating a Successful Group

While Experts in Teamwork frequently focuses on dealing with the challenges of working in cross-disciplinary groups, we also looked at some prerequisites for creating successful groups in the first place. Some of the measures we took internally to ensure a well-functioning group are described below.

### 2.1 Group Goal

According to Johnson and Johnson [3] effective groups state clear goals and strategies to achieve those goals. At the start of the project, our team agreed on a common goal - achieving the best possible grade. We also aimed to create a substantial prototype which could potentially be added to our personal portfolios. During first meetings we spent a lot of time trying to reach a common understanding of the game we were developing and how we could achieve our goals. We divided tasks among team members close to their interest which let us be committed to the group goal.

### 2.2 Group Rules

Another characteristic of effective groups which is mentioned by Johnson and Johnson [3] is effective communication to reduce misunderstandings. Our group contract dictated that we should use Discord<sup>1</sup> for communication, which we were required to check daily. We also defined teamwork climate rules, like how criticism should always be constructive. We also stated that if someone had a problem regarding our project this person should inform members as soon as possible and that we should try to help as a group.

Equal participation, shared leadership and members' power based on expertise, ability and access to information is the next characteristic mentioned by Johnson and Johnson [3]. In our group contract we agreed on the decision process and group members roles. We decided that large, impactful decisions should be made by all group members, while smaller decisions would be made by the technical leader and art director.

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<sup>1</sup><https://discordapp.com/>

### 3 Results

In the duration of the course we created a prototype for the game Conductor Hero (see Figure 3), a fully playable prototype for a VR conducting game. The game is available at GitHub<sup>1</sup> and a video demonstrating the gameplay can be found on youtube<sup>2</sup>. We discovered through the creation of this game that the group worked well together, with a low number of conflicts and a high amount of cooperation.



Figure 3: A screenshot of the final Conductor Hero prototype

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<sup>1</sup>[https://github.com/Per-Morten/imt4310\\_conductor\\_hero](https://github.com/Per-Morten/imt4310_conductor_hero)  
<sup>2</sup><https://www.youtube.com/watch?v=YQQTDyfQb-Q>

## 4 Discussion

### 4.1 Reasons for group success

Although our group was not entirely free from problems, the project as a whole can be characterized by good cooperation and employment of good practices, resulting in what we would describe as a successful project. This section discusses what we believe to be the reasons behind our success.

#### 4.1.1 Diversity

Diversity can be beneficial to the group performance. As mentioned by Johnson and Johnson [3, p. 445]:

Diverse groups tend to be more creative in their problem solving than are homogenous groups. The conflicts and disagreements that arise from the different perspectives and conclusions generate more creativity than is available in homogenous groups.

As demonstrated in the “triangle exercise” (see section 1.1.2) our group possesses diverse abilities and skills. Teamwork, in most cases, requires a multi-disciplinary approach, and it’s safe to say that if we did not have a diverse team we would not have been nearly as successful as we were. Furthermore, our knowledge and skills from different fields made it easier to divide tasks between members, reducing potential conflicts. We trusted each other’s expertise and abilities when working with the game. For example, when dealing with the musical part of our game team members without a musical background, Rikhart and Yijie, trusted the abilities of the rest of the team members. Similarly, group members with design backgrounds were trusted to make the correct decisions on design related problems. We believe that trusting each other’s abilities decreased conflict.

Diversity can also be a source of difficulties, as noted by Johnson and Johnson [3, p. 446]:

Diversity creates difficulties in communication, coordination, and decision making. These difficulties result in spending more time trying to communicate and less time completing the task.

This is why Sabina and Rikhart were given the roles of cross-discipline communicators, as the two of them had experience in both programming and design. With this flexibility, they could also contribute to both the design and the programming of the game.

