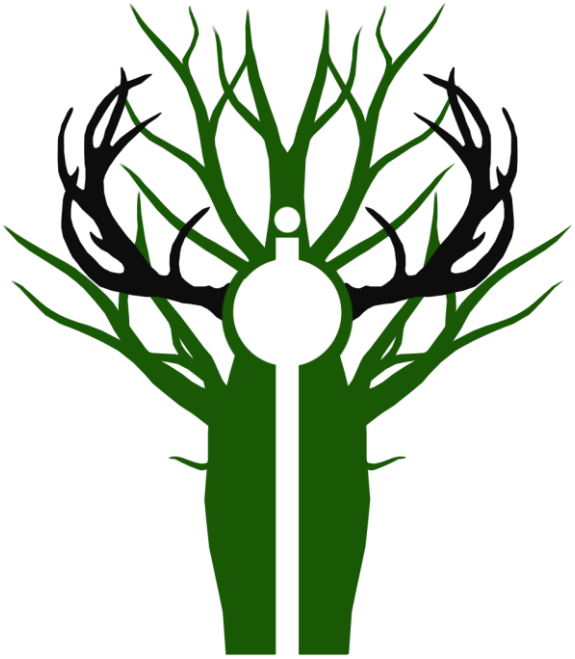

What Do Students Experience While Participating in a Motivational Classroom System? An Interpretative Phenomenological Analysis of Heimdall's Quest, a Gamified Classroom Framework

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Abstract

Dropout rates in in Norwegian upper secondary schools have for several years remained high in vocational studies. In order to combat this problem in school, I have created a framework that interacts with the classroom in order to stimulate student motivation, responsibility and effort with mechanics that reside within games. I call this a Motivational Classroom System.

The aim of this study was to answer my research question, *"What do students experience while participating in a Motivational Classroom System?"* The present qualitative, phenomenological study explored the meaning of students' experiences of participating in the MCS: Heimdall's Quest in the classroom. Phenomenological interviewing using semi-structured protocols was used to capture the experiences of three current students and four previous students who had graduated on to apprenticeships. All of the participants were Norwegian and were between 16 and 26 years of age during the time they participated in the class. Six of the participants were male with one female partaking in the study

An interpretative phenomenological analysis (IPA) of the findings revealed the following ten major themes:

- **Cooperation**: Students cooperated in all aspects of the classroom, group work and individual work, while participating in HQ.
- **Social aspects of team**: Students improved social connections with their classmates while participating in MCS groups.
- **Personal choice**: Students became aware of the fact that they had a choice and consequences of those choices.
- **Self-organization**: Students learned that to progress in the MCS, they had to work in the classroom.
- **Motivation**: Students learned to being motivated in various ways in the game, in the classroom and socially.
- **Modifying behavior**: Students had positive experiences with an MCS compared to their mostly negative experiences with orderliness and conduct grades in school.
- **Experience Points** (XP): Students were strongly motivated by extrinsic motivators that reflected their progression.
- **Powers**: Students viewed powers as a facilitator of improving classroom effort and quality of work within the MCS.

- **Attendance**: Students, while participating in HQ, had higher attendance throughout the school year.
- **Game mechanics**: In my study, I found that gaming had a positive effect on both girls and boys.

This study contributes to research in the field of game theory and motivation. This research has limitations which are not generalizable, but contribute to the research field. The findings of the study, may contribute to promoting the use of games in education.

Sammendrag

Frafallet i norske videregående skoler har i flere år vært høyt i yrkesfaglige studieprogram. For å bekjempe dette problemet i skolen, har jeg laget et rammeverk som fokuserer på samhandling i klasserommet for å stimulere elevenes motivasjon, ansvar og innsats med mekanismer som fins i spill. Jeg kaller dette Motivational Classroom System.

Hensikten med denne studien var å få svar på min problemstilling, *"Hva erfarer studentene når de deltar i et Motivational Classroom System (MCS)"* Denne foreliggende kvalitative, fenomenologiske studien har undersøkt betydningen av elevenes erfaringer med å delta i MCS: Heimdall Quest i klasserommet. Fenomenologisk intervju ved hjelp av semi-strukturerte protokoller ble brukt til å fange opp erfaringer fra tre nåværende studenter og fire tidligere studenter som hadde fortsatt som lærlinger etter videregående. Alle deltakerne var norske og var mellom 16 og 26 år i løpet av den tiden de gikk i klassen. Seks av deltakerne var menn og det var en kvinnelig deltager i studien.

En fortolkende fenomenologisk analyse (IPA) av funnene avdekket følgende ti viktige temaer:

• **Samarbeid**: Elevene samarbeidet i alle aspekter i klasserommet, med gruppearbeid og individuelt arbeid ved bruk av HQ (Heimdalls Quest).

• **Sosiale aspekter ved grupper**: Studenter opplevde et mer sosialt og inkluderende klassemiljø når de var med i MCS grupper.

• **Personlig valg**: Studentene ble klar over det faktum at de hadde et valg og konsekvensene av disse valgene.

• **Selvorganisering**: Elevene lærte at for å fremgang i MCS, måtte de jobbe.

• **Motivasjon**: Elevene lærte motivasjon på ulike måter i spillet, i klasserommet og sosialt.

• **Endring av adferd**: Elevene hadde positive erfaringer med en MCS forhold til sine mest negative erfaringer med orden- og adferds karakterer på skolen.

• **Erfaringspoeng** (XP): Elevene var sterkt motiverte av ytre motivasjonsfaktorer som reflekterte deres progresjon.

• **Powers**: Studentene så på evner som en måte å forbedre innsats og kvalitet på arbeidet innenfor MCS.

• **Oppmøte**: Studenter hadde, mens de deltok i HQ, høyere oppmøte gjennom hele skoleåret.

• **Spillmekanikk**: I min studie, fant jeg ut at spill hadde en positiv effekt på både jenter og gutter.

Denne studien bidrar til forskning innen spill-teori og motivasjon. Denne forskningen har begrensninger som ikke generaliseres, men bidrar til forskningsfeltet. Funnene i studien kan bidra til å fremme bruken av spill i utdanning.

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Chapter 1: Introduction

Each day teachers struggle with demotivated students. According to (Bäckman, Jakobsen, Lorentzen, Österbacka, & Dahl, 2014) dropout rates and high absence are pointed out as concerns, especially in upper secondary school and in vocational studies. Norway, topping these statistics has used enormous sums of money to combat this negative slide.

Dropout for students enrolled in vocational studies has been considerably higher than for those who began in a general line of studies. A recent report looking at dropout in upper secondary education in Norway shows that between 2010-2015 all vocational studies have had an average drop-out rate of 25% compared to an average of only 6% in general studies. Gender is also a considering factor. Boys are struggling in school with a 6% higher dropout rate than girls attending vocational studies (Statistics Norway, 2016).

Reflecting upon this research begs one to consider whether we are going about educating students the wrong way? It is clear that traditional classroom teaching is not improving these statistics. Nor is the amount of money being spent trying to figure out what the problem is. Is it perhaps time to start looking at unconventional forms for education? Is it instead possible to incorporate fundamentals that students already master and thrive in at home? That in itself is the basis for the motivation system I have created and termed: Motivational Classroom System (MCS)[1].

1.1 Background and focus for study

When I began teaching in vocational upper secondary school, I soon encountered students with very low motivation for school, high absence and concentration problems. Norwegian schools require educators to utilize "adapted teaching"[2] in order to meet the needs and demands of each student based on their own individual development, progress and differentiation (St.meld. nr. 16, 2006-2007). I was quickly faced with how I could effectively

[1] Classroom motivation system developed by Jason Ready incorporating gamified elements of role-playing games.

[2] Teaching method meant to adapt each individual student's learning content based on their required needs and at the correct educational level.

apply adapted teaching to such a challenging group. I said to myself… "What can I do as a teacher to motivate these students?" Therefore, I began to look at my students in a different light. What is it that motivates them? What do they enjoy? What is something that they all have in common, that I could build upon to bring them together as a class as well as motivate them as individuals? The answer I found is something that in my mind was obvious, but for many it may not be as clear. They all played video games.

Many of my students were gamers[3]. Gamers spend much of their free time stimulating themselves both socially as well as mentally by playing various types of computer games. Some of the students played Real Time Strategy (RTS), some played First Person Shooter (FPS) and the means to their gaming differed (PC, console, mobile, pad). Most of my students were boys, but the girls that have been in class were either gamers or related well to game situations. In light of this, I began to look at how to make the classroom a game to promote responsibility, effort and learning. I wanted to put my students in an environment which could stimulate them the same way as when they were engaged in gaming activities. This led me to reflect upon my own experiences with gaming. This become my focal point of research into the field of "gamification"[4]. Following that path led to the birth of "The Level System" where I used the concept of gamification in order to gamify the classroom.

From The Level System to Heimdall's Quest

It is important with a little background on "The Level System" (TLS)[5] in order to build a solid understanding of how an MCS has been developed over time. TLS was developed and officially placed into use in 2008 at Heimdal Upper Secondary School. It was used specifically in vocational ICT[6] studies, where it was applied to each class. The students were active in both use and development of the system. The system was built upon an idea inspired

[3] Gamers is a slang term referring to individuals who identify themselves as someone who actively plays video games.

[4] The use of game design elements in a non-game context in order to create an experience for a specific target group/person.

[5] Adapted teaching / gamified motivation system developed and implemented at Heimdal Upper Secondary School in 2008.

[6] ICT – information and communications technology - or technologies.

by Maslow's hierarchy of needs which consists of the following five levels: Physiological, Safety, Love/Belonging, Esteem and Self-Actualization (Maslow, 1943). TLS was designed as a pyramid system where the students, based upon their own in class effort could progress. Effort was measured by a student completing expected assignments, showing responsibility and overall hard work in class. If a student chose, he or she could attain a higher effort rating by choosing to do more than was necessarily required. This could be demonstrated by delving deeper when answering a problem or question, being more active in class through participation, etc.

At the beginning of each year, the students would choose five symbols and names that would represent the levels of achievement in each subject. The symbols, such as the Super Mario symbols shown in figure 1, were chosen by the students together as a class and implemented to represent the levels of achievement. Students would start at the bottom (base) level and have the possibility to graduate to higher levels in the system. At the base level a student's base educational needs were always in focus. This level would cover all aspects of the teaching plan for the specified subject. As a student progressed in achievement levels, they would earn a new symbol representing a higher rank in the system. As a student's rank increased, so did the freedom over their own education. The idea was, by allowing the students to take a more active role in their own education they would eventually place themselves via their own effort at the correct educational growth level. Those students which put in more effort and showed responsibility would have a more active role in how they received their education.

Figure 1: The Level System Pyramid: Based on Maslow's Hierarchy of Needs

TLS was a system focused on self-organization and motivation in contrast to the qualification system, where students are assessed only in relation to their individual competence in the various school subjects. In Norway it is not allowed for teachers to evaluate effort as a part of a student's classroom assessment towards subject grades (FOR-2006-06-23-724, ss. § 3-5). Behavior in the form of orderliness and conduct are considered in separate grades, which therefore makes it important to place the focus on a students' competence, not upon their effort. The trick with TLS was that it was in no way directly connected to their assessment or grades in their school subjects. However, students who did not put much effort into their assignments and in-class work would not do well in TLS. Yet, he or she could still attain top grades in class by demonstrating his or her proficiency during assessment in the school subjects. The same could be said of a student who rose very high in TLS and performed poorly in academic evaluations, thus earning a weaker subject grade. It appeared to me that those who worked harder also performed better during periods of evaluation. The students progressed in TLS by working hard on assignments and participating in class. Those who put in extra effort of their own choosing would always have the fastest progression.

The system worked extremely well for the first half of the year. Nevertheless, towards the end of the year after Christmas, motivation and student interest in using the system fell off steeply. Why was this? What we had learned after running the system for a few years was that in the first half of the year we gave out more assignments than during the second half of the year. The second half of the year was used primarily for larger project work and exam

preparation. As the chances to earn effort rating and level up\progress… increased, so did the students' enthusiasm and motivation. As the frequency of earning effort rating decreased, so did the students motivation. This major design flaw is what led to the creation of the first Motivational Classroom System (MCS): Heimdall's Quest[7].

Motivational Classroom System (MCS)

An MCS framework is a gamification tool designed around the idea of motivating students, particularly in order to induce the experience of flow[8] into their learning. Vygotsky (1978), refers to a tool or artifact as crystallized knowledge within the activity system. In this particular instance, a tool alludes to the parts of the game system which have been thoroughly learned by the player and are utilized by the player in order to achieve the game's objectives. The teacher as a mediator of the game mechanics, relates to the system as a tool promoting interaction between the students, classroom and teacher in order to promote student motivation and the desire to master the game itself. It could also be said that a tool is only as potent as the person who wields it, as their knowledge of how to correctly utilize it will dictate overall effectiveness. Therefore, it is also important that the teacher has a solid understanding of how to use the framework correctly and effectively in the classroom.

A fundamental explanation of how an MCS works is necessary in order to understand the research and its focus. Let me introduce an example: "The students enter the classroom. Loud, raucous, earphones on, music and voices mingling in a cacophony of sound, then a sudden silence as the teacher enters the room. The students understand the rules…they are now in the presence of a god. The teacher and students are all participants in a Motivational Classroom System."

The teachers in this example being compared to gods and the students themselves mortals with classroom powers, such as a Viking who has the ability to earn the freedom to eat and

[7] Heimdall's Quest is the first developed MCS. It was designed by Jason Ready and first implemented and used at Heimdal Upper Secondary School in Trondheim, Norway in 2013. It is currently in further development and being tested in multiple schools in Norway.

[8] Flow Theory (Csikszentmihalyi, 1975), explained in detail in chapter 3

drink in class. Students and teachers involved within an MCS must be able to interact and cooperate with each other on different levels.

An MCS such as Heimdall's Quest, heavily incorporates elements from role-playing games (RPG)[9] in order to bring the game experience into the students' everyday reality. Edith Ackerman gives a powerful description of role play:

> *"Role-play is a specific form of pretense "where the child assumes or is given a role to play". Through it, a person experiences things through the eyes of others, and learns to simultaneously stage, enact, narrate, and ultimately work through aspects of her own and other people's ways of being, doing, and relating. Role-play requires that the players mentally slip out of their personae, and act as if they were someone else: another person, animal, or even a thing that they animate in their mind. In their role-play, even very young children "become" a baby or a mom, a cat or a dog, a scary monster or a robot."*(Ackermann, Gauntlett, & Weckstrom, 2009, p. 52)

An MCS can be used across a single or many classrooms and relies on a model of variation and choice for student achievement progression. Students are placed into groups early in the year and are encouraged to develop a group identity, building a sense of cooperation. The system also incorporates a graphical avatar[10] in which students develop an individual identity. This avatar changes graphically as the students' progress to higher tiers of expertise, which is designed in order to provide a sense of mastery. Experience is gained as experience points (XP) which reflect a student's progression. Gaining enough XP allows for progression in levels and allows them to purchase real world powers. In order to provide incentive to come to school each day, a point cost called "Mana" is also attached to the use of powers. The system was developed utilizing multiple well known motivation, learning and social theories. These theories are explored at a deeper level in chapter 3. An in depth description of the (MCS) Heimdall's Quest is also provided in Appendix A.

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[9] A game in which players assume the roles of characters in a fictional setting.

[10] An avatar is a virtual body or a personal figure used to represent oneself in a virtual world such as a role-playing game.

1.2 Personal motivation

I have chosen to study the experiences of students in an MCS in order to come to a deeper understanding of what aspects and why these aspects of an MCS system can come to affect my students. This has practical applications for myself in order to modify and better design future systems. It is also important to weigh upon the potential to enlighten upon a better understanding of the thoughts, culture and motivations of today's students and their relations to gaming mechanics. I also feel that gamification has huge value to education and can help alter the current negative course of student drop out in school.

1.3 Target group

This research is meant for educators, teacher students as well as any persons or organizations interested in looking into the value of utilizing gaming mechanics/gamification into a classroom or other educational setting. By conducting this research my hope is that underlying values will surface exposing possible benefits of utilizing gamified systems such as an MCS in the field of education. My belief is that this can provide a foundation from which to promote increased student effort, responsibility and mastery in school.

1.4 Thesis and Research Question

My research question is, *"What do students experience while participating in a Motivational Classroom System?"*. For this research I will be looking specifically at the use of the first Motivational Classroom System I have developed: Heimdall's Quest. In order to fully embrace the essence of what these students are experiencing, I have chosen to embrace a qualitative methodology to the research utilizing an interpretive phenomenological approach. As there have been no previous studies pertaining to an MCS, I am particularly interested in what the students participating within the system experience. Methodology and analysis will be explained in detail in chapter 4.

1.5 Thesis overview

This Master's thesis is divided into 6 different chapters. In addition to these chapters there is an abstract with a short description of the work done. There are also an overview of figures and tables and appendixes at the end of the paper. Chapter 1 is an introduction to my problem

area. An in depth background is included in order to give a foundation of understanding for the reader. It is also a presentation of my rational and reasoning for conducting this study. A brief introduction to the research questions is also included here. Chapter 2 consists of literature review of research that is relevant to the study topic and white papers pertaining to the use of games in education. Chapter 3 is the theory chapter. In this chapter I have discussed relevant theory used in an MCS and how it relates to educators and learners. Chapter 4 contains an overview to my chosen research method, the research framework, the research process and how the research was conducted. Analysis is included towards the end of the chapter. Chapter 5 includes the results of the research. These results are presented through a table of major themes and selected sections of transcriptions. I will then reflect in detail upon the research results and their meanings. Chapter 6 will wrap up the thesis with a summary of my findings, brief answers to the research questions and conclusions.

Chapter 2: Research in the Field of Games and Gamification in Education.

2.1 Introduction

In this section, I will present research and white papers focusing on the use of game mechanics in schools. I will attempt to relate how previous studies and white papers support the foundation of an MCS as well as how they are applicable to teaching, learning and motivation.

2.2 Previous studies / research

Does Gamification work?

Gamification is defined in this study as, "A *process of enhancing services with (motivational) affordances in order to invoke gameful experiences and further behavioral outcomes*" (Hamari, Koivisto, & Sarsa, 2014). This can be interpreted in simple terms as gamification promoting the same psychological experiences that are normally elicited by games. Many successful startups have begun to emerge that have developed an entire service focused on

adding a gamified layer to a core activity. An example of this is Codecademy, which provides a service that uses game-like elements in order to help teach users how to code.

The report, "Does Gamification Work? — A Literature Review of Empirical Studies on Gamification", focuses on multiple peer-reviewed empirical studies on gamification with the aim of answering if gamification actually works. These studies covered areas of education, commercial use of gamification and marketing. The results of the report covered studies of qualitative and quantitative nature and used a mixed methods methodology.

Hamari, Koivisto, & Sarsa (2014) have broken down gamification into three componants in order to structurally analyze the results and state of the research:

1. Motivational affordances
2. Psychological outcomes
3. Behavioral outcomes

Results of their research shows that gamification does indeed work, yet some caveats exist. They cite that the majority of the studies reviewed did yield positive effects/results from gamification. However, they mention that most of the quantitative studies concluded positive results in only part of the considered relationships between gamified elements and studied outcomes. Studies that investigated gamification qualitatively revealed gamification to be much more manifold than many of the studies often assumed. Two primary aspects arose from these studies to be vital in the context of successful gamified systems: The first is the role of the context being gamified. The second depends upon the qualities of the users.

In light of this report it is important to consider how an MCS framework is developed keeping the two findings in mind. Context of the MCS resides in the teacher and his or her relation to the classroom and the students within. As an MCS such as Heimdall's Quest is developed with the purpose of using gamified elements to interact with the teacher, students and the classroom itself, it then becomes a tool directed by the interactions between those three entities. Qualities of the users is important as it also specifically points to the teacher as a guiding force. A teacher who understands the elements within the system, the students within his or her class, and how to effectively use the system to motivate those students will receive the best results utilizing an MCS in the classroom.

2.3 Norwegian white papers

In this section I will focus upon two white papers discussing the use of games and technology in Norwegian schools. The first paper (NOU 2015:8, 2015), is based upon recent research by a committee headed by Professor Sten Ludvigsen. This particular committee has highlighted aspects of learning that are important for future generations of students in school. They have also, based on research, made recommendations on how teaching plans and curricula can be recreated to meet these needs. The second paper (St.meld. nr. 14, 2007-2008), focuses on the use of computer games in schools. How and if computer games can be used as a teaching tool in the classroom, as well as their relevance to incorporating ICT generally throughout school. I will highlight aspects of these two papers and reflect upon their relevance to an MCS framework.

School of the future: Renewal of disciplines and competencies

School of the future. An exciting phrase that inspires the mind to envision works of greatness, science and innovation. The report (NOU 2015:8, 2015) is based on international trends (EDU/WKP(2009)20, 2009), (COM(2012) 669 final , 2012) and focuses on what is important for learning in the next twenty to thirty years. It also makes recommendations on how the school system and curricula should be reformed in order to meet the demands of tomorrow. Challenges in society in upcoming years such as greater diversity, higher degrees of complexity in learning and rapid changes in the climate are all factors considered when the committee put this report together. This includes rapid changes in computer and media technologies, challenges with sustainable development, demographic changes, both local as well as global. Ethnic, cultural and religious considerations are also considered. Finally, a focus on future knowledge based education in regards to consumption and growth as well as internalization of employment are all factors considered. Based on these areas of consideration, the report narrows its view upon these five areas within the Norwegian school system.

1. **Reforming the curriculum**: The curriculum is currently overloaded with skills students are required to learn. This leaves little room for further development.

2. **Children must learn how to learn**: Students who have shown an awareness of their own learning, what and how they learn, are considered better equipped to solve problems in a reflective way. This involves individual and group work. Knowledge acquired through education is also meant to be something useful throughout the student's life.

3. **Creativity is to be encouraged in all subjects**: The focus is on the development of explorative and creative skills. These are considered skills of great social value in the coming years. Being able to adapt to situations, develop critical thinking skills as well as judgment, problem solving and creativity are all emphasized skills. These skills are of equal importance in vocational studies and not just within academic careers.

4. **Introduction of learning in depth**: This means that the knowledge learned is also meant to be put to practical use. However, this does not mean that it is meant to apply to all learning. It expresses that the student can make choices. It also expects the teacher to take this into consideration.

5. **Strengthening of mental health**: Students need to learn how to take care of their own lives. Responsibility and effort lead to a successful life in the work force. The focus is on students developing the ability to make good decisions, as well as ethical judgments. This will help students to make responsible choices in their own lives

When looking at an MCS framework in the light of this report, it may not be easy to see the relevance of using a game to promote many of these values. However, if you consider that a game can be a tool utilized to affect the behavior of an individual based on responsibility, effort and repetition, it is possible to look at games as a way to bridge the gap between student, teacher and values of learning.

My experience is that games promote inquisitive learning. Students can sit at home on a video game for hours striving to learn how to progress to the next level or perhaps solve a problem. Games promote creativity, allowing for adaptive and critical thinking (Russ, 2004). However, thinking outside the box in order to find solutions that may not at first glance be visible. Games have for example been used to teach practical skills: when a doctor training on

brain surgery utilizes a simulation in order to prepare for eventualities in a real operation setting. Moreover, the US military uses games simulations such as America's Army[11] to prepare soldiers for the realities of war as well as to teach the consequences of battle and laws. However, the context of the game is important to the teaching of the desired skills or behavior and must be taken into consideration, like the examples demonstrate.

