NTNU
Norwegian University of
Science and Technology

Let the gamification begin!

A qualitative case study of student
experiences in the gamified learning
environment Heimdall's Quest

Madeleine Lorås

Master of Science
Submission date: May 2017
Supervisor: Terje Rydland, IDI

Norwegian University of Science and Technology
Department of Computer Science

Let the gamification begin!

A qualitative case study of student experiences in the gamified learning environment Heimdall's Quest

By

Madeleine "Hella" Lorås

May 2017

Teacher Education with Master of Science

Norwegian University of Science and Technology

Abstract

Educators in classrooms all over the world are focused on integrating and utilizing new technologies that can help with the challenge of unmotivated students. At the same time, digital games have the ability to engage children and adults in complex problem solving and creative activities with high motivation for long periods of time. What happens when these worlds collide in a gamified learning environment?

The aim of this study was to answer the research question "How does gamification affect students' experienced learning environment?" More specifically, I wanted to find out more about what characterizes the gamified learning environment created by the Heimdall's Quest system, and to what extent commercial gaming experience can be significant.

By conducting an iterative case study consisting of observation and interviews with teachers and students participating in the motivational classroom system Heimdall's Quest, I was able to gain knowledge about student experiences in a gamified learning environment. Constant comparative analysis of these datasets found that there are three levels to a gamified learning environment: the student level, the classroom level and the society level. Furthermore, my research found that on the student level, playfulness and repetition is essential for extrinsic motivation and competitive features to have a positive effect. On the classroom level, the teacher has great importance in the development and implementation of effective gamified learning activities, where students are able to utilize their skills and knowledge from commercial gaming and take responsibility for their own learning. Lastly, the gamified classroom provides a learning environment where the students' gaming experience is valued, which can improve their self-perception and identity. The findings of this study may give valuable insight to other educators in developing and implementing gamification as a learning tool for the future.

Key words: gamification, learning environments, Heimdall's Quest, motivation, games, learning

Sammendrag

Lærere og undervisere verden rundt prøver stadig å finne nye teknologier som kan være med å løse problemene med umotiverte elever. Det å spille digitale spill har vist seg å engasjere barn og voksne i kompleks og kreativ problemløsning med høy motivasjon over lang tid. Hva skjer når disse to verdenene møtes i et spillifisert (gamified) læringsmiljø?

Målet med denne studien har vært å svare på forskningsspørsmålet: *Hvordan påvirker spillifisering (gamification) elevenes opplevde læringsmiljø?* Nærmere bestemt ville jeg finne ut mer om hva som kjennetegner det spillifiserte læringsmiljøet som omringer Heimdall's Quest, og i hvilken grad erfaring med kommersielle spill kan være signifikant.

Ved å gjennomføre en iterativ case studie, bestående av observasjon og intervju med lærere og elever som deltok i det spillifiserte klasseromsystemet Heimdall's Quest, fikk jeg tilgang til informasjon om elevenes opplevelser og erfaringer i et spillifisert læringsmiljø. Konstant komparativ analyse av disse dataene fant at det er tre nivåer i et spillifisert læringsmiljø: elevnivået, klasseromsnivået og samfunnsnivået. Videre indikerte resultatene mine at på elevnivået er lek og repetisjon essensielle aspekter i forsøket på å gjøre ytre motivasjon til en indre driv. På klasseromsnivå, er læreren den viktigste aktøren i utviklingen og implementeringen av effektive spillifiserte læringsaktiviteter, hvor elevene får brukt ferdigheter og kunnskap fra kommersielle spill og ta ansvar for egen læring. Dette klasserommet legger rammene for et læringsmiljø hvor elevenes tidligere spillerfaringer verdsettes, noe som viste seg å bygge opp under elevenes selvoppfatning og identitet i samfunnet. Disse resultatene kan gi lærere og undervisere nyttig innsikt i det effektfulle læringsverktøyet spillifisering, og møte fremtidens elevers behov.

Nøkkelord: spillifisering, gamification, læringsmiljø, motivasjon, spill, læring

Acknowledgements

Table of Contents

1   Introduction

In Norwegian secondary school, the dropout rate is as high as 15% and the government has implemented strict rules to keep students in school (SSB, 2016). Although the reasons for the students dropping out vary individually, researchers, teachers and politicians point to lack of engaging activities in the classroom as a major problem (Lillejord et al., 2015). Concurrently, children today are bombarded with entertaining games, engaging social media as well as interesting and instantly accessible material on various devices, so much so that in the classroom the teacher often struggles to compete for attention. Some schools have now seen the need to invoke smart device bans in all classrooms, while others embrace and utilize these new devices and address the challenges that may be attached to their usage.

The number of children who play digital games is rising and among boys between ages 9-16 years the number is as high as nine out of ten (Norwegian Media Authority, 2016). Both children, teenagers and adults are becoming more and more interested in games, yet the public debate on the effects and dangers of gaming continues unabated. At the same time, professional competitive computer gaming, or e-sport, is becoming an established field, and some schools are even adding e-sport as a subject. In fact, the gaming industry is a billion-dollar industry, and rivals the movie industry in annual revenue (Ask, 2016).

Motivation and engagement is a struggle in many classrooms, yet we know some students can spend hours in front of their games in high concentration. However, the topic of computer games is still controversial in Norway, and the public debate leans towards a technological deterministic view (Smith & Marx, 1994). This debate states that either computer games create violent children who cannot function in the real physical world, or they are a fun and educational way for children to spend their free time. Consequently, the use of games in education is also currently under heavy discussion, using many of the same arguments: either computer games will be the end of education, or they will enhance students' motivation and increase their

learning. In this jungle of biased opinion and inaccurate assessments, it is difficult to find the right path, both as a student, teacher and parent. Regardless of public and private opinion, research shows that most children enjoy playing computer games at home, and as educators we owe it to our students to explore this possible learning opportunity.

Future classrooms will have to change in order to meet the students' learning needs, and using *gamification* is one potential way to go. Gamification takes elements from commercial games, and uses them in a different context, for example school. Research on the effects of gamification has shown many potentially positive benefits related to motivation, behavior and engagement, and in this thesis we will look closer at the gamified learning environment.

1.1 Personal motivation

I began this journey curious about the amazing world of gamification and ready to debunk some of the myths on the connection between effectiveness of games in school and students' commercial gaming experience. I had heard many discussions about how gamification only works on "gamer students", and was interested to find out more about this.

The gaming sphere is very fascinating to me, especially the amount of time and effort some people put into their gaming hobbies. What is the big deal with these games? How can we use this kind of drive they have in an educational setting? I soon learned that one promising method is gamification. Therefore, I began researching gamification as a concept and how other educators and researchers have used it. My research found an overwhelmingly positive trend. Gamification can improve motivation and behavior; the students are overwhelmingly positive and it sure seemed fun to use as a teacher. I had done some of my practice teaching requirement at a school where I had had the opportunity to use the motivational classroom system called Heimdall's Quest. Heimdall's Quest is essentially a

gamification of the entire school day, from content learning to behavioral modification.

Combining my curiosity about "gamer students" and my experience with Heimdall's Quest I decided I wanted to research how previous gaming experience affected students' learning outcomes in a gamified classroom. However, after observing this classroom and talking to these students and teachers, I discovered that there is more to gamification than just how gamers learn. It is about not only how they learn, but also what motivates them, as well as how they interact with other students and teachers. It concerns the entire learning environment and how gamification affects the students' experience of this environment. In particular, what makes the Heimdall's Quest gamified learning environment so successful? In addition, to what extent is previous gaming experience a significant factor?

The term "learning environment" could be considered somewhat vague, and a successful gamified classroom is yet undefined. I will give a more in-depth explanation of these terms as well as the methodological approach for this study, and in conclusion my results and findings in the following chapters.

1.2   Research inquiry

In this thesis, I will examine the powerful tool that is gamification and the effect it has on the learning environment. A learning environment involves all the physical, social and cultural aspects of a student's learning activity, and concerns both internal processes within the student and interaction with other students and teachers. My research question is as follows: *How does gamification affect students' experienced learning environment?*

To answer this question, I will be studying the motivational classroom system Heimdall's Quest, which has had great success motivating and engaging students in vocational ICT schools. Specifically, I will look at what features of the gamified learning environment Heimdall's Quest creates that make it so successful. In

addition, I want to examine the connection between the students perceived learning environment and their previous gaming experience playing commercial entertainment games. I believe this is essential because there is a need for more research on the topic, and because it will give an important perspective to answering the research question. To summarize, the research inquiry is as follows:

How does gamification affect students' experienced learning environment?
    - What characterizes the gamified learning environment of Heimdall's Quest?
    - To what extent is commercial gaming experience a significant factor?

1.3 Overview and scope

In Chapter 2, I begin with an introduction to relevant concepts, theories and previous research that are applicable for more exploration of the research inquiry. I will first define and examine the theories around learning and learning environments. Then I will discuss what we know about games and gamification in various contexts of importance.

In the next chapter, I will present the gamified system Heimdall's Quest, describe the way this system is designed and discuss how it works (Chapter 3). This includes a detailed description of the complex points and freedoms system, and a depiction of how it is used in practice. Additionally, I will present previous research on Heimdall's Quest and discuss the relation to learning theories and environments.

Chapter 4 describes the research methodology used to collect and analyze the data in this study. This includes a description of all the various steps taken throughout this study, and a discussion of their validity and reliability. Results from the analysis are presented in Chapter 5.

Lastly, in Chapter 6 I will examine these results in light of theory and previous research, as well as discuss the implications they may have for learning

environments. An overview of figures, tables and appendixes is included after the bibliography at the end of this thesis.

This thesis is written for anyone who is interested in learning more about gamification, including those with experience in the world of games and gamification, and those with no experience with games whatsoever. Gamification can be a powerful tool, both in smaller portions and in a complex system like Heimdall's Quest. I encourage you to be curious and open-minded, and urge you to be creative with the knowledge you may acquire here and elsewhere about gamification.

2   Concepts, theories and previous research

The wonderful world of games and learning is vast, and filled with important terminology, descriptive theories and informative research. In order to find some manageable limitation for this thesis, my research inquiry concerns two main topics: learning environments and gamification. Accordingly, I want to examine what constitutes a well-functioning gamified learning environment exemplified by Heimdall's Quest, and what role commercial gaming experience can play. In this chapter, I will present definitions, theories and previous research on learning environments and gamification that are relevant to these topics.

2.1   Learning environments

Professors of pedagogics Sidsel and Einar Skaalvik have done some highly influential work on theorizing and defining the concept of learning environments in a Norwegian school context. Based on their own investigation, as well as international research, they define the terms self-perception, motivation and learning environment, and discuss the connection between them. Skaalvik and Skaalvik define a learning environment as the various components that surround and influence a learner (Skaalvik & Skaalvik, 1996). This includes physical components, such as chairs, desks and computers, and psychological and social factors experienced by the students. In this thesis, I define a learning environment as the social, cultural and pedagogical components that surround the learner. The social and cultural components will be discussed in the following section, and in the next subchapter, I will cover the pedagogic components concerning learning theories.

A central finding in Skaalvik and Skaalvik's research is that the students' experienced learning environment often affects their motivation, self-perception, sense of accomplishment and behavior (Skaalvik & Skaalvik, 1996). Motivation is defined as the extrinsic and intrinsic factors that drive a student to learn. Accomplishment and behavior are more or less self-explanatory; however, self-perception needs further

clarification. According to Skaalvik and Skaalvik, self-perception is defined as the awareness, assessment, expectation, belief and knowledge a person has towards him-/herself (Skaalvik & Skaalvik, 1996, p. 15). Identity is closely related to self-perception; however, identity is defined by the social position of the person and depends on other people's views. The students' self-perception is important because it often affects their expected achievement, which in turn affects motivation and behavior (Bandura via Skaalvik & Skaalvik, 1996). In other words, the students' self-perception and experiences in the learning environment are inevitably linked to each other.

When evaluating a learning environment, there are some influential aspects that also need to be examined (Skaalvik & Skaalvik, 1996). How the instruction is adapted to the students' preconceptions is important to the students' experience of achievement. Furthermore, social comparisons within the group can have positive and negative effects on the students' self-perceptions. A good example of this is the contrast between a competitive environment, and one that is task-focused. The structure of the education is also important because it lays the foundation for students to be independent and take responsibility for their own learning. In addition, ongoing evaluation serves an important role in guiding the students towards reaching their personal learning goals, especially the informal feedback students receive on a daily basis. Lastly, an inclusive and accepting social environment will provide a safe atmosphere where the students can thrive. These aspects provide the framework for assessing a learning environment, and are important when evaluating the features of a successful learning environment within the gamified classroom.

2.1.1 Learning theories

The previous section discussed the social and cultural aspects of learning environments, and in this section I will examine the pedagogical component by considering some central learning theories. Various learning theories have been developed over the years, and they give a broad outline of different views on knowledge, learning, motivation and the role of the teacher. Behaviorism, cognitivism

(cognitive constructivism), and constructivism (social constructivism)[1] are the three main theories educators subscribe to (Imsen, 1998; Schunk, 2008; Siemens, 2014), although more recently, new perspectives such as connectivism are gaining traction (Siemens, 2014).

In the behavioristic learning theory, knowledge is seen as a set of learned behaviors, and something that can only be changed though external influences. In other words, learning is about behavior change and the passive absorption of knowledge, and it happens through repetition as well as positive and negative encouragements. In contrast, the cognitivist learning theory views knowledge as constructed cognitive structures within the mind of the student, and learning actively adds new experiences to these constructs. The constructivist learning theory sees knowledge as something created through social interaction. Learning is collaborative, and students learn by interpretation and communication.

Before describing the various learning theories' views on motivation, we need to define the two classifications commonly used to discuss motivation: intrinsic and extrinsic motivation. In short, extrinsic motivation describes the drive that comes from some kind of external factor, for example a prize or punishment of some sort (Ryan & Deci, 2000). In contrast, intrinsic motivation is the internal drive coming from within the individual. Where the behavioristic learning theory is solely based on extrinsic motivation, both cognitivist and constructivist learning theories favor intrinsic motivation (Imsen, 1998; Schunk, 2008). Additionally, constructivist learning theory acknowledges the extrinsic effect a social community can have on students.

Different views on knowledge, learning and motivation, affects the perspective we have on the role of the teacher and teaching methods. The behavioristic learning theory implies a teaching methodology based on transferring knowledge from the teacher to the student, and evaluating the behavioral responses. The cognitive and

---

[1] These learning theories have been developed over several decades, and have many different contributors and nuances not touched on here. This subchapter is intended to give an overview of the various perspectives in order to explain some central phenomena.

constructivist learning theories views the teacher as more of a guide and facilitator, rather than being the basis for all knowledge (Imsen, 1998; Schunk, 2008). Common to both of the latter two theories, teaching activities involving group work and experience-based learning are highly valued.

As an alternative to these traditional learning theories, George Siemens introduced connectivism (Siemens, 2014). In the connectivist learning theory, knowledge and learning are seen as things that lie beyond the student him-/herself and are "focused on connecting specialized information sets, and the connections that enable us to learn more are more important than our current state of knowing" (Siemens, 2014, p. 5). Siemens' main critique of traditional learning theories is that they do not apply to the technological environment of the digital age, and the inherent educational challenges lying in wait in future classrooms.

In summary, learning environments are complex, and involve many students with individual needs. Students interact with each other and the teacher in different ways. The way we as educators perceive the student and their learning, is dictated by our beliefs and experience, as well as our education and knowledge. The perspectives presented here will provide a basis to discuss the characteristics of the gamified learning environment created by Heimdall's quest in Chapter 3 and 6.

2.2 Games and gamification

To understand gamification, we need to understand games in general and what position games can have in people's lives. I have chosen to divide the discussion on games and gamification into sections defined by context. Games at home concerns games in general, and what we know about students' gaming habits in a private sphere. Games in school discusses the various ways in which games are used for educational purposes, including gamification. Lastly, games as a technology have a position in society that becomes relevant when discussing gamification in a broader perspective.

2.2.1 Games at home - Defining games, gaming and gamers

A game can be many things, and it can have many different mediums, however it is important to distinguish game from play (Ask, 2016; Deterding, Dixon, Khaled, & Nacke, 2011). A common way to separate the two concepts is by using the terms *ludus* and *paideia*, where ludus is gaming and paideia is playing (Deterding et al., 2011). Ludus refers to a situation with set rules and goals, while paideia describes exploring, free from constrictions. In her doctoral thesis, Kristine Ask discusses this dichotomy in depth. According to her, gaming is restricted to the interaction with and consumption of games, while play additionally includes the production of meaning, knowledge, culture and artifacts (2016). Ask emphasizes that play is hard work, and not always fun. Playing a game involves more than just navigating through the steps of the game. A game in this situation refers to everything in the gaming spectrum from a board game to a computer game to a game made up spontaneously by two children. However, in this subchapter I will focus on digital games, hereby understood as any form of game that uses a digital medium. This includes computer-based games, mobile- or tablet-based games and console-based games.

A survey conducted by the Norwegian Media Authority in 2016 revealed that 96% of boys and 76% of girls between the ages of 9 through 16 years old play digital games (2016). Considering these numbers, a large majority of students in the Norwegian educational system have some form of previous gaming experience. According to the same survey, the gender distinction is larger for older students, and there is a difference between kinds of games girls and boys choose to play. Thus, when researching students' previous gaming experience, we need to consider both gender and what kind of games they have played.

How games are classified varies considerably within the gaming community, but some of the most common game genres can be found in Table 1. Accordingly, there are some interesting trends regarding which genders and age groups play what games. Among Norwegian children ages 9-14 years, Minecraft is the most popular game, regardless of gender (Norwegian Media Authority, 2016). Other than that, girls

seem to play more simulation and puzzle games, and boys play more shooter, action and adventure games. I want to point out that these are the trends shown in current research, and it is not intended to mean that no girls play shooting games or vice versa.

Game type	Description	Examples
Shooter	Games where the player engages in various shooting activities, alone or in a team.	Counter Strike, Halo, Call of Duty, Battlefield
Action and adventure	Games where goal is for the player to go on missions and adventures, and create something or solve problems.	Minecraft, Clash of Clans, Subway surfers, Grand Theft Auto, League of Legends
Strategy	Games where the player has to strategize and think ahead, there are often several ways to solve a problem.	Football manager, Civilization, Battlefield
Puzzle	Games where the player solves various puzzles of different types.	1010!, Wordfeud, Candy Crush
Simulation	Games where the player is virtually pretending to do something or be someone.	The Sims, Hay Day, SimCity
Role-playing	Games where the players role-play as other characters, and creates the game together.	World of Warcraft, God Wars
Massive multiplayer-online (MMO)	Games where many players from all over the world play and interact together in a game.	Momio, World of Warcraft, Final Fantasy
Sports	Games where the player virtually plays some kind of sport.	FIFA, Football manager, Rocket League

Table 1: Overview and examples of game categories.
Based on (Adams, 2013; Norwegian Media Authority, 2016)

When studying people who play digital games there is a need to discuss gamer types (types of people who play games), especially time spent on games and the relationship between the gamer and the game. It is common to distinguish gamers on a scale from hardcore to casual gamers (Ask, 2016). Hardcore gamers play a lot and

put a great deal of personal meaning into the game, whereas casual gamers play more occasionally and thus have less personal investment in any particular game. This is a somewhat generalized description, bordering on stereotypes; however, it is relevant to understand that while different categories of players have distinctive gaming habits, they are all still considered gamers. Academically, hardcore gamers are described as using a goal-oriented play style that maximizes the performance, while casual gamers usually have a more playful and positive play style, with little time commitment (Ask, 2016). The common factor here is enjoyment, and the two groups need different things in order to achieve that. It is a common misconception that people who "only" play Wordfeud and Candy Crush on their smartphones are not considered gamers. However, for this purpose anyone who semi-regularly plays any kind of digital game is considered a gamer. Additionally, the various gamer types take part in different cultures. A central part of any kind of gaming culture is talking about and socializing outside of the game, where the level of commitment directs the amount of participation.

2.2.2 Games in school - Gamification explained

The use of games in education has recently gained a lot of attention, and the term gamification has over the last 10 years become a widely discussed topic (Deterding et al., 2011; Kapp, 2012). Playing and gaming have always played a role in the educational system; however, with the rising popularity of games for education, it is not surprising to see that educators are revisiting games and gamification. In this subchapter, I will discuss the different types of games used in education, including gamification.

When it comes to the topic of using games in education, a distinction is often made between using games made specifically to teach a certain topic and games made commercially, solely for entertainment purposes (Deterding et al., 2011; Ready, 2016; The Norwegian Centre for ICT in Education, 2014). Games designed for learning purposes are known as serious games, while pure entertainment games are referred to as commercial games. The DragonBox games are examples of very successful serious games made to teach students (ages nine and up) algebra, and

were at one point more popular in Norway than AngryBirds.[2] An example of a commercial game used in school is The Walking Dead, a zombie-themed game used to teach ethics and religion in upper secondary school (The Norwegian Centre for ICT in Education, 2014).

In addition to serious and commercial games, there is the notion of gamification, which is a relatively new concept in the education sphere. Sebastian Deterding, Dan Dixon, Ralla Khales and Lennart Nacke conducted a thorough study of the term gamification and its origin in 2011 and proposed a definition of gamification as "the use of game design elements in non-game contexts" (Deterding et al., 2011, p. 11). In this definition, gamification is seen as individual parts, rather than an entire game, and as gaming rather than playing. These distinctions are important in order to separate gamification from regular games and toys. Juho Hamari, Jonna Koivisto and Harri Sarsa have a slightly different view in their literature review from 2014 (Hamari, Koivisto, & Sarsa, 2014). They define gamification as "a process of enhancing services with motivational affordances in order to invoke experiences and further behavioral outcomes" (Hamari et al., 2014, p. 3026). In comparison to Deterding et al.'s definition, Hamari et al. have a broader definition, in addition to focusing more on the outcome of the gamification, rather than the content. In Norway, the Center for ICT in Education defines gamification as "using game like rewards as motivational systems, and not necessarily using video games as a medium" (2014, p. 4), In my opinion, this definition too narrowly focuses on the rewards and motivation, and does not cover the broader view of gamification as an encompassing methodology. Therefore, in this thesis I will use Deterding et al.'s definition of gamification as using game elements in non-game contexts.

Gamification as a concept and methodology also exists outside the realm of education, and can be both part of a larger game and a game in itself. The way I see it, both gamification as well as serious and commercial games can all overlap one another as depicted in Figure 1. A serious game can have gamification elements

---

[2] According to an article in Wired: https://www.wired.com/2012/06/dragonbox/

within the game, as well as be a commercial game in the sense that it is designed to be primarily entertaining.

Figure 1: The relationship between serious games, commercial games and gamification.

The gamified system examined in this thesis is Heimdall's Quest, which will be thoroughly presented and discussed in Chapter 3; however, it is worth mentioning some other examples of gamification. In general, gamification can be found in various technologies and applications, often in the form of badges or a level system. The popular beer-tracking app Untappd[3] for instance, gives you badges for trying many different beers or being social. This is an example of gamification because it uses the game element of giving recognition in the form of a badge, in the non-game context of drinking beer. In the educational sphere, variations of badges and levels are common, as well as individual competitive components such as Kahoot[4] (Denny, 2013; Hamari et al., 2014).