Our group consisted of four males and two females, from three different countries. This required us to pay greater attention to how we used language to formulate our ideas and opinions, in an understandable fashion. An interesting observation was made by Yijie regarding how in his culture the feelings of group members are less important than the work being done. This is quite different to the Norwegian model, where individuals’ personal feelings and contributions are considered more important in group collaboration.

Our group had four Norwegian members, therefore, Sabina and Yijie could observe the Norwegian style of working. One example was the strong emphasis on working together at the same time with everyone engaged in the same task. At the first glance this might look ineffective, while in reality it helped keeping everyone involved and created a common vision.

#### 4.1.2 Need for Affiliation

Chun and Choi [4] speaks of the need for affiliation (a need to belong) as one of three needs in their study, based on McClellands three needs theory. The other two needs being control and achievement. We identified that this need was an attribute all of the members possessed and had fairly equal amounts of. As Chun and Choi [4] points out, the presence of this need plays a role in the groups performance, but so does the strength of this need and how it is distributed amongst the members. They further explain that if one member has a strong need for affiliation this might cause conflict, while if the distribution is equal, or close to equal, it does not cause problems. This is because there is a higher understanding amongst the groups members that everyone has the same goal in the group - to belong. We believe that our group had an equal distribution of the affiliation need and that this contributed to our productivity and lack of conflict.

#### 4.1.3 Communication

Another self-identified key for success was good intragroup communication. The group decided to make communication a priority, as several of the group members had negative previous experiences with poor communication in group work.

Johnson and Johnson [3, p. 44] lists

...accurate and complete communication among members

as one of the requirements for an effective group. In the aforementioned previous groups there were an imbalance amongst the different members need for information and the comfort of knowing the current progress. This resulted in some members not communicating at all. A whole range of issues ensued from this one problem, causing these groups to be very ineffective.

We therefore made it a point, even as early as when forming the group contract, to include certain stipulations directly related to group communication. These group rules included demands to check Discord<sup>1</sup> every day and also to notify about changes in plans as soon as possible. This meant that if someone couldn't meet, adjustments could be made in time. The use of the Discord platform allowed for instant communication if needed. Since the contract stated that each member had to check this platform at least once a day, when someone wanted opinions or help, they could ask over discord and receive fast answers. For example, this happened when Ellinor wanted opinions on her graphic design for the user interface and wanted to know if she could move forward with it, she asked via Discord and received fast answers. This eliminated a lot of waiting, allowing Ellinor to proceed quickly to the next step.

Another interesting aspect to our communication was that while it was highly task related, it was not exclusively task related. The importance of topical balance has been covered by Wheelan [5] who points out that in effective teams the ratio of task and goal

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<sup>1</sup><https://discordapp.com/>

related communication is usually around 70-80%. This ratio seems reasonably close to our communication pattern. While we were heavily task focused, we would often change to a non work related topic after longer intense periods of task oriented discussions.

#### 4.1.4 High mutual dependency and shared responsibility

In his book “Team”, Kjell B. Hjertø defines a team as a work group of at least 3 members that have a high degree of mutual dependency and a large amount of shared responsibility in order to satisfy the group’s goals [6]. The balance between mutual dependency and shared responsibility is necessary for a team to function optimally.

Related to our group, we think that there was indeed high mutual dependency and high shared responsibility. Our mutual dependency came from the fact that we each had different specialties and each of us worked on different important components of the game that depended on each other. As a result, we also had high shared responsibility, as everyone is working on different and essential components of the project. One of the ways we can see our shared responsibility is in how we did not assign blame, which is something that often happen in ineffective teams [5]. If something did not work it was the whole groups problem, not just a single member’s.

#### 4.1.5 High Task Focus

Throughout the project we have had a large focus on team productivity, efficiency and the task at hand. As mentioned in the project report we chose methodologies and workflows that removed what we perceived as unnecessary overhead or distractions. We see this focus as a contributor to our groups success, which also aligns with Wheelans [5] guideline of encouraging and supporting norms that promote effectiveness and productivity.