Computer games (St.mld. nr. 14)

The white paper (St.meld. nr. 14, 2007-2008) "Dataspill", from the Norwegian government focuses on possible uses, as well as cultural considerations regarding the use of video games / games in education. This pertains to using an MCS such as Heimdall's Quest in education, and how the government views incorporating game based learning into schools. Many countries, including Norway, are now pushing for new initiatives to incorporate game-based learning into schools and curriculum. Most of these games are currently produced in the USA, however, Norway and other European countries are seeing the need for computer games with an educational foundation to be produced. This is important in order to consider games and gamification in both cultural as well as educational development. In the white paper (St.meld. nr. 14, 2007-2008), the Norwegian government focused on computer games in school, referring to using games in context while in the classroom to promote learning.

Computer games can for example be used as a starting point for discussions in the classroom. This is based on the teacher initiating a game followed by discussions and or assignments. Games can also provide a strong motivational effect on academically challenged students. In order to succeed with computer games in school, it is necessary that teachers understand the games being used and that the games are customized for the students. The games must be used according to the law and curriculum and not as rewards.

Based on the finding in this report, indications are clear, games in education are considered a valid method of teaching. This supports the use and development of serious games within an educational context, as well as opening for gamified systems and frameworks such as an MCS.

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[11] Strategic simulation game created by US Army, designed to allow young Americans to virtually explore the Army at their own pace and according to their interests to determine if soldiering matches their needs, interests and abilities. https://www.americasarmy.com/

Professor Sten Ludvigsen stated at the 2015 Game and Coding Conference in Bergen, *"Games with good design and context should be used in schools."* For example, Nordahl Grieg Upper Secondary School in Bergen uses commercial games such as The Walking Dead[12] in order to teach ethics. They utilize this efficiently when playing the game content together. The teacher relates the context of the lesson to the game material. Countless other commercial games can also be used in a similar manner. The point here is that the teacher is essential. It is the teacher that provides the guidance and the context to how a game can be used to facilitate learning in school subjects, not the game itself.

Chapter 3: Concepts and Theory

3.1 Gaming theory: Introduction

"We do not stop playing because we grow old, we grow old because we stop playing!"
— Benjamin Franklin

I argue that teachers often struggle with the idea of using games or elements of games in the classroom. They are often faced with the problem of evaluating what is relevant and appropriate game content in regards to the curriculum and classes they teach. Some researchers, including Ludvigsen, argue that the majority of entertaining commercial games contain irrelevant content and functions which can lead to wasted lesson time. However, Eck (2010) argues that design in commercial games does not "suck the fun out" in order to maintain relevance and that principles are already thematically and contextually embedded within these games. A movement of game-based learning that is focused on what is considered "gamification" or in other instances "serious games" [13] look to alleviate the perceived contextual problems that reside in many fun commercial games.

Theories lay the foundations required for us to best perceive how life operates. This chapter focuses on illuminating the research and theories of using game elements in

[12] A zombie apocalypse game where players must make hard ethical choices in order to survive.

[13] Simulations of real-world events or processes designed for the purpose of solving a problem. Although serious games can be entertaining, their main purpose is to train or educate users.

education. Specifically, this chapter will focus on looking at how a (MCS) Motivational Classroom System is designed in order to incorporate these theories and how they are applicable to a classroom setting.

3.2 Games: Definitions and terminology

In order to understand some of the underlying theories that reside within an MCS we first need to understand the definition of a game. There exists many different perspectives and approaches to the definition of a game. David Kaufman (2010) speaks of a game as a set of voluntary activities which has participants, goals, rules and some kind of physical and mental competition. Digital games as defined by Marc Prensky (2006) are a set of key characteristics including: rules, goals and objectives, outcomes and feedback, conflict/ competition/ challenge/ opposition, interaction and representation or story. Katie Salan and Eric Zimmerman give an excellent more focused definition of a game: *"A game is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome."* (Salen & Zimmerman, 2004, p. 81)

Salan and Zimmerman also raise the question whether a puzzle is a game? In his book, The Art of Computer Game Design, Chris Crawford differentiates games from puzzles:

> "*Puzzles are static; they present the "player" with a logic structure to be solved with the assistance of clues. Games, by contrast, are not static, but change with the player's actions."* Crawford (Salen & Zimmerman, 2006 p.196)

Puzzle and game designer Scott Kim (Salen & Zimmerman, 2004) agrees with Crawford, expressing that puzzles are different from games because they have a correct answer or outcome. It is important to differentiate between a puzzle and a game, since for the most part a puzzle is a game, yet Salen and Zimmerman consider puzzles a special type of game with which a correct set of answers frame the game (Salen & Zimmerman, 2004, p. 81).
Karl Kapp expands upon Salen and Zimmerman's definition of a game, modifying it to fit into a learning context by adding the concept of emotional reaction based on the idea of fun as presented by Raph Koster (2005 in Kapp, 2012):

> *"A game is a system in which players engage in an abstract challenge, defined by rules, interactivity and feedback, that results in a quantifiable outcome often eliciting an emotional reaction."* (Kapp, 2012, p. 7)

Looking closer at Kapp's description, it is possible to combine the singular elements in order to make an event that is larger than the individual aspects alone. Kapp uses this example:

> *"A **player** gets caught up in playing a game because the instant **feedback** and constant **interaction** are related to the **challenge** of the game, which is defined by the **rules**, which all work within the **system** to provoke an **emotional reaction** and finally, result in a **quantifiable outcome** within an **abstract** version of a larger system."* (Kapp, 2012, p. 9)

Gaming elements

> *"One of the most difficult tasks men can perform, however much others may despise it, is the invention of good games."*
> **— C.G. Jung**

It is important to recognize key elements and features residing within games. Games are themselves a complex system of variables and require multiple elements in order to trigger an effective learning experience. The melding of so many elements is partially what draws people to play games. Through the interplay of these elements many of the best games are created. According to Kapp (2012), elements residing in games can be categorized by: introduction, abstractions of concepts of reality, goals, rules, conflict or cooperation, time, reward structures, feedback, levels, story, aesthetics and repetition.

Games can tell a story or be used as a narrative to guide the player along. Many games such as Tetris are not guided by any particular narrative, however other games such as Chess contains terms like knight, bishop, queen and king to represent warring factions. Other games such as Star Wars: Knights of the Old Republic II[14] are genuinely designed with a huge storyline where player choice guides a narrative based on the actions the player chooses in

[14] A roleplaying video game developed by Obsidian Software in 2005. Specifically created with an open ended story line where the player's choices dictate the narrative.

the game. These types of games allow the player to influence not only reactions to themselves in the game, but also can influence the progression of characters, places and things within the narrative. This allows for plot twists, curiosity and surprise.

One vital aspect of games is looking at them as a form of art. Aesthetics being art, beauty and visual elements to any game. These help the player get caught up in the experience of a game. Consider Chess, where pieces have been extrinsically carved in detail using the finest of earthly elements.

Colors can and often do have meaning in a game. It is important to consider that color in culture can represent different things to different people. This in itself can be considered a work of art for a game designer, to balance a game for widespread acceptance. Game developer Greg Costikyan (Salen & Zimmerman, 2004) supports this by referring to games as art with an identified form of culture. Video games can also contain depths of realism and as Kapp (2012) explains, it is important not to confuse aesthetics with realism. A game does not need to have incredible photorealistic images to be appealing. Massive sandbox[15] video games, such as Skyrim[16] , are often considered works of art as they allow players to experience landscape, nature, architecture and culture. Sandbox games allow players to fully immerse themselves in the environment of a game, freed from the usual structure and direction that is typically found in video games. This freedom allows the players to choose what, when and how to approach the content.

The goal of a game is an important aspect. One of the most important reasons to play a game is to have fun. This can also be considered the primary goal of a game. Malone (1981) proposes that the most important factors to make a motivating game are challenge, curiosity and fantasy. Entertainment value of a game will often vary from person to person based on personal preferences. Casual games can also be fun to play and do not necessarily have a goal to defeat anyone. It can be just as enjoyable to just play without winning or losing. The

[15] A game wherein the player has been freed from the traditional structure and direction typically found in video games, and is instead given the ability to choose what, when, and how they want to approach the available choices in content.

[16] Skyrim: A medieval fantasy, open world, sandbox, action role-playing game that allows the player to experience the world as if they resided it in themselves in the role of their chosen character. Landscape, architecture and nature are considered by many as a form of art.

Sims[17] series of games are a good example of games that do not have winning as a goal. It is a game used to simulate a family where the characters in the game interact with their world in as realistic a way as possible with the player controlling how that family's life will play out. It is all about the enjoyment of the experience. In contrast, a board game such as Catan[18] has very specific goals required for a player to win the game. So considering Kapp's (2012) refined definition of a game, it is possible to see how aspects such as narration or storytelling, aesthetics and colors, rules and goals all need to be considered when designing a game.

A game also requires players to have an experience. Feelings of conflict, competition or cooperation fuel the desire to work together or against other players and lead to the desire to repeat the process. This emotional reaction from a player is vital to a good game experience. This experience can be anything from the elation of victory, the woes of loss or perhaps just the simple enjoyment of playing the game for its own sake.

Effects of video games

In 2004 neuroscientists Green and Bavelier (2007, pp. 88-94) published the article: Action-video-game experience alters the spatial resolution of vision, with their findings on video games and learning. They discovered that playing all types of video games positively affects "visual selective attention". In simpler terms meaning that kids learn in situations where many things are going on at the same time; how to identify and concentrate on the most important things while filtering out the rest. Their research has also shown that frequent playing results in better vision tests compared to non-players. Playing video games can therefore improve coordination as well as problem solving and critical thinking skills.

In their paper, (Ungerleider & Burns, 2002) Information and Communication Technologies in Elementary and Secondary Education: A State of the Art Review, Margoulis (1988) confirms that games can be used to stimulate learning and problem solving.
An example of this is the video game, Assassin's Creed [19] series of games. In these games the player explores the memories of a number of Assassins throughout different historical time

[17] The Sims (1-4): A life simulation video games series. Largely considered sandbox or open ended games.

[18] Multiplayer board game focused on building a settlement to a set size before your opponents.

[19] Assassin's Creed – Series of historical inspired adventure games

periods. Unlike historical simulations and games, Assassin's Creed has a created setting where players are actively engaging with the environment and proactively learning about it. The game has a quest line that can be followed, yet also encourages exploration and choice. For example, do you as the player choose to assassinate a lone guardsman sleeping in front of a chest with a treasure inside… or do you choose to sneak behind him, cause a distraction or perhaps knock him unconscious? This type of play requires problem solving, ethical considerations, as well as strategy. Ferguson, Diller, Leung, Benyo, & Foley (2006) point out that strategic and tactical games, such as Age of Empires, SimCity, and Civilization, help players to develop logical skills, as well as help in decision making skills.

In his book; What Video Games have To Teach Us About Learning And Literacy, Gee (2007) discusses how video games can have a tremendous effect on improving motoric skills such as writing with a pen. By training these skills, those with handicaps or learning disabilities are able to improve solidly over time. Players of video games, especially social aspects ones, also show greater control over keyboards and other receptory devices such as the mouse. Educational video games have also shown to improve player's communication and problem solving abilities, alertness and ability to locate things without straining oneself (Rufus, 2004).

Not all aspects of video games are considered positive. Video game players often demonstrate poor posture and poor ergonomic habits. This can later develop problems with sitting and back posture, headaches and or pain in fingers and joints due to incorrect typing techniques (Rufus, 2004). Such players often have great control interacting directly with the computer, yet while developing these skills they often do not focus on posture and correct techniques.

3.3 Motivation theory

Motivating students through the use of games is for many a complicated process. Teachers with a low personal relation to games can struggle to implement game-based learning. In a study of games in schools, Anders Boas (2013) points out that teachers utilizing serious games[20], often leave students to their own devices while utilizing games in the classroom.

[20] Simulations of real-world events or processes designed for the purpose of solving a problem. Although serious games can be entertaining, their main purpose is to train or educate users.

The result of this is that teachers often realize that the students have not learned as much as expected. Teachers need to be as involved as the students when utilizing games in education. This section will delve into theories of motivation that support teachers' involvement and support improving student motivation within an MCS.

Self-Determination Theory

There are primarily two main types of motivation; extrinsic and intrinsic. These are both important elements related to learning. Extrinsic motivation can be viewed as something that triggers an interest to start with something, or a spark used to bring about curiosity and initial excitement. Enjoyment of the activity can then create a lasting intrinsic motivation. Different types of motivations can and do relate to different kinds of learners based on individual needs and personal preferences.

Deci and Ryan's Self-Determination Theory (Deci & Ryan, 2013) defines motivation by intrinsic and extrinsic experiences.

- **Intrinsic motivation** - pushes us to act freely, on our own, for the sake of it; (activity one does because it is inherently interesting or enjoyable)
- **Extrinsic motivation** - pulls us to act due to factors that are external to the activity itself, like reward or threat; (in games this is often rewards)
- **Amotivation** - denotes the absence of motivation.

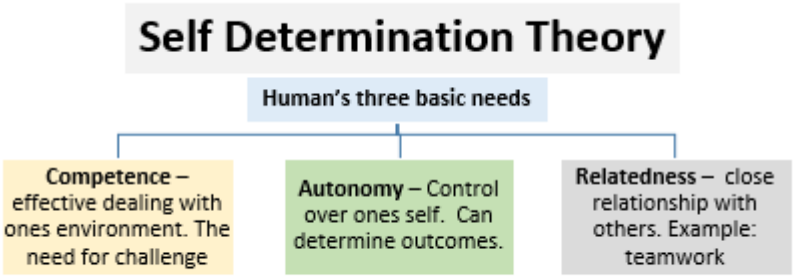

Figure 2: Self Determination Theory – (Deci & Ryan, 2013)

According to Deci and Ryan (2013) every human being strives for as much autonomy over its own actions and decisions as possible. Similarly, humans aspire for competence in their actions and surroundings. These two needs are essential. A third factor, relatedness, focuses on activities where learning happens in a social context (teamwork, classroom, online chat, games, etc.). Additionally, research has shown that security, warmth and autonomous support created by a parent or a teacher promotes intrinsic motivation and inquisitive behavior (Grolnick & Ryan, 1989).

Discussion on SDT

Self Determination theory builds the foundation of an MCS. As I stated in my introduction, when I began teaching vocational IT, many of my students lacked motivation in school. This was Amotivation, or the lack of motivation. Being able to look at the students participating in Heimdall's Quest and evaluate what factors are affecting their intrinsic motivation is a major part of the system. It is also important to look at how extrinsic goals built within the system are used to promote intrinsic motivation in student learning.

Flow Theory

"This is the real secret of life -- to be completely engaged with what you are doing in the here and now. And instead of calling it work, realize it is play."
— Alan W. Watts

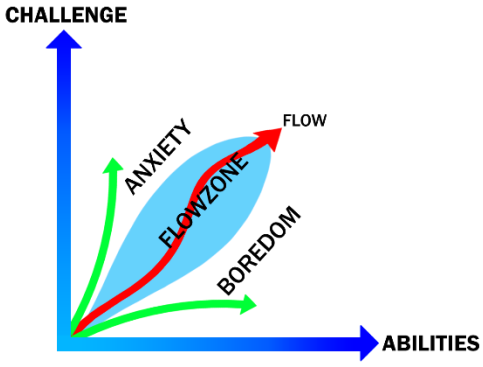

Figure 3: Flow Zone

Csikszentmihalyi (1975) describes flow as a state of mind of utter concentration on and absorption in the task. Flow appears in those moments, when we forget time, our worries and become one with an activity. Flow itself is a state of mind and can occur during any activity. In sports it is often referred to as being "in the zone". It is a state of intrinsic motivation closely resembling competence in Self-Determination Theory. Yet, Flow has a more practical approach and includes aspects such as action-awareness merging, concentration on the task at hand and sense of control – all being related to usability. This is of vital use when designing for games. It is also a perfect state of learning that is ideal if stimulated in a classroom. It is

also in my opinion, a perfect tool to implement adapted teaching in school with the use of gamification. Since flow occurs when skill meets the appropriate level of challenge, teachers can adapt the way a game or even teaching itself is done in order to meet the needs of each individual student. The trick is keeping them in the flow zone, which resides between boredom and anxiety. Make the challenge too low, based on a student's skill and they will lose interest. Make it too hard and they will become stressed and feel it is too hard. Everyone reaches flow at different points and differentiating is therefore important when attempting to reach Flow in the classroom.

Discussion on Flow

Flow is the optimal state of mind that I want to induce in my students. Deci & Ryan (2013, p. 279) refer to flow as a state of intrinsic motivation indicated by optimal challenge and autonomy. By using game techniques in the classroom, an MCS framework is designed to increase the chance that a flow state can be brought about with the students. This in itself is a valuable tool, yet it can also be a tool for teachers to map out paths of adapted teaching of individual students and or groups by using the connecting levels of progression designed into an MCS. Basically the system adapts to the challenge level required by the learner. Figures 3, 4 and 5 demonstrate Flow and show how it can be utilized in order to customize adapted teaching for students.

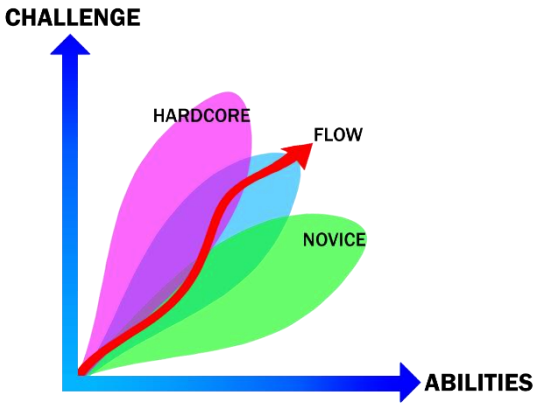

Figure 4: Differentiation of a learner based on their own individual challenge requirements.

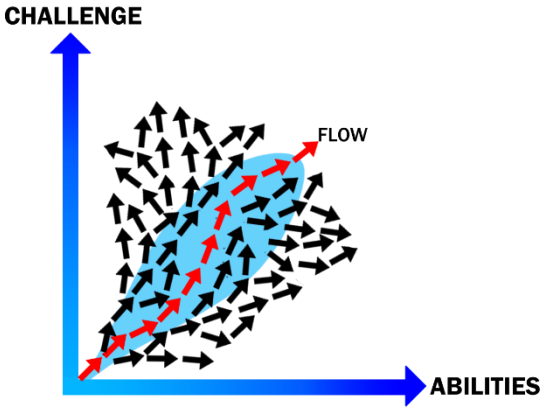

Figure 5: Flow can be customized by an educator to meet the needs of different individuals. Adapted teaching.

The Taxonomy of Intrinsic Motivations and Learning

Originally, Thomas Malone and Mark Lepper had each researched and written about similar aspects of intrinsic motivation and learning (Kapp, 2012). They eventually combined their research into what is known as *The Taxonomy of Intrinsic Motivation and Learning.* This theory is very interesting as it focuses specifically on why games are so fun and motivational and looks at motivation from various angles. The Taxonomy is divided into two main sections, the first focuses on internal motivation and the second focusing on interpersonal motivations.

The Taxonomy is listed up in both sections in (Kapp, 2012, pp. 55-59). The first section focusing on internal motivation includes:

- Challenge in terms of goals, uncertain outcomes, performance feedback, and self esteem
- Curiosity in terms on sensory and cognitive inquisitiveness
- Control in terms of contingency, choice and power
- Fantasy in terms of emotional and cognitive aspects of fantasy as well as interweaving of the fantasy and skills to be learned within a game.

The second section focusing on interpersonal motivations includes:

- Cooperation of players working together in order to achieve a goal within a game
- Competition in terms of competing against others in order to achieve a goal.
- Recognition of achievements so that others can see the amount of hard work needed in order to achieve a level of mastery in a game.

Discussion on The Taxonomy of Intrinsic Motivations and Learning

When looking at the Taxonomy in regards to using an MCS it is very clear how it becomes relevant. The first section regarding internal motivations looks at both intrinsic as well as extrinsic motivation tying them to what it is that is fun in games. Fantasy stands out as a major element that is incorporated heavily within an MCS framework. Malone in (Kapp,

2012, p. 55), defines fantasy as, *"An environment that evokes mental images of things not present to the senses or within actual experience of the person involved."*
This doesn't need to mean swords and magic, but can be anything that makes the classroom environment more interesting to the learners. Fantasy is there as an incredible cognitive and emotional tool to facilitate designing educational environments.

Interpersonal motivations are perhaps the most important aspect utilized within an MCS. The feeling of teamwork, inspiring and cooperating towards a common goal. The feeling of having support even when you are perhaps weaker in a subject has untold possibilities. Competition can be both an internal motivation as well as an interpersonal one. Take avatars for example: within an MCS a player will develop their own avatar. Seeing other players excel and gain new levels of mastery promotes a feeling of competitiveness with a student, both internally as well as the desire to be as good or better than the other student. This ties into the team aspect as well, since one student can excel and inspire a team mate to improve their own mastery of learning. This in itself is supported directly by the use of an avatar. A student displaying mastery will eventually reach new levels in the MCS and their avatars visual effects will change reflecting this. This is in essence a form for extrinsic motivation, however, it also builds upon the promotion of intrinsic motivation as a student will identify with their avatar as well as their team. Recognition of another student's mastery is both a tribute to that student as well as a motivating factor for others to follow his or her example.

ARCS Model

In 1987, John Keller incorporated existing research on psychological motivation and created the ARCS model of motivational design. ARCS is a four-factor model originally developed in order to examine the concept of motivation in games. The model is well known in the field of instructional design and is often used in creation of e-learning course material (Kapp, 2012).

The ARCS motivational design process is a systematic problem solving approach that requires knowledge of human motivation and progresses from learner analysis to solution design. More specifically, the process includes:

- Knowing and identifying the elements of human motivation,
- Analyzing audience characteristics to determine motivational requirements,

- Identifying characteristics of instructional materials and processes that stimulate motivation,
- Selecting appropriate motivational tactics, and applying and evaluating the appropriate tactics.

(Keller, 2010)

ARCS stands for Attention, Relevance, Confidence and Satisfaction. Karl Kapp (2012) outlines Keller's ARCS model in detail, focusing specifically on how it relates to the gamification of learning and instruction, as well as how it may be applied to game-based learning:

Attention: This is important in order for learners to gain interest in the content. Keller singles out perpetual arousal as gaining attention through specific means and most importantly through the element of surprise (Keller, 2010). Inquiry arousal is the use of stimulating curiosity. Getting the learners to be curious and want to experiment, role-play or just plain problem solving. Variability can then be used in order to maintain attention by varying the delivery method of a lesson.

Relevance: Kapp (2012) points out three methods of establishing relevance of material to learners:

1. Goal orientation: orienting the learner to the importance of the goal. Relating it to something the learner can identify with
2. Matching the motive of the instruction with that of the learners (achievement, risk taking, power or affiliation)
3. Familiarity: Showing how new knowledge is related to a learners existing knowledge.

Adapted teaching is represented in matching of a learners needs within this area. By finding out how to motivate a student as well as the degree of difficulty a student requires in order to learn, a teacher can adapt the content based on relevance to the individual student.

Confidence: Here resides the learner's expectations of achieving success. If the learner feels they can learn the material being taught, they tend to be more confident in their own ability to

proceed. Kapp (2012) makes it clear that it is very important for an educator to clearly state the learning requirements and expectations at the beginning. This allows the learners to better estimate the amount of time and effort actually needed for learning. If learners can do this, they are more likely to succeed, whereas if they don't know, they are more likely to be reluctant in putting forth the effort.