2.2.3 Games in society – The role of games in the future

Digital games and the role they now play in children's lives has become somewhat of a controversial topic in Norway, which also has had an impact on the prevalence of such games used in education. The public debate is often characterized by stereotypes, and tends to be concentrated on the amount of time spent on games, their potential for addiction, possible incitements to violence and the risks for social isolation. An example of this is the current media debate on gaming addiction

---

[3] Read more about Untappd here: https://untappd.com/
[4] Kahoot is a popular quiz-site used in many classrooms: https://getkahoot.com/

stemming from a news item published by the Norwegian National Broadcasting network (NRK) during spring of 2017. The Norwegian Labor and Welfare Administration made a statement that gaming addiction was a bigger problem than drug use among young adults outside of the workforce.[5] This caused the gaming community to unite, and there was issued a counter post in the following days.[6] Both on NRK's website and in social media the debate was strongest between the old and the young, the gamers and the sceptics.[7] This kind of polarized public debate about a technology is an example of technological determinism. Technological determinism is one theory explaining the role of technology in society, highly criticized by academics, but very common in politics and media (Ask, 2016; Chandler, 2012; Sørensen, 2006). Technological determinism describes technology as a driving factor of society, and that technological development is pre-determined and cannot be affected by any other circumstances (Berg, 1998; Sørensen, 2006). This perspective on technology is problematic because it does not consider how people interact with technology and how technology's role in society affects that same technology. The theory of domestication counteracts technological determinism by considering the integration of technology into everyday life (Berg, 1998; Sørensen, 2006). By creating routines involving new technology, meaning and identity, and by learning how to use it, we "tame" new technology and it becomes a natural part of our daily life. It is obvious from public debate thus far, that digital games are not yet tamed. The pessimism and optimism that characterizes this debate on the use of games in education is a sign of determinism. For the younger generation, games are becoming a culturally and practically integrated part of their daily lives; however, the educational system has not yet domesticated games.

When discussing everyday life, culture is central. Today's culture is in a great many ways very different than it was a century ago, among other things when it comes to the ludification of culture or culture of play. According to several games and

---

[5] The first news article on nrk.no 17.03.2017: https://www.nrk.no/trondelag/ville-heller-spille-enn-a-ga-pa-skole-1.13424921
[6] Counter article from the gamer community: https://www.nrk.no/ytring/selvfolgelig-spiller-de_-1.13429951
[7] Answer from NAV: https://www.nrk.no/ytring/ungdom-sliter-med-spillproblemer-1.13437881

technology researchers, games have become a cultural medium and a source of formative experiences, in the same way literature, movies and television have been for previous generations (Ask, 2016; Deterding et al., 2011; Raessens, 2006; Zimmermann, 2015). Gaming has become a phenomenon of cultural importance, and technologies such as smartphones and the internet are generating playful identities (Raessens, 2006). The 21st century is being called "the ludic age", the same way the 20th century was "the information age" (Zimmermann, 2015). Similarly, Ask describes the 20th century as the time for moving images, where the 21st will be the century of play (Ask, 2016). Concurrently, Ask emphasizes that the notion of play and games is not something newly created; it is the renewed interest and re-evaluation we are seeing now that is important. However, as we have seen earlier, society does not yet fully recognize and value games as a medium in the same way as Ask, Raessens, Zimmerman and Deterding et al. does.

Now that we have looked into the future of games in society, it is interesting to examine the position games could have in the educational system. At this time in Norway, two major government strategy documents have been recently published about the future of games in the educational system: The School of the Future Report (Ludvigsen, 2015) and the Computer Games Report (Ministry of Culture and Church Affairs, 2008). The former is a review of the current educational system and a recommendation of what needs to be done in order to meet the demands of the future. The four main recommendations towards what will be needed in the future were subject-specific competence, competence in learning, competence in communicating, interacting and participating and competence in exploring and creating (Ludvigsen, 2015). The second report is about computer games in general, where the value of using games in an educational setting is recognized. It states that children who play games are involved and engaged in complex learning situations, and that games can be used as a starting point for discussions (Ministry of Culture and Church Affairs, 2008). Additionally, it emphasizes the role of the teacher as a facilitator and the opportunities for customizing learning towards the individual student.

2.2.4 Gamification - What does the research suggest?

Professor of Instructional Technology Karl Kapp wrote a very influential book on gamification and learning called "The Gamification of Learning and Instruction: Game-based Methods and Strategies for Training and Education" (2012). In this book, he explored the origin and mechanics of gamification, and included an extensive review of literature and previous research. He looked at both peer-reviewed meta-studies on the effectiveness of game-based learning and individual studies on the various game elements. Kapp concluded that gamification can (among other things) change behavior and have a positive effect on motivation and learning (2012). Concurrently, Hamari et al. examined 24 peer-reviewed empirical studies in their literature review in 2014. They found that the majority of these studies concluded that gamification has positive effects and benefits on motivational, behavioral and psychological affordances (Hamari et al., 2014). Positive effects on motivation is considered to be increased motivation, either intrinsic, extrinsic or both. Behavior, on the other hand, is more dependent on context. Positive behavioral change is determined by what kind of behavior the various settings require. In a school situation, positive behavior is related to attendance, punctuality, social interaction, participation and self-organization. When it comes to psychological affordances, this is more related to enjoyment and attitudes, and closely linked to motivation.

Why is gamification successful?

The studies examined by Kapp were in general older in origin than the ones Hamari et al. reviewed, but Kapp took a broader scope in his research. While they had slightly different approaches, both Kapp and Hamari et al. came to the same conclusion, namely that gamification can definitely have a positive effect on motivation and behavior, and in consequence on learning environments. Furthermore, they both identify several underlying factors necessary for gamification to succeed. Hamari et al. suggest that the context being gamified and the qualities of the users as important factors, while Kapp also emphasizes that gamification can often yield better attitudes towards learning than traditional education. Context, users and attitudes are essential to the success of a gamified learning environment, but

how does one ensure this? In this section, I will examine game design principles as an introduction to that "playing field".

The design of the game, both in consideration of user interface and game elements, as well as the quality of the users, is essential to the success of gamification (Gee, 2003; Kapp, 2012). Kapp condensed his findings into three main categories that influence the effectiveness of certain game elements:

- Reward structures
- Player motivation
- The use of avatars and player perspectives

Another influential instance on the importance of good game design is Professor James Paul Gee's work on the connection between learning and the design of commercial games (2007). Many see his research as an argument for using digital games in school, but as Gee specified in the updated version of his book on this subject, it is the learning principles of good games that should be utilized.

> *"Real learning comes from the social and interactional systems within which a powerful technology like videogames is placed, not from the game by itself."*
>
> *(Gee, 2007, p. 216)*

Gee has developed a comprehensive list of 36 learning principles that are found in good games, and summarized the most important ones as follows (2007):

- Building strong identities
- Thinking in "scientific" cycles
- Acting as producers rather than just consumers
- Lowering the consequences of failure
- Customizing to fit learning style
- Building up skills to solve hard problems
- Inducing flow

While Kapp's four categories relate to the cognitive processes happening within the student, Gee's principles concern the functions of the game mechanics. Kapp

discusses how well designed reward structures increases the release of dopamine in the brain, which has shown to have positive effects on motivation. Gee on the other hand, highlights how good games are constructed in a way that walks the player though learning the game and on to solving problems that occur. Kapp and Gee overlap in their research concerning certain areas, for instance that avatars and player perspectives are closely linked to building identities and lowering the consequences of failure.

Criticism of gamification

Gamification, like any other innovative technology, has its skeptics. The main criticism towards gamification among academics and game developers is related to the hype and the game mechanics. On the one hand, gamification as a concept has indeed seen a huge increase of attention over the last decade (Deterding et al., 2011; Hamari et al., 2014). Some critics argue that gamification is just putting different wrapping on old technology in order to increase revenue (Bogost, 2015; Bouça, 2012; Chorney, 2012). According to Ian Bogost, a professor and game designer, gamification is not a style, it is a way of putting game design into use, and is highly critical of the way gamification is marketed in the business world as revolutionary and "a game changer".

On the other hand, there are those who are skeptical to the use of extrinsic motivators (Bouça, 2012; Kapp, 2012; Ryan & Deci, 2000). According to Kapp, the main problems with pure extrinsic motivation are that it can cause resentment among the students if they perceive unfairness, and the fact that it can lead to decreased learning if the student is only motivated by the end reward. In addition, the modified behavior or learned knowledge is in danger of vanishing once the rewards are gone (Kapp, 2012). Deci and Ryan are skeptical to the extensive use of external motivators in general, because they are worried that it will be harmful to the students' initiative and responsibility, also that these can possibly cause physiological distress (Ryan & Deci, 2000). When it comes to the positive and negative effects of both extrinsic and intrinsic motivation, it seems very likely that studies can be found which back up almost any claim that may be made either way. In my opinion, the most

important aspect of this debate is not whether extrinsic motivation is good or bad, it is how we can exploit this powerful tool for motivating any and all students.

Hamari et al.'s review also uncovered some negative effects of gamification, mainly related to the competitive nature of gamification. Considering competitiveness, using any kind of point system falls within behavioristic learning theory as a positive reinforcement. An important aspect of a competition is that whenever there is a winner, there will also be a loser. Among the Norwegian educational community, the behavioristic learning theory is considered outdated, and has been replaced by cognitive and constructivist theories, which emphasize learning through social interactions and building on existing knowledge and experience.

3   Heimdall's Quest - a gamified classroom system

3.1 About HQ

Heimdall's Quest (hereby referred to as HQ) is a gamified classroom system developed by teachers at Heimdal Upper Secondary School in 2013. After working as an ICT teacher in a vocational education-oriented school with high dropout rates and many students who struggled with motivation, Jason Ready and his colleagues developed a gamified system to stimulate student motivation, responsibility and participation in school. HQ creates a gamified school environment where students, among other things experience increased motivation, higher attendance and positively modified behavior (Ready, 2016).

The predecessor to HQ was an analog level system where students received points for good work and behavior, and could progress through different levels. This level system was based on Maslow's Hierarchy of Needs and targeted students self-organization and motivation, rather than factual knowledge (Ready, 2016). Although this level system influenced students' effort in class, and thus academic achievement, the students' participation in class decreased during the school year. In reaction to this, Ready and his colleagues refined the game and created HQ as we know it today. HQ uses the level system as a base, but has added functionality with complex gaming elements and a role-playing dimension.

During the early days, HQ was played using a complex spreadsheet solution, but the developers soon created a web-based graphical user interface and database that is in use today. By logging on to a website, teachers and students can play the game at any time. The game is played by adding and subtracting points or using powers, all via the game site web page. To illustrate this further, Figure 2 shows selected screen shots of the game.
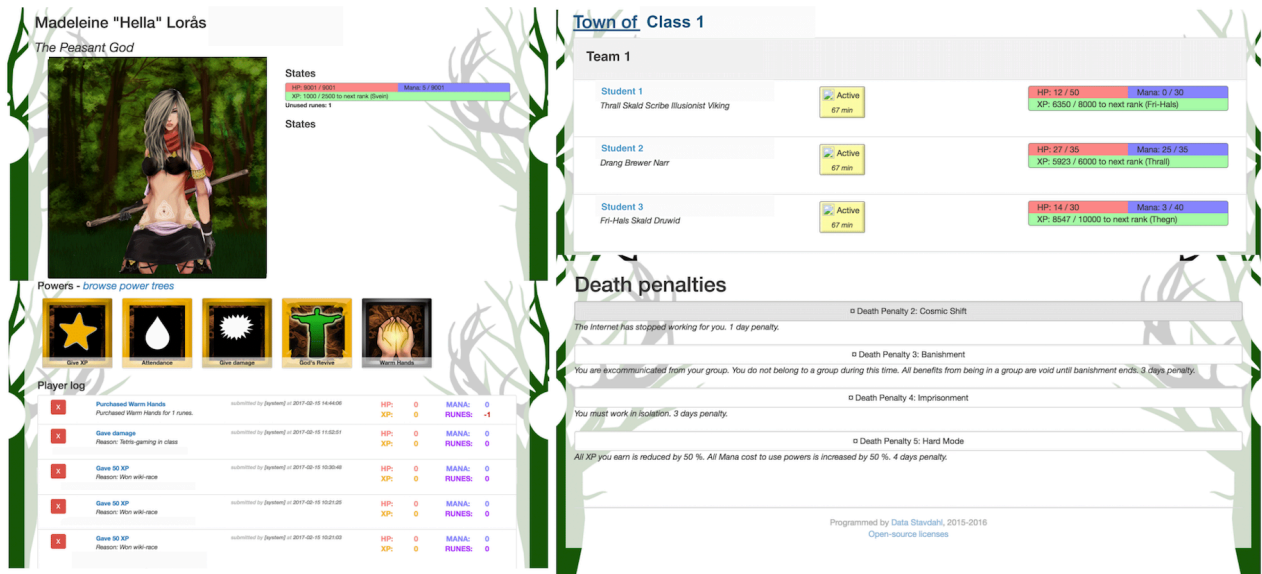
Figure 2: The current user interface of Heimdall's Quest.
The figure shows the character page (left), class page (upper right) and the different death penalties.

This following presentation and discussion is based on Ready's explanations, both in his thesis and in game documentation, as well as my own experience using the game as a student teacher and observation sessions for this study.

3.1.1 How HQ works

The HQ game takes place in a Norse universe where the teachers are Gods and the students are mortals. As Gods, the teachers have universal powers, and act as game masters. The most basic rules of the game are that players are always playing, and all players must respect decisions made by the Gods. In practice, this means that the game is always "on", and the teacher can use it in any way he or she sees fit. This provides the teacher with various pedagogical possibilities to activate, motivate and customize the education. The goal of the game for the student is simply to reach the highest level possible, and the game is never actually won by anyone (much like commercial online role-playing games). However, when the students reach 35 000 XP they become Demigods and can then create a unique power for themselves. In addition, these points come in handy during the "Ragnarok" event at the end of the school year, where the Gods create a week full of activities.

The complex system of gaining and losing points and using powers ensures the students' curiosity and engagement. This system of gaining, losing and using different types of points are similar to most role-playing games. In HQ, every activity or action by a student results in an action in the game. Positive behavior such as punctuality, academic improvement and cooperation will result in receiving points, which the students can use to gain rewards. Negative behavior such as absence without leave or coming late, eating in the classroom or playing other games in class decreases the students' points in the game, ultimately resulting in "death" with a subsequent "death penalty".

Experience points	+	Good behavior or effort, academic achievement
	-	Bad behavior can result in "damage", or loss of points.
Runes	+	1 rune, awarded for 1000 XP
	-	Runes are used to buy powers from the class and profession trees
Health points	+	Every player starts out with a certain amount of HP, depending on his or her class. To gain lost HP, players must heal themselves, or be healed by other players.
	-	Bad behavior, such as arriving late for class or handing in assignments late can result in "damage".
Mana	+	Every player gains 4 mana for attendance in class.
	-	Mana is consumed every time a player uses a power. Different powers require different amounts of mana.

Table 2: Overview of gaining and losing points.

The point system consists of four different point types, which are also given unique roles in the game; experience points, health points, mana and runes (Table 2). The students gain experience points (XP) for good academic work or behavior in class. The amount of XP a player achieves determines the level they are at in the game, and for each 1000 XP they gain one rune. Runes can be used to "buy" powers, which can give the students various freedoms and opportunities to use in the classroom.

23

The students receive four mana every day for attending class. Mana is used to activate a power, and each power costs a certain amount of mana to use. Lastly, health points (HP) determine the life of a player. A student will lose HP for misbehaving in class, and if their HP drops below zero the player "dies". Death results in a death penalty, which is then decided by rolling virtual dice. An example of a death penalty is "cosmic shift", where the student loses internet connection for three days. A summary of the various point types, and how students gain and lose points, can be found in Table 2, and Table 3 describes the different powers.

In the beginning of the school year, the students are divided into groups, which lasts the entire year. Within these groups, all the students must create a character in the game from a certain class, and create a nickname (often inspired by Norse mythology, or their regular gaming name). There are four classes to choose from: Viking, Narr, Seid and Druwid. The different classes are assigned their own strengths and weaknesses, so the group as a whole need to consider which classes each student chooses. In Figure 3 you can see the different qualities for each of the classes.

Each class has a power tree containing powers only that class can achieve. For instance, vikings can buy the "Beserk" power, which absorbs damage for him-/herself or other players. In addition, players can choose to buy powers within six different professions, which all give associated freedoms (Table 3):

Profession	Description
Hunter	The freedom to eat food during class. Varies from being able to eat for 30 minutes, to having the ability to eat whenever.
Brewer	The freedom to drink other drinks than water during class. Varies from being able to eat for 30 minutes, to having the ability to drink whenever.
Illusionist	The freedom to take breaks. Varies from being able to take a four-minute break, to a ten-minute break at the end of a class.
Skald	The freedom to listen to music during class. Varies from being able to listen for 45 minutes, to having the ability to listen whenever.

Oracle	The freedom to play computer games during class. Varies from being able to play for 15 minutes, to having the ability to play for 30 minutes.
Scribe	The freedom to deliver an assignment up to 3 days late. Alternatively, increase mana pool by 10.

Table 3: Summary of professions and their freedoms. All professions include options to extend the freedoms to the whole group. A full description of the professions, powers and cost can be found in Appendix A.

In Figure 3, you can see the different qualities for each of the classes, and Figure 4 provides an example of a power tree. A full description of the classes, professions, powers, freedoms and point assessments can be found in Appendix A.

VIKING

A warrior and protector.

Max HP: 50
Max Mana: 30

SEID

A leader and mystic.

Max HP: 30
Max Mana: 50

NARR

A clown and game master

Max HP: 35
Max Mana: 35

DRUWID

A holy man and healer

Max HP: 30
Max Mana: 45

Figure 3: Overview and specifics for different classes.
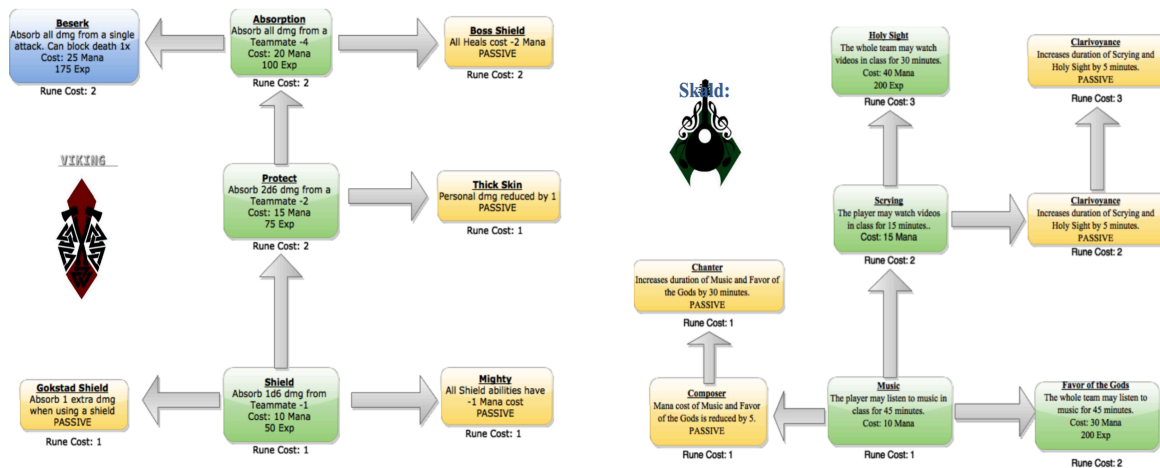
Figure 4: Example of power tree for the Viking class and the skald profession.

In summary, the students develop a complex character over the course of the school year. Each player has some powers linked to their class, and some they can choose individually. The main difference between powers obtained through class and profession, is that class powers involve game mechanics such as points, whereas profession powers only concern classroom freedoms. This means that class abilities are focused on progression, while professions are more about individually based freedoms in class.

How HQ is used

In some schools, HQ is used in all subjects, and is therefore in play throughout the school day, but it is also possible to use it only in one specific subject. The game is in no way used to assess academic performance and grading[8], however, there is a possible correlation between performance in the game and grades (Ready, 2016).

In the class examined in this study, teachers and students use HQ throughout the entire school day. A typical day starts with giving attendance mana to all students who are present and giving damage to those who are late. Often, the school day consists of teacher instruction and project work in groups. During instruction, the teacher can give XP to students who participate in class discussion, or who ask

---

[8] The Norwegian educational law states that teachers are not allowed to grade students based on effort.

questions and give responses. With group work, the whole group can earn XP by doing well or working efficiently. The teacher as a God is free to give out points and damages to encourage participation or discourage bad behavior. Throughout the entire day, students who break the classroom rules can be assigned damages. For instance, if a student is caught playing a computer game in class without activation of his power, he or she will receive a damage of minus 12 HP. Other examples are eating, drinking or listening to music without the use of a power, all of which result in losing 6 HP (or XP, depending on situation). The way this works, is that students can initiate powers in the web application whenever they want to. Some powers do however need teacher approval to insure they do not disrupt the class. If the teacher observes behavior that may break the rules, he or she can check the web application to see if the student has activated that specific power.

3.1.2 Previous research on HQ

In his master thesis research, Ready found ten major themes describing students' experiences with HQ (2016). He conducted seven interviews in total, with present and previous students who currently used or had previously used HQ. They all described very positive experiences, my favorite quote being:

> *"Heimdall's quest is not only great, and motivating, but including. I wasn't the person to seek contact with a group, but Heimdall's quest helped me to do that and to be a part of the group and class fast."*   *(Ready, 2016, p. 74).*

These are examples of increased cooperation and positive social aspect, which are two of the themes Ready discovered. The other eight are personal choice, self-organization, modifying behavior, attendance, experience points, powers, game mechanics and motivation. Personal choice reflects how each student's choices in the classroom have a consequence in the game, and students responded well to that. Accordingly, self-organization relates to the fact that students had to organize their participation in the classroom in order to progress. Modifying behavior explains the positive effect HQ had on student's orderly and conduct grades, while focus on attendance also positively influenced their overall attendance in school. Experience

points and powers were also shown to be strong inducements for extrinsic motivation, and are examples of how the core game mechanics worked to motivate students of all genders. Motivation, both intrinsic and extrinsic, can then be considered an important element that is consistent and underlying in all the themes.

3.1.3 Discussing HQ

HQ is an encompassing web-based game, with both serious, commercial and gamification game elements. It is a serious game because it is designed for educational purposes, and does not exist in a non-school setting. It is a game that cannot be played without teachers, students and classroom activities, because these actors and the interactions between them constitute the game itself. On the other hand, HQ can be modified to fit other contexts, such as an office environment or various sports. It is commercial in the sense that it builds on established commercial elements. For instance, the building of characters incorporates role-playing, the interaction between all the players makes it an online, multiplayer game and the Norse universe is adventurous. Lastly, HQ is a gamified system because it utilizes these aforementioned game elements in a non-game context; namely school.

My review of HQ concludes that there are aspects from all the learning theories underlying the learning environment. The HQ system builds on the cognitivist and constructivist views on knowledge and learning in the sense that knowledge resides within the student, and learning happens though experience and social interaction. One can argue that the focus on behavior modification is behavioristic; however, it can also be seen as a way of teaching students how to learn, which is a central theme in the connectivist learning theory. On the topic of motivation, HQ definitively builds on both extrinsic and intrinsic motivators. The complex points system falls within the behavioristic notion of positive and negative reinforcements, however the way the students gain these points builds on cognitivist, constructivist and connectivist features. Lastly, the teacher uses teaching methods that fall within all learning theories. The act of giving and receiving points is behavioristic, while the activities that facilitate the points system are based on group work and experienced

based learning such as are discussed in cognitivist, constructivist and connectivist theories.

In summary, the effect the gamification of HQ has on the various aspects of the learning environment is to some extent known. However, there are many unexamined factors, especially concerning culture, students' self-perception and significance of commercial gaming experience, which constitutes the core of my research inquiry.

4   The research process

4.1 Qualitative research

The research paradigm defines some important fundamentals, which along with the research inquiry drives the design of the study forward. As qualitative research pioneers Egon Guba and Yvonna Lincoln put it:

> *"[The research paradigm] represents a worldview that defines, for its holder, the nature of the "world", the individuals place in it, and the range of possible relationships to the world and its parts..."*

> *(Guba & Lincoln, 1994, p. 107)*

Successively, Guba and Lincoln outline four common paradigms: positivism, postpositivsm, critical theory and constructivism. This research project is based on a constructivist paradigm, which views the world in a relativistic way, rather than realistic (Guba & Lincoln, 1994). In other worlds, I believe the world is constructed by interactions between people and worldly items, such as nature and technology.