### 4.2 Situations

In context of the EiT course, the term “situation” can be understood as a series of circumstances which lead to misunderstandings and disagreements. The “situation” creates a high tension between group members, potentially leading to an argument or even a conflict. The “situations” can originate from differing opinions, non-conformity, lack of common understanding of domain or goal, lack of dialog, different members orientations (task-, relationship -, individually oriented people), or low level of transparency [7].

#### 4.2.1 Audio recording

The group had a bit of a split when we discussed how should we record the group meetings on village day 3. Per-Morten suggested doing audio recordings of group meetings because it would be easy to look back at specific times and clearly hear what people mentioned or thought about the discussion. Sabina mentioned that it would be uncomfortable to record everything and Rikhart agreed with this as it would be better to focus on the reflections at the moment and not necessarily too much in retrospect.

This situation occurred due to the diversity of our personalities and perspectives. Per-Morten approached the situation in a logical way, he focused on the facts about the decisions. Meanwhile, Sabina saw the situation from an emotional perspective. Additionally this situation was partly due to misunderstandings of whether or not the recording was a course requirement. Yijie thought we were required to record the process using videos or audios and preferred to do audio recording if this was a prerequisite.

Diversity can lead to either positive or negative outcomes in group, which highly depends on group members' willingness to understand and appreciate the existing diversity in the group [3]. Since this situation happened on village day 3, there was still an unfamiliarity between the members within the group. To handle this situation, we had an open discussion about whether or not we should do the audio recording. Ellinor made sure that everyone were able to express their opinions. The discussion helped us get a better understanding of each other. We realized there was diversity in the group and we tried to respect and value everyone's view. This allowed us to view the situation in a holistic way, and knowing each other's opinions further helped us discover future potential misunderstandings.

After the discussion, the situation was resolved and we reached an agreement to use the daily group reflections to document the process. This way we ensured a precise recording of the information without any of the group members feeling uncomfortable.

#### 4.2.2 Cross-disciplinary communication

On day 3, the group experienced a second situation. After making an initial time schedule for the project, we decided that we needed to refine the initial project idea, before we could begin actual work on either design or code. While Per-Morten and Andreas were keen on initially defining base functionalities, Sabina and Ellinor wanted to discuss overarching themes and user experiences. Both groups defined this as describing the “basic concept”, although they were really thinking about quite different aspects of the project.

Roger Schwarz [8] describes a set of “ground rules”; a set of behaviours that can be used to identify effective groups, or improve group process. The situation described above can be directly linked to his third ground rule; *Use specific examples and agree on what important words mean*. Agreeing on what important words means within a group can help avoid misunderstandings that otherwise are bound to happen. Using specific examples can be helpful to describe the meaning of words, as well as what they do not mean if necessary. While the discussion went on for a while during the meeting, it was first when we started giving specific examples of what we meant by saying “basic concept” that the problem was identified.

Several times during the project we would encounter similar situations. However, the group’s first discussion on “basic concept” had helped us recognize what was happening when the situations occurred. By taking a step back and explaining our understanding of the words that we used, we managed to resolve the situations quickly. The original situation seems to have helped us become more aware of communication challenges across disciplines, and better prepared to recognize and handle similar situations.

#### 4.2.3 Imbalance among talkers

Early on in the process it became apparent that there was an imbalance of who was talking and leading the discussions. This is an undesirable feature, as open communication with inputs from all members is a factor that often identifies effective teams [5]. In our group Per-Morten and Ellinor were dominating the discussions. The facilitator presented the group with a sociogram confirming this. This issue stayed with us for the duration of the project, but we managed to negate it through a few deliberate actions.

In the beginning, this imbalance was likely partly due to the fact that we were cautious with each other, since we did not know each other very well yet. Sabina admitted that

she was careful when it came to speaking in groups she did not feel comfortable in or knew well.