I like to look at this according to Flow theory (Csikszentmihalyi, 1975). If a student can feel a sense of mastery or success, they will then want to repeat the process. Success builds upon success. Therefore, an educator can provide challenging experiences that build upon one another. This also ties into adapted teaching by finding what is challenging to each individual student.

Satisfaction: This provides learners the need to feel that learning has value to them and that it is worth the continued effort. Here educators need to provide learners the opportunity to apply their learned knowledge in a real or simulated setting. By providing encouragement and reinforcement this area can be applied throughout the entire learning process.
Another way to look at satisfaction is utilizing forms of extrinsic motivation in order to facilitate intrinsic motivation within the learners. Kapp (2012), highly recommends to focus on promoting further intrinsic motivation via the use of intrinsic reinforcement (Deci & Ryan, 2013).

Discussion on ARCS

When looking at how ARCS is relevant to the use of an MCS. ARCS can be utilized as a guideline for educators to motivate students as well as a way to successfully integrate other motivational theories into a classroom setting. ARCS maintains a connection to Motivational theories such as Self-Determination Theory (Deci & Ryan, 2013) and Flow (Csikszentmihalyi, 1975). When comparing ARCS to other know theories of learning, it maintains a resemblance to Kolb's Experiential Learning Theory (Kolb, 1984), yet the focus of ARCS is to design/promote a motivational experience, whereas Kolb's theory focuses on how learning happens through experience.

A teacher utilizing the ARCS four factor model can maintain a good structure and relation to the MCS framework. This in return allows the educator to maintain high motivation in the

classroom. A simple analogy could be, if the MCS is the tool then ARCS is the maintenance handbook.

3.4 Learning theory

Experiential Learning

Games and learning go hand in hand. In order to play a game, you must first learn how to play. Games are perfect for utilizing a "learning by doing" method in the classroom. David Kolb's Experiential Learning Theory[21] (Kolb, 1984), solidly lays a foundation of the process of gaining knowledge from experience and applying it to education, work and development (See Figure 6). Experiencing, reflecting on the experience, processing or conceptualizing of ideas, and acting based on experience. These are all aspects of playing a game. In a game, you act and feel, you reflect on your actions and are able to realize consequences or perhaps see a path to victory, you think on what to do and you act again. This continual cycle promotes advancement in knowledge, greater understanding and improved practice.

[21] Kolb (1984) describes experiential learning as a four-stage cycle involving four adaptive learning modes: concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE).

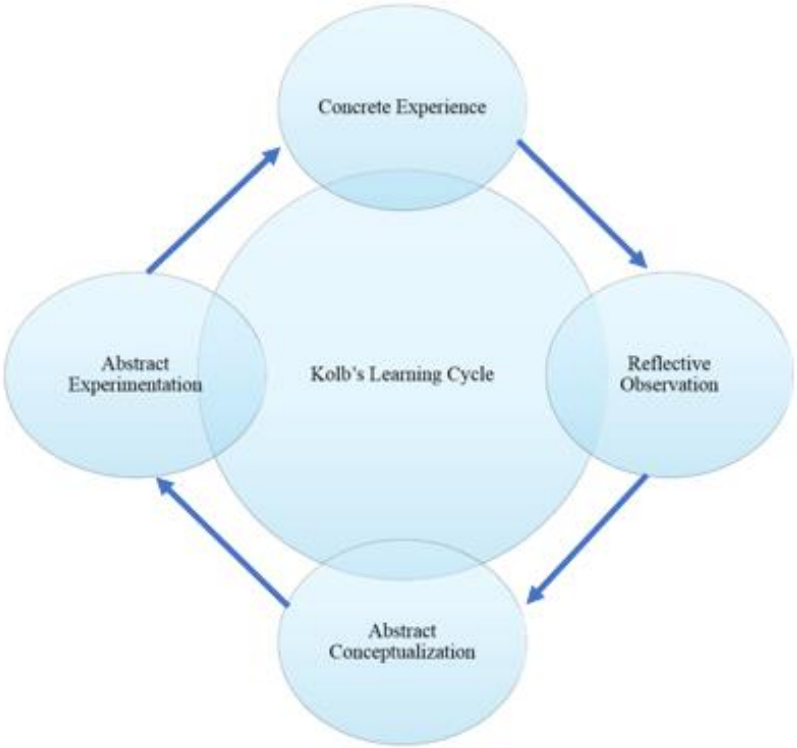

Figure 6: Kolb's Learning Circle

Discussion on Experiential Learning Theory

One of the nice things of experiential learning is how well motivation theories synchronize with it. If we apply Self Determination Theory while using Kolb's learning cycle to look at Heimdall's Quest, it is possible to get a clear picture on how learning via gamification can take place. An MCS such as Heimdall's Quest is designed in order to provide intrinsic motivation to the participants. Extrinsic values of the game system such as rewards, badges, avatars, etc. build anticipation in a participant, which further promotes intrinsic motivation. The participants relate to each other in a game framework, experiencing teamwork and mutual understanding of one another within the structural rules of the game. As a participant works their way through Kolb's learning cycle their experience may lead to" Flow" or as many often term it, being in the zone. An optimal state for learning.

Connectivism

Social aspects of games have become so widespread that it is impossible to ignore how learning occurs via networks and digital trends. George Siemens (Siemens, 2005) proposes a new theory for the digital age called Connectivism. He challenges the limitations of Behaviorism, Cognitivism, and Constructivism, which all focus on learning from the inside of people. Siemens states, "These theories do not address learning that occurs outside of people (i.e. learning that is stored and manipulated by technology). They also fail to describe how learning happens within organizations". Connectivism focuses on that experience is the best teacher of knowledge. Since we cannot experience everything, other people's experiences as well as other people themselves become connectors to new knowledge. Siemen's also challenges the importance of what information we assimilate now. For example, it has previously been common practice for students in USA to learn (memorize) the capital cities of all the States. Yet, how is that necessary in today's society when so much information is available to our fingertips via cell phones, internet and a quick search on google? By being connected socially as well as digitally[22], we have access to more information than ever before.

Stephen Downes reinforces Connectivism by giving a description of distributed knowledge:

> *"You probably grew up learning that there are two major types of knowledge: qualitative and quantitative. Distributed knowledge adds a third major category to this domain, knowledge that could be described as connective. A property of one entity must lead to or become a property of another entity in order for them to be considered connected; the knowledge that results from such connections is connective knowledge."*
> (Downes, 2005, p. 299)

Discussion on Connectivism

Connectivism looks to how we learn today and places value not on the knowledge we have internally, but the knowledge we have through connections, network and technology. When

[22] Digitally – referring to networked connection via digital devices, the internet or via games.

looking at how gaming can contribute to the classroom, we should perhaps ask ourselves if bringing in social media and games into the classroom could be of great use to further learning. Connectivism is already being used for a new type of classroom called a MOOC[23]. This type of instructional design approach attempts to connect learners to each other in order to answer questions and/or collaborate on projects. The collective is often a part of development of the MOOC itself.

AN MCS such as Heimdall's Quest places value on the team... the collective. The connection between the students allows them to grow together as a unit as well as individually. There is a cultural aspect to this with regards to gaming culture and students' inert understanding, yet it is the sharing of their individual knowledge and the use of their social networks that allows them the greatest possibility for self-growth.

3.5 Social Theory and Views

Learning to Labor

Paul Willis (Willis, 1977) in the 1970's performed an ethnographic study on a group of working class high school students in England. He wanted to know why these boys often ended up as working class workers in life. The students that worked hard in school and accepted the establishment of school were termed as "ear'oles". The "lads" were the boys from the working class. The lads rejected the establishment of school and formed their own counter school culture where they developed antagonistic views on working hard in school. They instead valued resistance to discipline and the enforcement of the school system. Their counter school culture placed value on things they knew and respected from their upbringing; practical knowledge, life experience and "street smarts" instead of theoretical expertise. They did not see school as an equal opportunity for them to progress to a higher station and therefor saw no need for it and in essence rejected the system. In 1976, Angela McRobbie (Baldwin, 1999) conducted a similar research on a group of British high school girls and concluded with the same findings as Willis. However, she made it a point for researchers not to forget the importance of gender in social research.

[23] MOOC – Massive Open Online Course - online course aimed at unlimited participation and open access via the web. Focus on building networks and sharing resources often with collective commons licensing.

Discussion on Learning to Labor

Learning to Labor holds a special interest for me concerning my work with Heimdall's Quest system and teaching in school. I noticed early on many students with a lack of interest in school. It was not that they were unintelligent; it was more or less that they just did not want to work. School punishments did not have any effect and if anything, it appeared to make them even more unwilling in school. They had in essence rejected the school system as the "lads" had in Willis's study. Since many of these youth grow up with a connection to gaming, I thought to myself, "why not introduce a system they can accept?" Heimdall's Quest is in part inspired based on the idea, if they don't accept the school system; why not introduce a system they can accept?

3.6 Summery

In this chapter, I have touched upon the main theories and their relevance to an MCS as well as students and teachers. Each of the presented theories hold a central role in the design, use and purpose of an MCS framework. Each discussion area following the presentations of the theories also consists of my views and understandings, or even more central to this research, my preconceptions based on the system design.

Chapter 4: The Research Process

4.1 Introduction

The previous chapters have focused upon white papers and earlier research of gaming mechanics, gamification in education and theories directly supporting the foundation of a motivational classroom system. As no previous research upon an MCS exists, these chapters have been used to give a better understanding of the what, how and why of an MCS. This chapter outlines the objective of this study and progresses to rationalize the utilization of a qualitative research design to meet the study's objectives. It gives an overview of the methodology, research framework, participant selection process, data collection and analysis.

Analysis will also delve into the strategies used in order to ensure reliability and trustworthiness. Finally, ethical considerations will conclude the chapter.

4.2 Aim and scope of research

According to Smith, Flowers, & Larkin, the aims set by IPA researchers tend to focus upon people's experiences and /or understandings of a particular phenomenon (2009, p. 46). The aim of this study was to closely yet objectively examine the participant experience of students who partook for a full school year in Heimdall's Quest: Motivational Classroom System. The research was conducted at Heimdal Upper Secondary School and participants were selected from classes within the ICT vocational program, and from previous students who had attended those same classes in previous years. The ICT vocational program consisted of three classes of fifteen students per class. Students in the class varied in age from 16 years to upwards of 26 years with an average age of 18-19 years. The study took place starting August 2015 and ended in June 2016.

Rationale

When I first considered which method I should choose the choice was between using a qualitative method or a quantitative. A quantitative method is attractive on many levels as it would allow the study to focus on specific areas of interest regarding the use of an MCS in school. However, since no previous research exists, it became clear that a better starting point would be to find out what exactly the students are experiencing while participating in an MCS system. According to Johnson and Christensen (2014), *"Qualitative research is used when little is known about a topic or phenomenon and when one wants to discover or learn more about it. It is commonly used to understand people's experiences and to express their perspectives."* (p. 33)

Once the value of those experiences has been revealed, a quantitative study would be a good choice to proceed with further research. Another point of consideration is that the selection for a quantitative study at this point would be quite low, considering that the system has been in use for a very short amount of time and with a relatively small amount of students. After a few more years or a larger selection group consisting of more classes and or

schools, a quantitative study could then truly delve into the effects an MCS system has upon important aspects of education. Therefore, at this time I have chosen to focus on a qualitative method in order to discover what these students are truly experiencing. The benefit to this is that it gives a true starting point to further research and reveals the "what", "how" and "why" of the phenomenon instead of the "how much" or "how many".

In order to excavate the essence of these students lived experience I have chosen to use an IPA approach. An IPA is primarily concerned with providing a detailed description and interpretation of the accounts of particular experiences as told by a small selection of individuals. The IPA approach provides an instrument to reflect upon the significance of perceived lived experience and emotional response as well as allowing the researcher to engage with the participants' reflections (Smith et al., 2009). Close examination of how the interviewee interprets lived experiences shared through the MCS framework allows the research to render a more complex, enriched understanding of the experience (Creswell, 2013).

4.3 Qualitative design

A qualitative study can give the researcher a faithful description of the world we live in. According to Creswell (2014), qualitative methods differ from quantitative by relying upon text and image data, have unique steps in data analysis and draw upon diverse designs (p. 214). A number of authors such as Creswell (2013), Hatch (2002), Marshal and Rossman (2011) have attributed a set of basic characteristics that define qualitative research:

- *Natural setting:* Researchers tend to collect data in the field at the site where participants experience the issue under study. Up-close information gathered by talking to people in the natural setting.

- *Researcher as key instrument:* Researchers collect data themselves via examination of documents, observing behavior or interviews. A protocol may be used, however the researcher themselves are the true tools of data collection. They do not utilize questionnaires or instruments developed by other researchers.

- *Multiple sources of data:* Researchers gather multiple forms of data, such as interviews, observations, documents and audiovisual information rather than rely on a single source. They then review, analyze, organize and categorize it all into themes.

- *Inductive and deductive data analysis:* Researchers build their patterns, categories and themes from bottom up by organizing data into increasingly more abstract units of information. Working back and forth between themes inductively. Then deductively, looking back at data from the themes to see if they need to gather more information.

- *Participant's meanings:* During the entire process the researcher keeps a focus on learning the meaning that the participants hold about the problem or issue, not the meaning that the researcher brings to the research or that writers express in literature.

- *Emergent design:* The research process is emergent. This means the initial plan for research cannot be strictly dictated and may change or shift after the researcher enters the field and begins to collect data. Key idea is to learn about the problem or issue from participants and to address the research to obtain that information.

- *Reflexivity:* The researcher reflects about how their role in the study and their personal background, culture and experiences hold potential for shaping the interpretations. More than just advancing biases and values in the study, but how the background of the researchers actually may shape the direction of the study.

- *Holistic account:* Researcher try and develop a complex picture of the problem or issue under study. Involves reporting multiple perspectives, identifying many factors involved in a situation and gradually illustrating the larger picture that emerges. Visual models of the process can help to establish a holistic picture.

  Creswell & Brown (1992) (as cited in Creswell, 2014, pp. 215-218)

For this research study I chose to utilize a qualitative research approach. This approach was chosen in order to meet the inquisitive and exploratory objectives of the study. Having chosen to utilize a qualitative research paradigm also directed the choice of the methodology and methods used. In order to create a strong design to the foundation of the research, I have chosen to follow Michael Crotty's recommendation that a researcher should consider these four important questions:

What *methods* do we propose to use?

- (techniques and procedures used to gather and analyze data related to the research question)

What *methodology* governs our choice and use of methods?

- (strategy, plan of action, process/design behind the choice and use of methods)

What *theoretical perspective* lies behind the methodology in question?

- (philosophical stance informing the methodology thereby giving context to the process and grounding its logic and criteria)

What *epistemology* informs this theoretical perspective?

- (theory of knowledge embedded in the theoretical perspective of the methodology)

(Crotty, 1998)

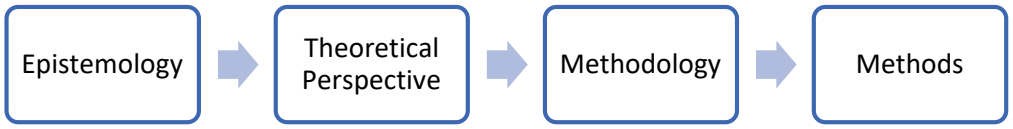

Figure 7: Model of Crotty's four questions to research design

This chapter will discuss these questions in the order as shown in Figure 7, beginning with epistemology and ending with methods. The process of constructing the research design involves reflecting upon my own understandings and personal interests regarding the research.

Epistemology: Constructionism

Constructionism was the epistemology that underpinned this research study. Constructionism takes the view that: "All knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context" (Crotty, 1998, p. 42).

The father of Constructionism, Seymour Papert says that constructionism might be summarized as 'learning-by-making', or according to Ackermann (2004) 'learning-by-

design'. However, he is very clear that it is 'much richer and more multifaceted' than such a simple formula might suggest (Papert & Harel, 1991).

Crotty (1998) points out that when using a constructionist paradigm that there is no one true interpretation, but rather multiple interpretations. According to this theoretical perspective, common themes exist within the lived experience of the participants and common meanings across the research sample. Individual, personal and unique subjective meanings and experiences also exist for each of the participants. This is in contrast to a positivist paradigm where meaning is discovered and objective. In a constructionist paradigm meaning is constructed and subjective (Krauss, 2005).

Constructionism also maintains connections to experiential learning, building upon the ideas inspired by Swiss psychologist Jean Piaget (1896-1990) in Constructivism. Crotty (1998) distinguishes between Constructionism and Constructivism, where Constructionism focuses on collective meaning making, compared to Constructivism where the focus lays on individual meaning making. Ackermann gives a good summery of what constructionism is primarily focused on, *"Papert's research focuses on how knowledge is formed and transformed within specific contexts, shaped and expressed through different media, and processed in different people's minds."* (Ackermann E. , 2001, p. 8)

Constructionism has also been linked to Flow theory. Papert noticed while observing students creating with their hands (sculptures made of soap), that they were in a deeply engaged state (flow), whereas when they were making something rather abstract in their minds alone (such as solutions to math problems), they were much less engrossed (Papert & Harel, 1991).

I feel that Constructionism was an appropriate epistemology for this study. The source of experience and meaning came from multiple students and these were used to explore the meanings of the phenomena being studied.

Theoretical perspective: (Interpretative) Phenomenology

> *"In everyday life each of us is something of a phenomenologist insofar as we genuinely listen to the stories that people tell us and insofar as we pay attention and reflect on our own perceptions"* Halling (2008, p.145) (as cited in Smith et al., 2009, p. 32).

Phenomenology is a philosophical approach to the study of experience, that focuses upon what the experience of being human is like, in all aspects, yet particularly of that which constitutes our lived world (Smith et al., 2009). According to Moustakas (1994), a phenomenological study illuminates upon the lived experiences of participants regarding a particular phenomenon, and attempts to develop an interwoven description of the essence of the journey for all of the individuals relating to "what" and "how" they experienced it.

Van Manen (2016) describes phenomenology as a human science; *"While natural science inclines to mathematics, phenomenology gravitates to meaning and reflectivity. The latter is caught up in a self-reflecting pathos, discerning meaning in sensing the world of things, others, and self."* (p.16)

In this study, interpretative phenomenology focuses upon examining the accounts, stories and narratives about the participants' lived experience of partaking in an MCS at school. In this way it is possible to gain an understanding of the phenomena via the perspective of the subjects themselves in order to describe how they experience the world (Kvale & Brinkmann, 2009).

Husserl's (Eidetic) Descriptive Phenomenology

Edmund Husserl (1859-1938) is by many considered to be the founder of phenomenology (Crotty, 1998; Laverty, 2003). As a trained scientist and philosopher, Husserl became critical of science's attempts to ground the *lifeworld* (the everyday life we lead), via the natural sciences in order to explain human issues (Smith et al., 2009). He believed that by utilizing the study of experience as an object, that phenomenology could lay the conceptual foundations for further scientific study (Smith et al., 2009). Husserl's scientific approach aims to reach true meaning by probing further and further into reality (Laverty, 2003). In order to achieve a true phenomenological attitude, Husserl developed a 'phenomenological method' from which to identify core structures of human experience. This method proceeds through a serious of 'reductions'. Each reduction offered a different perspective, way of thinking or perhaps a lens or prism in which to view the phenomenon. These reductions were intended to lead the researcher away from the distraction of their own assumptions and

preconceptions, back towards the essence of their experience of a specific phenomenon (Smith et al., 2009). This was in essence "bracketing", where the researcher sets asides his or her own preconceptions so as not to contaminate the essence of the phenomenon. Laverty (2003) describes this as the process of suspending one's judgements or beliefs in order to see things 'as they are'.

Heidegger's Interpretative (Hermeneutic) Phenomenology

Martin Heidegger began as a student of Husserl, who's phenomenological philosophies inspired him to diverge toward an interpretative hermeneutic view of phenomenology. This interpretative aspect, would delve deeper by going beyond the description of lived experience to interpreting the hidden, underlying meanings residing behind the description. According to Smith, Flowers, & Larkin (2009), Heidegger questioned the possibility of any knowledge outside of an interpretative stance, whilst grounding this stance in the lived world-the world of things, people, relationships and language (p. 16). The meaning of lived experience to Heidegger held a dual focus where experiences could be considered having visible meanings or may or may not also have hidden/concealed meanings (Smith et al., 2009).

Visible and hidden meanings differ from one another, however they should not be considered separate or mutually exclusive in all instances, as hidden meaning can be both part of and a part from visible meaning (Smith et al., 2009).

John Dewey (1933) writes a good descriptive reflection on meanings, *"Only when things about us have meaning for us, only when they signify consequences that can be reached by using them in certain ways, is any such thing as intentional, deliberate control of them possible."* (p. 19)

Meaning itself is something that can't just be attained through daily living as it is already implicated in the prereflective reflection of seeing, hearing, touching being touched and being in touch with the world (Van Manen, 2016, pp. 16-17). The researcher must take into consideration the participants reflection upon their experiences. Reflection upon these experiences may bring unique and novel views into a more perspective view, allowing for new and meaningful interpretations to arise (Van Manen, 2016).

In contrast to Husserl's descriptive phenomenological approach which insisted on the use of bracketing in order to eliminate bias, Heidegger rejected a 'pre-suppositionless' phenomenology considering that anyone interpreting a phenomena presented cannot rid themselves of their prior experiences (Smith et al., 2009, pp. 24-25).

Having designed and participated in Heimdall's Quest, I have a good fundamental understanding of the functionality of an MCS. With this is mind, it is not possible to totally bracket off my preconceptions. However, it is possible to be conscious of my own preconceptions and not allow them to dictate the essence of the participant experiences. Based on this fundamental knowledge of the field of study meant that it was possible to utilize more time probing deeper into the students' experiences. This in return meant that I would not need to use as much time questioning them about fundamental gaming terminology as I already had an understanding of this from before.

Methodology: Interpretative Phenomenological Analysis

In this section I will outline upon the choice and use of a qualitative methodology in order to find reliable answers to the research question. This study, using a qualitative methodology and Interpretative Phenomenological Analysis (IPA) approach, focuses on the "essence" of "lived experiences" of the participants with the goal of suspending all judgments in order to search for the philosophical meaning of the individual's experience (Creswell, 2013).

Unlike other phenomenological approaches, IPA is unique in that it draws upon the fundamental principles of phenomenology, hermeneutics, and idiography. It is considered is a relatively new approach to qualitative inquiry which originated in the field of psychology with increasing use in the human, social and health sciences (Smith et al., 2009). According to, Smith, Flowers & Larkin (2009) ,*"IPA is phenomenological in that it is concerned with exploring experience on its own terms" (p.7).* The primary goal of IPA researchers is to investigate how individuals make sense of their experiences. This approach is grounded in the exploration and understanding of lived human experience.

Dilthey (1976) (as cited in Smith et al., 2009, p.2) defines an experience as anything presenting itself as a unit in the flow of time. Even the smallest unit of time has a unitary meaning and can thus be called an experience. More complex units which consist of parts of a life, linked together by common meaning is also called an experience (Smith et al., 2009). In IPA studies these 'comprehensive units' of experience are often those of most interest to

the researcher. When an individual engages with an experience they have had they are able to reflect on what it means (Smith et al., 2009). In this study, the reflections of the students, their experiences and meanings are what constitute the core research data. This is in essence their lived experience.

