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The developing of a game exploring the effects of trust on projects

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THE DEVELOPING OF A GAME EXPLORING THE EFFECTS OF TRUST ON PROJECTS

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MASTER's THESIS SPRING 2018

FOR

STUD.TECHN. Martin Lagesen Richardsen

The developing of a game exploring the effects of trust on projects

Utviklingen av et spill for å utforske effekten av tillit på prosjekter

In this Master's Thesis a game will be develop that can be used for educational purposes to explore the effect of trust on projects.

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Preface

The research done in this master thesis was carried out at the Department of Department of mechanical and industrial engineering at the Norwegian University of Science and Technology (NTNU), as part of the course TPK4929 – Project and Quality Management during spring 2018.

This master thesis focuses on developing a game for use in project management education. The game is meant to educate and to explore the effect of trust in project management and project work. The main part of this master thesis is the developed game, which is based on a review of the use of games in education (based on the project specialization the previous semester), reviews on articles on trust in project management, also interviews with project managers and project workers on their experience and thoughts on trust in projects. It is my hopes that it will be useful in the future.

I would like to give a special thanks to my supervisor Bassam A. Hussein. His expertise on using games in education and project management was invaluable. Thank you again for your patience and not giving up on me.

Martin Lagesen Richardsen

Trondheim 11.06.2018

Summary

During this master thesis a game exploring trust in project management was developed. The game was to be designed as an educational tool for project management courses.

Four main concepts were discovered through the study of current educational games and the effect of games in education; *Learning by doing, Gamification, Transferability and Simulation.* The game incorporates these four cornerstones when creating an effective and useful game.

An important part of an educational game is to have grounds in reality. A study was done on the current research of trust in projects. The study includes interviews with people who have experience in project work. Project managers and project workers were interviewed. The main conclusion from the study and the interviews done where that people felt more motivated to work harder when they felt they were trusted. When trust was lacking, people felt the need to supervise each other to make sure everyone was doing their work. This led to an increase in the time it took to complete the overall project as the workers ended up using their own limited time to supervise others. This discovery initiated the concept of the game developed in this master thesis and what the game would explore. Lack of trust between players leads to inefficient use of time and thus longer time to complete the goal of the game, also known as the project. Through studies of existing educational games and interviews with game developers it was decided that the game was to be played by multiple groups and to have a debriefing phase after the game session. The sharing of different experiences and the subsequent discussion is where knowledge is gained.

Sammendrag

I denne master oppgaven ble et spill om tillit laget. Spillet er laget for å kunne brukes som et redskap for læring i et prosjektledelses fag.

Fire hovedkonsepter ble funnet gjennom en studie av eksisterende spill til læring og effekten av spill i undervisning: Learning by doing, Gamification, Transferability og Simulering. Spillet som ble laget er basert på disse fire konseptene i håp om at spillet skal været effektivt og nyttig.

Det er viktig at et spill som skal brukes i læring er basert på virkeligheten. En studie ble gjennomført på eksisterende forskning rundt tillit i prosjekter. Det ble også holdt intervjuer med individer som hadde erfaring med prosjektarbeid, både prosjektledere og prosjektarbeidere. Resultat fra forskningen og intervjuene var at mennesker føler seg mer motivert til å bidra og prestere bra når du følte at de ble gitt tillit. Når det var mangle på tillit mellom prosjektdeltakere så førte det ofte til at mye tid ble brukt til oppfølging og overvåking av andre, for å passe på at alle gjør jobben sin. Dette førte til at prosjekter tok lengre tid enn planlagt, fordi man måtte bruke av sin egen tid til å overvåke andre. Det er dette konseptet som spillet skal utforske. Mindre tillit mellom spilldeltakere føler til at det tar lengre tid for spillerne å nå målet. Basert på forskning av eksisterende spill i læring og intervjuer fra spill utviklere ble det bestemt at spille skal spilles av flere grupper samtidig, og at det skal være en oppsummering ved slutten av spilletiden. Mye av kunnskapen som blir lært av spill skjer via diskusjoner og deling av erfaring etter spillet er ferdig.

Table of Content

1. Introduction

This is a master thesis where a game was developed to enhance the education of students surrounding trust in project management and project related work. Project management is one of the most used tools for both public and private organizations, to improve internal operations, respond rapidly to external opportunities, achieve technological breakthroughs, streamline new product development, and more robustly manage the challenges arising from the business environment (Pinto, 2016). The educational side of project management has experimented with games to help educate students in project management. Teaching through the use of interactive exercises, also known as games, has showed to be an effective tool in teaching project management concepts and challenge perceptions and pre-made assumptions (B. A. Hussein, 2015).