To ensure that Ellinor and Per-Morten would not dominate all the conversations, and to involve the others and get their thoughts and input, Ellinor and Per-Morten tried to halt and ask for the others opinion when they felt they were talking too much. We saw this as a necessary solution, since part of the problem was that the rest of the members did not interject to point this out of their own accord. We also decided to have a 3 minutes stand-up meeting in the morning where everyone could speak. By forcing it to be maximum 3 minutes for each person, we made sure the two main speakers could not speak longer than anyone else. This created a better balance amongst us.

Chun and Choi [4] showed that the need of each group member has an impact on the groups performance. They studied three needs that group members might have within a group. One of these is the need for power. Although it seemed at first that Ellinor and Per-Morten might have this need; which would explain why they would always dominate and steer the direction of the conversations, other properties made us deem this as unlikely. Most of all because neither seemed to have any problems yielding when they needed to, and also because both agreed that they were speaking too much compared to the rest. Rather than something as strong as a *need*, our theory is that their personality naturally lent itself to verbalizing and sharing their ideas and thoughts a lot. While the personality of the other members naturally let this go unobstructed, the other members were just happy to let someone else speak.

#### 4.2.4 Allocating time for project work

The fourth situation happened when we concentrated on the project, the flow of work was often interrupted by the course exercises. For example, we expected to work on the project on day 6, but as a part of the course requirement, we had to review the group contract in the middle of the day. Per-Morten felt that this frequent switching of context was disruptive and made it hard for him to focus on the project and be productive.

This situation happened partly due to the nature of the course, which required us to both work on the project and have training in teamwork at the same time. As we could not change the course components, we had to adjust our schedule to improve this situation. Normally the plan of the coming village day was published one day in advance. We asked the Simon McCallum, the lecturer of the course, to publish the plan earlier so we could have enough time to schedule work sessions in advance. We allocated a block of time to focus on the project each day, and during that period, we tried to avoid being interrupted by long winded discussions or course exercises.

Another factor that escalated this situation was that all the group members felt strongly motivated to work on the project itself, rather than doing the course exercises. This may have been because we all have a high need for achievement [4]. A group with members who demonstrate a high level of need for achievement on average may be strongly task oriented and desire for superior performance [4]. When we encountered distractions, we lost our attention on the current task, which led to an outcome of lower quality. We therefore felt more sensitive and annoyed when the work disturbed by the course exercises.

Allocating time properly helped increase motivation in the group, both for the project

and for the course exercises. During the allocated time period for group work, we felt more concentrated and efficient.

## 5 Reflection

An important part of the course has been the development of our ability to reflect on our own and others behaviour when working in groups. Reflection, both individually and as a group, can serve as a tool for personal and group development.

Personal and group reflections were written each village day. A brief summary of group and personal reflections are provided below.

### 5.1 Group Reflections

Exercises were introduced early in the course, at a time where the group members were not familiar with each other. Because of this they felt forced and artificial, giving us a bad impression that stayed with us throughout the project. A common theme throughout the group reflections was that the course exercises did not give us any major insights. In retrospect we should probably have been more open to the exercises, as we got the feeling that some of the other groups found them beneficial.

During the exercises, we still found the results to be descriptive of the dynamics in the group. While this was interesting, and helped us identify problematic patterns, we also felt like the exercises reinforced our already existing traits, rather than solving any problems.

We acknowledged several times throughout the project that we all felt safe within our group, both in terms of presenting ideas, and vulnerabilities. However, there was an imbalance in who was talking the most in the group. While we believe that such an imbalance can be unhealthy, in our case we consider this to be the natural result of the group members' personalities. As long as everyone's opinion is considered, and the more quiet group members are allowed to talk, we consider this unproblematic. Additionally, we felt safe in relation to finishing tasks on time, allowing us to delegate work and rely on each group member pulling their weight.