One of the main challenges the researcher faces is to understand what the individuals' reflections mean (Smith et al., 2009). IPA is considered to have a double hermeneutic as the participants make meaning about 'X' and the researcher must try and make sense of the participants meaning making (Smith et al., 2009, p. 3). A third hermeneutic also exists in an IPA study as the researcher must also take into consideration the imagined reader who is trying to makes sense of the researcher making sense of the participant making sense of 'X' (Smith et al., 2009, p. 41).

> *"IPA requires a combination of phenomenological and hermeneutic insights. Without the phenomenology, there would be nothing to interpret; without the hermeneutics, the phenomenon would not be seen."*(Smith et al., 2009, p. 37)

The third theoretical orientation which IPA relies upon is idiography. Values of IPA studies are often shown as offering detailed, nuanced analyses of particular instances of lived experience (Smith et al., 2009, pp. 37-41). This refers to an in-depth analysis of single cases and examining individual perspectives of study participants in their unique contexts. The fundamental concept underlying the idiographic approach is to explore every single case, before cautiously moving onto examination of similarities and differences. In doing so this allows the researcher to produce fine grained accounts of patterns of meaning for participants reflecting upon a shared experience (Smith et al., 2009).

4.4 Framework for Research

In this section I will outline my framework for the research study. This model is designed as a flow chart displaying the processes within the research design. The initial process begins with participant selection. It then proceeds to the interview and data collecting stages of the research. Transcriptions are then the final step before progressing downwards to the analysis. Analysis in this design was set up as a hermeneutic circle. A hermeneutic circle looks at one's understanding of the whole based upon the understanding of each individual part (See

Figure 8). In this case it is the understanding of the individual participants' experiences within an MCS in order to frame a picture of the whole. Smith et al., (2009) states that in order to understand any given part you must also look to the whole; to understand the whole, you must also look to the individual parts (p.28). This is a good representation of the circular process of interpretation. The framework model of the research is visually displayed below in Figure 9.

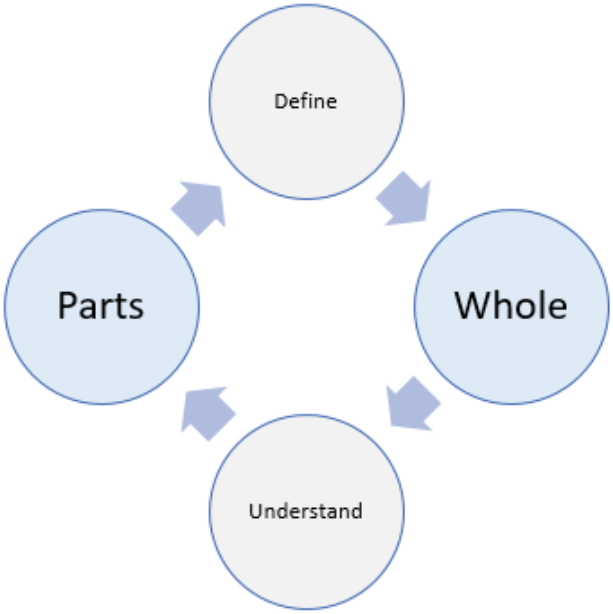

Figure 8: The Hermeneutic Circle

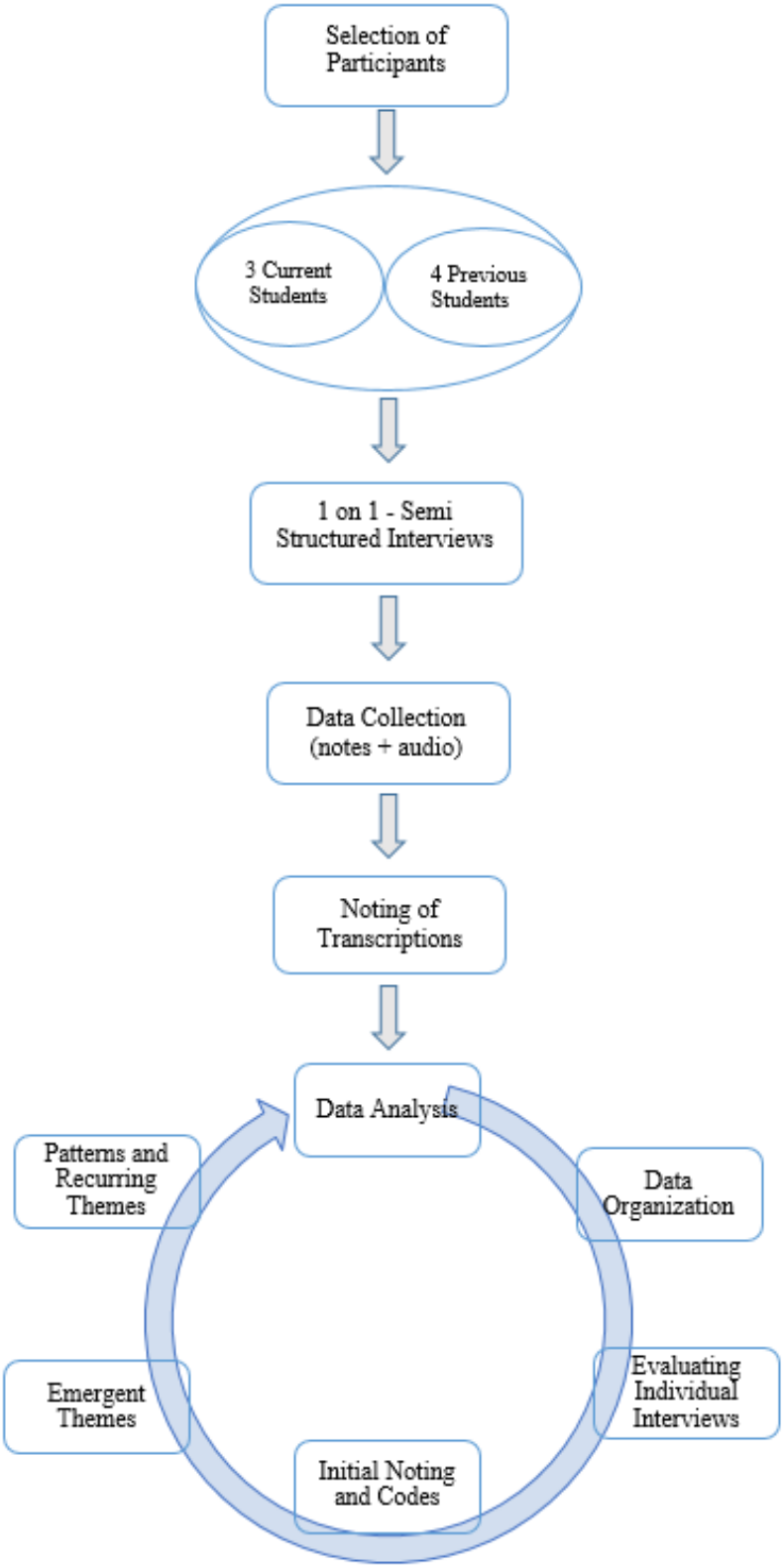

Figure 9: Model of research framework as a flow chart

Resources and timeframe of the study

The following resources were required for this study:

Resources:

1. Access to students that have participated in Heimdall's Quest (MCS) for an entire school year.
2. Audio recording device in order to capture the interviews upon agreement of the participants. Recordings destroyed immediately after completion of transcribing.
3. All data and transcripts were maintained upon a personal BitLocker[24] encrypted computer with password encryption upon the files. Contents of these files and transcripts will be destroyed shortly after research is completed.
4. A computer utilizing word processing, spreadsheets and NVivo software with password encryption were also utilized in the research.

The milestones listed below were used as a guideline in order to provide good time, preparation as well as structure to the study:

Timeframe:

1. Initial research topic chosen (Summer 2015)
2. Literature review and previous research / white papers (Jan/Feb 2016)
3. Interview guides devised (March 2016)
4. Participant selection and request (April 2016)
5. Interview of participants (May/June 2016)
6. Transcription of interviews (June 2016)
7. Compilation and analyzing results (Fall 2016)
8. Document Findings (August/September 2016)
9. Finalization of thesis (October 2016)
10. Final delivery of thesis (November 2016)
11. Thesis defense (Dec 2016/Winter 2017)

[24] Program used to fully encrypt hard drives upon a computer. Data is scrambled upon the storage drive and requires the correct encryption key in order to gain access to the data.

Research framework

Table 1: Research Framework

Interpretative Phenomenological Analysis	
Data Site	Heimdal Upper Secondary School (VG2)
Data Type	One-on-one, in depth, semi-structured interviews (1 interview per participant / 30-45 minutes in length)
Data Collection	Audio recording, notes
Selection	Deliberately selected participants, homogeneous *(7 participants)*
Data Analysis	NVivo qualitative analysis software • Line by line analysis: descriptive, linguistic, conceptual comments; • Reflection, interpretation, coding, relationships and theory • Emergent themes, abstraction, common themes and subthemes, individual themes, recurring themes and patterns
Human subject protection	No risk to participants; pseudonyms; secure storage; encryption; anonymity

4.5 Participant Selection

The participants were selected carefully and purposefully as dictated by an IPA study due to that they can offer a particular insight into a particular experience (Smith et al., 2009). Therefore, participant selections were chosen in order to give as full and detailed representation as possible. Snowballing[25] was not used during this research as other participants' in this case would be fellow students. Most participants were male with one female available for participation.

[25] Referrals by participants.

The sample size in an IPA study is often defined through the data collection by the quality and/or richness of the data collected (Smith et al., 2009). According to Smith, Flowers & Larkin a sample size between three and six participants is often optimal, however the researcher should be careful not to consider larger numbers as more indicative of "better" work in IPA studies.

A total of seven participants were selected and asked to participate in the interviews. Three which were current students in 2015/2016 attending second year ICT vocational studies were selected based on differing ages and in class groups. One was younger than the class average, another was the same as the class average and the last was a few years older than the class average. All three belonged to a different group in Heimdall's Quest within the class.

It is important to consider that the current students' responses could be colored due to my being their teacher, therefore four former students who have previously participated in Heimdall's Quest were also included. Three of the previous students from 2014/2015 have participated in the system and have now been working for one year as apprentices. Two of these students had a different teacher while participating in Heimdall's Quest, thereby possibly also providing different perspectives of the phenomenon. The third student from 2014/2015 was the only female included in the study. The last of the previous students has completed his apprenticeship and is preparing for a job in the work force. He was a participant during the first year Heimdall's Quest was utilized in the class in 2013/2014.

It is less likely that my relationship to any of these previous students would affect their responses and can therefore also be utilized to compare to the results from the three current students, as well as allow them to reflect upon their own experience after a year or two of apprenticeship. There is also inherent value listening to the reflection of their personal experience as an apprentice. It is then viable to illuminate upon their participation in an MCS and if the system has had any impact on their current situations. The overall sample was homogenous, however as the focus of the study is upon the year of participation within an MCS, variations between those that were current students during the study and those who had moved on to an apprenticeship were expected.

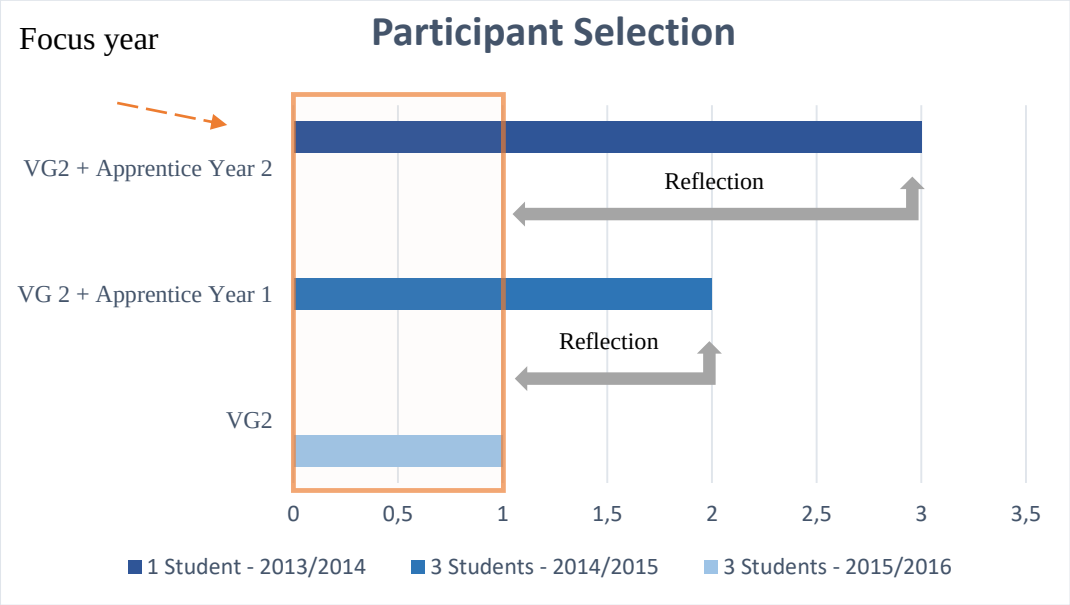

Figure 10 – Model showing participant selection. Year of focus is the year of participation in the MCS.

4.6 Data Collection

When collecting data for an IPA, it is best to focus upon collection methods that will offer a rich and detailed, first person account of the experiences (Smith et al., 2009). In this study, the goal of data collection was to grasp the essence of the participants' everyday experience in an MCS. This section will focus upon the data collection methods employed in this study.

Interviews

With the use of interview the researcher can attempt to understand the meaning, not only in their statements, but also in the meanings that lay "between the lines" Kvale (1997) (as cited in Postholm, 2010). When collecting data for an IPA, participants are encouraged to provide a rich, detailed, first person account of their experiences (Smith et al., 2009). In order to promote as rich and detailed data as possible, the study relied primarily upon semi-structured interviews. According to Brinkmann (2013), semi-structured interviews provide the interviewer a better chance of becoming a visible knowledge producing participant in the interview process (p.21). The interviews were directed by a semi-structured interview guide, which was devised in order to facilitate sharing experiences, thoughts and feelings. Two interview guides were used, one for previous students under apprenticeship and another for

current students in the system. Questions varied slightly in order to allow for work experience during apprenticeship to be included in the participant's reflection. Both guides are shown in Appendixes B and C.

The interview guides were more or less a baseline that I used to channel the student/apprentice towards conversation focusing on intimate participant experiences. I focused on this way of interviewing in order to provide "rich" and "full" data for analysis. The guides were designed to allow for diversion based upon participant responses.

"As an interaction, both interviewer and interviewee are active participants in the research process." (Smith et al., 2009, p. 58)

Before the interviews began, I met with the each of the participants in order to explain the aims of the study and what the interview would entail. The participants were fully informed about how the interview would proceed as well as what their participation in the process would involve. I had set off roughly 1 hour per interview and arranged ahead of time for possible follow up interviews if needed. The participants were also given an opportunity to ask any questions they had about the study. It was important to me that the participants were comfortable and at ease during the interview. Therefore, I provided some fruit and snacks as well as water and coffee. By offering food and drink, I felt it brought out a more informal atmosphere and allowed the conversation to proceed informally, relaxed and open.

The beginning of each interview began by asking the participant a general open-ended question. I wanted to allow them a chance to express themselves in an easy manner as well as inviting them to share some general information about themselves, such as hobbies and interests. The focus during the interview was to actively encourage the participants to share and elaborate on their experiences in a way that captures the essence of their journey (Smith et al., 2009). Throughout the interview prompts were used occasionally in order to encourage the participants to reflect on their experiences. An example often used was," Can you tell me more about that?" or "Is it possible to describe that in more detail?". According to Postholm (2009, p. 61), these types of questions are considered as clearing up questions. They allow the researcher to clear up any responses that they may have not fully understood or wish to have a fuller explanation on. I felt this was an important part of the interpretative and meaning-making process. My attention was also focused on any significant non-verbal cues that the participants may have shown. These were often jotted down as notes during the interview as a

way of adding to the understanding and expression of the participants' experiences. This could help with interpreting meanings beyond what could be heard on the recordings. According to Smith, Flowers, & Larkin (2009), engaging the participant on a deeper level helps to ensure that data collected is rich enough for analysis.

After the interviews were completed I asked the participants if they were amendable to being contacted for possible follow up questions if needed. A follow up meeting was also arranged, where they reviewed the interview transcriptions as well as verified that I had interpreted their responses correctly. This was the process of member checking in order to validate informant feedback. Member checking was important to verify that my interpretations matched the perspectives of the participants. It can also lead to a further revealing of more information. Lincoln and Guba (1985) consider this procedure as the most important in order to create a believable study (Postholm, 2011).

The participant interviews were recorded using a digital audio recorded at Heimdal Upper Secondary School. The duration of the interviews varied from 29 minutes to just around 45 minutes in length (see Table 2). After meeting with the participants for a follow up meeting and going over the transcriptions, none of them requested another meeting nor had any additional comments to add.

Table 2: Interview length by participant

Participant	Interview Length
Student 1	37 min
Student 2	45 min
Student 3	32 min
Apprentice 1	34 min
Apprentice 2	31 min
Apprentice 3	33 min
Apprentice 4	29 min
Average length	34.5 min

Contextualization of the interview

During the interviews, I maintained a steady flow of notes based on my observations of the participants. This allowed me to incorporate mannerisms and reactions of the participants as they explained their experiences. In addition, notes were taken after the interviews were completed, reflecting upon my impressions and interactions with the participants (Hollway & Jefferson, 2005) (as cited in Smith et al., 2009, p. 73). These notes helped to facilitate interpretations under the analysis process.

Transcription

After conclusion of the interviews, the process of transcribing the audio to text for analysis began. Each of the interviews lasted from 29 to 45 minutes in length, which then took roughly five to six hours each to transcribe to text. I personally listened to each of the interviews immediately after they were conducted. This was done in order to reveal anything that I could possibly take with me into the following interviews. According to Kvale & Brinkmann (2009), by listening to the interviews after each is conducted, there is always a chance of learning something that can be brought into the next interview.

After all interviews were completed I listened to each again and transcribed each of the interviews to text. An important aspect of the transcription process involved protecting the participants' identities. This was done by de-identifying participants by first randomly assigning participants a number of S1, S2, S3 (students) or L1, L2, L3, L4 (apprentices). Names and other details that could identify the participants either directly or indirectly were specifically omitted to protect their privacy. They were later assigned a pseudonym in order to give them a more personal feeling when describing their experiences in a narrative way in the study. As IPA is primarily focused on the aim to interpret the meaning of the content of the participant, it does not require a detailed transcription of the linguistic aspects of the recordings (Smith et al., 2009, p. 74). However, all of the spoken words were written as they were pronounced during the interviews. Pauses and breaks were generally not notated as O'Connell & Kowal (1995) point out that it is pointless to transcribe information that will not be analyzed (Smith et al., 2009).

Once the transcriptions were complete, they were then annotated with my written field notes which were made during the interviews. All other reflective notations made following each interview were also added. The field notes were added in the right hand margins using

brackets in order to separate the field notes from the interview transcription. All of the transcripts were then imported into the NVivo software in order to be analyzed for coding of themes. In reflection, I feel my personal involvement in the process of transcribing allowed me to become much closer to the research material.

Journal and bracketing

I needed to be aware of and or bracket my own personal biases, therefore a personal journal was maintained throughout the research process in order to capture experiences, observations and thoughts relating to an MCS and the students. This provided a record of the research process, demonstrating the journey as the researcher becoming familiar with the methodology of the study. The journal was also used as a logbook for interesting observations in class as well as a way to map out what was working or not working when using an MCS in class. For example, one entry goes on to describe an event in Heimdall's Quest where the MCS framework allowed the students to both play and experience a learning moment:

> Log entry: "*Today the students have been a bit restless after long hours of working on a 2-week case assignment. A few have requested a review on network, so I am running a challenge with them where each team must create their own ways of sending signals. They will send an encrypted message from one member of the team to another member through a chain. We'll do it outside to get some air and they'll need to be roughly 25-40 meters apart per link in the chain. Should be interesting to see what they do. 200 XP granted per member of the team with the fastest relay time and correct transmitted message."*
>
> Observation + Notes: *"Really interesting observing the various ways that they are doing this. Some are using hand signals… some have utilized colors. One group is trying to use Morse code as binary code, that is very cool, but may take more time to decipher. Can't wait to see who wins and their reflections on this afterwards!"*

The journals provide an understanding of how the MCS framework can be used from the teacher standpoint as well as including the observations of the students experiencing it. This provides reflection and a depth of understanding to myself as researcher throughout the study.

4.7 Analysis

> *"As with many other approaches in qualitative psychology, the essence of IPA lies in its analytic focus"*(Smith et al., 2009, p. 79).

In this study I followed the heuristic framework of analysis as presented by Smith, Flowers, & Larkin (2009) and the data organization, analysis and representation framework by Creswell (2013). These frameworks complement each other and are reccomended for both novice and more experienced IPA researchers. The analysis utilized a hermeneutic circle or as Creswell (2013) suggests a data analysis spiral (pp. 205-207). Data organization, reading and memoing, describing and classifying the data in codes and themes, interpreting the data, and visualizing the data were the outlined steps of data analysis and representation (Creswell, 2013). All of these terms are considered important to the data analysis process of a qualitative IPA study.

Organizing the data

Analysis of the data was a significant task which required considerable focus and dedication to the materials. To prepare the organization of materials for this daunting task I used NVivo qualitative analysis software with encrypted password protection upon an encrypted computer. All written materials were rewritten in digital form and imported into the software before analysis. This process of preparation ensured the positive control and protection of the participants' personal confidential information (Smith et al., 2009). The NVivo software provided a good organization of the transcriptions, memos, notes and other resources before, during and after the analyzing and coding process had begun.

Immersion of the data

Falling back on IPA's idiographic commitment, it is reccomended to first start with a decription of an analysis for a single case in detail, thereafter repeating the process again for each of the following cases (Smith et al., 2009). Therfore, I started the analyzation process on each case one at a time. Upon completing the analysis of the first transcription, the process began anew with the second and repeating the process anew from the start on each subsequesnt interview transcriptions. This was done throughout all seven transcriptions.

Following creation and organization of the data, it was important to become immersed into the data. During this point of the research, I read and re-read the transcriptions line-by-line, checked over notes and began to create initial codes. According to Creswell (2013), this is an important process in order to characterize various relevant aspects of the transcriptions that may stand out. Throughout the process of reading and re-reading the transcriptions, it was also important to listen to the interviews. This forces the researcher to slow down in order to be assured that the participant remains the focus of the analysis (Smith et al., 2009). I found this especially interesting as it brought into focus the participant's tone of voice when describing specific experiences related to their unique views of participation in Heimdall's Quest. Hearing excitement, joy and other emotions when listening to the recordings while reading was an eye opening experience. Re-reading the transcripts was important as it allowed a model of the overall interview structure to begin to surface. This helps to enlighten the analyst on how particular narratives can bind sections of interviews together (Smith et al., 2009). While re-reading the transcriptions, memos and annotations were added in order to identify any reoccurring phrases, interesting concepts or ideas, emotions and any specific life experiences.