The purpose of this thesis will be to see how trust effects people in project work and create a game that educates participants on trust and the effect of trust in project work and management. The idea came to the author through work experience and studies where he personally saw how different levels of trust affected him and the people around him.

First the methods of information gathering will be discussed. This will be followed by a section about games in education, which is based on the study by Richardsen (Richardsen, 2017). Following this is a section that covers how to get started with the game and existing games. After this we will discuss what the main part of the game is meant to do, educating about trust. This will include research done on trust in project management and project work, including interviews with both project managers and workers from different fields. These interviews focus on their personal experiences with trust in project work. The last part of the thesis will introduce the developed game. The thesis will end with a conclusion and a discussion on further research that can be explored within the field.

2. Method of information gathering

Relevant literature and theories were collected through researching articles and studies on the subject. The theory and knowledge obtained surrounding games in education and the effect on trust in project work and project management was found on www.oria.no and Web of Science. Relevant articles and studies were found by searching phrases such as “gamification”, “Gamification Simulation”, “Serious games education”, “project management” and “management combinations”. Articles on the effect on trust were more difficult to find, but the search for “trust + “project management” yielded articles with valuable reference materials. The articles where chosen through relevance and number of citations. All articles were checked and compared to references material to see if the statements that were made were valid with the research it was based on.

Discussions with my supervisor Bassam. A Hussein, who has done extensive research on games in project management education, was a great addition for gaining more knowledge on the subject matter.

A short interview was held with one game developer, while another game developer gave advice through email. There was also interviews with individuals working with projects at different levels. All project-based interviews are completely anonymous. The interviews were held over the phone and transcribed by the author. The interview questions were meant to be as open ended as possible to avoid influencing the direction on any of the answers. All names, companies, genders and projects are kept anonymous, and there has also been a translation from Norwegian to English on all interviews. When the master thesis is complete all interviews will be deleted from the authors computer.

3. Games as an educational tool and what they can do

This section will identify how a game can be used as an effective tool in project management education. The definition of a game from the online dictionary is *"A game is a form of competitive activity or sport played according to rules."*. A game can be played alone, in teams, over a short period of time or a long period. It can definitely be argued that games are engaging, and that engagement has a positive effect on learning (Hamari et al., 2016). Games also lead to a sense of competition which gives the participants a motivating learning experience, but also leads to a greater focus on practical competencies and less on developing an understanding of the theoretical concepts beneath (Dominguez et al., 2013). Research also show that gamifying education can have other drawbacks, such as decrease in motivation, satisfaction and empowerment (Hanus & Fox, 2015).

This emphasizes that the use of games in education has benefits, but also drawbacks. In this section we want to explore the positive and negative attributes of games in education and see if it is possible to design a game that has more positive attributes that negative attributes.

First, the concepts used to gain knowledge is discussed; *teaching through learning by doing, transferability and experimental learning. Then,* a focused study on gamification and how it can be helpful in educational games is presented, followed by a dive into the simulation and how this tool helps create risk free experience. Lastly a conclusion is provided with discussion surrounding the use of these concepts for in a game in project management education.

3.1 Important concepts in learning

This study started with the concept of gamification. The concept was introduced by Bassam A. Hussein at NTNU. Further research was done through relevant literature and studies on gamification in project management. The research found several repeating concepts, which was later used in the design of the game and is described in the following sections.

3.1.1 Learning by doing and Experimental Learning

This concept of learning is rather self-explanatory. It can be compared to “On the job training”; you learn what you are supposed to do while doing it. Learning by doing focuses on teaching students or employees to learn “how to” instead of “know that”. This helps learners understand how to use the knowledge that they obtain (Schank, Berman, & Macpherson, 1999). It can be said that this teaching method is more effective when the subject at hand is more dynamic. The answer to a situation or a problem is not singular. If the participant is not exposed to behavioral and implementation training within a subject, it can lead to the person only having a strong conceptual understanding, but no idea of how to apply this knowledge in practice (Kalinska, 2010).