Throughout the project we managed to achieve a lot of the goals we had set for ourselves, indicating a good workflow. The daily meetings kept every group member updated on individual and group progress, and reduced the need for disrupting others' work later in the day leading to unnecessary discussions. At the same time these discussions were welcome if needed.

### 5.2 Individual Reflections

#### 5.2.1 Rikhart Vigdal Bekkevold

The group consisted of both programmers and designers. I had a background in web development, comprising of both design and programming, so I had experience in both fields. As a consequence of this, I did not have the same learning outcome in terms of developing my cross-disciplinary skills and understanding, as the others might have had. I already could communicate well with both fields so I didn't experience any conflicts that could arise from this.

A “1+2” exercise, midway through the course, forced us to give feedback about each other (1 negative and 2 positive). During this exercise the other members told me that I could present my views, and argue, very strongly (arguing strongly, not as a general behaviour), something that was described as “off-putting” at times. I was already aware of this tendency, but I never knew how people viewed it or felt about it. The strength of this task was that it forced us to share thoughts about each other, something we often try to avoid, and I learned something about myself I might not have otherwise.

Unfortunately this was all the usefulness I got out of the exercises we did, the group functioned too well to benefit from these exercises which mainly seemed aimed at non-functioning groups. We had too few, and mild, conflicts for me to learn much from them. In the end I felt that I didn’t really learn anything new about myself that I didn’t already know, so very few comments from the others (in relation to me), surprised me.

A beneficial part of this course for me was observing the behaviour of the other group members, and how their behaviour affected the group. I learned a lot from seeing how the other members dealt with situations and how they acted in relation to each other and to me. I observed that: They blamed themselves first, they didn’t overestimate their abilities, they respected others opinions, they worked hard, they saw others perspective, they explained their motives and reasoning, delivered their criticism in a considerate way and were helpful and friendly. Although I believe I can credit myself with some of these qualities as well, by seeing the great qualities of the others, it taught me that I still have lots of room for improvement when it comes to being a good group member.

In the future I will take the aspects/qualities of this group that made it work so well and apply in future groups. Hopefully I can use this to make the bad, conflict filled, group experiences of the past; better in the future. I will also remember that people don’t always tell you what they think and be wary of my sometimes overly strong arguing.

### **5.2.2 Sabina Niewiadomska**

During the course, I had a chance to get to know game programming, as well as how the graphics part is connected to the programming part. I was surprised that so many elements of a game are not programmed but just build into Unity. I think that the theory provided by the course on how to create a well-functioning team is interesting but I believe the course will not help much into a real work related situations, no one of exercises seemed to be applicable in a workspace and the course also didn’t teach us how to soften critical situations.

The course didn’t fulfill my curiosity about successful group communication, therefore I will continue my personal research on that topic. After the course, I’m more open for game programming, but still, I’m not encouraged to play any games.

However, the course was enjoyable experience in terms of project creation.

### **5.2.3 Per-Morten Straume**

Throughout the exercises and feedback given I was happy to discover that most of my perceptions of myself in groups was largely correct. I was also happy to notice that I didn’t really have any difficulties communicating with the group when it came to cross-disciplinary issues. I often understood what other group members was talking about, and in the cases where I didn’t I had no problem asking for clarification. This also seemed to

be the case with the other group members, ensuring that most of the time we were all on the same page, which is vital for group projects like these.

The unpredictable structure of the village days and our erratic group meetings became a frustration to me, as I need a predictable and structured work environment to stay focused and productive. Luckily the team was understanding and accepting towards this challenge leading to a satisfactory solution with chunked work times.

While the course didn't leave me with any newfound revelations of how I function in groups, it did strengthen all my existing theories, which I will bring with me. In the future I will be even more aware of my often dominating role in groups, and the positive and negative effects that role brings. I will be more vary of the consequences of my desire to be direct, honest, and "to the point", and how it might affect the group dynamic or influence the groups opinion. I also found that while I don't like being the overall leader of a project, I don't have any problem acting as a more specialized leading role, like technical director. Additionally, I have gained valuable experience in how I can play to the strengths of my diagnosis, but also the importance of predictable schedules, and getting help to structure and plan any non-product related activities. Because of this experience I will be more open about my diagnosis in future team projects to achieve greater productivity.