Initial noting and classification of codes

The initial noting and coding was by far the most time consuming and detailed process of the analysis. This step in the process examined semantic content and was used on a very exploratory level (Smith et al., 2009). With that in mind, the initial noting and coding was a process in which I often found myself going back to re-read the transcripts. I felt this back and forth cycle between these stages often revealed underlying layers of context, which helped focus on placing the various coded experiences into themes. Creswell (2013) refers to this as a loop forming codes and categories while moving along the hermeneutic spiral, effectively forming the heart of a qualitative analysis (p. 204). After each interview, the initial notes and codes were considered and reviewed while listening to the interview recording in order to verify their usability to the overall research. Following this procedure on each interview assisted in capturing the participants' experiences in an accurate manner, highlighting their words and phrases in order to come to the core of their feelings (Creswell, 2013). Coding took place directly in NVivo where the interview transcript was broken down line by line and associated to a node. Each interview was assigned as an individual case from

which to review all coding individually as well as eventually make comparisons when looking for patterns. The nodes were then placed into a tree hierarchy in order to better organize the large amount of data. See Appendix D for a detailed list of nodes.

Developing emergent themes

At this point in the research, the data set had grown substantially and it was necessary to look at reducing the volume of detail while maintaining the complexity. In order to do this in an effective way, the narrative flow of the transcripts needed to be broken down into chunks or themes. This breaking up of the narrative into themes is considered a part of the hermeneutic circle (Smith et al., 2009). Data obtained from the transcriptions was then classified into further codes and themes in order to develop significant statements, as well as group the significant statements where possible (Creswell, 2013). All coding was done directly in NVivo with the exploratory comments being created as annotations after reviewing the coding (see Appendix E). The exploratory comments were then further broken down into emergent themes, which were represented as coding nodes within NVivo. These theme nodes were set into their own unique folder and then connected directly to the text where annotations were made within the transcript source. A list of emergent themes from one participant are shown in Table 3 below.

Table 3: Development of Emerging Themes for a single participant

Development of Emerging Themes		
Emergent Themes	Transcript: Pg./line	Researchers Exploratory Comments
XP points motivate to attend school	S3: 4.88	Connecting XP as a motivator to show up for school. Seen as a motivating factor to not be away from school for an entire month.
Variation in group composure possibly better	S3: 3.66	Here it is suggested it may be better to mix the groups more. (polarized view)
Supportive Group in Classroom Environment	S3: 1.13	Good classroom environment. Supportive group, no bullying or hurtful teasing
Support of team mates important in an MCS	S3: 5.125	Interesting. View of damage having a better effect than school orderliness and conduct marks

Subject choice important to inner motivation	S3: 1.19	Has always had interest in ICT, however friends and social were important and dictated life choices.
Strong connection to permanent group isolates somewhat from rest of class	S3: 3.60	Weighing the positives of being in the same group all year vs the negatives of not being as necessarily connected to the rest of the class. Interesting. (polarized view)
Social Life important to life choices	S3: 1.21	Regret. Feeling on not belonging as a reflection on previous life choices.
MCS promotes self-achievement, self-awareness	S3: 2.33	Referencing to Extrinsic motivations. System promotes self-achievement, self-awareness. Powers equate to freedom in the class.
MCS a motivating factor in classroom	S3: 2.40	Important. Explaining how participating in an MCS is motivating and aligns with self-interests. States not currently lacking motivation to work, implying a lack of previous motivation ... hence "slacking off."
Helping each other in a group connected to use of in class powers	S3: 3.54	Connects the understanding of helping each other in a group to the use of in class powers.
Group coherency important to motivation	S3: 2.47	Group coherency and belonging building motivation. Fun to achieve within a group setting.
Familiarity with gaming	S3: 4.95	Very interesting. Speaks of familiarity with RPG gaming mechanics and positive surprise that it could be implemented in school. * *tone of voice during this suggests sincerity and honesty**
Damage system in MCS viewed as positive	S3: 5.110	Discusses school orderliness and conduct grade system vs damage in the MCS framework. Comments school orderliness and conduct leave a permanent mark where damage allows the team mates to use powers to dampen the effect.

In this process, the focus was to interpret the data in a way that allowed for a description of the experience which could be expressed texturally. Smith, Flowers, & Larkin (2009) make a distinction that it is important to not forget the I and the P in IPA as each stage of the analysis

takes you furthur away from the participant and includes more of you (pp. 91-92). Therefore, when looking to create themes, the challenge was to maintain a balance of the lived experiences of the participant and myself, as both aspects determined the result of the analysis. A descriptive, precise balance between charting how the themes fit together, connections, patterns of themes and producing a supportive structure is required for emergent themes (Smith et al., 2009).

Identifying connections across themes

Once the initial emergent themes were in place the phenomenon began to emerge. It was then possible to see various new angles of the data, which Creswell (2013) suggests also promotes minor enhancements and evolutions to originally created codes. In order to look for connections in the emergent themes, I then set all the themes chronologically and then eyeballed the list, creating clusters of related themes (Smith et al., 2009). This process involved reorganizing the transcript data in such a way that it allowed the themes to be fit together in a way that I as the researcher could relate to. Various methods were used in order to survey the data when looking at connections across themes. Abstraction was used to identify patterns by developing a ‘super-ordinate’ theme which was used to represent the same experience as the participants. Effectively, this is drawing together emergent themes by producing a structure focusing on the most important and interesting aspects of the participants account (Smith et al., 2009). A list of super-ordinate themes developed from the same participant as in Table 3 is shown below in Table 4.

Table 4: Development of super-ordinate theme from one participant

Abstraction: Developing a super-ordinate theme
Group dynamic in an MCS
Supportive Group in Classroom Environment
Support of team mates important in an MCS
Helping each other in a group connected to use of in class powers
Group coherency important to motivation
Variation in group composure possibly better
Strong connection to permanent group isolates somewhat from rest of class

Subsumption was a process used in order to verify correct context by listening to a specific transcript entry and identifying patterns. It was also interesting to look at the frequency with which a theme was supported. Smith, Flowers, & Larkin (2009) suggest nummeration can be a good way of indicating the relative importance of some emergent themes and although this may seem unusually quantitative, it can also be thought of as a patterning within the emergent themes (p. 98). However they are also very clear to not over emphasize the importance of frequency as very important themes which clearly unlock furthur meaning to the participant may be mentioned as few as one time (Smith et al., 2009). Polarization was then employed by viewing the data from opposing standpoints. This was interesting as it allowed for some interesting comparisons and discoveries where participants viewed things differently. Themes developed via polarization and by checking the function of the theme are listed as polarized and placed in brackets within the emergent themes. Contextualization was not used as much; however, it was used in various degrees in order to look at the contextual aspects of gaming culture within the narratives. This is considered a way to identify key life events throughout the transcripts (Smith et al.,2009). A final list of super-ordinate themes developed from the same participant as in Tables 3 and 4 are shown below in Table 5.

Table 5: Table of super-ordinate themes and emergent themes for one participant

Table of super-ordinate themes and themes from one participant
Group dynamic in an MCS
Supportive Group in Classroom Environment
Support of team mates important in an MCS
Helping each other in a group connected to use of in class powers
Group coherency important to motivation
Variation in group composure possibly better *(polarized)*
Strong connection to permanent group isolates somewhat from rest of class *(polarized)*
Factors for choosing line of study
Social Life important to life choices
Subject choice important to inner motivation
Motivational aspects of an MCS
XP points motivate to attend school
MCS a motivating factor in classroom
MCS promotes self-achievement, self-awareness
Damage system in MCS viewed as positive
Familiarity with gaming

Proceeding case-by-case

At this point in the research, each case was systematically broken down to the underlying themes and super-ordinate themes. This was in essence moving to the next participant's transcription and repeating the process as previously detailed. Smith, Flowers, & Larkin (2009), explain that it is important during this stage of the process to treat each case on its own terms in order to do justice to its own individuality (p.100). Therefore, comparisons and evaluations across the participants and their specific themes were specifically avoided until all the cases were first analyzed individually. In order to do this, it was necessary to bracket

off the themes and ideas that emerged from the first case while working on the second and so on. By breaking down each case on its own merits this holds true to the idiographic commitment of IPA as well as allowing for new themes to emerge with each new case (Smith et al.,2009).

Patterns across cases

During this stage, the analysis involved looking for patterns across the individual cases and super-ordinate themes. Each interview was first looked at independently as a significant work on its own in order to be assured there was no missing themes or themes that required further exploration. A few themes were found which needed to be placed under a different super-ordinate theme. One or two were also discovered that needed to be re-labeled to better convey the represented meanings. After the reconfiguring and quality checking was completed it was then time to look for the patterns.

In order to visualize the patterns across all the cases each transcript was looked at closely. I then created a large spreadsheet containing all super-ordinate and emerging themes viewing them across two computer monitors. This allowed me to see all aspects at once, delivering a clearer picture of patterns between the cases. Where common themes emerged, a relationship was created between those themes within NVivo. In some instances, it was necessary to create a major theme which represented a higher level of concepts which were shared across multiple super-ordinate themes (Smith et al.,2009). The emerging patterns within codes and themes, then decided the sample of themes that were checked for recurrence. Frequency of coding within nodes were also used in order to look for patterns of recurrence (See Table 6).

Table 6: Frequency of coding in nodes

Frequency of coding		
Codes with high frequency	Participants contributing to codes	Frequency
XP	7	34
Advancement	6	19
Powers	7	18
Freedom in class	6	15
Team	7	111
Cooperation	7	33
Relationship	6	23
Motivation	7	109
Behavior	7	83
Effort	7	36
Attendance	7	31

Recurring themes were measured by themes that were present in at least six out of seven of the participant interviews. According to Smith, Flowers, & Larkin (2009), *"Counting in this way can also be considered a way to enhance the validity of the findings in a larger corpus"* (p. 107). A graphic representation in the form of a table demonstrating identification of recurring themes is shown below in Table 7.

Table 7: Identifying recurrent themes

Identifying recurrent themes								
Major Themes	S1	S2	S3	L1	L2	L3	L4	Present in 85% of Sample?
(T1) Cooperation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(T2) Social aspects in group/team	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(T3) Personal choice	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
(T4) Self-Organization	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
(T5) Motivation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(T6) Modifying behavior	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(T7) XP as an important core element of an MCS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(T8) Powers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(T9) Attendance	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
(T10) Game mechanics of an MCS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Data visualization

In order to help uncover words frequently used by the participants, NVivo visualizations were produced to give a clearer overview of the material. Using visualizations helped to verify identified themes and codes as well as uncovering any invisible or vaguely seen words that played a more important role in the findings. The frequency analysis was run on only the coded responses from the participants. This removed any of the words that were included by me as the interviewer and kept the focus specifically upon the participants. The results were looked at including the stemmed aspects of the word. This would then bring focus upon similar meanings. Any words with letter values of 4 or less were omitted in order to better identify the patterns leading up to themes. This included words such as: *and, the, get,* etc. See Figure 11 below for the results of the final word cloud visualization.

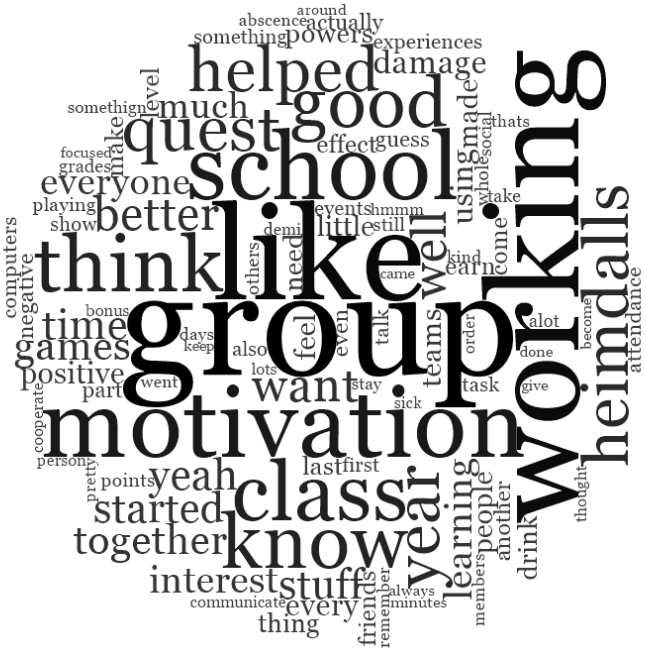

Figure 11: Word cloud based on coded nodes in NVivo

The term *group* had been used (434) times. Other significant terms were: *like* (376) times, *working* (369) times, and *motivation* (269) times. These words displayed a significance in the study of enjoying working at school when in a motivating group.

Analysis of the themes together with this cluster of terms, uncovered the importance of specific meanings within the system. Terms such as, group, motivation, XP and effort were all underlying currents that twisted in and out of the major themes. This formation of words provides a current of meaning to the study.

Major themes

A final major table of themes for the group was created in order to visualize the final list of group themes. Smith, Flowers, & Larkin (2009) suggest this method for presenting the patterns, as the graphic table for the entire group displays how emergent themes are nested within the super-ordinate themes and illustrates the themes for each participant within the whole. The final report includes figures, tables and discussions used to illuminate upon the emergent patterns representing the whole of the phenomenon. Additionally, NVivo graphic representations were also implemented where needed in order to provide enhancement to the findings (Creswell, 2013). A simplified version of the major themes with the nested super-

ordinate themes is shown below in Table 8. Each of the major themes is discussed further in detail in Chapter 5.2.

Table 8: Final table of Major Themes

Final table of Major Themes
Major Themes with nested super-ordinate themes
(T1) Cooperation • Group dynamic in an MCS • MCS groups encourage cooperation and inclusion • Importance of groups in an MCS
(T2) Social aspects in group/team • MCS promotes group and classroom social interaction • Classroom environment influenced by MCS • Establishing a positive classroom environment • Teamwork an important part of work in work force
(T3) Personal choice • Factors for choosing line of study • Subject choice imperative to school motivation • Subject choice important to inner motivation • Personal choices in MCS • Acceptance and fulfillment in school
(T4) Self-Organization • Play in an MCS requires real world work • Self-responsibility leads to progression in life
(T5) Motivation • Motivation within an MCS
(T6) Modifying behavior • Damage in MCS seen as alternative to negative school orderliness and conduct marks

• Responsibility
(T7) XP as an important core element of an MCS • XP is an important motivating element in an MCS • XP in an MCS promotes effort • XP in an MCS influences school attendance
(T8) Powers • Effort in MCS • Powers encourage effort • Progression in an MCS requires effort in class • Improved morale
(T9) Attendance • Lack of motivation (previous years) • Motivation to attend school
(T10) Game mechanics of an MCS • Taking personal interests into the classroom • MCS is gender neutral • Freedom and play in the classroom • Views on gaming culture • Activities and game mechanics in class • Challenge and Events in an MCS

Pseudonyms

In order to provide a more personalized feel when presenting the themes in a narrative, each of the participants was given a pseudonym. Each of the major themes will be listed below with participant narratives utilizing pseudonyms in place of the coded numerations for students and apprentices. Table 9 below displays the pseudonyms chosen for the participants.

Table 9: Pseudonym table

Pseudonyms for use in narrative		
Role	Gender	Pseudonym
Student	Male	Fredrick
Student	Male	Curtis
Student	Male	Phillip
Apprentice	Female	Lisa
Apprentice	Male	Roger
Apprentice	Male	Jakob
Apprentice	Male	George

Validity

Qualitative research requires sensitivity to context and evaluation of relevant criteria (Yardley, 2000). Yardly (2000), presented four principles for determining the quality of qualitative research: sensitivity to context, commitment and rigor, transparency and coherence, and impact and importance (Smith et al., 2009). Listed below are the ways these principles were applied in this study:

Sensitivity to context.

In order to address the principle of sensitivity to context early in the research process, I chose to use an IPA as a methodology. Sensitivity to the context of the participants lived experiences was important throughout the study. Due to an IPA study being inherently an activity in interpretation, it was important to me as the researcher to present the findings in such a way as to highlight the participant's tone within the interviews (Smith et al., 2009). Trust was also necessary in order to facilitate gaining a deep understanding of the participants unique and individual experiences. It was important to remain disciplined and immersive, in order to allow the participants to delve into their lived experiences, while valuing their personal accounts of interacting with an MCS. Due to the care taken when collecting data and

grounding analytic claims, sensitivity of context was shown by demonstrating the sensitivity to the massive amounts of raw data. This is reflected by a considerable amount of participant verbatim from each participant's material in order to support arguments that were made (Smith et al., 2009). I also used great amounts of time, writing the claims carefully, in order to correctly represent the analyzes samples.

Commitment and rigor.

In this study commitment is displayed by the degree of attentiveness to each participant during data collection and with the care that analysis of each case was carried out (Smith et al., 2009). Conducting an IPA in this way demanded a good deal of personal commitment and investment while conducting the participant interviews. This included making sure the participants were comfortable and at ease before, during and following the interviews.

Rigor was addressed through the selection of the participants, the quality of the interviews and the completeness of the analysis. This was displayed by allowing the participants to direct the course of the semi-structured interviews. As the interviewer, it was important for myself to be consistent while probing and digging deeper. It was also possible to see rigor during the follow up interviews, where thorough reading and annotating could uncover a missed cue or more depth could be captured (Smith et al., 2009). Final aspects of rigor can be considered through the systematic review of transcriptions and a complete journal both before and during the interview process (Smith et al., 2009).

Transparency and coherence.

I have attempted to maintain as high a degree of transparency and coherence as possible during this study. During each stage of the research process, I have worked to maintain complete and thorough descriptions. This is shown in each step of the data analysis process. I have also included tables in order to demonstrate detail for each step of the process, including participants, a time frame, schedule and elements of the analytic process (Smith et al., 2009). Aspects of transparency and coherence appear throughout the documentation of this study. I have conducted the study as originally proposed, with no required changes.

Impact and importance.

The presentation of this study was done with the intent of allowing the reader to be able to fully understand and identify important themes and conclusions arising from the research. As no previous research exists on an MCS, it is difficult to compare with previous research. This study was limited to a small group of students with geographical limitations. This study is important due to the examination of the experiences of the participating students as they experienced a school year in a classroom utilizing an MCS framework. This allows for an analysis of very human factors that need to be understood when using gaming mechanics in an educational setting.

4.8 Ethical Considerations

> *"Research involves collecting data from people, about people."* Punch (2005) (as cited in Creswell, 2014, p. 122).

During all phases of this research study I have striven to maintain both sensitive and ethical considerations. Following the strict ethical guidelines enforced by the Norwegian Data Protection Official for Research (NSD), I have followed the guidelines laid out on the webpage[26]. In accordance with data collection for research purposes I have filled out the online test, which has stated my project is not subject to notification (see Appendix F for NSD response). No personal direct or indirect information during this study was recorded or saved and any and all information in the study was saved anonymously, coded and encrypted in order to protect the identity of the participants. All recorded audio data was destroyed immediately after completion of transcribing and analysis.

Informed consent, anonymity and confidentiality

The participants were informed on the purpose of the study and how any and all collected data would be utilized for the research. In the first instance participants were required to sign a voluntary consent form (Appendix G) to acknowledge their willingness and commitment to take part. At this time the participants were also informed that they were free to withdraw

[26] http://www.nsd.uib.no/personvern/en/notification_duty/test

from the study without question at any time. All of the participants chose to remain for the entirety of the study.

Confidentiality of the participants' names and the information they gave was maintained, with only myself as the interviewer, researcher and transcriber. My supervisors only had access to the finished transcriptions without names or identifiers. This was all outlined in the request to participate in study and pre interview information sheets (Appendix H and I). Anonymity of their identities was maintained throughout this research study with the participants first being coded randomly and then being giving pseudonyms. In addition, I ensured that any identifying details, names, places or references to other people (school teachers, students or other personal information) who should not be identified, were also removed.

Upon conclusion of transcribing the interviews, each of the participants were contacted in order to review the transcriptions. They were provided a follow up form with an included review of their interview transcription (Appendix J). This was done for multiple reasons. First it allowed the participants a chance to verify that what was transcribed was correct. It was also important to verify that no personal information was included in any way that could identify the participant. All participants verified that the data did not reveal any personal identifiable information. Lastly it provided a source for trustworthiness in the study.

Researchers role in the study

In qualitative interviewing the researcher is the most important instrument for producing knowledge (Brinkmann, 2013). In this study my role as teacher, participant and researcher with regards to the phenomenon of study presented an interesting mix of challenges. As a teacher, I have a unique role and connection to my students, which as I mentioned earlier could color the responses of participants who have been students in my class. As a participant in regards to Heimdall's Quest, the teacher interacts daily with both the students and utilizes the gaming mechanics within the system. This provides a unique understanding as a complete participant within the classroom setting and allows for observation of the participants experiences and functionality of an MCS. Angrosino (2007) states that being a complete participant allows the researcher to establish a greater rapport with the people being observed (Creswell, 2013, p. 187). Finally, as a researcher, I must bracket out my own preconceptions to a degree, allowing for a more reflective understanding, yet I must not fully dismiss my

preconceptions and understandings as they give a better foundation for interpreting the participant experiences. As Heidegger (1962/1927) points out, people cannot help but look at any new stimulus in the light of their own prior experience/preconception, therefore it is important for researchers to be aware of their own biases and be able to illustrate their steps in the data analysis process (Smith et al., 2009).

4.9 Summary

This chapter has focused on introducing and discussing the research process of this study. Chapter 5 will look at the analyses results with a finer lens and discuss the findings found within the research.

Chapter 5: Results

5.1 Introduction

The purpose of this study has been to gain valuable insight into the experience of students who have participated in an MCS framework for an entire school year. This chapter is used to present the major themes and findings that emerged from the seven semi-structured participant interviews. Using IPA, the major findings revealed in this study are shown below in 5.2.

5.2 Findings

In this section all of the major themes are looked at in detail. Having broken down the transcripts into codes, themes, emerging themes and finally super-ordinate themes for each participant individually, this section will focus on the major themes which incorporate the views of all the participants. The hermeneutic circle now comes fully around, as the individual participants' voices in the narrative come together to give meaning to these collective group themes. These are my ten major findings: Cooperation, Social aspects in group/team, Personal choice, Self-Organization, Motivation, Modifying behavior, XP as an important core element of an MCS, Powers, Attendance and Game mechanics of an MCS.

Cooperation

All of the participants claimed cooperation was a primary motivating aspect of participating in a team within the MCS framework. Multiple participants pointed out that cooperating in a team has similarities to working with colleagues in a workplace. Collaboration is an important part of cooperation.

George discusses how cooperation and planning in the team was a daily ritual required to work well academically as well as within the framework of an MCS. As George states:

> *"That was something we always did since day 1. We always planned… and then we had to cooperate, we had to talk to each other to make everything work. And I think I'm not the only one who feels that way. I feel like everyone felt like yeah, we just have to cooperate. It was a positive thing of course; it was nothing negative."*

Lisa refers to cooperation as a strategy for the team to succeed within the MCS framework:

> *"We kinda had to plan and think strategy to make the best use of our points. But the group worked really well together."*

Curtis made these statements about team in an MCS:

> *"When we work in groups we use the Heimdall's Quest groups. I know them well and we work well together."*
>
> *"So it's easier to do assignments when working in a group. "*
>
> *"It is fun and you get to work with teammates."*

Fredrick makes a comparison of working in an MCS group to that of being coworkers in a workplace:

> *"Because you spend all your school time with the group. If you are working with a friend you could just kinda phase out, but when you are all working together you get used to it, kinda like if you were coworkers. You get used to working with people that you know."*

This perspective was also touched upon by two of the apprentices that were interviewed. When asked about what if anything was learned in an MCS and carried over to the work place as an apprentice George responded:

> *"What I've learned from Heimdall's Quest is that I've learned that cooperation and teamwork is essential when you are in a group setting."*

Fredrick also reflects on how members in the group motivate one another when one or another member is lacking in motivation or focus to work in class:

> *"Some days I'm tired and just don't want to work and then someone in the group just comes and says you need to do this or that and you have to focus."*

Helping one another was also mentioned by many of the participants as a motivating element of working in a group. Phillip makes this statements about helping fellow members and achieving success in a group:

> *"Since we are divided into groups, we help each other out. Its motivating to help one another. It's fun to succeed as a group."*

One participant also mentioned the importance of having a good group in class and group effort.