Learning by doing is an important concept in project management education. By actually using the theory, you learn and understand how things work. A game could be used to create a situation for learning what would not occur in a regular teaching scenario. It could be used to create experiences that the participants could draw knowledge from. A game can simulate a real-life experience, but under controlled circumstances. Through the game the participants can use what they have learned and gain a better understanding of how to apply their knowledge.

3.1.2 Transferability

When learning, the transferability of the knowledge is an important factor. We generally talk about two types of transfers. Analog and adaptive transfer. Analog transfer is using knowledge learned when solving problems, to solve a similar problem. Adaptive transfer is when knowledge gathered by solving problems is used to create solutions for different problems (Ivancic IV & Hesketh, 2000). It is also said that a key indicator of learning is how well an individual can adapt to changes in the situational demand (Smith, Ford, & Kozlowski, 1997). Meaning, if the participants experienced an adaptive transfer of knowledge, they should be able to more effectively react to changes in the problems they are presented.

As previously mentioned, projects are dynamic entities. There is always a chance that something changes or something unforeseen happens. Transferability is important because it’s impossible to give someone all the answer. When educating someone, all you can hope for is that they learned how to use

the tools that you gave them. From a game standpoint, it is important that the participants get both the analog and adaptive transfer of knowledge. Through the game, participants use the knowledge actively in solving the given problems, which if done correctly will help teaching the participants how to apply the knowledge in different situations, not only the given one. As professor Hussein did with his "Tower of Babel" game, he tried to open the eyes of his students to assumptions and biases (B. A. Hussein, 2015). This realization can be used in more than just paper tower construction, hence the development of the game. The experience is used for all types of projects.

3.1.3 Gamification

Gamification is using games based on mechanics to elicit a desired behavior (Lee & Hammer, 2011). The game elements can vary from scoreboards on a social app to giving people a competitive incentive to work out, or giving students badges for doing well at school. The desired behavior of the first example is to make people want to work out more, while the last example wants students to be interested to do well in turn making them more engaged in their education. The most effective use of gamification is to increase motivation and engagement.

When learning and teaching it is important to keep engagement up (Hamari et al., 2016). Motivation and engagement can come from two sets of reward types. Extrinsic rewards, which leads to an extrinsic motivation and a transactional engagement, where the participants do something and expects a set reward. This concept can be compared to doing a job and earning a wage. The second one is intrinsic rewards. These reward types engages on an emotional level and makes the participant want to perform better than expected, and in return gain a more fulfilling psychological contract (Ryan & Deci, 2000). One element of gamification can be to create numerous challenges of larger tasks and encourages participants with intrinsic rewards as they progress, to help create an emotional engagement (Burke, 2016).

Rewards can be used to help participants with motivation and enhance learning. Studies have shown that extrinsic rewards can sometimes help with motivation (Filsecker & Hickey, 2014). At the same time, rewards such as online badges and leaderboards can lead to a decrease in motivation and decrease in learning. External rewards can turn intrinsic motivation into extrinsic motivation (Hanus & Fox, 2015).

Gamification in education is a useful tool, but it has to be implemented with care. When creating a game, which objective is to teach someone a concept, the game itself would have to elicit an emotional engagement. We want the participants to feel that what they are doing is not only learning words, formulas and theories but actually doing something interesting. A way to do this could be to divide the task at hand into smaller challenges. The player would be rewarded with not only approval, but also giving the players a sense of fulfillment when they work their way through the tasks. This helps create a response where the participants themselves want to continue for the sake of their own interest. Seeing the development of their own knowledge through different levels and objectives and using what they have learned previously to solve the next step, is key to keeping a positive engagement. If a participant does not understand the end goal or does not feel that they are learning anything, they will just complete the tasks like separate entities, leading to a transactional engagement.

3.1.4 Simulations

An important part of learning is experiencing. When it comes to areas like project management, it is vital that participants are able to experiment in making decisions and act without the risk of actual failure (Cano & Sáenz, 2003). A real failure can cost money, which is not desirable. When learning while on the job, a failure can be catastrophic. Through simulation, it is possible to gain these experiences without repercussions. The challenge is to create a simulation that is accurate and usable to learn from. The simulation must have a connection to reality, it must be valid (Chin, Dukes, & Gamson, 2009). Simulations have shown promise as a research tool in project management, as long as the simulation has an adequate level of realism. (B. A. Hussein, 2011).