The constructivist paradigm is summarized by answering fundamental questions about ontology, epistemology and methodology (Guba & Lincoln, 1994; Postholm, 2010). Ontology describes what there is out there to know, while epistemology concerns how one can know anything about this. Within the constructivist view, these two questions of what reality is and how the researcher can research this reality are reciprocally linked. Because the researcher must in some way interact with the reality being researched, ontology and epistemology is inseparable. It is only when these two concepts are defined, that we can discuss how to go about acquiring this information through methodology. In turn, methodology concerns how knowledge is collected, and is traditionally divided up into a quantitative and qualitative orientation, although recently mixed methods have become more common (Robson, 2002). Figure 5 illustrates these three questions, and summarizes the overall research design for this project, which I will continue to describe in the following sections.
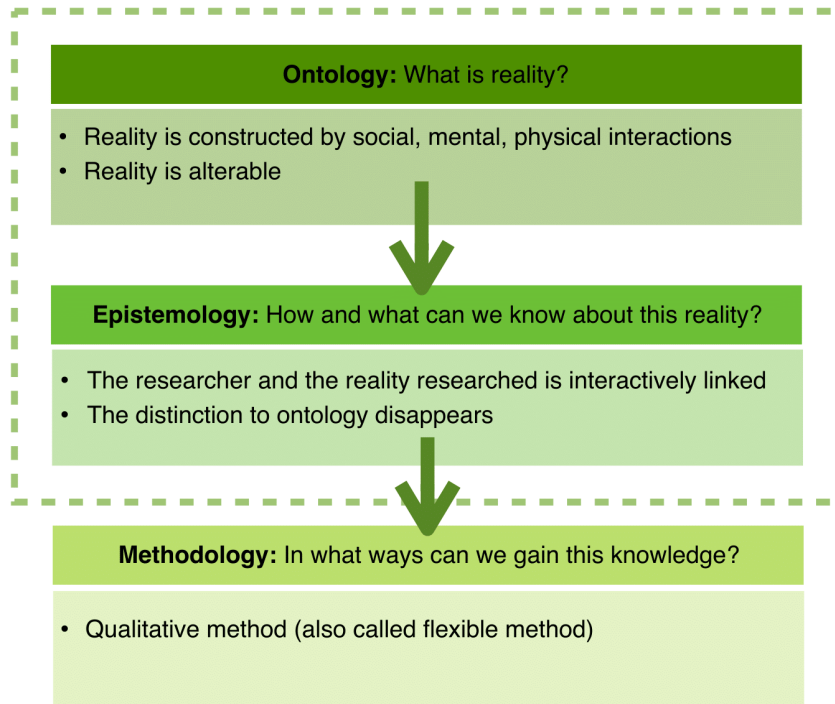
Figure 5: Summary of constructivist research paradigm used in this project. Dashed line symbolizes the reciprocal relationship between ontology and epistemology.
Based on (Guba & Lincoln, 1994; Postholm, 2010; Robson, 2002)

My position and preconceptions

As described, I have based this research project on a constructivist paradigm. Otherwise, it is worth mentioning that I consider myself a casual gamer. I have played various mobile and tablet games, but have limited experience in more complex computer games. I find enjoyment in easy puzzle and social games, because it is something fun to do as a break from work or study, or to pass the time. Nevertheless, I am very fascinated by the hardcore gaming culture, especially the amount of time and effort some gamers put into their games. Additionally, I have spent an extended period of time, first as a student teacher and later as a substitute teacher, at the school participating in this study. This has given me a great deal of experience using HQ as a teacher; however, I had not met this particular class of students before starting this project.

4.1.1 A qualitative case study

According to researcher Colin Robson, the research inquiry should drive the design of a study (2002). Considering that my research question is concerned with how someone is affected by something, it is reasonable to consider a qualitative approach. Within the qualitative direction there are many design possibilities, however, I chose to structure my project as a case study with a grounded theory based analysis. I founded this decision on the fact that the research inquiry involves humans and their experiences, and that there is a need to extend existing knowledge and possibly create new theories on the topic (Yin, 1981). In addition, the development of the research design and research inquiry was influenced by the regulatory conditions and timeframe for my thesis, as well as my previous experience as a researcher.

According to Robert Yin and his well-known research on the use of case studies, the case study methodology is a good way to describe, explain or explore a phenomenon. Yin's definition is used in many papers on qualitative research design and case studies (Bassey, 1999; Postholm, 2010; Robson, 2002); therefore I chose to base my study on his definition:

> *"A case study is an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident."*　　　　　*(Yin, 2009, p. 18)*

The contemporary phenomenon in my study is the use of gamification. The context is mainly the school environment; however, the home environment is also of importance. As for the boundaries between phenomenon and context, this is exactly what I wish to research: How does gamification affect students' experienced learning environment? Furthermore, Yin's definition requires a case study to be bound in time and space, and that the research is conducted in a naturalistic setting (Robson, 2002). In this situation, the study was conducted within a short time frame (four months), and within the same group of students in their regular school environment. Specifically, a class of upper secondary students in ICT vocational secondary school.

To maintain chain of evidence as requested by Yin, I will give in the following subchapters a detailed report of the data collection process and method of analysis, as well as give arguments for my choices for approach and a brief insight into why I decided against using various other methods.

4.2 Research design

Yin emphasizes that case study research is an iterative process, where the researcher should base decisions on what needs to be done during the research process on the various steps of the research. Following the nature of the iterative process, I reviewed and reflected at each step of the data collection, and did some form of either interpretation and/or analysis before continuing. At each step, I also assessed my work and plans in light of my research inquiry, which included continuously revising and adjusting the questions. The figure below shows each step of the process, including what types of reflections or analysis were performed at various points.
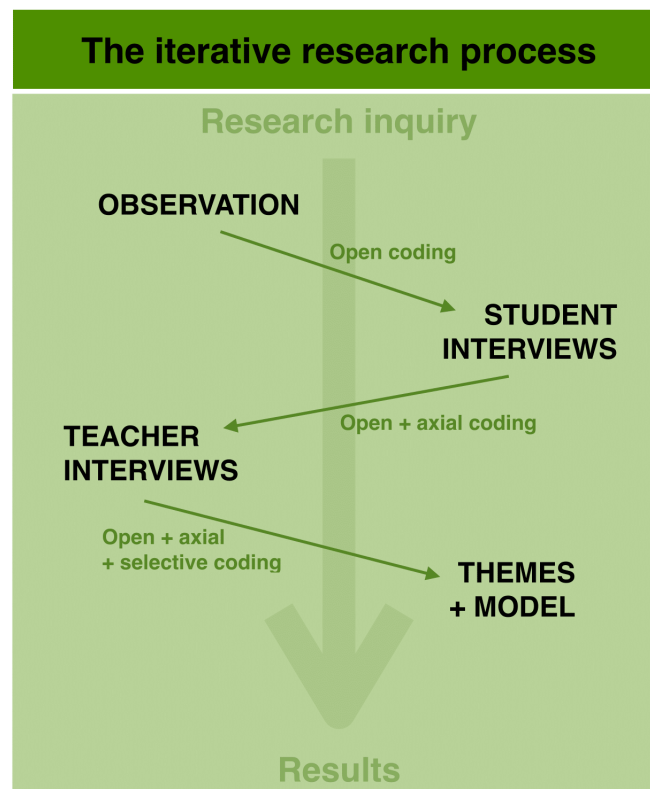
Figure 6: The iterative research process.
The specifics of open, axial and selective coding will be described in Chapter 4.3.

Using Yin's five components and categorization of case studies I created a study protocol summarizing the research design (Yin, 2009). Firstly, I developed two propositions based on my initial research question (see Table 4). This led me to separate and define the unit of analysis and case, which made it clear that this case study was a holistic single case (Yin, 2009). It was holistic because I only had one unit of analysis; the gamified learning environment provided by HQ, and it was a single case because I studied one specific class of students, at one specific school. Table 4 below summarizes all four components and categorizations. The next subchapter describes the specific observation and interview techniques. For more details, see the study protocol in Appendix B.

Research inquiry	How can a gamified classroom contribute to an increase in the students learning outcome?
Propositions	What characterizes the gamified learning environment of HQ? To what extent is commercial gaming experience a significant factor?
Unit of analysis	The gamified learning environment provided by HQ
Case	Class of students at an Upper Secondary school in Norway using HQ during the academic year 2016/17

Table 4: *Summary of case study components.*
Based on (Yin, 2009, p. 27 and 47)

My research inquiry consisted of two dimensions: *the gamified learning environment* and *students' commercial gaming experience.* In order to gain insight into the *students' commercial experience* dimension, I chose interviews with students as a data collection method. The students are the only direct source of information about their habits, beliefs and experiences. Considering that these were young people and strangers to me, I chose to do extensive participatory observation so that I could build a relationship of trust with my interviewees. In addition, this allowed me to base my participant selection on acquired knowledge about each student from this observation.

For the second part, *the gamified learning environment*, I chose to interview teachers in addition to the student interviews. At this point, I considered also doing interviews with previous students as well, with an expectation that their years away from school could give them some increased insight on their own learning experiences. However, the nature of a case study in itself suggested I stay true to my case, which was in this instance confined to one particular class of students, during the 2016/17 academic year. Additionally, I planned to do the teacher interviews at a later time than the student interviews, so that I could use those initial findings to develop the teacher interview guide. In the following sections I will explain the data collection methods observation and interviews in general, and describe how I decided to implement them.

4.2.1 Observation

Unlike formal structured observation, where the researcher deliberately does not interact with the situation, informal participatory observation is defined as observation of a situation where the researcher participates in the activity (Robson, 2002). Since the main goal of my observation was to establish a relationship of trust with the students, participatory observation was the natural choice. In addition, because of my previous work at this particular school and my relationship with the teachers there, I was able to participate in a natural, accepted way. I also arranged permission for this from the teachers in advance, so that I could walk around and talk to the students both about their schoolwork as well as other subjects.

I did a total of three days observing. During the first observation session, I presented myself, my research project and explained my role as a participant in their class. I made sure that I talked to all the students, and learned all their names. In the second session, I just said good morning, and positioned myself at the back of the class to observe. I alternated between sitting at the back of the class where I could see most computer screens, and walking around the class, continually making notes. Within 24 hours of leaving the class, I transcribed these notes info full field notes. While reviewing these notes I found that more observation would be of value in order to have a closer look at how the students interacted with HQ. I discussed this with the

teacher, and we agreed on including more HQ interaction during my next visit. The third session was largely similar to the second, except there were more points gained and lost in HQ.

4.2.2 Interviews

In the research context, interviews are commonly categorized in structured, semi-structured and unstructured interviews (Robson, 2002). For both student and teacher interviews I chose to do semi-structured interviews. I had drawn up a set of topics and questions that I wanted to talk to the interviewees about, but I also wished to let the flow of the conversation determine the order. These topics and questions were prepared in an interview guide, which also included an introduction and conclusion (Appendix C).

When preparing the interview guide I based the topics and questions on my research inquiry. For the student interviews, I started the conversation with exploring the students' relationship to HQ. By starting with inviting them to show me their character in the game, I allowed the students some time to get comfortable in the interview context. This also allowed us to be seated side by side rather than opposite one another, and thus required little eye contact as we both looked at the computer screen. The interview situation could then be a less intense experience and I hoped the students would feel safe, and in turn would answer honestly. The next conversation topic was the student's perception of learning, and their opinion on the learning environment. Lastly, I asked some questions examining the students gaming experience outside of school as well as how they perceived their own gaming habits.

When conducting the interviews, I wanted to make sure not to disrupt the students' workflow, or cause the students to miss plenary sessions. My solution to this was to participate in class as I did during my observation sessions, and then take aside individual students whenever there was an appropriate time for us to talk. For instance, when a student had finished an assignment, or during a break. In addition, I made sure the interview sessions did not exceed 20 minutes. The interviews were audiotaped, so that I could have the freedom to listen and participate in the

conversation. These audio recordings were anonymized and transcribed shortly after the interviews were conducted. The ethics of informed consent and data protection is discussed in Chapter 4.5.

For the teacher interviews I started by reviewing their relationships to games in general, and the use of games in school. After that, we discussed their views on HQ and how they felt it affects students' learning. Lastly, I presented some of my initial findings from the student interviews for the teachers to comment on. The teachers were emailed the questions and a summary of my findings beforehand in order to give them some time to consider their responses (Robson, 2002).

Transcription

Transcribing audio recordings of an interview is an important part of reducing the amount of data for analysis (Robson, 2002). Written accounts are easier to work with, in addition to providing more privacy for the participants. Additionally, the process of transcribing can be an effective way for the researcher to familiarize him-/herself with the data material. However, when transcribing, it is important for the researcher to be as objective as possible. For this project, I used the qualitative data analysis program NVivo to transcribe the recordings, which allowed me to adjust the speed and timestamp the various quotes. I attempted to do the transcribing of an interview within 48 hours, and while transcribing I concentrated on only writing down what they actually said, and not interpret any meaning. An example of this is writing down pauses and stutters, rather than noting that the person is thinking. For each interview, I listened through the whole recording once before starting the transcription. I also gave each quote a number, and identified if it was the participant or myself who was speaking. When transcribing my handwritten field notes, I used a similar structure to organize the data.

4.3 Method of analysis

In this project, I had collected three different data types: observation, student interviews and teacher interviews. Observation generated a set of field notes, which I analyzed to create interview guides. Student and teacher interviews generated audio recordings, which I transcribed accordingly. As mentioned earlier, this study was designed in an iterative manner (see Figure 6, p. 33), which meant that analyzing the various data sources had to be performed at different times. In the following subchapters, I will further explain my method of analysis. I will go through the basics of the grounded theory method of analysis, and the way I performed open, axial and selective coding in the various steps.

4.3.1 Grounded theory analysis

A central part of the qualitative analysis is to reduce the data, and in extension make sense of the findings. The method of analysis in the research project was based on the grounded theory methodology. It is important to clarify that grounded theory is both a research paradigm of its own, and a method of analysis (Postholm, 2010). In this project, grounded theory was used as a method to analyze the data, rather than an underlying ideology. The aim of a grounded theory analysis is to generate theoretical ideas, explanations and understandings from the collected data (Corbin & Strauss, 2014; Robson, 2002). There are two main orientations within grounded theory, developed by Glaser & Strauss in 1967 and Corbin & Strauss in 1994 (Corbin & Strauss, 2014). These orientations disagree on the role of previous knowledge, where Corbin & Strauss argue the "need to build theory from concepts derived, developed, and integrated based on actual data" (2014, p. 6). In other words, there is room for including existing theories and the researcher's knowledge in the analysis process, which I found most suitable for my project.

The reason I chose this approach, is partly that the nature of this study was to find new connections between known phenomena. In addition, grounded theory is advantageous when analyzing several data sources, in comparison to a phenomenological approach. Lastly, Corbin & Strauss have developed a structured

and reliable process that is consistent and manageable to implement, which in turn validates the qualitative research methodology (Shenton, 2004; Yin, 2009). Since there are many different interpretations of grounded theory methodology, I will now explain my approach in detail, which is based on Corbin & Strauss (2014) and Robson (2002). This analysis is subsequently based on doing constant comparisons in three phases, thus creating codes and categories which in turn can be theorized (Corbin & Strauss, 2014; Robson, 2002). The three phases are referred to as open, axial and selective coding.

4.3.2 Open coding

The goal of open coding is to find codes and categories, which summarizes the data in a satisfactory way (Corbin & Strauss, 2014). Codes are concepts that stand to meaning, and categories are a collection of codes who closely relate or depend on each other. I began the open coding process by reading through printed out transcripts and field notes in order to become familiar with the data. After that, I examined the data again and underlined every statement that I found interesting, without reflecting on why. During the third read-through, I started to label the different underlined statements based on my own reflections, and in this way created codes. I attempted to abstract the codes by using different terminology when describing them than the students (Corbin & Strauss, 2014). This process was used on both teacher and student transcripts. For the field notes I did a version of this process before preparing the interview guides; however, I did not use the notes for further analysis because they did not provide much insight into the students' experience.

The final phase of open coding consisted of transferring the codes from the interviews to the qualitative data analysis program NVivo.[9] NVivo is a tool that allows the researcher to organize, analyze and find insights in different types of qualitative data. I chose to use NVivo because of the amount of data I had gathered, and I

---

[9] More in NVivo can be found here: http://www.qsrinternational.com/nvivo-product
License was provided by NTNU.

wanted the ability to move around and adjust codes in a structured way during the various steps of the iteration.

For student interviews, I added all codes that were in relation to my research question. This process reduced the amount of data substantially. For teacher interviews, I attempted to use the existing codes as far as possible and in this way, confirm and enlighten what I had already found. Nonetheless, not all codes from the teacher interviews fit within the existing codes, and in those cases, I added new ones.

To categorize these codes, I used a hierarchy of NVivo-nodes. After careful review and editing, I had 53 codes to be categorized. NVivo is a powerful tool, and it is important to not rely on the software to do the analysis (Robson, 2002). In order to maintain this, I used a system of post-it notes to categorize the codes. I wrote each code down on a post-it, and used the colors green, pink and orange to separate codes mainly concerning HQ, gaming in general and the learning environment. I compared each note to the others, placed them on a table at suitable distances following that comparison, and in that way created clusters of codes.

This process of coding and categorizing was done for both interview data sets, and when I did this for the teacher interviews, I found one additional category. This phase of the analysis process was directed by the iterative nature of the research design, in the way I constantly revisited and reviewed codes and categories. In the end, I found that the codes clustered into nine categories. The categories are listed and described in Table 5, and the underlying codes can be found in Appendix D.

Category	Description	Codes
HQ, games and learning	Student descriptions of their experience with HQ. This includes both direct interaction with the game, indirect consequences caused by the game and reflections related to the game.	8
Motivating gameplay	Statements describing the HQ gameplay as motivating, inspiring and encouraging.	7

Self-assessment	Statements including self-assessment and comparison to others.	5
Working hard	Student statements describing the inclination to work harder for some reason relating to HQ and/or school.	3
Extra push	Student statements describing the "extra push" to achieve something, referring to both HQ, games and school in general.	7
Why students enjoy gaming	Student statements describing their motivation and interest in gaming.	6
How students learn	Statements describing their own learning patterns and how they think they learn best.	6
What students learn from games	Student statements describing their own reflections on what they can learn from games in general.	6
Gaming culture	*Student and teacher statements concerning the students' role in gaming as a modern culture and the affect that has on the teachers and the educational environment.*	*5*

Table 5: Overview of categories and number of codes. Italics indicate that the category identified during analysis of teacher interviews.

In addition to nodes, I used NVivo-cases to keep track of and categorize my research participants. I created NVivo-cases for all the students and teachers, and used attributes to document information they all had in common, such as games they played, and how much time they spent gaming each week (see Table 7 and 8, p. 48-49).

4.3.3 Axial and selective coding

After the open coding phase was saturated for each of the steps, I began the axial coding (Corbin & Strauss, 2014). I decided I had reached saturation when no new concepts were emerging from the data sets, and I started to develop an idea of hierarchy and relations within the categories. During axial coding the researcher explores the relationships between the categories, making connections and hierarches (Corbin & Strauss, 2014).

After the open coding of the interviews, the clusters of post-its illustrated a clear hierarchy between categories, which I have called themes. The themes were *motivation*, *games and learning* and *identity and culture*. The themes and underlying categories are illustrated in Figure 7.

Identity & Culture

| Gaming culture | Why students enjoy games | Self-assessment |

Games & Learning

| What students learn from games | How students learn | HQ, learning and games |

Motivation

| Motivating gameplay | Extra push | Working hard |
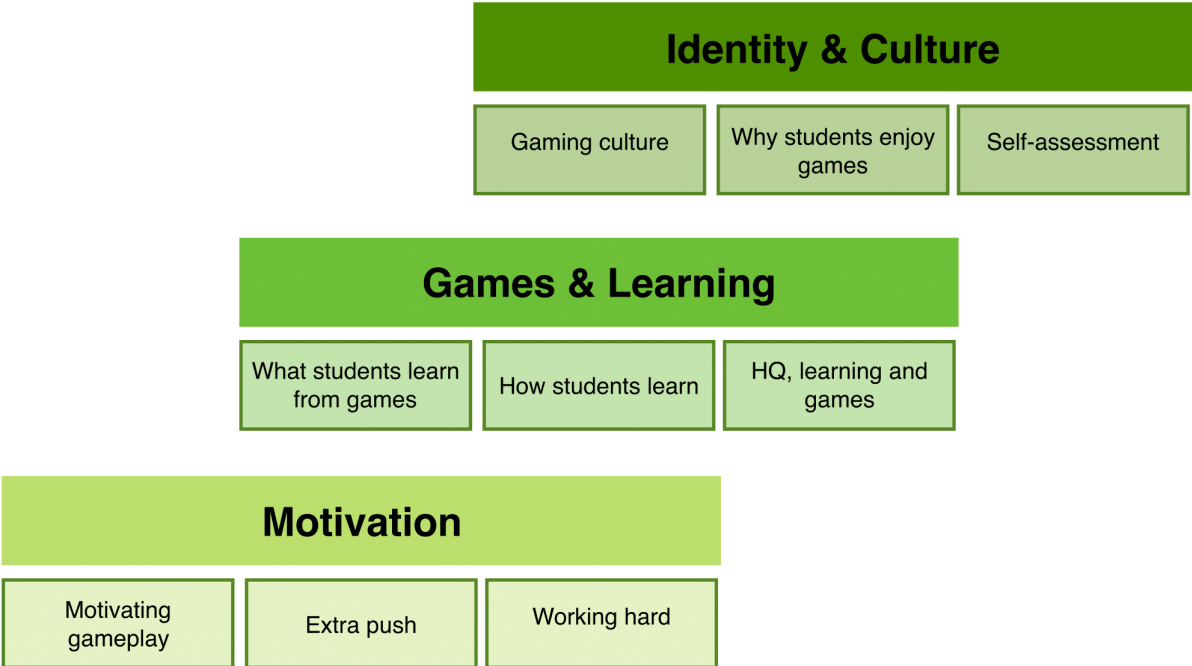
Figure 7: Final theme with underlying categories.

With the final themes identified, I was ready to do selective coding. The purpose of selective coding is to identify central codes (Corbin & Strauss, 2014; Postholm, 2010; Robson, 2002). By abstracting and summarizing the data, the researcher can isolate the essential findings. The themes I had found during axial coding summarized three important dimensions in the students' and teachers' descriptions of the gamified learning environment. In order to examine how these themes relate to my research inquiry, I zoomed out and tried to view the themes in light of concepts and research presented in Chapters 2 and 3. This revealed a model of the gamified learning environment describing the students' experiences in different situations and levels as depicted in Table 6 (p. 43) and Figure 8 (p. 62), and will be further explained in Chapter 5.5.

Level		Theme	Situations being affected
1	Student level	Motivation	The motivating gameplay
2	Classroom level	Games and learning	The gamified classroom
3	Society level	Identity and culture	The students position in society

Table 6: Relation between themes and model.

4.4 Validity and reliability

Validity and reliability are terms used to describe the quality of a research project. According to Robson there are three main threats to the validity of a qualitative study: description, interpretation and theory (Robson, 2002). In comparison, Yin differentiates between construct, internal and external validity (Yin, 2009). Construct validity concerns how well the operational measures were performed, which is what Robson refers to as description. Internal validity concerns establishing credible results during analysis, while external validity concerns the possibility to generalize the findings and is secured during research design. Internal validity falls within interpretation, while external validity falls within methodological theory. I will be discussing the validity of this project with regards to research design and data collection, and analysis. When it comes to reliability, this is a term concerning the dependability of the study (Shenton, 2004) and will be described further in subchapter 4.4.3.