> George: *"I was in a good group I'd say. Most of my members showed up to school every day and did their work."*

Social aspects in a group/team

Multiple aspects of social interaction within groups were brought up by all participants. The majority of participants commented on how the MCS teams helped students to become acquainted with one another. The following statements were made by multiple participants on how MCS groups facilitated becoming familiarized with other students early in the year:

> George: *"So we communicated a lot and discussed about that. And also in the start of the year when we didn't know each other well I think it helped a lot."*
>
> Roger: *"Yeah, because we had to work together with stuff. The levels and names, so you were forced to talk with others. It was a boost to get to know each other. I know all the people in my group very well now."*
>
> Lisa: *"I got to know my class and especially my own group much more... more than I think I would have without."*
>
> Curtis: *"It's good. Everyone got to know each other really fast due to the groups we sat in. So in the beginning we got to know the groups. We became friends really fast."*
>
> Phillip: *"We have all gotten to know one another and have good relations"*

The feeling of being included and supported by groups was expressed by multiple participants. This included expressed improvements in the classroom social environment and reduced hurtful teasing or bullying. Lisa states this simply in the following statement:

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

This was also expressed by Fredrick in the following statements:

> *"So everyone just gets along and the group system in HQ, gets everyone together to get to know each other and the group kinda hang around with each other. So in a lunch time, I sit around with my group and the other groups usually sit around with theirs. Or two groups together. Everyone is social together."*

> *"Everyone sits together and there is no one who is outside the group. Everyone is included. Even those that don't have such a good social antenna are part of the group and have friends. So that's really positive."*

Curtis, Jakob and Phillip also reinforce this view. Phillip does go on to mention that there were playful jokes within his group, however he is clear that it was nothing ever hurtful or mean:

> Curtis: *"So it's a great environment. Everyone is kind... or in a way kind."*

> Jakob: *"I'd say it helped. It made the social environment better. It was a good thing..."*

> Phillip: *"We all get along, no one is mean to anyone. We sometimes make jokes with one another, but nothing that can mean we make fun of them to be hurtful or anything."*

There were slightly conflicting views on if it was better to have the same group all year long or possibly better to mix the groups. Two participants stated opposing views. Phillip experienced becoming very close to his own group, yet saw this as a possible negative when relating to the other classroom groups:

> *"You become be very connected with members in your group, but you don't become as connected with members in the other ones..."*

> *"I think maybe a little bit more mixing of the groups would have been good."*

Curtis had a polarized view to having the same group all year in contrast to mixing throughout the year. He makes the following statements:

> *"Yes. The same group every time is better, because you get to know each person much better and you know what they can do and what they know and their knowledge of the subjects you are working with."*

> *"If you just switch around groups often, you have to adapt to other people every time and you don't know those group as well. With the same group you know what the group can do and what they can help you with."*

Fredrick also viewed a single group all year as beneficial. He gives an example of group work being beneficial to work effort and efficiency as a result:

> *"That's actually really good. hmmm, I hate when they just throw 2 people together who don't know each other well and probably have spoken together two times, because you kinda get used to being in your group. And when you get a group task while working with your group, we maybe start off chilling the first 15 minutes, but then we get working and it's just so efficient. After 45 minutes we are usually over half done with all of our task. It works really good. I really like the group part of it."*

Roger gives an explanation on how having been in an MCS group promoted solid, deeper, lasting friendships with his teammates even after finishing school and transitioning into an apprenticeship:

> Jason: *"You became good friends?"*
> Roger: *"Many of us, 4 of 5 are still hanging out a lot and talking with each other every day."*
> Jason: *"Did you know each other from before?"*
> Roger: *"No, not at all."*

This was also an experience noted by a student in class. Phillip mentions this when asked about friendships in the group:

> *"Yeah actually. The Gathering LAN party: I'm going with my good friend, but also two members of my group that I've just met this year and we are going to a long weekend get together. So we have become good friends in the group."*

Two of the four apprentices mentioned teamwork as a learned skill or trait which followed them from their time as a participating student in an MCS out into the workplace.

> George*: "I have actually talked to the guys I work with about Heimdall's Quest and they thought it seemed like a really good idea to help everyone get motivated and such. But I learned a lot about teamwork and cooperation which is very important where I am working now. We have to communicate well and do our jobs and yeah."*
>
> Lisa: *"Yes, Heimdall's Quest helped me to be better at group work. Learning to work in a team."*

Personal choice

It was pointed out by multiple participants that having selected an incorrect line of study or subject in previous years had a demotivating effect on their education. Fredrick explains that having chosen the incorrect line of study made him feel like an outsider. He also reflects upon his view that some students choose a vocational line of study due to the perspective of not having good enough grades in lower secondary school for anything else. This possibly implies that vocational study programs are given a lower status than general programs of study or college preparatory programs of study. His statement is shown below:

> *"Well, I went TIP last year and I was with all these guys who like cars and stuff. I'm interested in that too, but not in the same way. So I was kind of an outsider. Those*

> *who like computers or other things. Some guys just took TIP because they did not get good enough grades at ungdomskolen[27]."*

Jakob and Curtis make a connection between having selected incorrect subjects, to decreased motivation and lack of desire to attend school.

> Jakob: *"It might have been because I picked the wrong subjects too, but I had very little motivation. I didn't really want to go to school at all."*
>
> Curtis: *"Last year I wasn't really that motivated. It wasn't something I really had any interest in."*

Lisa distinguishes correct choice of subject content or personal interest, together with an MCS as enhancing the total learning experience:

> *"I really enjoyed working with computers and Heimdall's Quest just made it all that much more fun."*

Choices within the MCS framework were mentioned in various ways by all the participants. Aspects of this included choosing how to progress in an MCS via powers promoting team support and progression or powers promoting freedom in class. The following statements by Lisa and Fredrick highlight these views:

> Lisa: *"Well lots of the others in the class chose powers that let them eat and drink and stuff like that in class. I thought it was fun to try and get as much XP as possible. Then you could both level up and buy some powers like ... I think it was invisibility which let you take a break or food which you could eat in class."*

[27] Ungdomskolen - Lower secondary school

> Fredrick: *"I'm happy with the group aspects and that we can unlock powers to eat, drink in class and go to the toilet, listen to music and stuff like that."*

Self-Organization

Kristine Ask in her 2016 PhD dissertation defines a new term called Ludic Work. Ask describes ludic work as:

> *"I define ludic work as the labour that players have to do with in order to produce play. 'Ludic' implies a playfulness relating to games or play, and 'work' is an effort to reach an outcome. Together they direct the attention to the processes that make play."(Ask, 2016, p. 6)*

This term Ludic Work is relevant when looking at experiences that participants in this study have described. All of the participants in the study related play in an MCS to requiring real work and effort in the class. The following statements by Jakob and Lisa reflect this view:

> Jakob: *"It made learning a bit more fun. Because, if you put in good effort and showed up and wasn't late you got XP and you got to advance further which gave you advantages in the classroom. You could do whatever you want by the end of the year if you earned enough XP. That was motivating for me. I wanted to reach the top. That was the goal from the start."*
>
> Lisa: *"If we worked hard in class there was always more opportunity to earn XP and that made it worth putting in the extra effort."*

Fredrick also connects the motivation to earn powers in the system to an improved sense of learning:

> *"First it was kinda like... I want the drink power. So I really wanted to drink coke in class or something like that, but later, I was still like I knew I had learned lots of stuff just by listening and keeping myself motivated to get perks."*

The previous statements can also be reflected as students learning via the MCS game mechanics to take responsibility for themselves. Showing up on time, working hard, making independent decisions and a desire to progress. These are characteristics that can also be applied directly into the real world and a life in the work force.

Motivation

Motivation touched upon nearly every aspect of the participants' responses regarding an MCS. Within each of the major themes, motivation is often mentioned as a specific part of that particular theme. This theme is not meant to go into the intricacies of all the various ways motivation affects the participants, but instead looks more directly at motivation as a primary undercurrent within an MCS framework. The following statements reflect what all seven of the participants expressed when describing their experience in an MCS:

George: *"Like I said it helps build motivation. It helps a lot building your comradery with your classmates."*

Jakob: *"I found it to be pretty motivating overall. Was a nice experience."*

"I've never been as motivated ...to be completely honest."

Lisa: *"I was really motivated."*

"I had more motivation last school year than in years before."

"It definitely had a positive effect on my motivation."

Fredrick: *"I can gain freedoms like drink as much as I want to in class. That's a big motivation... just to be able to drink soda in class."*

Curtis: *"This really helps to get me motivated to work."*

"I really liked it. It gives me motivation"

Roger: *"I think I got more motivation from it."*

> Phillip: *"Very good... it's kinda like motivation to do good in class because you get rewarded for it. It allows you to improve... the better you work; you get more powers which you can get more freedom in the class."*

Intrinsic and extrinsic motivations are also mentioned by participants. In the following statement, Fredrick points out how his intrinsic motivation to earn good grades in school motivates him. He reflects upon previous years as well as his current:

> *"Yeah kinda, like normal school I would be motivated because I need to get good grades, and here it is still the same, I just need to get at least a 4 and up. So that's my normal motivation."*

Fredrick then goes on to explain how extrinsic motivation provided from an MCS had in fact improved his grades over what he expected due to putting in the extra work required in order to earn XP within the system.

> *"But if I get XP, I'll work a little bit extra just to get that and then maybe I'll even get a 5 or 6. I've gotten in I think two of my classes I got 5's for my grades and I know in both of them it was just because I could earn XP."*

This theme is summed up fairly straightforwardly by Phillip when he states his feelings of school in regards to an MCS:

> *"I just don't feel like slacking off anymore."*

Modifying behavior

In Norway, marks for orderliness and conduct are given to students based on their behavior in school. The teacher uses the marks as a reaction if students fail to meet punctually to class, display poor effort, disregard following the classroom guidelines or for disobeying general school rules (Udir-8-2014, 2014). However, many of the students in this study have pointed out that negative marks for orderliness and conduct have been demotivating in the long run

and leave a permanent negative stain upon a student's school records. They have not perceived a positive side to these marks as a student cannot modify their behavior in any way as to remove them or change the negative taint they leave. The following comment by Phillip summarizes this perspective while comparing damage within an MCS to school marks in orderliness and conduct:

> Phillip: "*It's a lot nicer than a straight up negative anmerkning[28], because that's like permanent. And damage you can get healed or blocked ... I guess... it's gentler but you should learn from it."*

Below, George excitedly recited an experience of receiving damage in class. He reflects upon an episode of having become damaged in the MCS, having had an effect on him becoming worried about disappointing his team mates. He then states how this motivated him to remain focused in class and future school work:

> *"I can remember a couple times you came running after me and said, "Hey you are playing games!! Damage!! "Because I got that damage I said hey my teams going to be mad so that got me back focused and motivated to work in order to gain XP and stay focused on school work."*

This view is reinforced in the conversation with Phillip below:

> Jason: *"Do you think it has the effect, you know when you or another get damage that you need to do better. Do you think it motivates you to be better or not?"*
>
> Phillip: "*Yeah, it motivates me to stop doing that... stop doing things I shouldn't be doing."*

[28] *Anmerkning is a Norwegian term for negative mark on orderliness and conduct grades.*

Death in the MCS framework was also seen as a motivator to remain focused in class. Roger describes how death was considered a huge event in the classroom and had the effect of encouraging the entire class not to die:

> *"I remember the first person in my class who died, it was a huge event. Everyone in my class after that were determined not to die. So I think it took 3-4 months before a person died again. It was a really big case when it happened. "*

Curtis confirms this effect below, mentioning how coming close to dying in the system was scary and motivated him to remain focused:

> Jason: *"Do you lose motivation when you die?"*
>
> Curtis: *"No, I don't think so. I have not died yet so. I've been trying to stay alive. I've been at 2 HP once and that was scary."*

Roger goes on to explain how damage within the system affected the entire group. He reflects on how this impacted the entire group as a somewhat negative, but fair aspect of the system:

> *"It was a bad feeling if other team mates ruined for you if they came late to school and got damage and eventually died. That made an impact on the whole group. That was the only problem I saw, but it was fair."*

Curtis states how he likes the death punishments in an MCS, due to randomness and a slim chance of something positive happening as a result:

> *"I like the death punishments. They are randomized so you can be really lucky and get full health and bonus XP."*

XP as an important core element of an MCS

XP is mentioned by all participants in different ways as a primary motivating element within the framework. XP being specifically tied to progression in the MCS framework was expressed in the following statements:

> Fredrick: *"I remember especially the beginning of every week when you gave out the XP and we could level up and stuff."*
>
> George: *"You got XP and you got to advance further which gave you advantages in the classroom."*
>
> Jakob: *"It was about XP, about getting the most of them and not getting damage."*
>
> Lisa: *"We could get XP and level up."*

Mastery was an important motivator for many of the participants. Reaching the top level was the ultimate goal for many and is summarized in this statement by Curtis:

> *"In Heimdall's Quest you have the Demi-God rank and you need to reach 30000 XP to reach that level, it's motivating to think that you can be in the hall of the fame in Heimdall's Quest and you can be sort of the level just under the Gods/Teachers. Working towards that is motivating and fun."*

This perspective was held by many of the participants. This reflects a form of Flow where upon reaching a new level of achievement it became enticing to continue to put in effort in order to reach the next. Jakob responds to being asked about his motivation within an MCS as such:

> Jakob: *"I wanted to reach the top. That was the goal from the start."*
>
> Jason: "*Was it an advantage to reach the top? Was that a goal for just for you or a goal for everybody?"*
>
> Jakob: "*I saw it that way...maybe not for everybody, but quite a few people"*

In the statement below, Lisa reflects on how reaching the highest levels of achievement in the MCS allowed a student more freedom in the classroom as well as over their own education. This could be considered as adapting their own education.

> *"Lots of people wanted to be demi gods. then you got the most freedoms in class and could also choose to do assignments and stuff that you wanted... with the teacher's permission."*

Fredrick also aspired to the highest levels of the system, yet points out how some students are slower at earning XP.

> *"But it's very interesting with the demi god thing. It's something to try and achieve, but some are a bit slower on earning XP"*

He continues in the statement below, slightly bewildered at how some students progress so much faster in the system than others, even when they are putting in effort:

> *"The XP thing is still up and down. Some of us have high amounts of XP points while others have a lower amount, so we don't understand how they get so much XP. So I guess some people get a lot of XP and others still do the work and get XP but we are really far behind and we don't understand why"*

That particular observation by Fredrick was thought provoking and I approached him on the subject briefly afterwards. The following transcriptions are taken from that follow up interaction and highlight an explanation given to the participant on how choice comes into play with regards to an MCS, XP and progression.

> Jason: *"It was interesting to hear you mention your views on XP. I thought we could perhaps follow up on that statement you made during the interview. I can maybe clear some things up."*
>
> Fredrick: *"Sure…well I basically just don't understand how others in the class have earned as much XP, when those of us in my group have also worked hard and done well in class?"*
>
> Jason: *"If you take a look at the choices that the students you mention have made in Heimdall's Quest. Specifically, the powers they have chosen. They have chosen to invest in their class powers which grant more XP when helping team mates as well as passive powers that increase their overall XP when helping their team. Now, to put it*

> *in perspective. Your team and yourself have invested primarily in powers that grant your freedoms in the classroom. You are all able to eat and drink every day, multiple times per day, listen to music and have other freedoms you have chosen as well. The difference is that those others chose to focus on gaining XP and progressing over having as many freedoms in class."*
>
> Fredrick: *"Wow… I never even thought about it like that. That totally makes sense."*

Larger amounts of XP were also considered more motivating than smaller amounts. George touches upon this when asked about any negatives he could think of regarding an MCS:

> *"I can't think of any negatives. Just mainly a few positives. Kinda like... if someone says if you do this you can earn 500 XP... we are like of shit! Then we all get together and work really hard."*

Curtis discussed how XP bonuses lead to learning and suggests how differentiating XP on assignments can bring excitement to the class:

> *"Yeah you could almost have it like if there is something that is really important that you give an extra XP bonus and people start learning that and they probably will remember that too. And if it's something that's just common, you have to learn it you could still give normal XP, so people still do the work but kinda get pumped up a bit."*

XP was mentioned by many of the participants as an important motivator to attend school each day. The following four participants explain this view in the following statements:

> Jakob: *"One of the criteria to get XP was to show up every single day of the month. I figured that was as easy way to gain more XP and made me want to come to school."*
>
> Roger: *"I would say it had a positive effect on that. Even if I was a little bit sick, I would force myself to go to school. I think it was every month we had full attendance we got more XP."*
>
> Phillip: *"You get a bonus XP, so that's a good motivation to come to school."*

George: *"Monday after lunch we could go up in levels and such, we'd get the bonus XP for being at school every day and give out that and so on."*

XP was repeatedly mentioned by all participants, as motivating in order to put in extra effort into their school work. This is reflected in the following statement by Lisa:

"If we worked hard in class there was always more opportunity to earn XP and that made it worth putting in the extra effort."

Roger goes a little deeper in his explanation, delving into aspects of both attendance and effort in relation to XP:

"It made a good reason to want to go to school and to get to school at the right time each day, work with your tasks and work with your work at home if you did not finish in school in order to get more points than the others."

Fredrick explains how it was motivating for him to have as little absence as possible in order to earn as much XP as possible to ascend to highest level of progression:

"First I was like, I wanted to have zero absence or as little as possible so I could get lots of XP and get to Demi-God and kinda do what I want."

He then goes on to reflect upon that and states how perhaps it is harder to reach the highest level. He mentions some absence and goes on to ruminate that XP needed to achieve the highest rank may in fact be too high.

"But I have not earned enough XP... I have some absence due to other reasons. But I think it's kind of a high amount of XP needed to become a Demi-God. I have about 1/4 less than what is required and others are almost at Demi-God."

This last response from Fredrick is feedback that is good for a teacher in order to adapt the

amounts of XP for balance. It also provides a guideline towards adapted teaching in order to try to find each individual students personal flow zone.

Powers

Powers as a part of the dynamics of an MCS system were spoken of often by all of the participants. The participants viewed powers as a facilitator to improving in class effort and quality of work. As was mentioned in the previous major theme regarding XP, effort in the system was viewed as a pathway to faster progression within an MCS.

Roger explains how powers were not only an individual freedom, but often involve the entire group. He points out that it was not something you could do every day, but was a positive experience:

> *"We had lab working, instead of working the whole group used different movie, eating and drinking perks. So the whole group rigged up the projector in the classroom and sat there and watched a movie instead of working. It was a very positive experience. Something unusual from a regular school day. It was not something we could do every day."*

He goes on to explain how the group planned and chose powers in order to get the most effective use of them.

> *"Overall I think it was a positive effect. We had to talk more, discuss which powers to take in order to get the most use out of it. For example, 1 had the power that made the whole group take a 10 min break I think it was. Then we could go to the store and buy some food. Then we came back and another used the power, drink in order to let us drink in class."*

In the statement below, George discusses how the team must work together in order to succeed in an MCS. He reflects on the thought if one member doesn't do their part it affects the whole of the team. This is a source of motivation for him to improve his effort and attention in class.

> *"In my opinion at least. We have to work together as a team to achieve stuff. And if one member of the team does not show up or does shit that will affect the whole team, so that thought made me think I actually had to do my work at school and pay attention in class and yeah, I feel like it helped out a lot in terms of my motivation."*

Jakob reminisces on when he participated in an MCS there was less individual free choice when choosing powers in the system. He comments on how he views the newer system as an improvement:

> *"When I participated you had very little choice in abilities and stuff. There was only 1 rank. I have seen the newer, updated version of the system and like that much better. I would have liked to have those possibilities to mix and match abilities too."*

Improved morale was something that was specifically touched upon by apprentices. Morale was something they mentioned as a learned trait. Both Jakob and Lisa explain how improved morale has followed them from school to the workplace:

> Jakob: *"It might have helped me with work morale. Because like I said. I got more motivated, and that has kinda stayed with me. So it did have some impact yeah."*
>
> Lisa: *"Work morale has definitely stayed at a pretty good level after participating in Heimdall's Quest."*

Attendance

Attendance has such an important role in the successful transition of a student from the institution of school to becoming a successful worker out in the work force. Many employers look first at the attendance record of a possible employee, even before grades, as this is a greater measure of reliability. In school, poor attendance eventually leads to poor orderliness marks, grades (or lack of grades) and eventually in the worst scenario; dropout. This theme looks at the experiences relating to the participants' attendance and an MCS.

Lack of motivation or in some cases Amotivation, was mentioned by multiple participants when asked about years prior to their participation in an MCS. Five of the seven participants mention this directly:

> George: *"The year, or the school year before Heimdal, I was kinda slacking a lot and getting through the school day was hard because I didn't really have any motivation to stay and do what I was supposed to do"*
>
> Roger: *"The first year of VGS, I didn't go to school when I didn't feel like it. I was not so much at school"*
>
> Fredrick: *"My attendance was much worse."*
>
> Phillip: *"Last year was a little worse... because... I had started to lose interest and motivation. So I did have quite a bit more absence there".*

Jakob was adamant in his reply to this question and made it clear how close to actually dropping out of school he was:

> *"I almost dropped out of school the year before. I didn't really want to go to school at all."*

Roger also mentions possibly not finishing school, yet attributes his participation in an MCS as helping him make it though:

> Roger: *"At the start, after the first year of school, I was like ughhh... I didn't know if I had the motivation to finish another year. But I think I got more motivation to finish the year and it went pretty well I think. So I would say Heimdall's Quest helped me be motivated in order to finish the year."*

All of the participants commented on their attendance during their year of participation. The replies they gave were in striking contrast to their experiences in the year prior to participating in an MCS. These views are highlighted below:

Phillip: *"I have zero absence."*

Lisa: *"I was at school every day, unless I was sick. I liked being in class and never knew what kind of thing we might do each day. It was like getting a surprise every day."*

Curtis: *"My grades are higher than last year. I have less absence and yeah... it's helped a lot."*

Jakob: *"So I showed up. Pretty much every day. I have never had as much attendance as I had that year."*

George: *"It was very good. I had only 6 days' absence and 3 were because I was at hospital and stuff, I had a declaration for that, so compared to the year before that I had 16 days and 40 hours' absence. so, hmm. Heimdall's Quest contributed a lot to help me stay focused in class"*

Fredrick was more emotionally invested in this question and it could be seen in his posture and the way he spoke that this was an important subject for him:

"This year is better. Heimdal's quest has had a positive effect on my attendance. I really like the group aspect. I keep coming back to that. We have a group task and we need to get that finished by a certain amount of time. So even when I've been sick you have the group pressure in a way. They will say we need to get this finished, and even though I'm a bit sick I'll come to school to help the group."

When asked to go deeper in his explanation on the group pressure he mentioned, he explained:

"Encourage, yeah that's the word. They encourage me to come to school...it's not pressure."