#### **5.2.4 Ida Ellinor Syverinsen**

After the initial group formation and exercises, I was selected to be the leader of the group. I considered this to be a great vote of confidence, and I found filling this role to be a new and very interesting experience. As I do know that I sometimes can be a little too focused on details, I used this as an opportunity to practice not micro-managing design (or other) decisions, but to instead delegate tasks and responsibilities.

It is possible that a lack of conflicts in the group have limited my learning, but it has been hard to find "difficult situations" to reflect about as, in my opinion, all group members involved themselves in the process, stayed positive, and contributed their share (and more!) to the project. Not surprisingly, the group had a few discussions where communication across disciplines created a few minor misunderstandings, but these were resolved quickly and I would not describe any situations within the group as "conflicts". Overall, I found the group work very rewarding, and it was exciting to create a project for VR technology.

The theory and exercises presented in the course curriculum have no doubt been interesting, but to me they seemed to be more useful for groups with high levels of conflict. I have personally found the discussions with the course coordinator and student assistants to be both more interesting and more valuable for my own learning.

While I do not believe that the way I behave in groups have changed significantly during this course, I think that I have become somewhat more aware of the needs and behaviours of other group members, as well as the dynamic between other group members. I believe that Expert in Teamwork have increased my interest in leadership, and that I am now more likely to pursue positions of leadership in the future.

### 5.2.5 Andreas Wang

While working on the project I learned a fair amount of various things. I got experience in working with a fairly diverse team which is closer to what you would find in a real world company. As part of this, I acquired more experience in integration of components from the various disciplines to make sure everything worked together in the final product.

As part of working in a team with high diversity I also learned the importance of making sure that everyone is on the same page during discussions as members from different disciplines might use the same or similar terminology, but with different meanings.

The course taught us a good amount of theory around how to structure and deal with situations in dysfunctional teams which is useful knowledge to have in the future, but the focus feels to be a bit too heavy on this end and it almost feels like it is expected that most groups will have their fair share of conflicts and issues. If a group already is dysfunctional in the real world I am also unsure if everyone in it would want to do the presented exercises in the course. While the theory was nice, I would have liked to see some more concrete examples of how to deal with group dysfunctionality as well. At the same time, doing this course has made me think more about previous group experiences(even teams/groups in games!) and reflect better on what went well or badly which I find pretty valuable.

A problem I had with a fair amount of the group exercises was that they were placed too early in the course at a point where the group had done very little actual work and the members did not know each other very well. Due to this it was not easy to give meaningful feedback to each other. This was particularly apparent with exercises like 2+1 as it was hard to provide positive and negative feedback when you barely know each other. It would probably beneficial to put these early exercises a bit later on in the course so there is more for the group to discuss.

In general, this is the most well functioning team I have worked with of this size in any course so far. While having such a well functioning team seems a little bit out of place in relation to what the course seems to expect, I feel like we still learned a lot from reflecting on why everything went as well as it did. On a more technical end I ended up getting experience with using the SteamVR library in combination with the HTC Vive which definitely can be useful for the future as VR becomes more mainstream.

I do not feel like I really learned anything new about myself and how I interact in groups as I already self reflect a fair amount. I already knew that I do not speak a lot, especially early on in new groups as I do not know everyone just yet, but also that I will speak my opinion on something if I deem it necessary.

I feel like the major takeaway from this course for me is partly the experience of working in a diverse team which is more representative of teams you will find in the real world. The things we have learned in the course can also be useful in the future to reflect more around the actual team itself and not only its individuals. I do not think that there is a “one size fits all” solution for every group out there, but there are valuable components of the various pieces of theory from the course which could be applied to other groups in the future.