4.4.1 Validity of research design and data collection

The research design of this study was based on established theory on case study design. I used several different sources to develop a design that fit my research inquiry, and created an extensive research protocol. This ensures an external validity of the study by making the process transparent and acts as an audit trail (Robson, 2002).

During the actual data collection process, I made extensive notes during observation and recorded all interviews. This ensures that the raw data is correct, however, the

credibility of said data lies in the hands of the participants. During observation, there were certainly situations I was not able to record, and my presence in the classroom might have interfered with activities (Robson, 2002). Furthermore, I could not directly control the truthfulness and openness of the interview answers. This is what is known as respondent bias, which in addition to researcher bias, is a common threat to qualitative research projects (Robson, 2002). There are, however, some established strategies for dealing with these threats. In addition to the audit trail, I have used triangulation, member checking and prolonged involvement to counter these threats (Robson, 2002; Shenton, 2004).

I used observation over several weeks (prolonged involvement) as a way to gain trust within the class, which can reduce the threat of respondent bias. Nevertheless, during interviews, I sometimes I got the impression that the students answered what they thought I wanted to hear. However, they were very frank and open about their gaming habits and would often describe negative aspects of teachers and HQ, which leads me to believe they were being honest. Additionally, the fact that I am myself not so many years past completing secondary school, and thus closer in age to the students than the teachers, may have influenced trust as well.

Furthermore, I gave each respondent, both students and teachers, the opportunity to read their transcribed interview afterwards (member checking). When I had finished transcribing each interview, I emailed copies to the ones who had requested their transcription. I did not receive any responses, which could indicate that they did not have any amendments or additional statements. However, it could also mean that they simply never read it.

Lastly, I used multiple sources of evidence to reduce the threat to respondent and researcher bias (triangulation). When conducting a case study, it is a major strength to use multiple sources of evidence (Postholm, 2010; Robson, 2002; Shenton, 2004; Yin, 2009). There are different ways to ensure triangulation. You can have multiple data sources, different investigators, various theoretical perspectives and methodological approaches (Patton, 2002 via Yin, 2009). In this study, I have used

different data sources, specifically five students and two teachers. Considering this is an individual master thesis investigator triangulation was not possible. Similarly, the possibility to use different theoretical perspectives to the data set was limited by the time constraint. However, there is a methodological triangulation in using both observation and interviews as data collection methods.

4.4.2 Validity of analysis

When it comes to the validity of the analysis, Corbin and Strauss use the terms credibility and applicability (Corbin & Strauss, 2014). Credibility concerns that the findings are believable and plausible, and applicability relates to the transferability to other situations and contexts. According to Corbin and Stauss

> *"[…] credibility indicates that the findings are trustworthy and believable in that they reflect participants', researchers', and readers' experience with the phenomena."*
>
> *(Corbin & Strauss, 2014, p. 346)*

To insure credibility in the participants' views, I shared my findings with teacher participant Peter. We reviewed and discussed the results together, and he expressed familiarity with the results. Nevertheless, as Corbin and Strauss emphasizes, my findings provide one of many possible plausible interpretations of the data. There will always be some researcher bias present during analysis. The researcher's experience, beliefs and views will color the perception of the data. To counteract this, I have given a description of my experience and preconceptions in the beginning of this chapter. Regarding applicability, I will further discuss this aspect in Chapter 6.3, along with the generalizability of my findings.

A negative case analysis is one possible way to neutralize the threats to the credibility of the study. A negative case is a piece of data that contrasts the main findings of a study (Corbin & Strauss, 2014). Although a negative case analysis might seem like a way to discredit the results, Corbin and Strauss view it as a "dimensional extreme or variation on the conceptualization of data" (Corbin & Strauss, 2014, p. 295). In my study, I included negative and contradictive statements not directly

supporting my findings in order to insure validity. These statements are presented in Chapter 5, along with the rest of the results.

4.4.3 Reliability

The reliability of a study concerns the notion that reconstructing the process, under similar conditions, would lead to the same results. According to Yin, the objective is to ensure "that if a later investigator followed the same procedures as described, [..], the later investigator should arrive at the same findings and conclusions". In order to ensure reliability of a study, each step of the research process needs to be thoroughly documented, there should be a sufficient amount of data and a certain level of transparency regarding the researchers views and beliefs. The amount of data collected in this study was guided by the need to collect information from a set of persons representing various groups of students, and after observation five students and two teachers seemed sufficient for this need. Although, I would have liked to have both genders present in this study, this was not possible considering the class participating did not have any. In addition, the topic of gender in relation to games is a controversial area, demanding its own research project.

In this chapter, I have given a detailed description and justification of the different steps of data collection and analysis, in addition to an account of the research paradigm, ontology and epistemology that substantiate this study. This description ensures an increased reliability.

4.5 Ethical considerations

The most important ethical consideration in this project is the privacy of the participants. In any qualitative study the participants' words and actions are the essence of the research, however, their personal security should not be jeopardized because they chose to contribute (Robson, 2002; Yin, 2009). In order to have a fully ethical study I followed the Norwegian Centre for Research Data's (NSD) guidelines for data collection. All research projects involving people have an obligation to notify NSD if the study processes personal data of any sort. After taking their online

notification test I decided to notify NSD because my project involved using computer based devices and a small, possibly identifiable group of participants (Norwegian Centre for Research Data, n.d.). Even when anonymizing interviewees, since HQ is currently not widespread, the privacy of the participants was possibly at risk. I was worried about revealing the gender of the interviewees because if there were female participants it would not be hard to figure out who these were. This turned out not to be a problem, since there were only male participants. Nevertheless, I notified NSD on 1 January 2017 and my study received project number 52207. On 23 February 2017, I received an answer concluding that my project satisfied the requirements. In Appendix E and F, you will find respectively the informed consent form and correspondence with NSD.

In order to protect the collected data and the anonymity of the participants, I took several precautions. During both the observation and interview processes, I took notes by hand, and transcribed them on my computer at a later time. Once the handwritten notes were digitally saved, I destroyed the originals. The digital notes were stored in a password-protected document on a password-protected computer, and was never shared or stored on any kind of cloud service. For the recording of the interviews I used my iPhone's recorder application, making sure the phone was offline until I was able to password protect the files and save them on my computer. In all documents, I used pseudonyms for all participants, and the system used for assigning pseudonyms was never written down directly in the same location.

Lastly, I was concerned with the students' psychological welfare, and the possible effects of the questions being asked and the response to being chosen or not for interviewing. I did not want the students to feel judged or interrogated during interviews, and attempted to be positive and encouraging to all their answers. Additionally, I did not want anyone to feel excluded by selecting certain students, and utilized a volunteering practice when choosing students for interviews. When students did not immediately volunteer, I did then also have the option of asking certain selected students. This way, no one would feel left out, and I got a varied participant pool.

5   Results and analysis

By following the methodology described in Chapter 4, I identified some central themes to enlighten my research inquiry. In the following chapter, I will present the different themes, and provide some examples from the data set. I will present the different participants and some essential background information before I describe the three themes: *motivation*, *games and learning* and *identity and culture*. Lastly, I will present the model of a gamified learning environment.

5.1   Participant cases

The participants in this study consisted of five students and two teachers, from an ICT vocational secondary school in Norway. The students all belonged to the same class, and the teachers taught different subjects in this class. The names of the participants have been changed for reasons of anonymity. The following tables provide some information about the participants.

Students

Student	XP	HQ character	Future plans	Current games	Average time spent on gaming per week in hours
Mikkel	24625	Narr	Apprentice	Minecraft	2
Hans	29821	Seid	Apprentice	World of Warcraft	40
Arne	23226	Viking	Apprentice	GTA, Battlefield	5-50
Tore	16000	Seid	Apprentice, folk high school	Counter Strike	50
Richard	18276	Seid	General studies	Counter Strike, League of Legends	10-20

Table 7: Student cases with attributes.

Teachers

Teacher	Years as a teacher	Gaming experience	Remarks
Peter	16	Regards himself as a gamer, and has been playing all kinds of computer games his whole life. Games as much as he has time for, wishes he had time for more.	Has been involved in the development of HQ and is the contact teacher for this class.
Truls	3	Regards himself as a gamer, and has been playing all kinds of computer games his whole life. Permits himself to game as a reward, avoids very time-consuming and demanding games.	Was a student of Peter himself, and has experience with the level system (HQ predecessor).

Table 8: Teacher cases with attributes.

5.2 Motivation

The motivation theme concerns all references, direct and indirect, regarding the use of games and gamification as motivating. This theme includes three categories, which I will present and explain in the following subchapters. All quotes have been translated from Norwegian, and the numbers in brackets refers to the statement number in the transcription.

5.2.1 Motivating gameplay

The first category in the motivation theme is motivating gameplay, which includes all descriptions of the HQ gameplay being motivating, inspiring and encouraging. Gameplay in this context refers to the different game elements of HQ, and this category concerns the way students seemed to be positively affected by the elements alone. Some of the students talked about their characters, powers and game events with great enthusiasm, and it is striking to see how engaged the students became in everyday activities such as eating and drinking.

> *"Yes, I have food. Ehh. I can eat for one hour if I use 10 mana. Also, I have drink. For drink I have endless, so I can drink as much as I want. Also, I have music, where I*

can, let me check… I can listen to music for 35 minutes for 5 mana. And I have toast,
and horn. For those I can bring either one of my group members, so they also can
drink for half an hour, or everyone can drink for a half hour."   Arne (17)

In close relation to the game elements and events, there are the group dynamics, which both students and teachers highlight as important. Peter described it like this:

"They respond well to the groups and are especially motivated to become Demi-gods
or to have a high progression."   Peter (41)

Where both teachers were very direct in their description of group dynamics as a motivating factor, the students on the other hand, were more ambiguous. The students focused more on their own role in the group, and how they needed to conduct their gameplay to get more points and freedoms. Take Richard for example:

"Yes, that's my main task. I have to give mana to the rest of my team. And that's my
main thing, while the rest do different other things. Like, give me life and help me.
And then I give them mana back, so that they can help me."   Richard (9)

On the competitive nature of HQ, both students and teacher described it as a positive motivator. Richard did not acknowledge competition as a part of HQ, but the other students talked about competition against both themselves, other students and the teachers. Arne described it like this:

"[…] there is more motivation, like, the competition between students and teachers."
                                                                        Arne (51)

When it comes to the possibility of the competition as having a negative effect on motivation, they all opposed that notion with comments such as "losing is part of the game" or "you win some, you lose some". Tore for instance described losing as a good thing:

"No, well… the competition is just that you push yourself ahead. Unless you are a
very strange person and thinks that everyone is better than me and that there is no
use even trying."   Tore (67)

Teachers largely agreed with these statements, and added that they would always attempt to create competitive situations where everyone could win some points or create different types of competitions so that everyone had a chance to win something during the year. Furthermore, the teachers underlined the importance of not having a lot of player-versus-player interaction, which is quite common in commercial games.

> *"I think it's OK, the competitive aspect, because it is not so-called, PVP [player versus player], it's not player against player. They can't kill each other. Only gods can kill them, and it is something they all accept. If they could kill each other, I think the system would be more destructive than helpful. Now, it causes unity instead of division."*
> *Truls (37)*

Interestingly, player-versus-player interaction was something the students name as a possible positive element. When asked what could change HQ so they would learn more, many of them mentioned more player-versus-player interaction.

5.2.2 Extra push

The second category within the motivation theme is the extra push students describe regarding both HQ, commercial games and school in general. The extra push terminology is used in the context of the HQ gameplay and arises from the element of competition. An example of the former is Tore's depiction of how gaining XP (experience points) works as an extra push:

> *"Let's say there is 1000 XP to finish this assignment. Like, I want that XP. Also, I want to finish the assignment. So, at least I get it finished."*
> *Tore (63)*

An example of the extra, competitive push is Richard's view on how competition drives him:

> *"…that's [competitions in the classroom] the kind of thing I will join. Because then I know I have to be best to be able to do it."*
> *Richard (77)*

As we have seen the students describe a definitive push in the gamified classroom, however, they differ on what they feel they are pushing towards. Goals vary from improving grades and being best at something, to being active and finishing a task or assignment. Richard's previous statement is one example of a push to be best. Consequently, Hans described a push to improve grades in this way:

> "So, instead of a grade 3 assignment, I hand in a grade 5 assignment. It [HQ] makes me want to go higher to gain more points."   Hans (39)

Furthermore, a similarity in most statements was a positive inclination towards the push element. An example of this is the way Hans talked about how HQ inspired him to be active and work more:

> "It does inspire us to do more. Some don't care at all, and just keep going as regular students. But many think HQ is good. And then we join a lot of active things. We join the group more, and work more."   Hans (29)

When it comes to the teacher's perspective on how the students respond to HQ, they highlighted the push to behave well. Truls described it like this:

> "For some, maybe they are more motivated to come to school, and that it gives them that extra push. And when they're at school, it is easier to learn more too. Less likely to fall off and quit."   Truls (25)

The students were also indirectly touching on behavior in their narratives about attendance and punctuality. However, this aspect of the game seems to produce less enthusiasm than being best or finishing assignments.

5.2.3 Working hard

The third category within the motivation theme is the students' descriptions of the inclination to work harder for some reason relating to HQ. This differs from the extra push category in regard to the inner-outer perspective. Where an extra push acts as an outer force, the inclination to work hard is something that comes from within. The difference is subtle, but as I will discuss in the next chapter, this inner-outer

perspective is theoretically justified. Hans, for instance, talked about how HQ made him work more than usual.

> *"We kinda do more assignments than we would regularly do if we did not have something to motivate us. Because, the more we do, the more points we get. And the more points we get, the more powers we get, that gives us more freedoms."*
>
> *Hans (29)*

The notion of freedoms recurs in the student statements. They expressed enjoyment and gratefulness towards the opportunity to take responsibility for their own school day. Mikkel included the freedoms in his description of what he liked about HQ like this:

> *"Because, you get more freedom to do what you want."*
>
> (Interviewer asks him to explain)
>
> *"No, well, if you need a five minute break, you can take a five-minute break. It will cost you some mana, but that's it… Yeah, I think it's genius."*   *Mikkel (36-37)*

In addition to gaining freedoms, the students described a drive to gain new levels, finish tasks and get things done. Gaining the top level and becoming a Demi-god is a recurring topic, and as Arne stated:

> *"I have a long way left yet. I just have to keep working hard, and I will make it."*
>
> *Arne (23)*

The drive to become Demi-god is also touched upon by the teachers as well. However, the other subcategories are not mentioned directly by the teachers.

5.3 Games and learning

The games and learning theme concerns all descriptions of how students view their own learning, regarding both HQ and games in general. When discussing the connection between games and learning during interviews, we touched upon both learning in general, the educational aspects of commercial games and the gamification of HQ. This theme includes three categories, which I will present and explain in the following subchapters.

5.3.1 How students learn

The first category in the games and learning theme contains descriptions of how the students learn, including their own learning patterns and how they think they learn best. The most prominent view in this case was that the students are different, and learn in different ways. When asked to describe how they learn best the students mentioned theoretical, practical and relevant learning activities, as well as combinations. Richard's description is very representative:

> "I'm more, like, practical. I learn best by doing things. But if he [the teacher] does not explain it to us first, I don't stand a chance to get it. It's way too advanced to just test it out, and figure it out. So, he has to explain it to us first, then we can test it ourselves."

> *Richard (61)*

When it comes to relevance and interest, this was something most of the students highlighted. Some found it important that tasks and assignments were relevant to their future, and some talk about their personal interest. Mikkel, for instance, believes interest should be a larger part of the school day.

> "[…] but I think if there is an opportunity there to talk about something you are interested in, within the topic, then I think there should be an opportunity to do that."

> *Mikkel (55)*

5.3.2 What student learn from games

The second category in the games and learning theme concerns reflections on what students can learn from games in general. This includes both specific facts, topics as well as various skills. When asked what they learn from playing commercial games, some students focused on factual aspects of computers, knowledge about different cultures and historic events or improved English proficiency. Hans reflected on how different war games had taught him some useful knowledge in social science and history.

> *"There are some things in school, like social sciences and history. I have learned a lot about World War II by playing games from that time. I learned a lot… and it's also helpful in school."*
>
> *Hans (67)*

Furthermore, they all mention improved English proficiency because of online interaction with other gamers. For example, Richard stated that he thinks ICT-students perform better in English class.

> *"Yes, I would generally say that ICT students are among the best in English. Really. Because we use most of our time playing games and everybody plays in English."*
>
> *Richard (107)*

Some students also highlighted the different skills they acquired by playing various games, such as responsiveness, creativity, positivity towards tasks and social skills. An example of this is Mikkels reflections on creativity:

> *"The creativity I have brought with me to other things. I draw a little sometimes, I guess I got that from games, I would think."*
>
> *Mikkel (69)*

When it comes to social skills, both students and teachers describe situations where playing commercial games teaches students about social interaction. Tore described it like this:

> *"Like… just being nice to people. Because, it's like, if you for example start a round by saying "cyka blyat" [very rude Russian term], then it will end up with everyone being rude to you the whole game, or that whole round. And then you will lose. So, if you're just a nice person, then people will behave in a way to have a nice time. And in that way everybody does well, I guess."*
>
> *Tore (97)*

Lastly, some students also stated that there was no connection between learning and playing commercial games, or only for some games. Take Arne for example:

> *"I don't think you learn anything from playing Battlefield and GTA and stuff like that no. I don't think so, no. By shooting people? What could you learn from that? Like, no, I don't think you learn anything."*
>
> *Arne (87)*

However, Arne also stated he had learned about computers and improved his English though gaming.

5.3.3 HQ, learning and games

The third category in the games and learning theme concerns student descriptions of their experience with HQ, including their opinions on the game and how it affects their learning. Their overall opinion was positive, although there were some negative statements regarding how HQ is implemented. The students described the presence of HQ as fun, engaging and a way to make the school day more enjoyable. The way some students compared school with HQ to previous school experiences without HQ is remarkable.

> *"You learn a little more. At least more than regular school."* Hans (29)

> *"I would say that I learn more by using it [HQ]. Like, at least compared to previous school years, there I've had problems with certain assignments."* Mikkel (53)

These statements are also examples of how the students perceive HQ in connection to learning. Most students believed HQ increases their learning outcomes, however some were less certain.

> *"I think it's kinda the same, if there was HQ or not."* Tore (43)

The teachers, on the other hand focused more on how the students learn and the quality of the learning process. Peter characterized it like this:

> *"I wouldn't say that they necessarily learn more. They learn how to learn. And they learn better because of that."* Peter (45)

On the topic of how HQ is implemented, the students highlighted rules and the role of the teacher as important. When it comes to rules, the students state that fairness and consistency is essential. Arne stated that the rules and consistency make it more fun:

> *"Yes, well, it's more fun that way. It is supposed to be a game. It's not deadly serious, but like, it's not right that the teachers are very strict with us, and it has to be this way*

and this way, if not you'll be damaged, but then they don't follow that themselves."

Arne (59)

In addition, Arne also criticized the way the teachers (who are Gods in HQ) are exempt from the rules, and how that can be demotivating. Other students added a dislike for the strictness of the rules; however, this can to a great extent to be somewhat expected in a classroom of teenagers. On the other hand, consistency and repetition were factors the teachers classified as key to the success of HQ. Peter described repetition and frequency as two of the most important things:

> *"Well the most important thing… well there are three things. Repetition is important because it needs to be used, often. And frequency. You need a certain amount of frequency, it has to be used daily. It has to be used consistently."*
>
> *Peter (43)*

The last thing Peter stated as most important is the role of the teacher, and how the teacher uses the game:

> *"[…] the teachers need to be involved in the system they need to consistently as far as using the powers damaging things that have to be consistent using those things and the need to be involved as far as being creative and adapting based on the student's needs and progression."*   *Peter (43)*

Truls shares this opinion:

> *"But the teachers have a lot of responsibility, to use the system. If they don't use it, then the chances of the students learning more decreases."*   *Truls (27)*

As an example of how the students view the role of the teacher in the use of HQ, take Mikkel's description:

> *"Peter is a genius person. That has come up with this idea. I think he… I don't really know if I would have thought this year would be nearly as fun if it wasn't for our teacher."*   *Mikkel (101)*

Lastly, the students and teachers presented some interesting reflections on HQ in comparison to other games. In general, these comparisons concern the language

57

and mechanics, and how HQ uses concepts that are familiar from commercial games. For example, here is Mikkel's description:

> *"But it is principally the same thing I guess, use mana… use different powers. You take damage when you make mistakes in the game. The game is actually the school day."*
>
> *Mikkel (87)*

5.4 Identity and culture

The identity and culture theme concerns references to students' identity as gamers, including their self-assessment as to why they like to play games and their position in the gaming culture. This theme differs slightly from the other themes because many of the categories already described earlier, appear here as well. For instance, the social aspect recurs in many categories, and self-assessments closely relate to aforementioned categories. The theme includes three categories, which I will present and explain in the following subchapters.

5.4.1 Self-assessment

The first category within the identity and culture theme is the students' self-assessment of their gaming habits, learning and behavior. A summary of the different types of games they play and time spent on gaming can be found in Table 7 (p. 48). Notably, they all play games regularly, and some quite a lot of time. For some of the students, gaming is a major interest, while for others it is just a pastime activity or hobby. In addition, they state that they have played different games in the past, and most of them say they used to play more before. Consequently, when asked about their own gaming habits, they were quick to start comparing themselves to others. It could be a subtle statement, like Arne's:

> *"I haven't played that many games myself."*
>
> *Arne (65)*

Or a more direct description such as Richard's:

> *"And if I master a game, then I want to keep on playing. But I'm not like the rest of the class. They play like 20 times as much as I do."*
>
> *Richard (89)*

Additionally, when it comes to the social aspect of gaming, the students tend to argue why they believe gaming is social. I will cover more on this in Chapter 5.4.2

Their descriptions on self-assessment of learning is covered in Chapter 5.3.3. In addition, an important note on the students' own views on learning is that they are not consistent in their descriptions. Some students state that they do not learn much more by using HQ, but at the same time say that this school year has taught them more than other years. Teacher Truls reflected on this paradox:

> *"It does help students who are very academically weak to still have a very good school year. They can thrive. Even though they don't get good grades, they have an environment they are comfortable in and enjoy, that they can get through it, that they're here."*   *Truls (79)*

When it comes to behavior, this is not something the students generally reflected on. The teachers, however, did have many reflections on this subject. The teachers seemed to be very aware of behavior change among the students. Take Peter for example:

> *"And those things are then being taught not as a direct thing but as a behavioral modification. It's not it's not like saying this is what we're doing to you, it's learning the values by repetition."*   *Peter (47)*

In addition to behavior, the teachers assessed the students' motivation as well. Where students stated that they were or were not motivated, the teachers reflected on the reason for this.

> *"Like, students who generally are motivated, are motivated by HQ as well. But those who maybe don't care as much, about games or school, are on the fence. Either they are very invested, or they don't care at all."*   *Truls (29)*

5.4.2 Why students enjoy games

The second category within the identity and culture theme concern the students' reasoning for why they enjoy gaming. The most prominent reported motive for playing games is because it is fun. Hans summarized this well:

> *"Well, it's fun to play games because… you have the competitive aspect, that you want to get better and better. Like, you get powers. And it gets easier with reaction time and stuff. Also, you have the story, like, games have so many good stories. So much lore and stuff like that. So, because of that it is fun and interesting to see so many different stories. And you have games where you just walk around and have fun. Have fun finishing stuff, or just… yeah, walk through different worlds that people have created. Look at their creativity."* Hans (53)

In this statement, Hans additionally described gaming as interesting, creative, challenging and social, which are positive aspects mentioned by the other students as well. Mikkel, for example, described creativity like this:

> *"I think it's genius. You have… there is sandbox. There you have the opportunity to do whatever you want then, basically. So, the creative part, I've always been a big fan of the creative part."* Mikkel (69)

The second most prominent motive mentioned by the students is the social aspect. In Tore's words:

> *"It is a team game. I like to be part of a team."* Tore (77)

Furthermore, Arne added an interesting argument on why he viewed gaming as social:

> *"Well, you play with others. Even if it might be wrong to say it's social, it is social."*
>
> Arne (79)

These types of arguments for gaming being social are mentioned by other students as well. Mikkel, for example, added a statement that being social in real life is important too.