Roger, upon reflecting on what aspects of an MCS if any followed him to the work place as an apprentice stated:

> *"Attendance for example. I have almost the same attendance this year as an apprentice as last year at school. I want to go to work. I feel motivation for that. I struggled with motivation before...I was really tired of school and learning stuff. I ditched a lot of days."*

When asked about coming late to class in an MCS, Curtis mentioned how "Mana" points promoted attendance:

> *"Because if you don't show up within 10 minutes of class starting you won't receive your attendance mana and then you can't use abilities in class."*

He goes on to explain why this was important in regards to using powers of freedom within the class:

> *"If you have your mana you can do that, but if you show up late too often you won't earn enough mana and won't be able to play with the spells."*

Game mechanics of an MCS

Internal game mechanics of an MCS were discussed throughout the interviews. All of the participants touched upon this theme, with views on gaming culture and bringing personal interests into the classroom as aspects they mentioned the most. Freedom and play in the classroom was a theme all brushed upon in some way or another. Activities and events were mentioned as ways to brighten up the school day.

One thing that stood out with this particular group of participants was their common enjoyment of games. George and Curtis were pretty excited when speaking about games:

> George: *"I like computer games and being with my friends. Kinda mobiles and MMO's. Also, Heimdall's Quest is a fun game and games at school are awesome."*

> Curtis: "*I like games. This is my hobby and something I love doing. I just really like it."*

Familiarity with gaming concepts demonstrated an affinity with gaming culture:

> Phillip: *"I'm used to playing RPG's and stuff... I'm used to the terminologies of HP and Mana."*
>
> Curtis: *"What I have been doing the last 10-15 years of my life are computers and games"*

George states briefly, but precise when asked why games made him feel more motivated:

> *"Every time you play a game you want to finish it."*

Using gaming in school was mentioned by Jakob as unheard of. He also explains how games are often portrayed poorly in the media, but have been a positive experience for him:

> *"Learning through games... never heard of. Games always get a negative highlight in the media and stuff like that, but it's only been helpful for me."*

When asked about his experiences with an MCS, Phillip responded:

> *"That has been really good! It was really interesting when we first started that you told us we were having a game in class and that everything we do in class we can earn experience or damage"*

Curtis was ecstatic when reflecting on an MCS in the classroom and how the teachers are also an integral part of the system. This also reflects upon how teachers in the system work on a level together with the students, involving themselves in something that interests the students:

> *"Everyone likes games, even the teachers, that's amazing!"*

Phillip reinforces the perspective of games in school being unique:

> *"I was pleasantly surprised that a school wanted to implement something like this as its very enjoyable."*

Events and activities play a large role in an MCS. The participants mention how learning during a fun activity is something that they remember really well. It was very interesting to hear the experience chosen by Lisa and George when asked to tell about a memorable experience, as the participants attended school in different years.

> George: "*The first group challenge we did on the hill, that was really fun. None of us were particularly expecting something like that and none of us were really good at it, but we had to guess a lot and use body language. Another time was when we did a weekly challenge like singing in class, or when we had a challenge to dance on the hill in front of school. We were only three guys that were dancing, so it was kinda awkward, but it's been really fun, positive and motivating. Really great."*
>
> Lisa: *"In the winter when we could get XP if we went outside with our jacket and rolled down the little hill in the snow. I think it was like a snow storm event where we could go jump in the snow for XP. It was really funny."*

Lisa and George both expressed how an MCS allows all genders to participate equally. They also reflected when asked if they felt girls were less likely to relate to the system than boys:

> Lisa: "*Gender doesn't matter, I didn't felt like "the girl", I was just a part of the team and most of the powers fit for everyone."*
>
> *"I don't think being a girl or boy matter as it is fun for everyone."*
>
> *"I think most would. Lots of girls play games and I think most of them do some kind of gaming... maybe iPad games, Sims or like me a bit of everything."*
>
> George: "*We had two girls last year. I never heard them complain or anything and they seemed open to it. As far as I know they were not gamers at all.so yeah...I think everyone can find it interesting and motivating and at least funny, since it is a game. Not real life."*

5.3 Summary of findings

This chapter provided a detailed discussion of the analyses and results from the interviews of all seven participants in an MCS framework. Ten major themes evolved from the emerging themes and super-ordinate themes as relevant to understanding what these participants experienced during their year of involvement in a classroom utilizing an MCS. The ten major themes of cooperation, social aspects of group/team, personal choice, self-organization, motivation, modifying behavior, XP as an important core element of an MCS, powers, attendance and game mechanics of an MCS were all explored and explained from the views of the participants themselves. The results demonstrated the perspectives and lived experiences held by the participants of their own interactions within an MCS. This also increased awareness of the functionality and purpose of an MCS framework within the classroom.

Chapter 6: Discussion

6.1 Introduction

In this chapter the findings revealed in Chapter 5 lay a foundation from which to build a collection of final thoughts with an aim to answer the research question: *"What do students experience while participating in a Motivational Classroom System?"* Following the conclusion, implications and recommendations of the research will be touched upon briefly concluding the chapter.

6.2 Conclusion

The findings, based on my data collection, have unveiled the inner workings of an MCS and how students experience the classroom while participating in Heimdall's Quest. The implications of these findings are to some extent generalizable, and they contribute to research on how gamification or game-based learning can be applied in an educational setting. Based on this study of students experiences with Heimdall's Quest, it is also possible to consider future uses of an MCS and if and how the mechanics within the framework can be

applied in order to reduce absence and drop out in vocational studies and school. The findings presented in chapter 5 were used in order to answer the research question. Research findings and conclusions to the research question are discussed in the section below.

The study resulted in ten major themes that describe student participant experiences while interacting with an MCS framework in school. Each of the seven participants identified with the themes that arose out of the individual semi-structured interviews. These views are discussed below.

Cooperation

Students cooperated in all aspects of the classroom, such as group work and individual work, while participating in HQ. Cooperation was a central theme that resonated throughout the study, demonstrating how teams within an MCS nurture a supportive and motivating atmosphere in the classroom. This is an important skill highlighted by the OECD[29] in the 21st Century Skills project, that qualities such as cooperation will be important for being able to adapt to new demands and expectations in working life (EDU/WKP(2009)20, 2009). Collaboration was also an integral part of this theme, demonstrating how learning to work together alongside others in a team is an important learned skill that is vital to successful work out in the work force. This is also supported by the Norwegian report, "School of the future":

> *"It is also recommended that collaboration and participation should be included in all subjects, focusing on cooperation on problem-solving and participation in discussions relating to subject content."* (NOU 2015:8, 2015, p. 10)

Social aspects of team

Students encountered improved social connections with their classmates while participating in MCS groups. Social aspects in a group/team in MCS groups was experienced by the participants as promoting a good social atmosphere in the classroom. Getting to know other students, becoming friends and developing a colleague like relationship were all mentioned

[29] The Organization for Economic Co-operation and Development (OECD) is an international organization committed to promoting policies that will improve the economic and social well-being of people around the world.

as aspects of working in MCS teams, demonstrating the aspect of Relatedness in Self Determination Theory (Deci & Ryan, 2013).

Participants cited feelings of being included, cared for and respected. Bullying, hurtful teasing and isolation of students did not occur within an MCS classroom. This is of vital importance when looking at today's schools and demonstrates how MCS mechanics are used to subtly combat negative social stigmatisms within the classroom. This is reinforced by the Norwegian laws of education (LOV-1998-07-17-61, 2016) stating in § 9a-1, that all students have the right to a good psychosocial learning environment. The law goes on in § 9a-3 and § 9a-4, to punctuate that students have the right to a safe environment free of derogatory words or statements, hurtful teasing, violence, discrimination, racism or being socially excluded.

Personal choice

Students became aware of the fact that they had a choice and that their choices had consequences. Personal choice was a theme that highlighted the importance of choosing the correct study program in education. This can be seen in students discovering they have chosen incorrectly, who often develop feelings of being an outsider and reduced motivation at school. According to a study by The Schools Counseling Committee for the central region of Norway (Møre og Romsdal, Nord-Trøndelag and Sør-Trøndelag) in 2014, there are four major problems that are possibly on the rise with students making incorrect choices when selecting a program of study. The first being increasing dropout rates in upper secondary school. Second, it can lead to an over applying to programs in general studies due to a higher rate of students re-choosing. Third, the need for school counselors to obtain information about an individual student will become much higher, based on the need to have a better background for their choice. Lastly, it can also lead to students postponing their choice, by instead choosing to select a program of general studies (Buland, Mathiesen, & Mordal, 2014, ss. 244-245). A possible way of addressing this problem was stated in an interview by Google's global education evangelist, Jaime Casap:

> *"A big driver for me is that we need to ask new questions in education. We used to always ask, "What do you want to be when you grow up?" That question has no relevance anymore. A long, long time ago there were jobs like firefighter, police, astronaut that you*

> *could envision becoming but now we live in a world that is creating new jobs in new industries every day.*
>
> *We need to instead ask students, "What problem do you want to solve?" That allows educators to follow up with, "OK, what do you need to learn in order to solve those problems? What blogs, what readings, what classes can you take, online and offline to really dive into and understand the problem and solve it?" That changes the conversation for students."*
>
> ― Jaime Casap (Cepeda, 2016)

Vocational programs were also pointed out as having a perceived lower status in comparison to other general programs of study. Having a B status, compared to more theoretical programs of study, does not promote the growth of vocational studies. *"Vocational workers in Norway were previously considered as a qualification category and not so much as an educational category."* (Olsen, 2012, pp. 373-374)

Olsen (2012), points out that for many students, vocational education has too much theory and is not practical enough. In my opinion many students beginning a vocational line of study, expecting a very practical hands on education, may not realize the amount of theory that is required in today's vocational education. Vocational jobs have become complex and demanding, requiring a solid amount of theory in order to understand principles needed to work with complex machinery, equipment, programming, etc. in today's vocational working environment. However, this can be viewed as a serious issue considering society's future needs for vocational workers. As a possible consequence of fewer students choosing vocational studies, or more students dropping out of school, society will struggle in the future to provide a necessary work force in order to fill the working needs of important sectors and branches.

An MCS does not help students when choosing a program of study. However, it can alleviate the problem of an increased theoretical aspect to programs by providing a varied and motivational classroom experience. This in itself could be enough to help a struggling student continue throughout the year without dropping out. Students who choose a program of study that fits their own expectations and inner motivation to succeed, combined with an MCS framework, could be motivated to fully excel by utilizing the mechanics within the system

that allow for freedom to dictate in the direction they want to steer their own education. The mechanic promoting freedom of choice within an MCS also directly supports the concept of metacognition which is presented in the Norwegian report, "*School of the Future*":

> *"Pupils who develop awareness of their own learning, who learn about learning and think about how they learn are better equipped to solve problems in a reflected manner, both on their own and with others."* (NOU 2015:8, 2015, p. 10)

Aspects of personal choice within an MCS included choosing personal freedoms within the framework or more of a focus on team support and faster progression. Both choices gave a better working ethic in the classroom. This demonstrates how an MCS promotes Competence within Self Determination Theory, and is represented by the students having control over their classroom environment and their need for challenge (Deci & Ryan, 2013). Autonomy is also represented in a student's choices by allowing him or her to choose how to progress in the system and in his or her studies.

Self-organization

Students learned that in order to progress in the MCS, they had to work in the classroom. Self-organization demonstrates how an MCS promotes Ludic Work in the classroom (Ask, 2016). Ludic Work is an important term, as it goes into detail on how play is defined by the structure of effort and work.

> *"In the types of play and players I have studied, ludic work does not only produce play, it defines play: what play should be about, why it has value, and how it is enjoyable. At times this ludic work is rewarding and adds value and meaning to play, while at other times, there is a distortion in the translation of actions and something other than play is produced."* (Ask, 2016, pp. 87-88)

It is the fine balance between being able to enjoy a game and the work involved in order to truly succeed in a game, that is of relevance in an MCS. Using an MCS, it is the teacher who must balance this effect, based upon each individual student's educational needs. As the participants in this study highlighted, mechanics within an MCS promote work by allowing

play. Yet, in order to succeed and progress while playing, a student needs to put in the work in class.

Self-responsibility was also mentioned as a primary learned aspect that participants within an MCS have identified with. This includes punctuality, effort, making independent decisions and a desire to progress in the classroom. This is can be viewed as an aspect of self-regulation or more specifically taking responsibility over one's life as stated in (NOU 2015:8, 2015),

> *"Moreover, features of social development, such as individualization are relevant for pupil motivation and mastering in connection with taking responsibility for one's own life."* (p.55)

Motivation

All participants in the study referred to being motivated in various ways in the game, in the classroom and socially. Motivation was clearly experienced throughout all aspects of participation in an MCS. This was an important undercurrent flowing through the majority of major themes in the study. As motivation is often mentioned as a lacking commodity in today's schools, it is important to reflect upon all the ways an MCS provided motivation to the participants. Daily motivation in class, freedom to affect the classroom through powers and choices, attendance as well as progression in the MCS system were pointed out by participants. Intrinsic and extrinsic motivation was also touched upon indirectly by participants when mentioning what sort of things motivated them in school. As this particular theme is so widespread, I will highlight further aspects of motivation within each of the major themes as I progress through them discussing the relevance of the findings within.

Modifying behavior

All participants in the study had a positive experience with an MCS compared to their mostly negative experiences with orderliness and conduct grades in school. Modifying behavior was a theme where participants compared damage as a form of punishment in an MCS to that of negative orderliness and conduct marks given in the school system. Participants in this study have punctuated upon how grades in orderliness and conduct have been demotivating for them at school. This is also supported by the following statement:

> *"A practice that assigns much importance to the grade assessment and the possibility of a lower grade may end up being a form of punishment than a means of support for pupils' development."* (NOU 2015:8, 2015, p. 93)

Group support and the ability to affect damage in a positive way were highlighted as aspects of an MCS that participants viewed as having a better effect than orderliness and conduct grades. XP was also mentioned in multiple of the major themes as a motivator to improve behavior in the classroom.

Experience points

Students were strongly motivated by the use of the extrinsic motivators that reflected their progression. XP as an important core element of an MCS was a theme that also permeated throughout the study. Points in an MCS are structured in such a way as to provide informational feedback to the students. Participants repeatedly pointed out how XP was an indicator of where their individual and group progression was in context of the MCS and classroom. Progression, motivation and mastery were mentioned specifically by all of the participants as being affected by XP. This aspect also demonstrates how Flow in the MCS framework comes into play, as the students become more motivated and focused in order to progress (Csikszentmihalyi, 1975). Many of the participants aspired to reach the highest levels of progression within the MCS, supporting this point of view. Autonomy within the framework was reflected when students were given the freedom to choose how they would progress, both within the MCS system well as with their own education (Deci & Ryan, 2013). They were then able to accept and understand consequences of those choices within the classroom.

Powers

Powers were reflected as a facilitator of improving classroom effort and quality of work within the MCS. This theme had close ties with the themes of XP and motivation as both greatly affect when and how a student earns their powers. Powers in an MCS are not simply badges and awards that are given. Research has shown, that if there is no point or connection to the extrinsic reward being given, then the users eventually become uninterested, as no intrinsic motivation is developed. Lepper (1988) (as cited in Kapp, 2012). However, powers

do have a connection to the class, students culture and interest in games. They become a medium for the student to affect their environment with freedoms they would not normally have. It has been shown in further research, that in the classroom, intrinsic and extrinsic motivators can and do coexist (Lepper, Iyengar, & Corpus, 2005). Powers therefore had a lasting effect upon the participants' intrinsic motivation throughout the school year. Freedom of choice and improved morale were directly associated with the use of powers in the classroom.

Attendance

Students, while participating in HQ, had higher attendance throughout the school year. Attendance was one of the most important aspects of the study, as it delved into how participants were motivated to attend school while participating in an MCS. Amotivation or lack of motivation (Deci & Ryan, 2013), was cited by the majority of participants when referring to years prior to participation in an MCS. In contrast, individual participants cited much improved attendance and a desire to be at school while participating in an MCS.

The strong relationship with the team and the encouragement that the team provided to attend school was also a strong point of interest. Social approval has been pointed out by Kapp (2012) as a reason people play games. Players want to show their friends and social connections their accomplishments and progression in a game. It is also possible to view social connections within an MCS team as a motivator to be at school, as all the members of the team are dependent upon each other in order to succeed. Kapp (2012) makes another point of interest, explaining how social recognition has been shown to have a positive effect on performance when used as an incentive (p.229).

MCS functionality such as "mana" and the need to attend school in order to use classroom powers was also mentioned as relevant. Mana in this case, being a system of points that has the function of fueling the individual powers within an MCS. Participants directly referred to the importance of showing up to class in order to earn mana, so that they could use their powers and help their team mates or gain freedoms.

Game mechanics

In my study, I found that gaming had a positive effect on both girls and boys. Game mechanics of an MCS encapsulate aspects of all the themes, as the MCS mechanics

interweave through them all. Participants mentioned games in school as amazing, enjoyable and surprising. Gaming culture being an important focus brought up by the participants' perspectives on how gaming culture outside the classroom is something that many students identify with on a social and connective level in their daily lives.

Using an MCS built upon gaming mechanics that the students already understand, was experienced as motivating, brightening up the school day and as a positive experience. This is also a flexible medium that allows teachers to come down to the students' level of understanding and participation in the classroom. Using the game mechanics that reside within an MCS allows for a teacher to be extremely flexible with how they teach in regards to methods, assignments and content. This demonstrates how an MCS can be used in order to reach all the students based on their individual needs and progression. The Norwegian white paper, "School of the Future" states:

> *"Thus flexible teaching is required, where teachers are able to make changes if the methods or work forms they have chosen do not give the desired results in their pupils' learning outcome."* (NOU 2015:8, 2015, p. 12)

Gender was an aspect of an MCS that was touched upon directly by a few participants. It is important to reflect on how gender plays a role in the use of an MCS. A recent report produced by the Norwegian Media Authority in 2016 shows how boys and girls between 9-16 years of age play computer games (Mediatilsynet, 2016). The report statistically shows that both boys and girls have a very high relation to pc games between the ages of 9-11 years. 63% of the boys between 9-11 played pc games, compared to 64% og girls between 9 and 11. However, as they progressed further into their teen years, boys between 15-16 years increased their pc gaming to 76%, where girls between 15-16 years dropped to 47%. These statistics for both boys and girls were higher when including other mediums of play such as console, mobile phones and pads, with an incredible 95% of boys playing some form of games compared to 53% of girls (Mediatilsynet, 2016, pp. 56-59).

The findings in this report are of importance to an MCS as it shows that most boys and girls have some sort of relationship to games. Participants in this study emphasized that an MCS is supportive and including for both boys and girls. This allows me to draw the conclusion that MCS mechanics are gender neutral, designed to support the student

regardless of gender. Another aspect of these findings relevant regarding gender, is that due to boys having such a strong relationship to gaming, they may be more influenced than girls in the overall aspect of an MCS. According to Statistics Norway (2016), boys have a 6% higher dropout rate in vocational studies than girls. A benefit to boys having a high engagement level in regards to gaming, is that through an MCS, boys may reach higher levels of engagement in the framework leading to higher motivation and a decreased chance of dropout.

Implications

In this thesis I have tried to answer my research question, *"What do students experience while participating in a Motivational Classroom System?"*. I used a qualitative research method with an IPA approach, where I interviewed seven students. This study contributes to research in the field of game theory and motivation. My study shows that students that participated in an MCS, developed cooperation, social aspects of group/team, personal choice, self-organization, motivation, modifying behavior, experience points, powers, attendance and game mechanics. This research has limitations which are not generalizable, but contribute to the research field. The findings of the study, may contribute to promoting the use of games in education.

I argue that the findings from my research have implications for educators, student teachers, school administrators and organizations, providing insight into the user experience of participation in an MCS. There has been no previous research concerning an MCS, allowing findings from this study to reveal future opportunities to utilize different methodologies in order to illuminate aspects not covered by this study.

The experiences shared by the participants was a humbling experience and allowed me to view many aspects of the system that were more obscured. Motivation is often mentioned as waning in many of today's classrooms. The in depth individual interviews allowed the participants perspectives to arise, focusing on how and why they are motivated in school though the use of an MCS. These enlightenments pave the way for the use of gaming mechanics within an MCS framework, combined with the educational platform of a classroom, allowing the teacher to associate with the students on a closer level by using their interests and culture as a medium to develop closer bonds. As this study demonstrated, motivation was one of the primary experiences cited by the participants, and it is enticing to

think of how an MCS or other elements of gamification can be used to inspire and motivate our students in school. The following statement sums up one of the major focuses an MCS in the classroom aims to achieve:

> *"All in all, education must be dedicated to the personal qualities we wish to develop and not solely to subject matter. The key is to create an environment that provides ample opportunities for children and young people to evolve social responsibility and practical capability for their future roles as adults."* (Norwegian Board of Education, 2011, p. 32)

Recommendations

The Ludvigsen committee, which has been assigned to evaluate today's school and recommend a future teaching plan and renewal for schools in Norway has made this statement regarding marks in orderliness and conduct in school; *"Knowledge regarding the ability to self-regulate can signalize that marks in orderliness and conduct should be discontinued."* (Rege, 2015)

The Norwegian government has now started a three-year project in order to force students to show up to class (Udir-3-2016, 2016). The project takes the starting point that a student cannot have more than 10 percent absence in a class or they will not receive a grade in that class. The government's intention can be viewed as making the students self-regulate as a consequence of the rule. However, this does not make allowances for the student to demonstrate responsibility by delivering self-notice of absence, as an employee is allowed to do in the work force. Generally, only documentation certified by a doctor will bypass this rule. This rule can be viewed as a form of extrinsic motivation. However, unlike an MCS the 10 percent rule does not provide positive encouragement to self-regulate and has only negative consequences. It will be interesting to see what the future brings and how and if gaming elements such as those implemented in an MCS could be applied to the school of the future.

Recommendations for Future Research

This study with the use of an IPA approach, was aimed at excavating the experiences of individual participants that have participated in an MCS framework in the classroom. As a qualitative phenomenological study, this probed deep into what the individuals experienced. The individuals were then viewed together in order to make deeper meanings of the total experience.

Future research could look to go much wider, through a quantitative study. This would allow the researcher the means to look more directly at the effects of the framework based off statistical data and a larger sample. It is also possible to delve into what the teachers themselves experience when utilizing an MCS in the classroom. This would give a different view to that of the students as participants and could resonate better to educators on how the framework can be used effectively in an educational setting.