### 5.2.6 Yijie Zhou

Throughout the course, two most significant learning outcomes for me are how to handle group diversity and the use of group rules. We learnt and practiced various theories and methods around group diversity in this course, including form a heterogeneous group, benefits and damages of diversity, manage potential conflicts caused by diversity, etc. As a designer in the creative industry, it is naturally required to work in multidisciplinary teams, where diversity commonly exists. Therefore, I think being able to deal with the group diversity in a proper way and take the advantages of a diversified team can be a useful skill in the future. These outcomes are also helpful when you are in a leadership position, giving you the insight to recruit teams with a decent amount of diversity which is suitable for your project.

The second useful skill for me is to introduce the group contract and group rules in the teamwork. With the group contract, members can have better awareness about the common goal and work in the same direction. Since group rules are established based on group members' agreement, when conflicts happen, it can provide a solution which is acceptable for every group member. This can focus the group on the task and avoid personal conflicts, which has a relatively higher harmful influence on the teamwork. For example, if one member comes out with an idea which does not correspond to the common goal, instead of saying it is a bad idea, which may cause unnecessary argument in the team, others can reject the idea based on the group contract. I think using group rules are helpful both in school projects and the real working environment.

In addition, this course also provided an opportunity to improve my expertise. I explored 3D interaction in the VR environment and sharpen my 3D modelling skills. While working with experienced game developers, I grasped the fundamental concept of game design and had a better understanding of the collaboration between Blender and Unity. Since our project is an ensemble conducting game, I also gained more experience in the orchestral music and had a better understanding of conducting.

I will keep the useful skills from the course with me in the future teamwork. With a more holistic view of the team and various theories of teamwork, I would like to try to take more responsibilities in the group and challenge myself for positions which require a higher level of leadership. Also, I feel personal reflection is a good way to have a better understanding of myself and my position inside the group, and I will keep this as a habit.

## 6 Conclusion

The course has been an interesting experience, allowing us to confirm our pre-existing assumptions as well as gaining new knowledge about ourselves. In the end we managed to create a functional prototype for Conductor Hero, an achievement we are all proud of. We believe this was due to our clear expectations, goals, and a common desire to participate. Good communication ensured that we had everything under control most of the time, and that we did not waste unnecessary time, maximizing work and limiting risk. Additionally, the group diversity and range of previous experiences helped us make choices that were beneficial to the project. The inclusive nature of the group helped ensure that everyone felt welcome, allowing them to present their ideas without fear of scrutiny. We believe all these factors contributed to the general success of our group, and taught us lessons that will be invaluable in the future.

### 6.1 Applying teamwork skills in the future

We believe that teamwork skills will be relevant for all team members in their future professional careers. While we all had some experience with teamwork before, there are a few aspects of teamwork we believe the course has made us more aware of.

First, we found the 6-animals model [2] a very interesting method for group formation, and for ensuring a balance of diverse “traits” and “functions” within a group. We also believe that we have become more aware of how to take advantage of diversity within groups, while also staying aware of each group member’s needs and motivations. In this connection, we also believe that we have become more aware of the importance of clear and open communication, especially in cross-disciplinary environments.

The importance of creating clear guidelines, in the forms of establishing group goals and expectations, is a tool we will utilize in future work. We believe a part of our success is due to establishing firm rules for the group at the start of the project. Contrasting this with previous group experiences without these rules, we see a significant difference in the outcomes. Establishing ground rules, and being clear on expectations, is something we believe is important to keep in mind.

While we experienced some minor situations, we did not experience any particularly difficult conflicts during the project. We do, however, believe that we are likely to encounter more challenging situations in the future. We have perhaps become more sensitive to when such situations are beginning to unfold, and have learnt some techniques that can be applied to deal with situations before they become destructive.

In the end we are very thankful for the opportunities that has been presented to us through this course, and the valuable lessons we have learned.

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