> *"Like, I do believe that you have to be social with actual people too, but it [games]*
> *does help the social aspect."*   *Mikkel (73)*

When asked about the social aspect of gaming the teachers highlighted the social effect gaming as a hobby had in the classroom.

> *"Gaming is like a common interest. So socially, they connect over gaming."*
>
> *Peter (41)*

5.4.3 Gaming culture

The third category in the identity and culture theme is gaming culture, which includes descriptions concerning the students' role in gaming as a modern culture and the effect that has on the teachers and the educational environment. Truls gives an example of this:

> *"There has not been a lot of gaming, except when we sometimes talk about and*
> *connect stuff we are working on to a game, by connecting it to group*
> *accomplishments and team work."*   *Truls (21)*

This illustrates how the class culture is affected by the common interest in games. Furthermore, how important it is for the social environment. Peter described the gaming culture in the class like this:

> *"It's just like sports. You talk about sports together if you like football or soccer or*
> *whatever. Talk about that all day because of common interests. It's the same kind of*
> *concept."*   *Peter (21)*

This category also differs from all others in that it is only directly described by the teachers. However, when reviewing the students' interviews there were some indirect references. For instance, student descriptions in the other categories within the identity and culture theme are related to culture, but also, motivating gameplay and HQ descriptions can be viewed as examples of gaming culture in the classroom.

5.5 Model of the gamified learning environment
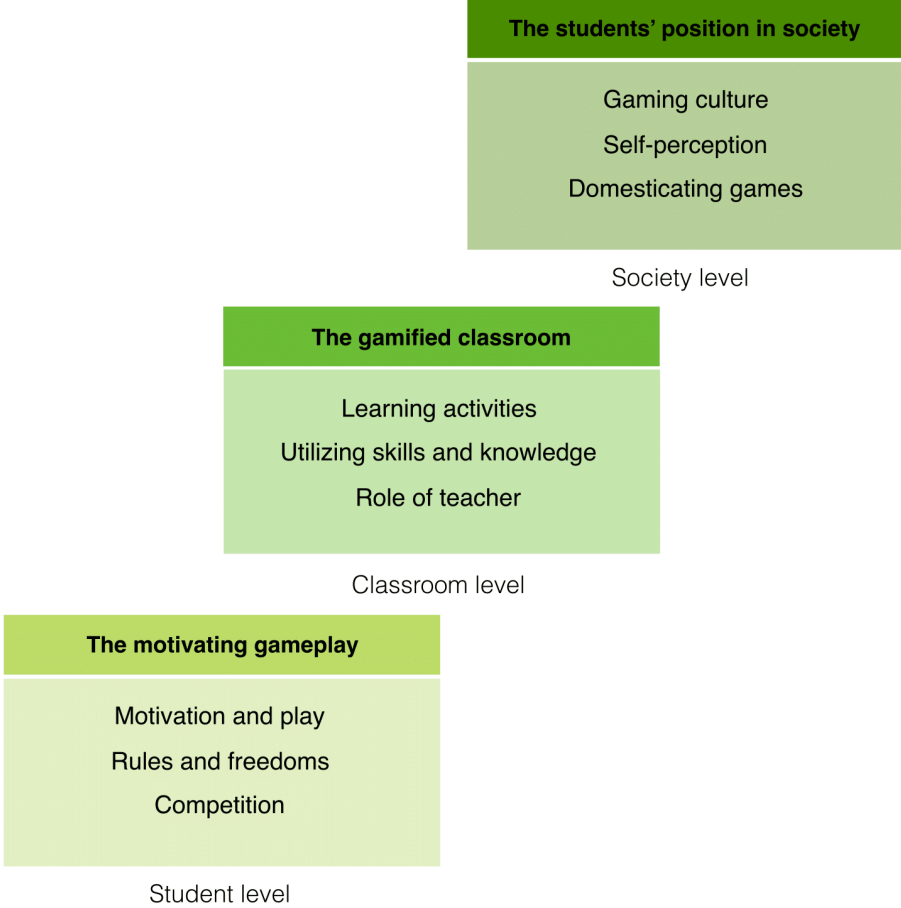
Figure 8: Model of the gamified learning environment.

My analysis of these themes led to the development of a model of the gamified learning environment. The different themes describe situations at different levels of the students' school experience. The model and the way these situations interact is illustrated in Figure 8 and described in Table 6 (p. 43). In the center, you have the gamified classroom. This environment is on one side affected by the motivation of the student. On the other side, it is affected by society, and how the student views him/herself in the world. The motivation theme describes the student level, and how the students' motivation is affected by the playful and competitive elements of gamification. The motivation of the student is at the student level because motivation

is something that exists within the student. The identity and culture theme describes the students' position in the gaming culture, and the importance of identity and self-worth. The identity and culture theme is at a different level, because it is about how the student relates to the rest of the world, at society level. The games and learning theme describes the gamified classroom, how the students learn in school, in games and in this classroom. These three levels together constitute the gamified learning environment, and will be further described and discussed in Chapter 6.

6   Discussion

In the analysis of my data, I found three themes that constitute the three levels of a gamified learning environment: the motivating gameplay, the gamified classroom and the student's position in society. I defined a learning environment as the social, cultural and pedagogical components that surround the learner. These components are evident throughout the different levels. In this chapter, I will discuss the implications of these findings in light of the definitions, theory and previous research presented in Chapters 2 and 3. In this way, I will attempt to answer my research question: How does gamification affect students' experienced learning environment? I will first assess the features of the HQ learning environment evident in all three levels, and then the significance of commercial gaming experience. This model, and the various aspects discussed in this chapter is summarized in Figure 8 (p. 62). Lastly, I will discuss the implications of these findings for future education and research.

6.1   Features of the HQ learning environment

6.1.1 The motivating gameplay

The findings in this study indicate that students in a gamified learning environment are motivated by the game mechanics, and in HQ especially, the opportunity to take responsibility and customize their learning experience and school day. The students responded well to the group dynamics and the competitive nature of the HQ system. Consequently, these findings suggest that the motivating gameplay of HQ can be divided into two categories: working hard and extra push, describing an inner and outer drive towards gaining points, powers and academic achievement.

Motivation and play

The overall increased motivation is not surprising, considering the previous research on gamification done by Hamari et al., Kapp and Ready (2014; 2012; 2016). My analysis of the HQ learning environment revealed two driving forces of motivation:

working hard and the extra push. The difference between the *extra push* category and the *work hard* category lies in the inner-outer perspective. This can be explained by intrinsic and extrinsic motivation, respectively (Ryan & Deci, 2000). The extra push described by the students, is an outer factor and can therefore be seen as extrinsic motivation. Likewise, the work hard category describes an inner drive as in intrinsic motivation.

These categorizations describe the motivational drive; however, it is interesting to examine the driving force and the desired goal surrounding these descriptions. The driving force behind both is the different parts of the HQ gameplay. The game mechanics involving receiving points and damage lead to extrinsic motivators, resulting in an extra push. On the other hand, game elements such as character powers and professions, group dynamics, desire to progress, levels and competitions seem to cause intrinsic motivations. Consequently, the intrinsic gameplay elements are driven by the complex points system, and could not exist without it. Therefore, the extrinsic motivators in one way cause the intrinsic motivators. In other words, the whole gameplay design creates several "paths" towards a motivated student. Some students are motivated by the intrinsic aspects such as the groups and the characters alone, while others need an extra push to enter the flow of intrinsic motivation.

The difference between gaming and playing becomes apparent when you compare the two categories to each other. Using Ask's definitions, the *extra push* category describes gaming, while the *working hard* category describes play (Ask, 2016). The students who focus on the freedoms and possibilities of the HQ-gameplay, rather than just the points, are playing the game because they put more meaning in the game than just navigating through the steps. This playfulness is essential in the effort to fight the possible negative effects of extrinsic motivations. My research indicates that introducing playfulness to the points system can influence the students to apply meaning to the points, and thus shift the motivational drive from extrinsic to intrinsic.

Rules and freedoms

The findings in this study indicate that the various gameplay elements of HQ act as motivating forces. As discussed, the complex points system provides extrinsic and intrinsic drive; however, the rules regarding powers and professions are also influential. Skaalvik and Skaalvik emphasize the structure of the education as essential for a successful learning environment (1996). In this case, the system of powers and professions in HQ provide a structured framework for the students to be independent and take responsibility. My findings suggest that the freedoms provided in the gameplay are highly valued by the students.

Consequently, frequency and structure is something the teachers highlight as important for HQ to be successful. The value of repetition is important in Gee's learning principles as well, especially to lower the consequence of failure (2007). An important aspect of commercial games is that the player knows that there will be more chances to earn points in the future. By using HQ frequently and consistently, students know that there will always be more chances to gain points, which can lower the pressure to perform in individual situations and influence the students to think long term.

6.1.2 The gamified classroom

The findings in this study indicate that students in a gamified classroom learn in various ways, theoretical, practical and in relation to interest, as is normal in any classroom. The fact that the students have different perspectives on their own learning both in school and in games is not unexpected considering that the student participants are teenagers. Moreover, the way the students often are inconsistent in their descriptions of learning through commercial games and the educational value of HQ, is in my opinion confirmation that there is a great deal of learning that happens subconsciously. In contrast, the students seem very aware of the effect HQ has on their motivation.

Learning activities

The various learning activities that constitutes a gamified classroom are the parts of the non-game context that are gamified by using HQ. Previous research on why gamification is effective revealed the importance of context, user quality and attitudes towards learning (Hamari et al., 2014; Kapp, 2012). My findings indicate that the students greatly appreciate that the context of school is gamified, and that it positively influences their attitude towards learning. On the topic of user quality, I will discuss the connection between gamified learning activities and commercial gaming experience in Chapter 6.2.

The findings from this study on the success of the various learning activities fits with most of Gee's summarized learning principles (2007). The way the students develop their characters and avatars with powers is a contributing factor to building strong identities, and directly relates to Kapp's avatars and player perspectives category (2012). In addition, the rules of HQ create a world within the school where the players (i.e. students and teachers) interact. The second principal evident in HQ is that the students act as producers, rather than just consumers, in the sense that students' actions have a corresponding elements in the game. Likewise, customizing activities to fit the students' individual learning style is an important principle in the game. The powers system allows students to choose freedoms that fit their learning style. Additionally, teachers can customize further by adding individual freedoms. For instance, the teacher can implement a "taking breaks" power for students who have concentration difficulties.

In the cases where HQ alone does not fulfill Gee's learning principals, the notion of context and user quality becomes essential. These principals are as follows: thinking in scientific cycles, lowering the consequences of failure and building skills to solve difficult problems. In my view, these are all achievable in HQ, but it depends on how the teachers use the game. Since the teachers and students largely create the narrative of the game, thinking in scientific cycles does not happen by default. However, the way the teacher structures the game can induce this. For example, the teachers can award points for completing steps throughout a project, rather than at

67

only upon completion of a project. The same can be said for building skills to solve difficult or complicated problems. An example of this for these particular students is that their biggest challenge is often the single, verbal exam covering the entire curriculum that is given at the end of the school year, for which the students are prepared iteratively throughout the year. Similarly, the teacher can lower the consequence of failure by allowing students a second chance at certain tasks.

6.1.3 The student's position in society

The findings in this study has shown that the students are very aware of their own place in the gamified classroom and role in the gaming culture. The amount of time spent on commercial games and the types of games played vary among the participants; the common factor is that they are all gamers. From information gained in my interviews and observation, I would consider all of the students except Mikkel as hardcore gamers. By the same criteria, both Mikkel and the two teachers could also be considered as definite casual gamers, which indicate that they may have been hardcore at some point in their lives. The types of games they all play on a regular basis cover most categories, and fall within the expected types for their gender. On the topic of gender, my study was not able to include any girls, which could be considered somewhat limited as to selection of interview subjects. There were no female students in the ICT class in which my study was conducted, unfortunately a rather typical situation in ICT vocational education programs, which traditionally has had very few female applicants.

Domesticating games

My findings suggest that games are a natural part of these students' and teachers' everyday life. They all play games regularly at home, and describe gaming as a hobby and leisure activity that is a regular part of their day. This indicates that games are domesticated in their home life. Consequently, the way HQ is seamlessly integrated in their school day suggests that HQ is domesticated in their education as well. HQ is part of their daily routine, has meaning and creates identity in the learning environment.

However, this is not consistent with the education sector in general. When considering the number of children who play games regularly, this issue may also become problematic in the future. The percentage of children who play games is quite high and rising, and my results indicate that there is reason to believe these children have domesticated gaming technology. The dichotomy between school and home can be problematic because if the educational system does not represent a world that the students know, the knowledge and skills they learn in school may become inadequate in the future. This is part of what the alternative learning theory for connectivism is so critical about, and emphasizes the importance of basing learning methods and educational approaches on future needs (Siemens, 2014). As mentioned earlier, both the leading Norwegian government strategy documents on the topic of future learning and the use of computer games highlight the necessity of preparing students for future needs and cite the value of gaming as educational approaches (Ludvigsen, 2015; Ministry of Culture and Church Affairs, 2008).

6.2 Significance of commercial gaming

6.2.1 The motivating gameplay

The findings in this study indicate that students are motivated by the gameplay, and they have extensive experience playing commercial games. In a sense, they are accustomed to the influence of extrinsic motivators such as points, levels and winning outside the school context, and my research suggests there might be a correlation with their experience playing commercial games.

The aspect of competition

Competition is an important aspect of the HQ gameplay, and as discussed in Chapter 2 competition can be seen as a controversial motivator. My findings indicate that the students in this study respond positively to the competitive nature of HQ. Concurrently, the students in this study are gamers, and the results imply that students' commercial gaming experience might be significant in relation to the effect of competitions. On the one hand, the students are used to being in a competitive

environment, which might influence their experience in the classroom. In a sense, the students are used to winning and losing, and therefore are not necessarily negatively affected by the latter. On the other hand, research suggests that the playful nature of games is significant. If the students view HQ competitions as play, the consequence of failure is lowered, and thus the possible negative effects of losing.

6.2.2 The gamified classroom

In my results, the students differ in their opinion as to the educational value of the commercial games they play at home and the effect of the gamification in HQ. Additionally, the teachers in this case seem to value the students gaming skills and attempt to utilize them in an educational setting as much as possible.

Utilizing skills and knowledge

Based in my findings, some students find great educational value in their gaming habits, while others do not. They do agree however, that their communicative English skills have been improved by the international aspect of gaming online. Other than this, their descriptions vary to some extent. In my opinion, this is a sign that there is room for improvement in helping students reach their full learning potential.

Students acquire a set of skills and many kinds of knowledge while playing commercial games. Some of these skills and knowledge may never be directly applicable in a school context; however, the skills and knowledge that could be applied should be utilized as much as possible. Academically speaking, these can be skills such as leadership, strategy and planning, creative thinking and problem solving, while examples of relevant knowledge can include historical, geographical and cultural facts. The students in this study have clearly incorporated a large set of skills and knowledge through their gaming experiences. However, to what extent they are able to use these skills and knowledge directly in a school context could be limited, even in a gamified classroom. However, my findings suggest that the role of the teacher has great potential in this regard.

On the other hand, the technical skills and knowledge the students acquire about general game mechanics and terminology seem to be very applicable in a gamified classroom. The students are familiar with terms such as experience points, penalties and levels, which are arguably useful when learning how to play HQ. Consequently, these can also play a number of roles in the social aspects of the game.

Role of teacher as gamer/ non-gamer

My findings indicate that the teacher is essential to the educational potential of the gamified learning environment, which is true for most learning situations. On the one hand, the teacher can utilize the skills and knowledge students acquire through commercial gaming in subject-specific activities. In this case, the teachers' experience with commercial gaming becomes significant. The teacher must have some knowledge about what the students may have learned; however, this knowledge does not need to come from the teacher playing all the same games that their students play. My results imply that curiosity about the students' skills and knowledge, and an overview of the possible overlap is sufficient.

On the other hand, the teachers' gaming experience may be significant in the successful implementation of a gamified system and the development of relevant teaching activities. If the teacher has played commercial games, the implementation and work with HQ might be easier to begin with; however, it would not necessarily be an essential skill set. Openness, curiosity and a willingness to learn, also on the part of the teacher, should be considered as equally or even more important than an extensive knowledge about and experience with commercial games.

6.2.3 The students' position in society

My findings also indicate that students find enjoyment in the challenge of commercial games, and value the social aspect. As a consequence, they seem to assess themselves in relation to other students and to other people in general. They are accustomed to defending why their time spent on games is valuable and social, and seem to find a sense of community in the gamified classroom. However, if this sense of community is only caused by the gamified system, or by the fact that a large

majority of the students consider themselves gamers, is somewhat difficult to differentiate.

Self-perception

Some of the most significant and important of these findings is that a gamified learning environment recognizes and assigns value to the students' interest in gaming, and by extension improves their self-perception and identity as a gamer. Research has shown that self-perception affects motivation and behavior (Skaalvik & Skaalvik, 1996), and considering that a gamified learning environment can improve these elements for many students, gaming experience can be considered significant in the sense that students with gaming experience may perform better in a gamified learning environment.

On the other hand, we must consider the opposite situation as well. My research cannot directly say anything about how a gamified learning environment may affect students with little or no commercial gaming experience; however, my assessment is that it should not be harmful as long as playfulness and repetition is in focus. Additionally, considering that the number of children who play games regularly is increasing, this may not be a problem in the future.

Games as a culture

My findings indicate that the gamified learning environment provides a framework for gaming culture to thrive. Since gaming is a common interest, the social environment often revolves around gaming. This may have a reinforcing effect on creating meaning and knowledge about HQ. This can in turn strengthen the playful aspect of the game, which again is important for extrinsic motivators and competition to have a positive effect. Additionally, the presence of an inclusive and accepting social environment plays an important role in this regard (Skaalvik & Skaalvik, 1996).

For this gaming culture to exist, the students' commercial gaming experience is significant. Again, considering the opposite situation (i.e. a classroom full of non-gamers), it is not possible to draw any definite conclusions based on my data.

Nevertheless, the research on increasing ludification of culture suggests that this issue will be less significant in the future.

6.3 Implications and recommendations

The findings in this study have revealed that there are several features important to the success of a gamified learning environment. Some are general aspects of students' experiences in a gamified classroom, while others are related to their commercial gaming habits.

6.3.1 Generalizability and applicability

A case study is bound in time and place; therefore the findings from a case study have limited transferability. The findings of this study cannot be directly transferred to any other classroom and then be expected to provide the same results. However, these results can contribute to the understanding of how a gamified learning environment could be experienced by the students, and the significance of commercial gaming habits. The knowledge about the features of a gamified learning environment found in this study can be used as a starting point for other educators wanting to implement gamification in their classroom. Figure 9 shown below, summarizes the generalizable features found in this study.

Motivating gameplay	The gamified classroom	Position in society

Features of teaching activities
Playful competitiveness
Utilizing skills and knowledge
Repetition and frequency

Features of teaching values
Acceptance of gaming as a culture
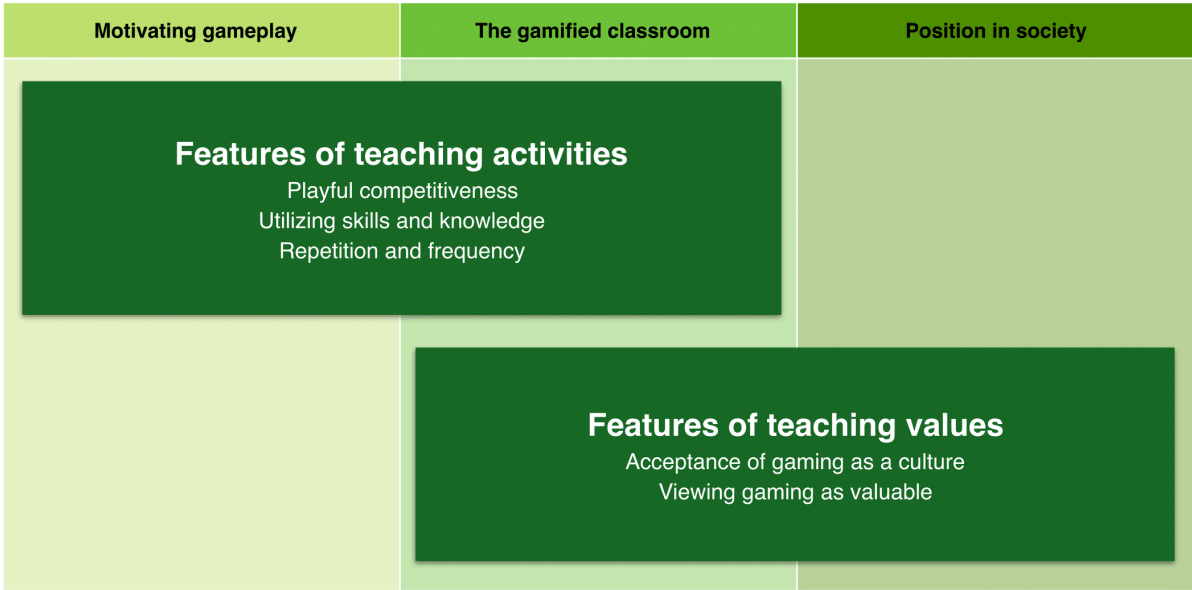Viewing gaming as valuable

Figure 9: Features of a gamified learning environment.

On the student and classroom level, the nature of the gamified teaching activities is important. My findings suggest that playful competiveness plays a central role in the effort to shift extrinsic motivators towards an intrinsic drive. Concurrently, repetition and frequency is important in order to lower the consequence of failure and allow students the framework to take responsibility and use their earned freedoms. Lastly, any effort from the teacher to utilize the students' skills and knowledge from gaming is influential in the further development of their self-perception. Consequently, the teaching values on both the classroom and society level become important. The attitudes and beliefs the teachers display towards the students send a message. My research suggests that acceptance of gaming as a culture and viewing gaming as valuable can be essential for many students' identities and positions in society.

Context and class composition

The gamified system examined in this study was Heimdall's Quest; however, there are various other gamification systems and tools available to educators. To what extent these findings are applicable to other gamification systems, could be a question of how the results might be applied in those settings. HQ is a complex system developed for students with low motivation and attendance problems, and using the system in other contexts could provide different challenges. My findings suggest that the way the teacher implements the various gamification elements is important; additionally that this is transferrable to other contexts. For example, using HQ in classes with high performing students struggling with stress and/or feelings of pressure might require modifying the system to be less competitive. A different example of context is the composition of students in a class. In this case, the class consisted entirely of male students with extensive gaming experience, and my results cannot conclusively say anything about how HQ might work in a classroom full of non-gamer girls. However, my findings on the students' perceived position in society, seen in connection with the rising number of male and female gamers, suggest that my results will become more generalizable with time.

In the end, it can all come down to what we define as success. In the case of HQ, the goal was to increase motivation and effort in a group of students with great personal

potential. Using HQ or any other form of gamification in a different group and with the same goals would not necessarily provide the same positive results. However, my perception after this study is that the success of a gamified learning environment is not exclusively linked to increased motivation and learning outcomes, it is also about the needs of the students. My findings suggest that gamification can be an effective way to teach students how to take more responsibility for their own learning and for the teacher to meet them on their own level; gamification can additionally be an effective tool for preparing students for a more highly digitalized future. In summary, the gamification baseline of HQ, and the overall findings of this study, can be transferrable, especially if the gamified elements are customized and adapted to the individual student's skills, knowledge and needs.