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Overview of Figures and Tables

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Appendix

Appendix A: Heimdall's Quest (MCS)

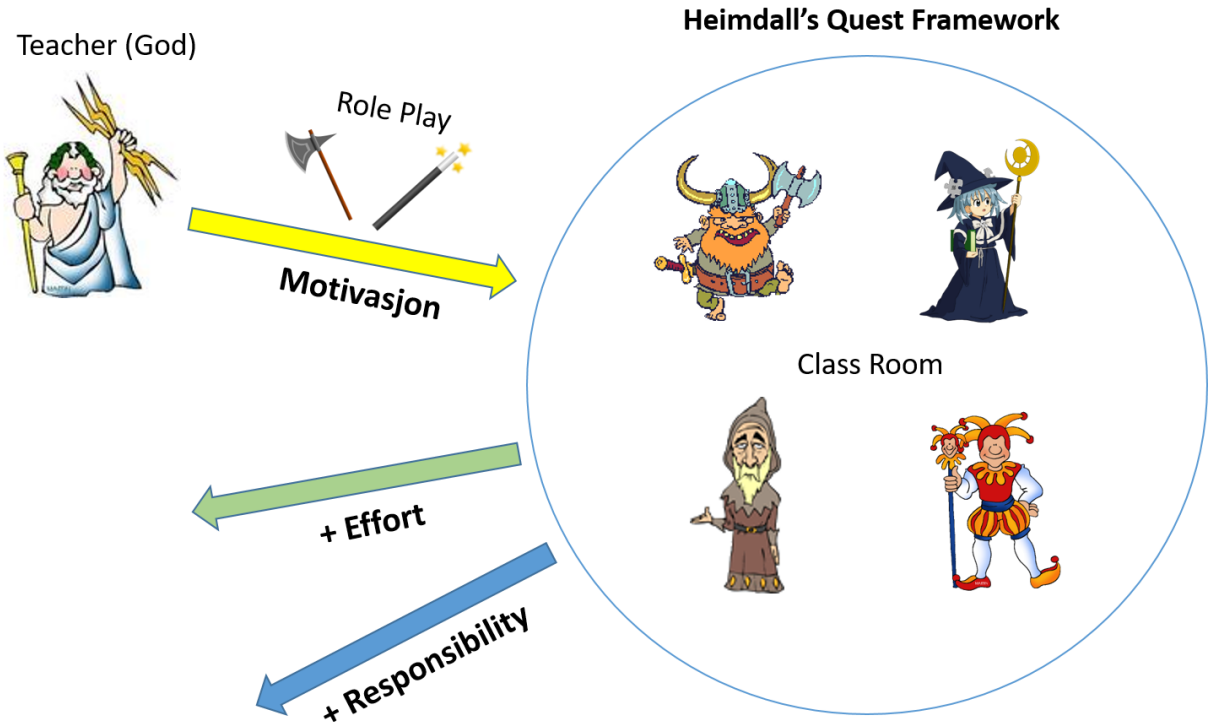


Figure A1: Visual representation of interactions within classroom utilizing Heimdall's Quest framework

An MCS such as Heimdall's Quest, incorporates elements from role-playing games (RPG)[30] in order to bring the game experience into the students' everyday reality. Just as in TLS an MCS is independent of grades and educational evaluation. In contrast to TLS which focused only on five levels of achievement and was based upon an individual classroom, an MCS can be used across a single or many classrooms and relies on a model of variation and choice for student achievement progression. Students are placed into groups early in the year and are able to develop a group identity, building a sense of cooperation. The system also

[30] A game in which players assume the roles of characters in a fictional setting.

incorporates a graphical avatar[31] in which the students develop an individual identity. This avatar changes graphically as the student progresses to higher tiers of expertise, which is designed in order to provide a sense of mastery. Experience is gained similarly to TLS, yet as a student progresses they can gain multiple levels of progression, which in return allow them to purchase real world powers.

Real world powers such as being allowed to eat in class, listen to music or to play a video game are all attainable, however the student must actively work in in their subject in order to earn the right to purchase such freedoms. In addition, each power has an activation cost. We refer to this cost as "Mana". Mana is given to the students upon meeting up at the correct time at the first class period of the day. Here is a short example of how "Mana" and powers interact:

> *"If a student who has earned the power "Music" wishes to use their power in class, they must first have saved up the required amount of "Mana" in order to activate the power. "Music" allows the student to listen to music via a headset for the class period and it has a "Mana" cost of 10. Daily attendance grants 4 "Mana" per day. Therefore, in order to use "Music" a student would need to have been in perfect attendance for at least 3 days and have saved enough "Mana" in order to pay for the activation."*

The use of powers is designed specifically to allow students more freedom in class, yet this requires them to be responsible in order to both earn as well as use such powers. Freedom to choose over how they wish to focus their education resides in their progression and earned MCS rank. The rank displays how much responsibility and work ethic the student has shown in class. The higher the rank, the more freedom they have to suggest what and how they wish to focus their learning in class. This freedom is a cooperation between the student and teacher together, relying upon the teacher's guidance, as well as the subject curricula.
Health is also a part of the equation, with each student's avatar having a set amount of life. Being irresponsible in class results in damage to the "Health" of the student. Of course this is

[31] An avatar is a virtual body or a personal figure used to represent oneself in a virtual world such as a role-playing game.

not real physical damage, but rather represented as damage to the health stat of the student's avatar. As a consequence of actions, such as being late for class, not participating, using freedoms in class without having earned or payed for powers, the student's individual avatar is given damage. This is a part of the game and the students accept this consequence knowing fully well they have broken the rules. This also allows for team members to help one another by using their powers in order to "Heal" or "Protect" team mates from damage. Again this focuses on building a team relationship and as positive reinforcement from their fellow students.

Listed below are screenshots taken from the prototype interface of Heimdall's Quest. Three images are shown. A2 is shown demonstrating a student's personal page with logs of his/her activity in the system, earned powers and stats of Health, Mana and XP. Rank is also displayed on the top left below the name. Visually ranks are displayed by the graphics on the avatar which change dynamically as the student ascends in ranks.

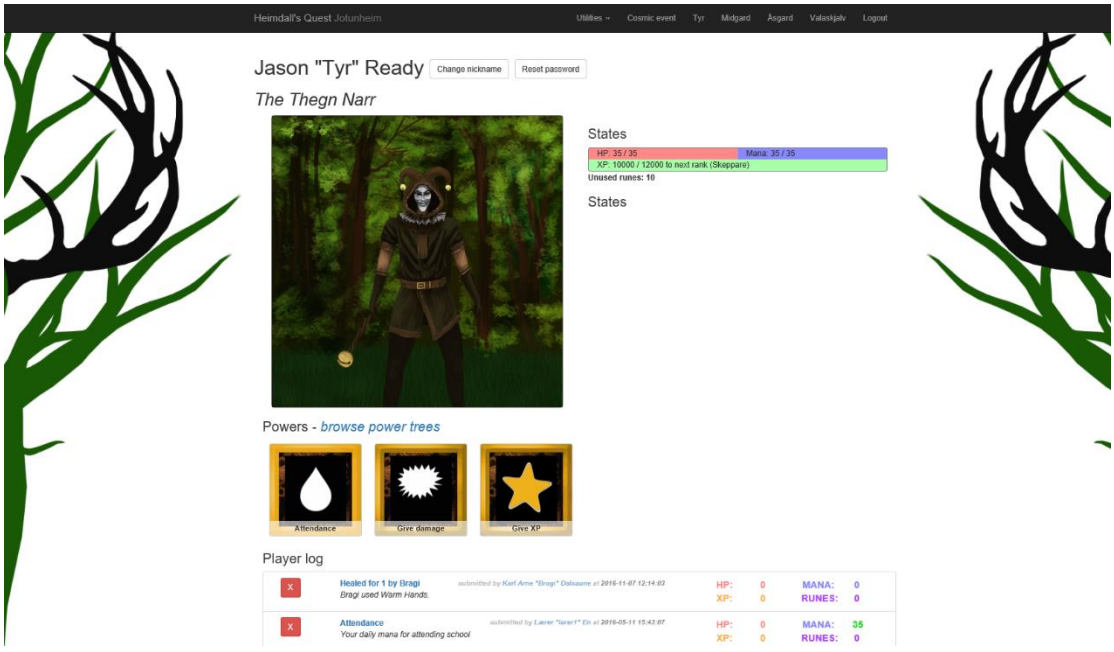


Figure A2: Personal avatar and character sheet in Heimdall's Quest

Figure A3 shows the team view in Heimdall's Quest. This is used by students and teachers alike in order to view team stats, if students have an active power and to be able to click upon and view other another student's avatar sheet and progression. Active powers will display a symbol of the power with a description upon hovering over with the mouse pointer. It will also display a timer if the power is limited in order to keep track of when it will expire. Teachers need only check this page when they suspect a student is breaking the rules. If for example they are eating in class and no power allowing eating in class is active. It is simple to give them a verbal notice and then damage within the system.

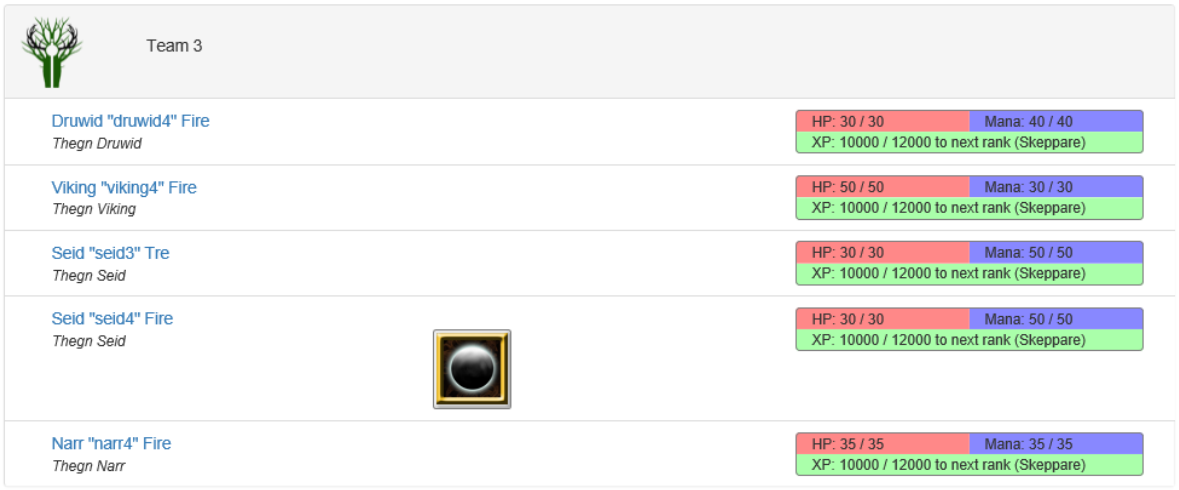


Figure A3: Team view in Heimdall's Quest

Figure A4 displays the Cosmic Event. This is a random daily event which brings variation, chance and surprise into the classroom. This example is called: Name brother – which allows all students who have a name the same as a god in Norse mythology to earn a free 50XP. An example of this could be Odin or Thor, Frigg or Freya.

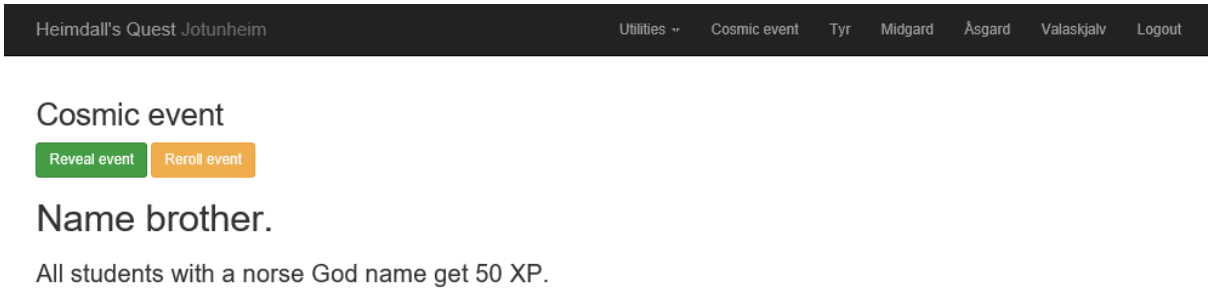


Figure A4: Cosmic Event

The final image in Figure A5 displays one of the many power trees that students may choose in Heimdall's Quest. Each student has a unique class tree, where class powers that help team mates and support progression reside. In addition, there are six profession trees which each focus on various freedoms that may be chosen in the classroom. This varies from the Hunter tree which supports eating in class to professions, such as a Scribe, which gives passive bonuses to XP earned in the system as well as a power that allows a student to heal themselves slightly, called Binding. Each power in a given tree starts with the base power with a cost of one rune to purchase. Each subsequent power in a tree costs from one to three runes. In effect no student will be able to have all the powers in more than a total of two trees throughout the school year, so it is important for them to decide what they wish to spend their runes on. One rune is granted for every 1000XP points a student earns in the system.

Figure A5: Example of a power tree in Heimdall's Quest

Appendix B: Student interview guide

What do students experience while participating in a Motivational Classroom System (MCS)?

Date: Time:

Place:

Questions:

1. What kinds of things do you enjoy? Can you tell me a bit about your hobbies, interests and activities that interest you?
2. Can you describe your classroom environment?
3. Can you describe how your school year has been this year?
    a. Compared to other years?
4. What has been your experience with Heimdall's Quest?
5. How is your motivation at school?
    a. Has Heimdall's Quest system had any positive or negative effects on motivation for you?
6. How do you view Heimdall's Quest in regards to group situations?
7. How was your attendance last year?
    a. Has Heimdall's Quest had any positive or negative effects on your attendance?
8. Can you share any particularly memorable experiences with Heimdall's Quest?
9. Has Heimdall's Quest had any effects upon you in relation to your current job/studies?

a: prompts

Appendix C: Apprentice interview guide

What do students experience while participating in a Motivational Classroom System (MCS)?

Date: Time:

Place:

Questions:

1. What kinds of things do you enjoy? Can you tell me a bit about your hobbies, interests and activities that interest you?
2. What type of job are you currently working with as an apprentice? (Hardware, Software, Support, etc.?)
    a. Can you tell me about the kinds of work you do? (Support, Server, Maintenance, etc.?)
3. What was your experience with Heimdall's Quest?
4. How was your motivation during your last school year?
    a. Did Heimdall's Quest system have any positive or negative effect on motivation for you?
5. How do you view Heimdall's Quest in regards to group situations?
6. How was your attendance during your last school year?
    a. Did Heimdall's Quest have any positive or negative effects on attendance?
7. Can you share any particularly memorable experiences with Heimdall's Quest?
8. Has Heimdall's Quest had any effects upon you in relation to your current job/studies?

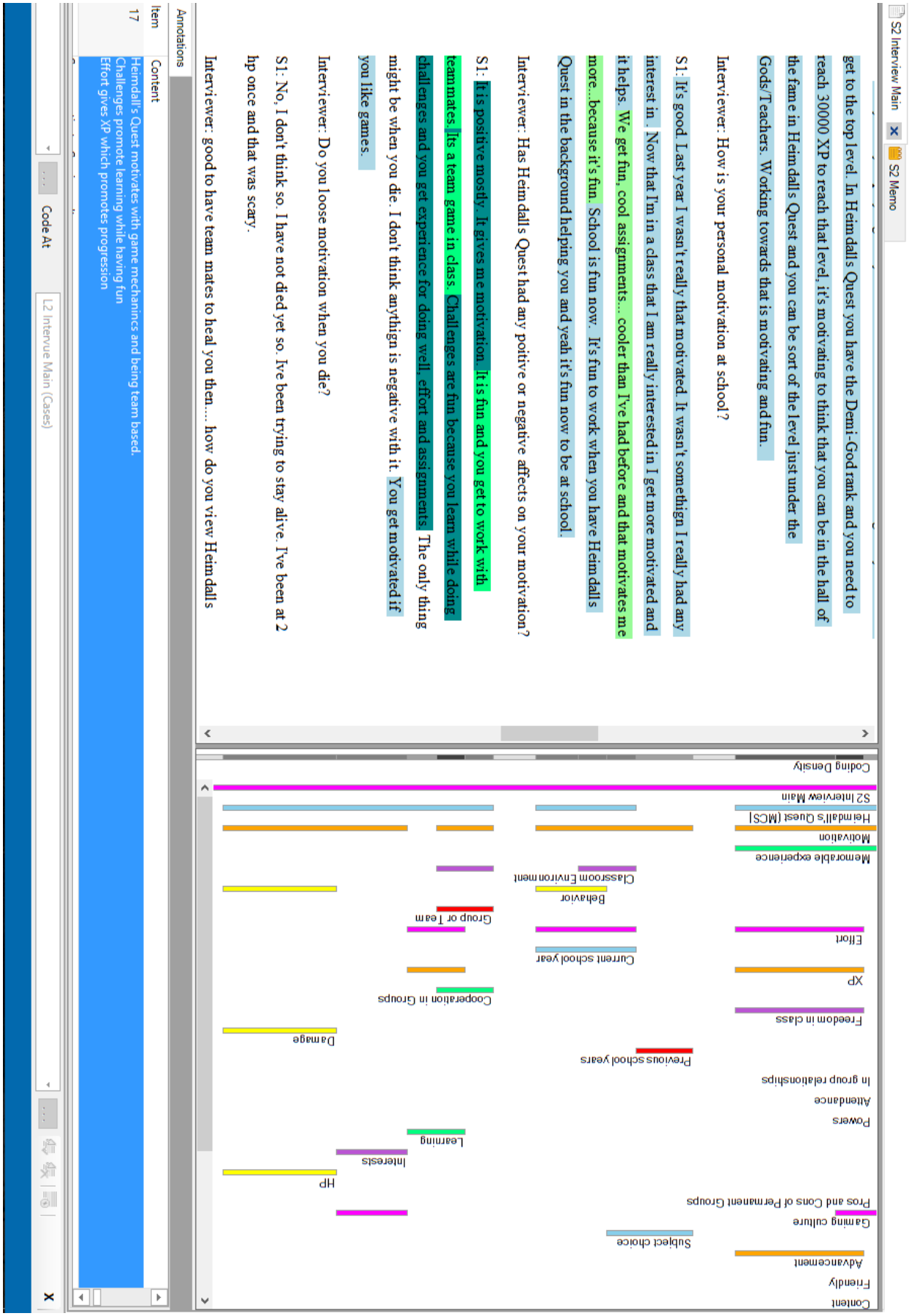
a: prompts

Appendix D: Node classifications

Name		Sources	References
Heimdall's Quest (MCS)		7	213
XP		7	34
Advancement		6	19
Powers		7	18
Freedom in class		6	15
Damage		4	11
Self-improvement		5	7
HP		2	5
Rewards		3	4
Mana		1	2
Group or Team		7	111
Cooperation in Groups		7	33
In group relationships		6	23
Pros and Cons of Permanent Groups		7	19
Mastery in groups		3	3
Motivation		7	109
Subject choice		6	13
Lowered motivation		6	11
Motivation in class		3	6
Behavior		7	83
Effort		7	36
Attendance		7	31
Classroom Environment		7	51
Friendly		6	15

No bullying or teasing		3	3
Interests		5	33
Playing Games		4	8
Computers		3	6
Social		2	4
Programming		2	3
Previous school years		7	21
History		2	2
Feeling of not belonging		2	3
Reflection on choices		2	3
Connection to friends' dictate choices		1	1
Interest in computers from early age		1	1
Current school year		3	20
Content		2	4
Memorable experience		7	16
Gaming culture		6	13
Learning		4	10
Grades		3	6
Reflection after work experience		4	5
Gender		2	5
Drop out		2	4

Appendix E: Sample coding and themes with annotations in NVivo



Appendix F: NSD response

Result of Notification Test: Not Subject to Notification

You have indicated that neither directly or indirectly identifiable personal data will be registered in the project.

If no personal data is to be registered, the project will not be subject to notification, and you will not have to submit a notification form.

Please note that this is a guidance based on information that you have given in the notification test and not a formal confirmation.

For your information: *In order for a project not to be subject to notification, we presuppose that all information processed using electronic equipment in the project remains anonymous.*

Anonymous information is defined as information that cannot identify individuals in the data set in any of the following ways:

- *directly, through uniquely identifiable characteristic (such as name, social security number, email address, etc.)*
- *indirectly, through a combination of background variables (such as residence/institution, gender, age, etc.)*
- *through a list of names referring to an encryption formula or code, or*
- *through recognizable faces on photographs or video recordings.*

Furthermore, we presuppose that names/consent forms are not linked to sensitive personal data.

Kind regards,
NSD Data Protection

Appendix G: Consent form

Research study consent form

(Please cross off the box that fits)

☐ I have received information on this research study and give my consent to participate.

☐ Parent consent if participant is under 18

I/we have received information on this research study and give my/our consent that our daughter/son may participate.

The prerequisite for the consent is that all texts and other material collected will be anonymous, treated with respect and complies with applicable ethical considerations and privacy.

Date:

Signature: _____

Parent Signature: _____

Appendix H: Request to participate in research study

Request for participation in research

"What do students experience while participating in a Motivational Classroom System?"

Background and purpose

This research project is a Master Degree Thesis focused on understanding what students are experiencing while participating in a Motivational Classroom System (MCS). This study does not aim to evaluate your experiences. It is being conducted in order to illuminate on the core experiences of participating in an MCS in the classroom. In this study I will need to interview a few individuals who are or have participated as students in Heimdall's Quest (MCS).

What is required for participation in this study?

Participation in this study requires a conversation with me lasting roughly 30 min to 1 hour in length. I will ask some questions and would appreciate your open and honest answers regarding your experiences. The conversation is not strictly dictated by the questions and anything you would like to add or discuss is welcome and appreciated. The conversation will be recorded. (recordings will be destroyed shortly after transcription and analysis are completed)

What happens with the information about you?

All information regarding you and any data gathered will be handled strictly confidential to myself as the researcher. All recordings will be listened to by only myself. The recording will be destroyed immediately after listening to/transcribing the data and analysis. No direct or indirect personal (name, address, mobile, etc.) recognizable data will be acquired and all information will be coded without any connection to your identity or information connecting the data to you.

Voluntary participation

All participation in this study is voluntary and you may withdraw your acceptance to participate at any time without giving a reason. If you would like to know more about what data is being collected and how it will be used in the research, please feel free to contact me via mobile phone or email. I hope you think this study is interesting and would like to participate.

Thanks!!
Regards, Jason Ready

Appendix I: Pre interview information to participants

Introductory Protocol

To facilitate note-taking, I would like to audio tape our conversations today. Please sign the release form. For your information, only myself as the researcher on the project will be privy to the recordings which will be eventually destroyed shortly after they are transcribed. In addition, you must sign a form devised to meet our human subject requirements. Essentially, this document states that: (1) all information will be held confidential, (2) your participation is voluntary and you may stop at any time if you feel uncomfortable, and (3) I do not intend to inflict any harm. Thank you for your agreeing to participate.

I have planned this interview to last no longer than one hour. During this time, I have several questions that I would like to cover. If time begins to run short, it may be necessary to interrupt you in order to push ahead and complete this line of questioning.

Research background and purpose:

You have been selected to speak with me today as you have been a student in a classroom using a Motivational Classroom System (MCS). This research project is focused on understanding what students are experiencing while participating in an MCS. This study does not aim to evaluate your experiences. It is being conducted in order to illuminate on the core experiences of participating in an MCS in the classroom. Please be as honest and forthcoming with your answers as possible. There is no right or wrong way to reply. Your honest reflection on your experience is of great value to the research. You have my thanks for your participation!

Appendix J: Post interview communication

Dear [Participant's First Name],

I want to thank you very much for your participation in my study. A Phenomenological study such as this cannot be accomplished without volunteers like you. I greatly appreciate your time and sharing your experience has been of great value to me. Hopefully this study will contribute to a better understanding of a Motivational Classroom System and allow others to experience it in school as you have. Please find the attached transcript of our interview session. I would greatly appreciate any comments or corrections you may offer. Any additional comments are welcomed and will be treated, as with the rest of the interview transcripts, with the greatest concern for your privacy and confidentiality. Please contact me if you have any questions or concerns.

I would greatly appreciate if you would forward any comments and/or corrections you may have as soon as possible. If I have not heard from you in two weeks, I will assume that you do not have anything further to communicate and will proceed with my analysis.
Upon completion of the study, I will notify you and provide you with a written summary of the study's findings.

Sincerely,
Jason Ready