6.3.2 Future research

This study provides a broad overview of different aspects of a gamified learning environment. Each level of this environment can be studied in more depth to verify the findings in various contexts, in order to learn more about why these features may be effective. An interesting aspect on the student level where my data does not provide sufficient grounds for drawing conclusions, is the connection between playfulness and commercial gaming experience. Perhaps the students who play role-playing and adventurous games, may have a greater ability to impose meaning and culture around the gamified elements, than those students who play first person shooter games (or no games at all). On the classroom level, the effect gamification can have on group dynamics, and how that can be implemented, is an aspect that is worth further research. The advantage of avatars in the development of the students' self-perception and identity is also an interesting aspect for more study on the society level.

Additionally, more research is needed on the effect of a gamified learning environment in different contexts. For instance, looking at students in different age or gender groups would be an interesting areas for further study. Especially the aspect of behavior modification, which is an important part of the educational system in lower grades, is another interesting dimension of gamification. Furthermore,

examining how a gamified system functions in a class consisting of different gamer types, or non-gamers, or combinations thereof, could also provide some much-needed information.

6.4 Closing words

By observing and interviewing students and teachers using the gamified system Heimdall's Quest, this study has examined how gamification affects the students' experienced learning environment. My research indicates that in order for extrinsic motivation and competitive features to have a positive effect, playfulness and repetition is important. Furthermore, the teacher has great importance in the development and implementation of effective gamified learning activities, where students are able to utilize their skills and knowledge from commercial gaming and take responsibility for their own learning. Lastly, the gamified classroom provides a learning environment where the students' gaming experience is valued, which can improve their self-perception. However, gamification is not a "quick fix" to any educational problem. It requires preparation and dedication from the teachers, and openness and creativity from the students. Ask says that play requires hard work, and so does gamification (Ask, 2016).

In a time where more and more children as well as adults spend their time in adventurous universes, fighting monsters, meeting challenges, solving problems and winning battles, the educational system can harness these kinds of approaches in positive ways, in order to further motivate and teach students the skills and knowledge they need for an increasingly digitalized future. By using the powerful tool of gamification, the teacher has the opportunity to engage students in the wonderful world of learning. In other words, let the gamification begin!

7   References

Adams, E. (2013). *Fundamentals of Game Design* (3rd ed.). San Francisco: New Riders.

Ask, K. (2016). *Ludic work: Assemblages, domestications and co-productions of play* (Doctoral dissertation). NTNU, BIBSYS Brage.

Bassey, M. (1999). *Case Study Research In Educational Settings*. Buckingham: Open University Press.

Berg, A.-J. (1998). Fra automatiseringsspøkelse til kyborgvirkelighet? Om teknologisk determinisme og hverdagslig teknologibruk. In *Mot et bedre arbeidsliv* (pp. 327–352). Bergen: Fagbokforlaget.

Bogost, I. (2015). Why gamification is bullshit. In *Gameful world* (pp. 76–91). Cambridge: MIT Press.

Bouça, M. (2012). Mobile Communication, Gamification and Ludification. In *Proceeding of the 16th International Academic MindTrek Conference* (pp. 295–301). New York: ACM. https://doi.org/10.1145/2393132.2393197

Chandler, J. A. (2012). "Obligatory Technologies": Explaining Why People Feel Compelled to Use Certain Technologies. *Bulletin of Science, Technology & Society*, *32*(4), 255–264. https://doi.org/10.1177/0270467612459924

Chorney, A. I. (2012). Taking The Game Out Of Gamification. *Dalhousie Journal of Interdisciplinary Management*, *8*(1). https://doi.org/10.5931/djim.v8i1.242

Corbin, J., & Strauss, A. (2014). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (4th ed.). Los Angeles: SAGE Publications, Inc.

Denny, P. (2013). The effect of virtual achievements on student engagement (pp. 763–772). Presented at the Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, New York: ACM. https://doi.org/10.1145/2470654.2470763

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: defining gamification. In *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments* (pp. 9–15). New York: ACM. https://doi.org/10.1145/2181037.2181040

Gee, J. P. (2003). What Video Games Have to Teach Us About Learning and Literacy. *Computers in Entertainment (CIE)*, *1*(1), 20–20. https://doi.org/10.1145/950566.950595

Gee, J. P. (2007). *What Video Games Have to Teach Us About Learning and Literacy* (2nd ed.). Hampshire: Macmillan.

Guba, E., G., & Lincoln, Y., S. (1994). Competing paradigms in qualitative research. In *Handbook of qualitative research* (2nd ed., pp. 163–194). London: Sage.

Hamari, J., Koivisto, J., & Sarsa, H. (2014). Does Gamification Work? – A Literature Review of Empirical Studies on Gamification. In *2014 47th Hawaii International Conference on System Sciences* (pp. 3025–3034). https://doi.org/10.1109/HICSS.2014.377

Imsen, G. (1998). *Elevens verden: innføring i pedagogisk psykologi*. Oslo: Tano Aschehoug.

Kapp, K. M. (2012). *The Gamification of Learning and Instruction: Game-based Methods and Strategies for Training and Education*. New Jersey: John Wiley & Sons.

Lillejord, S., Halvorsrud, K., Ruud, E., Morgan, K., Freyr, T., Fischer-Griffiths, P., … Manger, T. (2015). Frafall i videregående opplæring. En systematisk kunnskapsoversikt. Retrieved May 13, 2017, from http://www.forskningsradet.no/servlet/Satellite?c=Rapport&cid=125400880877 8&pagename=kunnskapssenter%2FHovedsidemal

Ludvigsen, S. (2015). Fremtidens skole: Fornyelse av fag og kompetanser [NOU: 8]. Retrieved January 18, 2017, from https://www.regjeringen.no/contentassets/da148fec8c4a4ab88daa8b677a700 292/no/pdfs/nou201520150008000dddpdfs.pdf

Ministry of Culture and Church Affairs. (2008). Dataspill [Stortingsmelding 14]. Retrieved May 2, 2017, from https://www.regjeringen.no/no/dokumenter/stmeld-nr-14-2007-2008- /id502808/

Norwegian Centre for Research Data. (n.d.). Meldeskjema - Personvernombudet - NSD. Retrieved February 24, 2017, from http://www.nsd.uib.no/personvern/meldeskjema?eng

Norwegian Media Authority. (2016). Barn og medier 2016. Retrieved January 13, 2017, from http://www.barnogmedier2016.no/

Postholm, M. B. (2010). *Kvalitativ metode*. Oslo: Universitetsforlaget.

Raessens, J. (2006). Playful Identities, or the Ludification of Culture. *Games and Culture, 1*(1), 52–57. https://doi.org/10.1177/1555412005281779

Ready, J. (2016). *What Do Students Experience While Participating in a Motivational Classroom System? An Interpretative Phenomenological Analysis of Heimdall's Quest, a Gamified Classroom Framework* (Master's thesis). NTNU, BIBSYS Brage.

Robson, C. (2002). *Real World Research* (2nd ed.). New Jersey: Wiley-Blackwell.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68–78. https://doi.org/10.1037/0003-066X.55.1.68

Schunk, D. (2008). *Learning Theories: An Educational Perspective* (5th ed.). New Jersey: Pearson.

Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*, *22*(2), 63–75.

Siemens, G. (2014). Connectivism: A Learning Theory for the Digital Age. Retrieved from http://er.dut.ac.za/handle/123456789/69

Skaalvik, E. M., & Skaalvik, S. (1996). *Selvoppfatning, motivasjon og læringsmiljø*. Oslo: TANO.

Smith, M. R., & Marx, L. (1994). *Does Technology Drive History?: The Dilemma of Technological Determinism*. Cambridge: MIT Press.

Sørensen, K. (2006). Domestication: The Enactment of Technology. In *Domestication Of Media And Technology* (pp. 40–61). Open University Press.

SSB. (2016). Flere fullfører videregående. Retrieved May 13, 2017, from http://www.ssb.no/utdanning/statistikker/vgogjen/aar/2016-06-02

The Norwegian Centre for ICT in Education. (2014). Dataspill i skolen. Retrieved January 13, 2017, from https://iktsenteret.no/sites/iktsenteret.no/files/attachments/spill_i_skolen_-_sikt-notat_nr_1.pdf

Yin, R. K. (1981). The case study as a serious research strategy. *Knowledge*, *3*(1), 97–114.

Yin, R. K. (2009). *Case Study Research: Design and Methods* (4th ed., Vol. 5). California: SAGE Publications.

Zimmermann, E. (2015). Manifesto for a ludic century. In *Gameful World* (pp. 30–33). Cambridge: MIT Press.

8   Overview of figures and tables

Figures

Figure	Title	Page
1	Relation between serious games, commercial games and gamification	14
2	Web-based user interface of Heimdall's Quest	22
3	Overview of classes	25
4	Examples of power trees	26
5	The constructivist research paradigm	31
6	The iterative research design	33
7	Final themes	42
8	Model of the gamified learning environment	62

Tables

Table	Title	Page
1	Overview and examples of commercial gaming categories and games	11
2	Overview of point system in Heimdall's Quest	23
3	Summary of professions and freedoms in Heimdall's Quest	24-25
4	Case study components	34
5	List of categories	40-41
6	Relation between themes and model	43
7	Student cases	48
8	Teacher cases	49

9   Appendix

A   Overview of Heimdall's Quest classes and professions

B   Study protocol

C   Interview guides (Norwegian)

D   Summary of codes and categories

E   Informed consent letters (Norwegian)

F   Correspondence with NSD (Norwegian)

Heimdall's Quest classes and professions

Based on work by Jason Ready, 2016

Druwid: *A holy man and healer.*

Max HP: 30 **Max Mana: 40**

Revive
Player ignores death penalty and comes to life with 5 HP
Cost: 25 Mana
100 Exp

Rune Cost: 2

Herbs of Life
Heal Teammate 3d6
+25% exp
Cost: 20 Mana
100 Exp

Rune Cost: 2

Infusion
All Heals cost -2 Mana
PASSIVE

Rune Cost: 1

Rejuvinate
Heal Teammate 2d6
Cost: 15 Mana
75 Exp

Rune Cost: 2

Natures Embrace
Heall All Team 1d6
Cost: 20 Mana
100 Exp

Rune Cost: 2

Turnicate
Warm Hands +
Rejuvinate now use d8
PASSIVE

Rune Cost: 1

Sainthood
All Heals +2 Hp
PASSIVE

Rune Cost: 1

Warm Hands
Heal Teammate 1d6
Cost: 10 Mana
50 Exp

Rune Cost: 1

○ Core Skill

○ Passive Modifier

○ Utility Skill

Viking: *A warrior and protector.*

VIKING

Max HP: 50   **Max Mana: 30**

Beserk
Absorb all dmg from a single attack. Can block death 1x
Cost: 25 Mana
175 Exp

Rune Cost: 2

Absorption
Absorb all dmg from a Teammate -4
Cost: 20 Mana
100 Exp

Rune Cost: 2

Boss Shield
All Heals cost -2 Mana
PASSIVE

Rune Cost: 2

Protect
Absorb 2d6 dmg from a Teammate -2
Cost: 15 Mana
75 Exp

Rune Cost: 2

Thick Skin
Personal dmg reduced by 1
PASSIVE

Rune Cost: 1

Gokstad Shield
Absorb 1 extra dmg when using a shield
PASSIVE

Rune Cost: 1

Shield
Absorb 1d6 dmg from Teammate -1
Cost: 10 Mana
50 Exp

Rune Cost: 1

Mighty
All Shield abilities have -1 Mana cost
PASSIVE

Rune Cost: 1

Core Skill

Passive Modifier

Utility Skill

Seid: *A leader and mystic.*

Max HP: 30   **Max Mana: 50**

SEID

Strong Medium
Essence Transfer, Nexus and
Mystic Conjunction now uses D8.
PASSIVE

Rune Cost: 1

Cosmic Power
Non-Seid Teammate
regains All mana
Cost: 35 Mana
200 Exp

Rune Cost: 2

Mystic Conjunction
All Non-Seid Teammates
replenish 2d6 Mana
Cost: 25 Mana
150 Exp

Rune Cost: 2

Nexus
All Non-Seid Teammates
replenish 1d6 Mana
Cost: 15 Mana
75 Exp

Rune Cost: 1

Tutor
Gain 25 XP more when using
Essence Transfer or Nexus, and
50 XP more when using Cosmic
Power or Mystic Conjunction
PASSIVE

Rune Cost: 2

Strong Presence
Essence Transfer cost
reduced by -1 Mana
PASSIVE

Rune Cost: 1

Essence Transfer
Non-Seid Teammate
gains 2d6 mana
Cost: 10 Mana
50 Exp

Rune Cost: 1

Eclipse
Attendance gives
1 mana more
PASSIVE

Rune Cost: 2

Core Skill

Passive Modifier

Utility Skill

Narr: *A clown and game master.*

Max HP: 35   **Max Mana: 35**

NARR

Skinchanger
No extra Mana cost when using Mimic or Doppelganger
PASSIVE

Rune Cost: 3

Doppleganger
May use an ability of Rune cost 2 from another class at -1 to result
Cost: 10 Mana more than ability
Exp: See Ability

Rune Cost: 2

Smuggle
You may smuggle a teammate with you to another group's table
Cost: 15 Mana

Rune Cost: 1

Mimic
May use an ability of Rune cost 1 from another class at -1 to result
Cost: 10 Mana more than ability
Exp: See Ability

Rune Cost: 2

Disguise
May sit at another group's table
Cost: 10 Mana

Rune Cost: 1

Acrobat
May use Chance on own dice rolls, but without its XP gain.
PASSIVE

Rune Cost: 1

Dice Master
Add 1 to dice result when using Twisted Fate
PASSIVE

Rune Cost: 1

Twisted Fate
A team mate may make one reroll when using a power of his class.
Cost: 5 Mana
25 Exp

Rune Cost: 1

Core Skill

Passive Modifier

Utility Skill

Professions:

A profession focuses on skills that will grants in world freedom to the player. A player may choose to invest earned Runes to purchase abilities from any of the professions. A player always has only one Class and may not purchase abilities from other classes than their original chosen class.

Hunter:

Sarimner Pig
Food has no cost. May be used at all times
PASSIVE
Rune Cost: 2

Pack Leader
The whole team may eat in class for up to 30 min
Cost: 35Mana
200 Exp
Rune Cost: 2

Sharpshooter
Mana cost of Food, Stag Hunter and Pack Leader is reduced by 5.
PASSIVE
Rune Cost: 2

Autumn Feast
When a Hunter Power and Brewer Power are used, Total Mana cost is reduced by 25%
PASSIVE
Rune Cost: 2

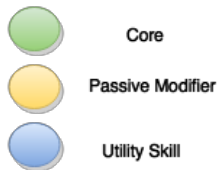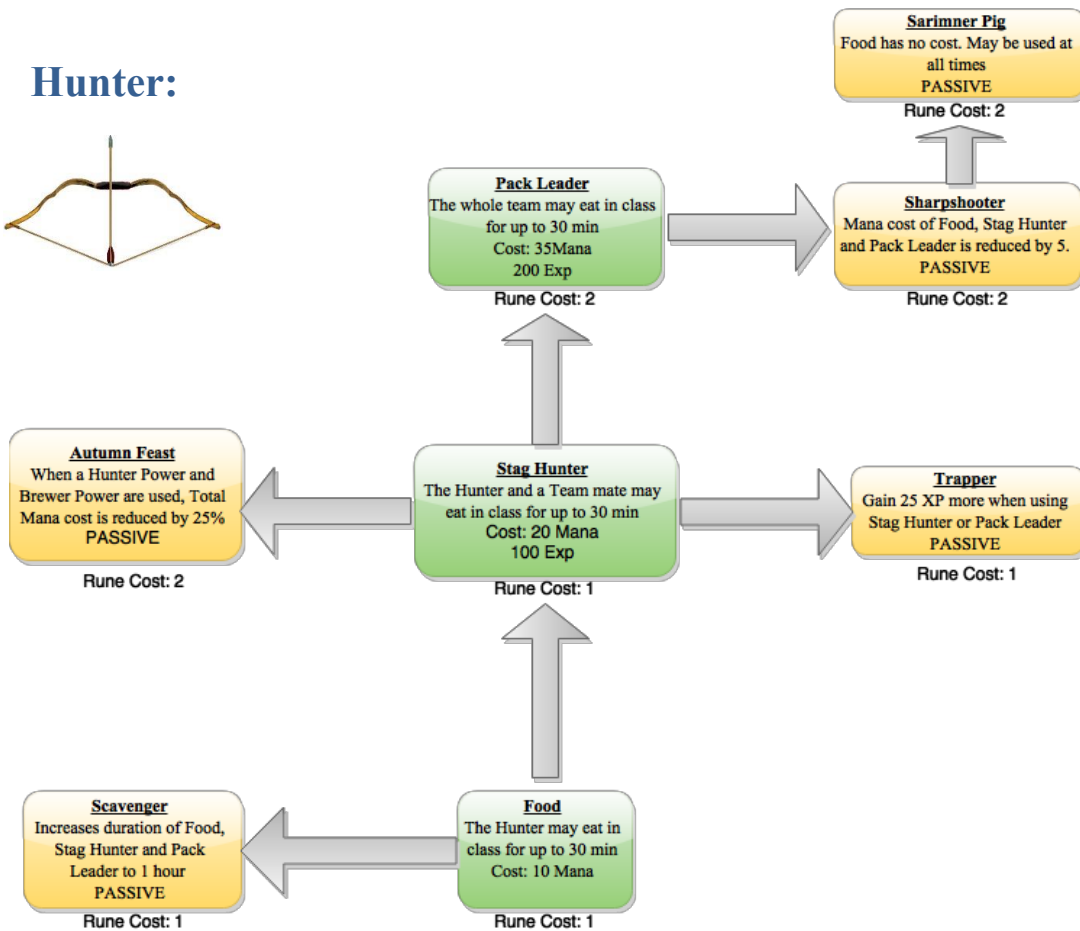**Stag Hunter**
The Hunter and a Team mate may eat in class for up to 30 min
Cost: 20 Mana
100 Exp
Rune Cost: 1

Trapper
Gain 25 XP more when using Stag Hunter or Pack Leader
PASSIVE
Rune Cost: 1

Scavenger
Increases duration of Food, Stag Hunter and Pack Leader to 1 hour
PASSIVE
Rune Cost: 1

Food
The Hunter may eat in class for up to 30 min
Cost: 10 Mana
Rune Cost: 1

○ Core

○ Passive Modifier

○ Utility Skill

Brewer:

Horn of Endless Mead
Drink has no cost. May be
used at all times
PASSIVE

Rune Cost: 2

Toast
The whole team may drink in
class for up to 30 min
Cost: 35Mana
200 Exp

Rune Cost: 2

Well
Mana cost of Drink, Horn and
Toast is reduced by 5.
PASSIVE

Rune Cost: 2

Spring Feast
When a Hunter Power and
Brewer Power are used, Total
Mana cost is reduced by 25%
PASSIVE

Rune Cost: 2

Horn
The Brewer and a Team
mate may drink in class for
up to 30 min
Cost: 20 Mana
100 Exp

Rune Cost: 1

Jug
Gain 25 XP more when using
Horn or Toast
PASSIVE

Rune Cost: 1

Cup
Increases duration of Drink,
Horn and Toast to 1 hour
PASSIVE

Rune Cost: 1

Drink
The Brewer may drink in
class for up to 30 min
Cost: 10 Mana

Rune Cost: 1

- Core
- Passive Modifier
- Utility Skill

Illusionist:

Ethereal Plane
The team is transported to another plane of existence. The entire team is granted a 10 min. break.
Cost: 30 Mana
200 Exp

Rune Cost: 3

Ghost Form
Duration of Invisibility, Teleport, Daydream and Ethereal Plane is increased by 5 minutes.
PASSIVE

Rune Cost: 2

Teleport
Player may take a 10 minute break.
Cost: 15 Mana

Rune Cost: 2

Vanish
Teleport and Ethereal Plane may also be used at the end of a class lecture.
PASSIVE

Rune Cost: 1

Invisibility
Player may come up to 10 minutes late to class.
Cost: 15 Mana

Rune Cost: 2

Stealth
Mana cost for Invisibility, Teleport and Daydream is reduced by 5.
PASSIVE

Rune Cost: 1

Obscurity
May leave the class room for up to 4 minutes (may not be used at end of day).
Cost: 4 Mana

Rune Cost: 1

Core

Passive Modifier

Utility Skill

Skald:

Holy Sight
The whole team may watch videos in class for 30 minutes.
Cost: 40 Mana
200 Exp
Rune Cost: 3

Clarivoyance
Increases duration of Scrying and Holy Sight by 5 minutes.
PASSIVE
Rune Cost: 3

Scrying
The player may watch videos in class for 15 minutes..
Cost: 15 Mana
Rune Cost: 2

Clarivoyance
Increases duration of Scrying and Holy Sight by 5 minutes.
PASSIVE
Rune Cost: 2

Chanter
Increases duration of Music and Favor of the Gods by 30 minutes.
PASSIVE
Rune Cost: 1

Composer
Mana cost of Music and Favor of the Gods is reduced by 5.
PASSIVE
Rune Cost: 1

Music
The player may listen to music in class for 45 minutes.
Cost: 10 Mana
Rune Cost: 1

Favor of the Gods
The whole team may listen to music for 45 minutes.
Cost: 30 Mana
200 Exp
Rune Cost: 2

Core

Passive Modifier

Utility Skill

Oracle:

Dungeon Master
Increases duration of Oracle, Mysticist and Game Master by 15 minutes.
PASSIVE

Rune Cost: 3

Game Master
The whole team may play games in class for 15 minutes.
Cost: 35 Mana
200 Exp

Rune Cost: 2

Vanish
Teleport and Ethereal Plane may also be used at the end of a class lecture.
PASSIVE

Rune Cost: 1

Greenseer
Norns' Challenge no longer requires a dice roll.
PASSIVE

Rune Cost: 1

Mysticist
The player and a team mate may play games in class for 15 minutes.
Cost: 20 Mana

Rune Cost: 2

Norn's Challenge *
Roll a D6: If 5 or 6, today's event (if random) will be redrawn.
Cost: 15 Mana

Rune Cost: 2

Oracle
The player may play games in class for 15 minutes.
Cost: 10 Mana

Rune Cost: 1

Evade *
The player may ignore the effect of today's Cosmic Event.
Cost: 10 Mana

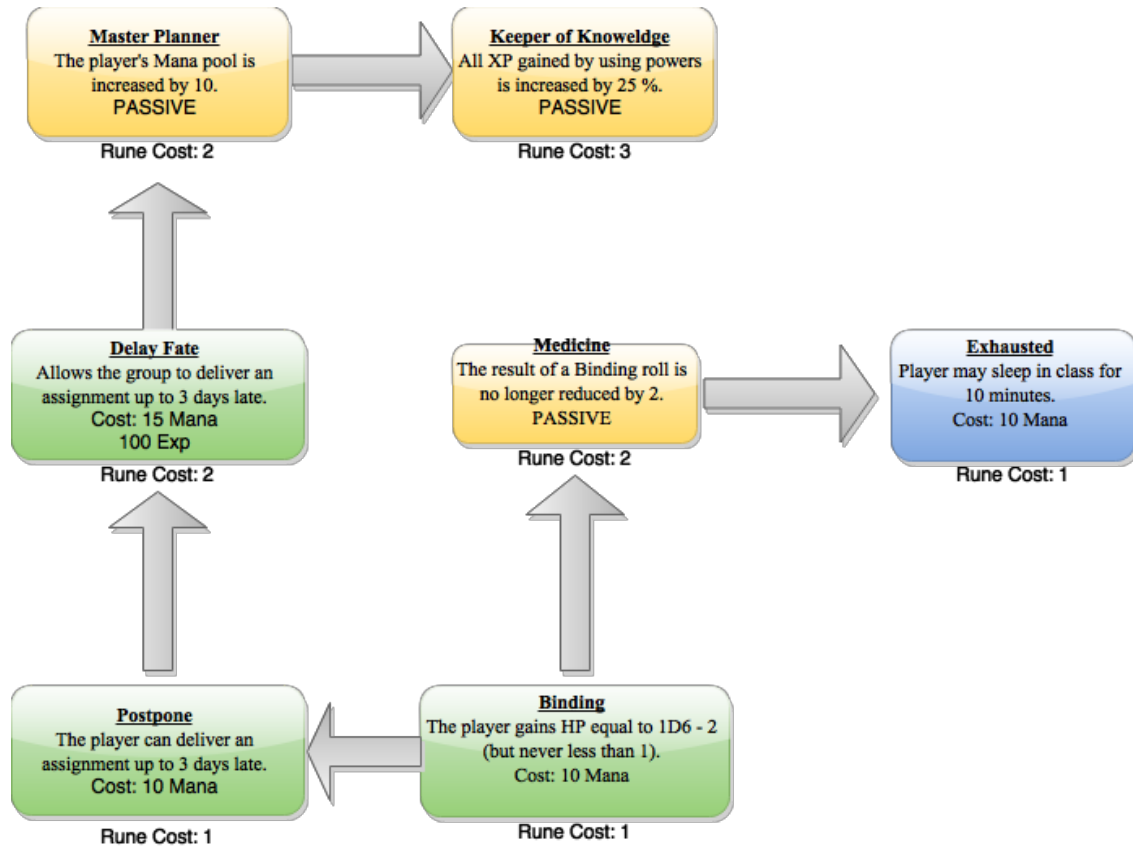Rune Cost: 1

* May only be used within 10 minutes after the event has been revealed.

Core

Passive Modifier

Utility Skill

Scribe:

Master Planner
The player's Mana pool is increased by 10.
PASSIVE
Rune Cost: 2

Keeper of Knoweldge
All XP gained by using powers is increased by 25 %.
PASSIVE
Rune Cost: 3

Delay Fate
Allows the group to deliver an assignment up to 3 days late.
Cost: 15 Mana
100 Exp
Rune Cost: 2

Medicine
The result of a Binding roll is no longer reduced by 2.
PASSIVE
Rune Cost: 2

Exhausted
Player may sleep in class for 10 minutes.
Cost: 10 Mana
Rune Cost: 1

Postpone
The player can deliver an assignment up to 3 days late.
Cost: 10 Mana
Rune Cost: 1

Binding
The player gains HP equal to 1D6 - 2 (but never less than 1).
Cost: 10 Mana
Rune Cost: 1

Core

Passive Modifier

Utility Skill

Study protocol

Data collection methods

What	*When*	*Why*	*How*
Participatory observation	30.01.17 27.02.17 02.03.17	- get to know classroom, students, relationship with the game - basis for selection (possible survey is needed) - gain trust to do good interviews	Real time notes Detailed field notes transcribed after
Student interviews	06.03.17 08.03.17	- gain insight into gaming experience (time, type etc.) - learn about how they learn - gain insight into their perception of learning though games	Taped unstructured conversations Possibly 2 times (if needed) 4-6 students, base number on observations
Teacher interviews	05.04.17	- gain more insight on how the specific students learn - learn about their views on the gaming at home-school relationship, for specific students, and in general - triangulate data	Taped unstructured conversations Based student interviews, so must be sometime after 1-2 teachers, one interview each, possibly in group?

Data analysis methods

Iterative analysis after each data collection point.
Grounded thoery based constant comparative open, axial and selective coding.

Intervjuguide: elever

Mål
• Få innsikt i elevenes spillvaner og erfaring ved bruk av spillet HQ i skolen

Introduksjon
Presentere meg selv og målet med studien
- Meg: Madeleine, 26 år, fra trøndelag, skal bli lærer
- Jeg jobber med en masteroppgave om bruk av spill i skolen. Det vil si at jeg skal prøve å finne ut om hvorfor dette fungerer slik at andre kan lære mer.
- Du blitt valgt ut ganske tilfeldig
- Min erfaring med spill: lest mye om det, spilt litt spill, syns det er spennende å bruke som lærer, ønsker å vite mer om hva du som elev syns.

Informasjon om opptaket
- Jeg ønsker å ta opp intervjuet slik at jeg kan bruke det senere i min forskning. Da er det lettere for meg å følge med på hva du sier hvis jeg slipper å notere, også er det også en bedre metode å samle data på
- Opptaket er kun tilgjengelig for meg og veileder, du vil bli helt anonymisert
- Opptakene slettes ila. sommeren 2017

Tema og spørsmål
- Jeg har noen tema vi skal gjennom og noen direkte spørsmål, men det skal ikke være en grilling, så du må gjerne stille spørsmål tilbake. Se for deg at det er en hyggelig samtale
- Det kan være at du syns spørsmålene er litt rare eller like, du må bare tenke høyt å svare så godt du kan
- Det finnes ikke noe feil svar. Jeg er interessert i å høre akkurat hva du tenker og hvorfor. alle svar er gode svar
- Hvis du ikke vil svare på noe er det bare å si ifra om det så går vi videre. Du kan også avbryte når som helst.

Lurer du på noe før vi starter?

HUSK
- lytte
- gi feedback
- smile
- tillate stillhet, ikke avbryte

Spill i skolen (Heimdall's quest)

Kan du vise meg karakteren din i HQ?
- Hva er du?
- Hvilke powers har du?
- Hvilken gruppe er du på? Hvilken rolle har du i gruppa?

Hvilke ambisjoner har du med HQ?

Hva syns du om HQ?
- Liker du det? Hvorfor/hvorfor ikke?
- Hvordan påvirker det skoledagen din?

HQ og læring
- Hva lærer du mye av? Hvilke type aktiviteter?
- Hva motiverer deg?
- Mener du at du lærer mer eller mindre av HQ? Hvorfor det?
- Hvilke grep kunne lærerne gjort for at du skal lære mer??

Er det noen likheter mellom spillene du spille hjemme og HQ? Ulikheter?

Spill utenfor skolen

Kartlegge spillvaner:
- Spiller du digitale spill hjemme? (EKS: PC, mobil, PlayStation, XBox)
- Har du alltid spilt? Når begynte du?
- Hva spiller du?
- Hvor mye spiller du ila. en vanlig uke? Syns du det er for mye?
- Spiller du med andre?

Kan du si noe om hvorfor du liker å spille?
- PROBES: er det sosialt? bare gøy? lærerikt?

Syns du at det er lærerikt å spille? Lærer du noe? Isåfall hva?
- PROBES: hvilke fag bruker det? Er det motiverende?

Tror du at dine spillvaner hjemme påvirker hva du gjør på skolen? Hvordan det?

Er det noe du har lyst til å tilføye til slutt?

Avslutning

- Takk for praten, dette har vært veldig lærerikt.
- Det som skjer videre, er at jeg skal sette meg ned å høre på det vi har snakket om, og skrive det ned ord for ord.
- Hvis du vil, kan jeg sende deg dette, hvis du vil lese hva vi har snakket om, og komme med oppklaringer?
  - Hvis ja; ordne mail!

Intervjuguide: lærer

Mål
- Få innsikt i elevenes spillvaner og erfaring ved bruk av spillet HQ i skolen sett fra lærerperspektiv
- Få innsikt i elevenes læringsutbytte

Introduksjon
Presentere meg selv og målet med studien
- Litt om meg: Madeleine, 26 år, fra trøndelag, skal bli lærer
- Jobber med en masteroppgave om bruk av spill i skolen, og en ganske casual gamer selv.
- Du blitt valgt ut fordi du er lærer for den klassen jeg forsker på, og bruker HQ

Informasjon om opptaket
- Jeg ønsker å ta opp intervjuet slik at jeg kan bruke det senere i min forskning. Da er det lettere for meg å følge med på hva du sier hvis jeg slipper å notere, også er det også en bedre metode å samle data på
- Opptaket er kun tilgjengelig for meg og veileder, du vil bli helt anonymisert
- Opptakene slettes ila. sommeren 2017

Tema og spørsmål
- Jeg har noen tema vi skal gjennom og noen direkte spørsmål, men det skal ikke være en grilling, så du må gjerne stille spørsmål tilbake. Se for deg at det er en hyggelig samtale
- Det kan være at du syns spørsmålene er litt rare eller like, du må bare tenke høyt å svare så godt du kan
- Det finnes ikke noe feil svar. Jeg er interessert i å høre akkurat hva du tenker og hvorfor. alle svar er gode svar
- Hvis du ikke vil svare på noe er det bare å si ifra om det så går vi videre. Du kan også avbryte når som helst.

Lurer du på noe før vi starter?

HUSK
- lytte
- gi feedback
- smile
- tillate stillhet, ikke avbryte

Spill utenfor skolen

Hva er dine erfaringer med spill utenfor skolen? Spiller du noe selv?

Kan du si noe om elevenes spillvaner? Merker du noe til at de spiller mye hjemme?
- Har du som lærer merket deg om det påvirker deres skolegang noe? På hvilken måte?
- Ser du om elevene klarer å bruke det de lærer i spill i skolekontekst?

Spill i skolen (Heimdall's quest)

Hva er dine erfaringer med spill i skolen? Både med HQ og ellers?
- Har du noen mening om det fungerer til å motivere? Hvorfor?
- Tror du det fører til økt læring? Hvorfor?
- Hva mener du er viktig/kritiske faktorer for at spill skal ha en effekt? Hva må elevene/ lærerne kunne?

Hva tror du er den viktigste faktoren for at elevene får økt utbytte ved HQ og spill i skolen generelt?

Ser du forskjeller/likheter mellom elevenes læring ved bruk av HQ eller andre spill, og deres individuelle spillvaner?
- Har hvor mange timer de spiller i uka og hvilke typer spill de spiller noe å si?

Hvordan opplever du at elevene takler konkurranseaspektet?
- Hvordan reagerer elever på å tape?
- Blir noen umotivert eller negativ av å ikke vinne?

Diskusjon av mine funn

Etter å ha snakket med noen av elevene har jeg identifisert noen tema jeg ønsker å diskutere med deg. På neste side oppsummerer jeg disse og det jeg ønsker å snakke med deg om er følgende:
-

Sammendrag av hovedfunn
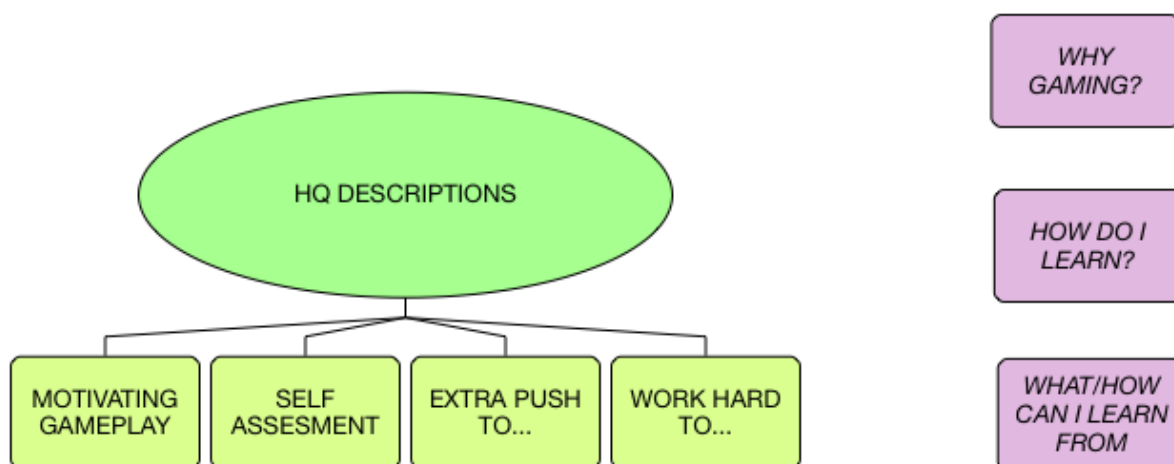
HQ descriptions

Student descriptions of their experience with HQ. This includes both direct interaction with the game, indirect consequences caused by the game and reflections related to the game. Within their descriptions I found that the different statements could be categorized in the following main topics:

Motivating gameplay

Student statements describing the HQ gameplay in itself as motivating, inspiring and encouraging. This includes character characteristics, competition with self and others, game events, group dynamics, importance of rules, activeness towards others, and relationship to winning and losing. In summary students are motivated by the gameplay itself.

Self-assessment

Student statements including self-assessment and comparison to others. This includes their own view on their behavior, gaming habits and learning, both compared to them self and other students.

Work hard to...

Student statements describing the inclination to work harder for some reason relating to HQ and/or school. This includes working hard to finish/get things done, gain freedoms and gain levels.

Extra push to...

Student statements describing the "extra push" to achieve something, referring to both HQ, games and school in general. This includes an extra push to be active in class, be best, finish tasks and improve grades. The extra push can be as a consequence of HQ or of competition.

Why gaming?

Student statements describing their motivation and interest in gaming. They state that gaming is creative, fun, interesting (narratives), social and important to win.

How do I learn?

Student statements describing their own learning patterns and how they think they learn best. This includes practical, theoretical, relevant learning activities, as well as combinations of them all.

What can I learn from games?

Student statements describing their own reflections on what they can learn from games in general. This includes learning about computers, history, society, the world, language (English specifically), social skills, creativity and positive thinking. Some state that there is no connection between gaming and learning, and some state only some games can have a learning outcome.

Codes and categories

The following tables describe and summarizes the codes and categories found in this study. Codes are fist level markings in the dataset, while categories are clusters of codes that relate to each other. The number of sources is related to how many of the interviews that particular code was used. References indicates how many times that code was used.

Motivating gameplay

Statements describing the HQ gameplay in itself as motivating, inspiring and encouraging.

Name and description	Sources	References
Activeness towards others *Descriptions of being active towards other student through the game as a positive aspect.*	3	3
Character characteristics *Descriptions of their HQ characters powers and professions.*	5	13
Competition with self and others *Descriptions of competitions in HQ, against others and self, including possible negative aspects of player-vs-player.*	6	8
Game events *Descriptions of specific HQ events they found motivating.*	3	4
Group dynamics *Descriptions of HQ facilitating group work and good cooperation.*	6	15
Rules *Descriptions of HQ rules and the importance of fairness, consistency and the role of the teacher.*	4	12
Winning and losing *Descriptions of HQ as competitive, referring to winning and losing.*	4	5

Self-assessment

Student and teacher statements describing self-assessment and comparison to others.

Name and description	Sources	References
Behavior - self-assessment *Reflections on behavior.*	1	2
Gaming - self-assessment *Reflections on gaming habits, including time spent on games.*	4	7
Learning – self-assessment *Reflections on their own motivation and in turn learning, including comparison to previous school experiences.*	2	6
Learning through gaming *Descriptions of HQ using negative words or statements.*	6	15
Teacher assessment (confirmation) *Descriptions from the teachers of the students learning, behavior and gaming.*	2	10

Working hard

Student and teacher statements describing the inclination to work harder for some reason relating to HQ and/or school.

Name and description	Sources	References
Work hard to finish/get things done *Descriptions of the inclination to work hard to finish tasks, or get things done. Both because of HQ and in general.*	2	3
Work hard to gain freedoms *Descriptions of the inclination to work hard to earn freedoms in HQ and in general.*	2	6
Work hard to gain levels *Descriptions of the inclination to work hard to gain levels in HQ.*	2	2

Extra push

Student and teacher statements describing the "extra push" to achieve something, referring to both HQ, games and school in general.

Name and description	Sources	References
Extra push as consequence of HQ *Descriptions of HQ acting as an extra push.*	5	16
Extra push as consequence of competition. *Descriptions of competitions in general acting as an extra push.*	4	5
Extra push to behave well *Descriptions of HQ having a positive affect on behavior.*	2	4
Push to be active *Descriptions of an inclination to be active/contribute as an extra push.*	2	3
Push to be best *Descriptions of an inclination to be best at something as an extra push.*	3	6
Push to finish *Descriptions of an inclination to finish a task/get things done as an extra push.*	1	2
Push to improve grades *Descriptions of an inclination to achieve better grades as an extra push.*	2	2

Why students enjoy gaming

Student and teacher statements describing their motivation and interest in gaming.

Name and description	Sources	References
Gaming is challenging to finish *Descriptions of gaming as a positive challenge to finish.*	1	1
Gaming is creative *Descriptions of gaming as a creative outlet, both for the student and a place to view others creativeness.*	2	5
Gaming is fun *Descriptions of gaming as fun and enjoyable.*	4	5

	Sources	References
Gaming is interesting (narratives) *Descriptions of gaming as having interesting and stimulating stories.*	1	2
Gaming is social *Descriptions of gaming as a social, both in the game itself and when gaming with others (physically).*	7	10
Gaming to win *Descriptions of winning games as positive motivation.*	1	2

How students learn

Student and teacher statements describing their own learning patterns and how they think they learn best.

Name and description	Sources	References
Combination practical and theoretical learning *Descriptions of both practical and theoretical learning having best effect.*	2	2
Learning activities – practical *Descriptions of practical work such as working on computers, servers etc. having best effect.*	4	7
Learning activities – relevant *Descriptions of activities relevant to their future and within their personal interest as having best effect.*	3	3
Learning activities – theoretical *Descriptions of theoretical work such lectures and reading etc. having best effect.*	2	2
Negative learning statements *Statements relating to learning activities that have no effect, including too detailed tasks and too much group work.*	1	2
Positive learning statements *Statements relating to learning activities that have an effect, including competition and gaining freedoms.*	3	5

What students learn from games

Student and teacher statements describing their own reflections on what they can learn from games in general.

Name and description	Sources	References
About computers *Statements relating to learning about computers.*	2	2
About history, society, world and language *Statements relating to learning history, society, other cultures and language, specifically English.*	5	7
Creativity and positivity *Statements relating to developing creativity and positivity, and learning how to solve problems.*	2	3
No connection *Statements describing no connection between gaming and learning.*	2	2
Only some games *Statements describing some that some games can be educational, but not all.*	3	4
Social skills *Statements relating to improving social skills.*	3	4

HQ, games and learning

Student and teacher statements describing their experience with HQ. This includes both direct interaction with the game, indirect consequences caused by the game and reflections related to the game.

Name and description	Sources	References
Games compared to HQ *Descriptions of similarities and differences between . HQ and other games the students play*	4	5
HQ - negative aspects *Descriptions of HQ using negative words or statements.*	5	5
HQ - positive aspects *Descriptions of HQ using positive words or statements*	6	16

|		
HQ and gaming - Comparison to others *Statements where the student compares his/her relationship to gaming to other students' habits.*	2	5
HQ is a learning tool *Descriptions of HQ as a learning tool in the background.*	2	2
HQ is fun *Descriptions of HQ as fun and enjoyable.*	2	3
HQ no competition *Descriptions of HQ as non-competitive.*	1	1
HQ no effect *Descriptions of HQ having no effect on learning or motivation.*	2	4

Gaming culture

Student and teacher statements describing the gaming culture surrounding HQ and general gaming.

Name and description	Sources	References
Gaming culture *Descriptions of situations in the classroom affected by gaming culture.*	2	8
Gaming in school *Descriptions of how gaming culture affects various teaching and learning situations in the classroom.*	2	2
Teacher gaming *Descriptions of teachers gaming habits, and experience using games and gamification in the classroom.*	2	4

Using NVivo

The codes and categories were organized using NVivo. The figures below shows how coding was done using nodes.
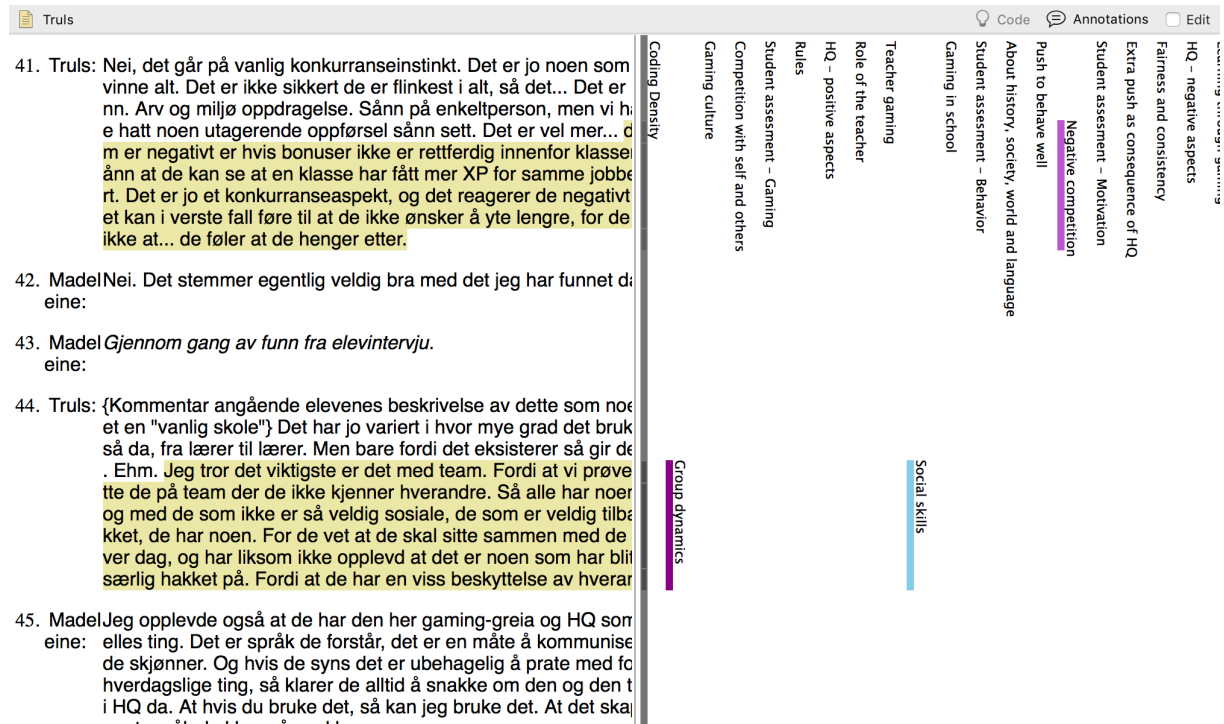
Example of student coding.

Categories were organized my using a hierarchy of nodes and folders, as shown in the figure below.

Overview of the categorizing system.

Madeleine Lorås
P.A. Munchs gate 14, 7030 Trondheim
928 85 006, madelelo@stud.ntnu.no

Lærer

Forespørsel om deltakelse i forskningsprosjektet

Dataspill hjemme og på skolen
- en studie av hvordan elevers spillerfaringer påvirker læringsutbytte ved bruk av dataspill på skolen

Bakgrunn og formål
Formålet med denne studien er å se nærmere på og kategorisere forholdet mellom elevers spillvaner hjemme og på skolen. Nærmere bestemt ønsker jeg å se på hvordan elevenes læringsutbytte påvirkes av deres tidligere erfaringer med lignende spill. Prosjektet er en del av arbeidet med min masteroppgave, som skal leveres i juni 2017. Veileder er amanuensis Terje Rydland ved NTNU.[1]

I studien trenger jeg å observere og snakke med elever som bruker dataspill i skolen og det er derfor deg og din klasse er forespurt til å delta i dette forskningsprosjektet.

Hva innebærer deltakelse i studien?
Deltagelse i denne studien innebærer en samtale med meg hvor du svarer på noen spørsmål og forteller litt om dine erfaringer med spill hjemme og på skolen. Målet med undersøkelsen er ikke å teste dine kunnskaper, men å få innsikt i hvordan du tenker og dine erfaringer. Samtalen vil bli tatt opp til videre bruk.

Hva skjer med informasjonen om deg?
Alle opplysninger om deg og data samlet inn vil bli behandlet konfidensielt. Opptakene vil kun bli hørt og hørt av meg og min veileder. I materiale som skrives eller på annen måte presenteres for andre vil involverte personer bli anonymisert. Innsamlede data vil bli slettet etter at prosjektet er avsluttet, senest 1. juli 2017.

Frivillig deltakelse
Det er frivillig å delta i studien, og du kan når som helst trekke ditt samtykke uten å oppgi noen grunn. Hvis du vil vite mer om dette, eller hva det innsamlede materialet skal brukes til, så er det bare å ta kontakt med meg på telefon eller e-post (se øverst for detaljer).

Studien er meldt inn til Personvernombudet for forskning, Norsk samfunnsvitenskapelig datatjeneste AS og har prosjektnummer 52207. Rektor, avdelingsleder og kontaktlærer har gitt meg tillatelse til å gjennomføre dette prosjektet ved denne skolen.

Jeg håper du synes dette er interessant og viktig og har lyst til å delta i dette forskningsprosjektet.

På forhånd takk!

Vennlig hilsen,
Madeleine Lorås

---

[1] Terje Rydland kan nås på telefon 735 91 845, og epost terjery@idi.ntnu.no.

Samtykke til deltakelse i studien

(Kryss av det som passer for deg)

☐   Jeg har mottatt informasjon om studien, og er villig til å delta.

Forutsetningen for tillatelsen er at tekster og annet innsamlet materiale blir anonymisert og behandlet med respekt, og at prosjektet følger gjeldende retningslinjer for etikk og personvern.

Dato: Underskrift:

Madeleine Lorås
P.A. Munchs gate 14, 7030 Trondheim
928 85 006, madelelo@stud.ntnu.no

Trondheim, 14. Januar 2017

Elev

Forespørsel om deltakelse i forskningsprosjektet

Dataspill hjemme og på skolen
- en studie av hvordan elevers spillerfaringer påvirker læringsutbytte ved bruk av dataspill på skolen

Bakgrunn og formål
Formålet med denne studien er å se nærmere på og kategorisere forholdet mellom elevers spillvaner hjemme og på skolen. Nærmere bestemt ønsker jeg å se på hvordan elevenes læringsutbytte påvirkes av deres tidligere erfaringer med lignende spill. Prosjektet er en del av arbeidet med min masteroppgave, som skal leveres i juni 2017.

I studien trenger jeg å observere og snakke med elever som bruker dataspill i skolen og det er derfor din klasse er forespurt til å delta i dette forskningsprosjektet.

Hva innebærer deltakelse i studien?
Deltagelse i denne studien innebærer en samtale med meg hvor du svarer på noen spørsmål og forteller litt om dine erfaringer med spill hjemme og på skolen. Målet med undersøkelsen er ikke å teste dine kunnskaper, men å få innsikt i hvordan du tenker og dine erfaringer. Samtalen vil bli tatt opp til videre bruk.

Hva skjer med informasjonen om deg?
Alle opplysninger om deg og data samlet inn vil bli behandlet konfidensielt. Opptakene vil kun bli hørt og hørt av meg og min veileder. I materiale som skrives eller på annen måte presenteres for andre vil involverte personer bli anonymisert. Innsamlede data vil bli slettet etter at prosjektet er avsluttet, senest 1. juli 2017.

Frivillig deltakelse
Det er frivillig å delta i studien, og du kan når som helst trekke ditt samtykke uten å oppgi noen grunn.

Hvis noen vil vite mer om dette, eller hva det innsamlede materialet skal brukes til, så er det bare å ta kontakt med meg på telefon eller e-post (se øverst for detaljer).

Studien er meldt til Personvernombudet for forskning, Norsk samfunnsvitenskapelig datatjeneste AS.

Rektor, avdelingsleder og kontaktlærer har gitt meg tillatelse til å gjennomføre dette prosjektet ved denne skolen.

Jeg håper du synes dette er interessant og viktig og har lyst til å delta i dette forskningsprosjektet.

På forhånd takk!

Vennlig hilsen,
Madeleine Lorås

Samtykke til deltakelse i studien

(Kryss av det som passer for deg)

☐   Jeg har mottatt informasjon om studien, og er villig til å delta.

☐   Jeg/vi har mottatt informasjon om studien, og gir tillatelse til at jenta/gutten vår kan delta.

Forutsetningen for tillatelsen er at tekster og annet innsamlet materiale blir anonymisert og behandlet med respekt, og at prosjektet følger gjeldende retningslinjer for etikk og personvern.

Dato: Underskrift:

MELDESKJEMA

Meldeskjema (versjon 1.4) for forsknings- og studentprosjekt som medfører meldeplikt eller konsesjonsplikt
(jf. personopplysningsloven og helseregisterloven med forskrifter).

1. Intro

Samles det inn direkte personidentifiserende opplysninger?	Ja ○ Nei ●	En person vil være direkte identifiserbar via navn, personnummer, eller andre personentydige kjennetegn. Les mer om hva personopplysninger. NB! Selv om opplysningene skal anonymiseres i oppgave/rapport, må det krysses av dersom det skal innhentes/registreres personidentifiserende opplysninger i forbindelse med prosjektet.
Hvis ja, hvilke?	□ Navn □ 11-sifret fødselsnummer □ Adresse □ E-post □ Telefonnummer □ Annet	
Annet, spesifiser hvilke		
Samles det inn bakgrunnsopplysninger som kan identifisere enkeltpersoner (indirekte personidentifiserende opplysninger)?	Ja ● Nei ○	En person vil være indirekte identifiserbar dersom det er mulig å identifisere vedkommende gjennom bakgrunnsopplysninger som for eksempel bostedskommune eller arbeidsplass/skole kombinert med opplysninger som alder, kjønn, yrke, diagnose, etc.
Hvis ja, hvilke	Grunnen til at jeg mener dette prosjektet kan ha indirekte personidentifiserende opplysninger, er at det kun er to skoler i landet som bruker det spillet jeg skal forske på, og siden det er svært få jenter innen dette området kan det være mulig å finne tilbake til personen dersom jeg oppgir kjønn i oppgaven. Jeg skal selvfølgelig anonymisere både personer og skole, men det er interessant for funnene om jeg har snakket med jenter eller gutter. Jeg planlegger å opplyse kjønn på gruppen som helhet, men ikke på personen bak utsagnene jeg bruker i oppgaven for å anonymisere sterkere.	NB! For at stemme skal regnes som personidentifiserende, må denne bli registrert i kombinasjon med andre opplysninger, slik at personer kan gjenkjennes.
Skal det registreres personopplysninger (direkte/indirekte/via IP-/epost adresse, etc) ved hjelp av nettbaserte spørreskjema?	Ja ○ Nei ●	Les mer om nettbaserte spørreskjema.
Blir det registrert personopplysninger på digitale bilde- eller videoopptak?	Ja ○ Nei ●	Bilde/videoopptak av ansikter vil regnes som personidentifiserende.
Søkes det vurdering fra REK om hvorvidt prosjektet er omfattet av helseforskningsloven?	Ja ○ Nei ●	NB! Dersom REK (Regional Komité for medisinsk og helsefaglig forskningsetikk) har vurdert prosjektet som helseforskning, er det ikke nødvendig å sende inn meldeskjema til personvernombudet (NB! Gjelder ikke prosjekter som skal benytte data fra pseudonyme helseregistre). Dersom tilbakemelding fra REK ikke foreligger, anbefaler vi at du avventer videre utfylling til svar fra REK foreligger.

2. Prosjekttittel

Prosjekttittel	Dataspill hjemme og på skolen - en kasusstudie av hvordan elevers spillerfaringer påvirker læringsutbytte ved bruk av dataspill på skolen	Oppgi prosjektets tittel. NB! Dette kan ikke være «Masteroppgave» eller liknende, navnet må beskrive prosjektets innhold.

3. Behandlingsansvarlig institusjon

Institusjon	NTNU	Velg den institusjonen du er tilknyttet. Alle nivå må oppgis. Ved studentprosjekt er det studentens tilknytning som er avgjørende. Dersom institusjonen ikke finnes på listen, har den ikke avtale med NSD som personvernombud. Vennligst ta kontakt med institusjonen.
Avdeling/Fakultet	Fakultet for informasjonsteknologi og elektroteknikk (IE)	
Institutt	Institutt for datateknologi og informatikk	

4. Daglig ansvarlig (forsker, veileder, stipendiat)

Fornavn	Terje	Før opp navnet på den som har det daglige ansvaret for prosjektet. Veileder er vanligvis daglig ansvarlig ved studentprosjekt.
Etternavn	Rydland	
Stilling	Amanuensis	Daglig ansvarlig og student må i utgangspunktet være tilknyttet samme institusjon. Dersom studenten har ekstern veileder, kanbiveileder eller fagansvarlig ved studiestedet stå som daglig ansvarlig.
Telefon	73591845	
Mobil	95773463	Arbeidssted må være tilknyttet behandlingsansvarlig institusjon, f.eks. underavdeling, institutt etc.
E-post	terjery@idi.ntnu.no	
Alternativ e-post	terjerydl@mac.com	NB! Det er viktig at du oppgir en e-postadresse som brukes aktivt. Vennligst gi oss beskjed dersom den endres.
Arbeidssted	IT-bygget, kontor 21	
Adresse (arb.)	Sem Sælands vei 9	
Postnr./sted (arb.sted)	7023 Tronheim	

5. Student (master, bachelor)

Studentprosjekt	Ja ● Nei ○	Dersom det er flere studenter som samarbeider om et prosjekt, skal det velges en kontaktperson som føres opp her. Øvrige studenter kan føres opp under pkt 10.
Fornavn	Madeleine	
Etternavn	Lorås	
Telefon	92885006	
Mobil		
E-post	madelelo@stud.ntnu.no	
Alternativ e-post	madeleine.loras@gmail.com	
Privatadresse	P.A. Munchs Gate 14	
Postnr./sted (privatadr.)	7030 Trondheim	
Type oppgave	● Masteroppgave ○ Bacheloroppgave ○ Semesteroppgave ○ Annet	

6. Formålet med prosjektet

Formål	Malet med denne studien er a finne ut mer om sammenhengen mellom elevers spillvaner utenfor skolen og hvordan bruk av dataspillet HeimdalsQuest påvirker deres læringsutbytte i skolen. Bruk av dataspill i skolen er et mye omdiskutert tema, men det har ikke blitt gjort veldig mye forskning på området. Denne studien vil kunne bidra til å avmystifisere bruken av spill i skolen, og samtidig gi nyttig innsikt i elevers erfaringer og oppfatning ved bruk av spill. Problemstillingen min er: På hvilke måter påvirker studenters spill erfaring deres læringsutbytte ved bruk det motiverende klasseromssystemet HeimdalsQuest.	Redegjør kort for prosjektets formål, problemstilling, forskningsspørsmål e.l.

7. Hvilke personer skal det innhentes personopplysninger om (utvalg)?

Kryss av for utvalg	□ Barnehagebarn ■ Skoleelever □ Pasienter □ Brukere/klienter/kunder □ Ansatte □ Barnevernsbarn □ Lærere □ Helsepersonell □ Asylsøkere □ Andre	
Beskriv utvalg/deltakere	Utvalget bestar av en klasse elever i videregaende skole, 2. ar. Noen elever i denne klassen blir forespurt om deltagelse på intervju.	Med utvalg menes dem som deltar i undersøkelsen eller dem det innhentes opplysninger om.

Rekruttering/trekking	Kontaktlærer og jeg blir sammen enige om hvem som skal forespørres om intervju, mens hele klassen blir observert.	Beskriv hvordan utvalget trekkes eller rekrutteres og oppgi hvem som foretar den. Et utvalg kan trekkes fra registre som f.eks. Folkeregisteret, SSB-registre, pasientregistre, eller det kan rekrutteres gjennom f.eks. en bedrift, skole, idrettsmiljø eller eget nettverk.
Førstegangskontakt	Kontakt med utvalget er gjennom deres kontaktlærer og direkte nar studien skal gjennomføres.	Beskriv hvordan kontakt med utvalget blir opprettet og av hvem. Les mer om dette på temasidene.
Alder på utvalget	□ Barn (0-15 år) ■ Ungdom (16-17 år) ■ Voksne (over 18 år)	Les om forskning som involverer barn på våre nettsider.
Omtrentlig antall personer som inngår i utvalget	16-18	
Samles det inn sensitive personopplysninger?	Ja ○ Nei ●	Les mer om sensitive opplysninger.
Hvis ja, hvilke?	□ Rasemessig eller etnisk bakgrunn, eller politisk, filosofisk eller religiøs oppfatning □ At en person har vært mistenkt, siktet, tiltalt eller dømt for en straffbar handling □ Helseforhold □ Seksuelle forhold □ Medlemskap i fagforeninger	
Inkluderes det myndige personer med redusert eller manglende samtykkekompetanse?	Ja ○ Nei ●	Les mer om pasienter, brukere og personer med redusert eller manglende samtykkekompetanse.
Samles det inn personopplysninger om personer som selv ikke deltar (tredjepersoner)?	Ja ○ Nei ●	Med opplysninger om tredjeperson menes opplysninger som kan spores tilbake til personer som ikke inngår i utvalget. Eksempler på tredjeperson er kollega, elev, klient, familiemedlem.

8. Metode for innsamling av personopplysninger

Kryss av for hvilke datainnsamlingsmetoder og datakilder som vil benyttes	□ Papirbasert spørreskjema □ Elektronisk spørreskjema ■ Personlig intervju □ Gruppeintervju □ Observasjon ■ Deltakende observasjon □ Blogg/sosiale medier/internett □ Psykologiske/pedagogiske tester □ Medisinske undersøkelser/tester □ Journaldata (medisinske journaler)	Personopplysninger kan innhentes direkte fra den registrerte f.eks. gjennom spørreskjema, intervju, tester, og/eller ulike journaler (f.eks. elevmapper, NAV, PPT, sykehus) og/eller registre (f.eks.Statistisk sentralbyrå, sentrale helseregistre). NB! Dersom personopplysninger innhentes fra forskjellige personer (utvalg) og med forskjellige metoder, må dette spesifiseres i kommentar-boksen. Husk også å legge ved relevante vedlegg til alle utvalgs-gruppene og metodene som skal benyttes. Les mer om registerstudier her. Dersom du skal anvende registerdata, må variabelliste lastes opp under pkt. 15
	□ Registerdata	
	□ Annen innsamlingsmetode	
Tilleggsopplysninger		

9. Informasjon og samtykke

Oppgi hvordan utvalget/deltakerne informeres	■ Skriftlig ■ Muntlig □ Informeres ikke	Dersom utvalget ikke skal informeres om behandlingen av personopplysninger må det begrunnes. Les mer her. Vennligst send inn mal for skriftlig eller muntlig informasjon til deltakerne sammen med meldeskjema. Last ned en veiledende mal her. NB! Vedlegg lastes opp til sist i meldeskjemaet, se punkt 15 Vedlegg.
Samtykker utvalget til deltakelse?	● Ja ○ Nei ○ Flere utvalg, ikke samtykke fra alle	For at et samtykke til deltakelse i forskning skal være gyldig, må det være frivillig, uttrykkelig og informert. Samtykke kan gis skriftlig, muntlig eller gjennom en aktiv handling. For eksempel vil et besvart spørreskjema være å regne som et aktivt samtykke. Dersom det ikke skal innhentes samtykke, må det begrunnes.
Innhentes det samtykke fra foreldre for ungdom mellom 16 og 17 år?	Ja ● Nei ○	Les mer om forskning som involverer barn og samtykke fra unge.

Hvis nei, begrunn		

10. Informasjonssikkerhet

Hvordan registreres og oppbevares personopplysningene?	□ På server i virksomhetens nettverk □ Fysisk isolert PC tilhørende virksomheten (dvs. ingen tilknytning til andre datamaskiner eller nettverk, interne eller eksterne) □ Datamaskin i nettverkssystem tilknyttet Internett tilhørende virksomheten ■ Privat datamaskin □ Videoopptak/fotografi ■ Lydopptak ■ Notater/papir ■ Mobile lagringsenheter (bærbar datamaskin, minnepenn, minnekort, cd, ekstern harddisk, mobiltelefon) □ Annen registreringsmetode	Merk av for hvilke hjelpemidler som benyttes for registrering og analyse av opplysninger. Sett flere kryss dersom opplysningene registreres på flere måter. Med «virksomhet» menes her behandlingsansvarlig institusjon. NB! Som hovedregel bør data som inneholder personopplysninger lagres på behandlingsansvarlig sin forskningsserver. Lagring på andre medier - som privat pc, mobiltelefon, minnepinne, server på annet arbeidssted - er mindre sikkert, og må derfor begrunnes. Slik lagring må avklares med behandlingsansvarlig institusjon, og personopplysningene bør krypteres.
Annen registreringsmetode beskriv		
Hvordan er datamaterialet beskyttet mot at uvedkommende får innsyn?	Både datamaskin og mobiltelefon er beskyttet med passord. Notater på papir er fullstendig anonymisert og oppbevares på låsbart rom.	Er f.eks. datamaskintilgangen beskyttet med brukernavn og passord, står datamaskinen i et låsbart rom, og hvordan sikres bærbare enheter, utskrifter og opptak?
Samles opplysningene inn/behandles av en databehandler (ekstern aktør)?	Ja ○ Nei ●	Dersom det benyttes eksterne til helt eller delvis å behandle personopplysninger, f.eks. Questback, transkriberingsassistent eller tolk, er dette å betrakte som en databehandler. Slike oppdrag må kontraktsreguleres.
Hvis ja, hvilken		
Overføres personopplysninger ved hjelp av e-post/Internett?	Ja ○ Nei ●	F.eks. ved overføring av data til samarbeidspartner, databehandler mm. Dersom personopplysninger skal sendes via internett, bør de krypteres tilstrekkelig. Vi anbefaler for ikke lagring av personopplysninger på nettskytjenester. Dersom nettskytjeneste benyttes, skal det inngås skriftlig databehandleravtale med leverandøren av tjenesten.
Hvis ja, beskriv?		
Skal andre personer enn daglig ansvarlig/student ha tilgang til datamaterialet med personopplysninger?	Ja ○ Nei ●	
Hvis ja, hvem (oppgi navn og arbeidssted)?		
Utleveres/deles personopplysninger med andre institusjoner eller land?	● Nei ○ Andre institusjoner ○ Institusjoner i andre land	F.eks. ved nasjonale samarbeidsprosjekter der personopplysninger utveksles eller ved internasjonale samarbeidsprosjekter der personopplysninger utveksles.

11. Vurdering/godkjenning fra andre instanser

Søkes det om dispensasjon fra taushetsplikten for å få tilgang til data?	Ja ○ Nei ●	For å få tilgang til taushetsbelagte opplysninger fra f.eks. NAV, PPT, sykehus, må det søkes om dispensasjon fra taushetsplikten. Dispensasjon søkes vanligvis fra aktuelt departement.
Hvis ja, hvilke		
Søkes det godkjenning fra andre instanser?	Ja ● Nei ○	F.eks. søke registereier om tilgang til data, en ledelse om tilgang til forskning i virksomhet, skole.
Hvis ja, hvilken	Det søkes om tillatelse til forskning fra skolens ledelse, ved rektor, avdelingsledelse og kontaktlærer.	

12. Periode for behandling av personopplysninger

Prosjektstart Planlagt dato for prosjektslutt	16.02.2017 01.07.2017	Prosjektstart Vennligst oppgi tidspunktet for når kontakt med utvalget skal gjøres/datainnsamlingen starter. Prosjektslutt: Vennligst oppgi tidspunktet for når datamaterialet enten skalanonymiseres/slettes, eller arkiveres i påvente av oppfølgingsstudier eller annet.
Skal personopplysninger publiseres (direkte eller indirekte)?	□ Ja, direkte (navn e.l.) □ Ja, indirekte (bakgrunnsopplysninger) ■ Nei, publiseres anonymt	NB! Dersom personopplysninger skal publiseres, må det vanligvis innhentes eksplisitt samtykke til dette fra den enkelte, og deltakere bør gis anledning til å lese gjennom og godkjenne sitater.

Hva skal skje med datamaterialet ved prosjektslutt?	■ Datamaterialet anonymiseres □ Datamaterialet oppbevares med personidentifikasjon	NB! Her menes datamaterialet, ikke publikasjon. Selv om data publiseres med personidentifikasjon skal som regel øvrig data anonymiseres.Med anonymisering menes at datamaterialet bearbeides slik at det ikke lenger er mulig å føre opplysningene tilbake til enkeltpersoner. Les mer om anonymisering.

13. Finansiering

Hvordan finansieres prosjektet?		

14. Tilleggsopplysninger

Tilleggsopplysninger		

Terje Rydland
Institutt for datateknologi og informatikk NTNU
Sem Sælandsvei 7-9
7491 TRONDHEIM

Vår dato: 23.02.2017   Vår ref: 52207 / 3 / AGL   Deres dato: Deres ref:

TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 16.01.2017. Meldingen gjelder
prosjektet:

52207	*Dataspill hjemme og på skolen - en kasusstudie av hvordan elevers spillerfaringer påvirker læringsutbytte ved bruk av dataspill på skolen*
Behandlingsansvarlig	*NTNU, ved institusjonens øverste leder*
Daglig ansvarlig	*Terje Rydland*
Student	*Madeleine Lorås*

Personvernombudet har vurdert prosjektet og finner at behandlingen av personopplysninger er
meldeplikting i henhold til personopplysningsloven § 31. Behandlingen tilfredsstiller kravene i
personopplysningsloven.

Personvernombudets vurdering forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i
meldeskjemaet, korrespondanse med ombudet, ombudets kommentarer samt
personopplysningsloven og helseregisterloven med forskrifter. Behandlingen av personopplysninger
kan settes i gang.

Det gjøres oppmerksom på at det skal gis ny melding dersom behandlingen endres i forhold til de
opplysninger som ligger til grunn for personvernombudets vurdering. Endringsmeldinger gis via et
eget skjema, http://www.nsd.uib.no/personvern/meldeplikt/skjema.html. Det skal også gis melding
etter tre år dersom prosjektet fortsatt pågår. Meldinger skal skje skriftlig til ombudet.

Personvernombudet har lagt ut opplysninger om prosjektet i en offentlig database,
http://pvo.nsd.no/prosjekt.

Personvernombudet vil ved prosjektets avslutning, 01.07.2017, rette en henvendelse angående
status for behandlingen av personopplysninger.

Vennlig hilsen

Kjersti Haugstvedt
                                        Audun Løvlie

Kontaktperson: Audun Løvlie tlf: 55 58 23 07

Dokumentet er elektronisk produsert og godkjent ved NSDs rutiner for elektronisk godkjenning.

Personvernombudet for forskning

Prosjektvurdering - Kommentar

Utvalget informeres skriftlig og muntlig om prosjektet og samtykker til deltakelse. Informasjonsskrivet er greit utformet, men veileders navn og kontaktinformasjon må tilføyes.

Personvernombudet legger til grunn at forsker etterfølger NTNU sine interne rutiner for datasikkerhet. Dersom personopplysninger skal lagres på privat pc/mobile enheter, bør opplysningene krypteres tilstrekkelig.

Forventet prosjektslutt er 01.07.2017. Ifølge prosjektmeldingen skal innsamlede opplysninger da anonymiseres. Anonymisering innebærer å bearbeide datamaterialet slik at ingen enkeltpersoner kan gjenkjennes. Det gjøres ved å:
- slette direkte personopplysninger (som navn/koblingsnøkkel)
- slette/omskrive indirekte personopplysninger (identifiserende sammenstilling av bakgrunnsopplysninger som f.eks. bosted/arbeidssted, alder og kjønn)
- slette digitale lydopptak