Kolb's Experiential Learning Theory (ELT), describes four basic levels in the learning cycle: concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb, Boyatzis, & Mainemelis, 2001). A simulation gives concrete experience through risk free simulated situation the participants can solve. Through a logging system or from external observers, a reflective observation can be made. Through multiple simulations and acquired data, the participants get to make abstract conceptualizations. And lastly, because it is a simulation, that participants get to do active experimentation through the dynamic environment created by the simulator.

3.1.4.1 Simulation in project management

As mentioned, for participants to be prepared for real situations, they need to be able to practice in "the real world" of project management. This can be done through simulation (Davidovitch, Parush, & Shtub, 2006). When it comes to project management, every project is unique. The complexity and the decisions made during every project is different. It would be impossible to prepare someone for every specific situation. Participants in a simulated game get to experience the consequences of the decisions they make during the process (B. A. Hussein, 2009). Through training in a simulation, a person can learn how to handle situations, and through this knowledge, adaptively transfer these experiences to solve other problems.

3.2 Functional and Project Leadership Simulation Games

Games can be used for a wide range of education purposes. Some games are aimed to keep engagement up and motivate the participants. Through a game, players get to test or simulate their findings. This can give participants a sense of ownership over the process in a simulation, which was discovered to be a qualitative requirement to achieve optimum learning (B. Hussein, 2012). Others are more focused on specific concepts that they want to teach (Ritchken & Getts, 1985; Veshosky & Egbers, 1991). Other types of game try to give experience to the participants, that they would otherwise have to get through on the job training (Baird & Flavell, 1981; Baker, Navarro, & Van Der Hoek, 2005; Galvão, Neto, Bonates, & Campos, 2012). Games can be a standalone experience or can be in parallel with a course (Veshosky & Egbers, 1991). The main theme is that games are used to enhance learning. The material, and the method used will differ, but the desired results are the same; give participants knowledge that they would otherwise not have received, increase understanding, and give safe options to experiment.

Games are made to cover different topics and have different methods of conveying the material they wish to teach. Different simulation games can be divided into two main categories. The first category is functional simulation games, which aims to educate about functional project management problems and concepts such as cost, time, trade-offs, and scope. The second category is Leadership simulation

games, which focuses on softer issues, such as developing project strategy, decision making skills and negotiation abilities (B. A. Hussein, 2007).

3.2.1 Project Leadership Simulation Games

There is more to working with projects and being a project manager than just theory. Ramazani and Jergeas wrote a paper where they discussed what a project manager must do to go from a good project manager to a great project manager (Ramazani & Jergeas, 2015). The study was done through interviews with both project managers and project engineers. One of their findings were that education gives people the toolbox, but not how to use the tools. The knowledge of how to apply the toolbox to solve problems is learned through using the tools in practical situations. This can be done through the functional games discussed above. The other part of being a great project manager, is the softer parameters such as interpersonal skills and leadership. Bassam Hussein talks about softer parameters and refers to them as the "issues rising at the leadership level of project management, e.g. those concerning identification and selection of project execution strategy, optimal project work breakdown structure, optimal project organization structure and contract strategy." (B. A. Hussein, 2007). A game that explores the effect of trust on project work and project management would fall under the category of the softer parameters.

3.3 Implementing concepts into the game

An educational game about project management could be a good addition to a course. If done right it help participants bridge the gap between on paper theory and real-world experience. A game can simulate the real world and give participants a sandbox to explore. Through play it is possible to test different possible solutions to problems and then reflect and learn from the results. Gamification can be used to motivate and keep players engaged in the game. The participants should be motivated to learn and give more of themselves to the game. The game should help participants solve problems, but also teach to adaptively transfer what they learn to solve other problems that are not in the game. For this do work, the game has to have validity in a real life.

The concepts: Learning by doing, transferability, gamification and simulation where found through the research done on games in project management. They can be considered as tools that can improve the chances of making a successful game. It is important to know what you want the game to accomplish before you decide on how to implement any of these concepts. It will also be important to know which types of people will be utilizing the game and in what setting. As mentioned earlier, the wrong implementation can lead to decreased educational value.

The framework for the game developed in this master thesis are as followed:

- Gamification will be used to stimulate competition. There will be a goal in the game that can be interpreted in different ways that can lead to interesting situations. This will be furthered discussed in the section that covers the game itself.
- The game will have adaptive transferability. This will be done be focusing on the interaction between the players and drawing experience and knowledge through the gameplay and debriefing. The game will not be focused on a specified exact task, but a simplification of a task given to a project group and the learning will come from how the players deal with the task and each other.
- The game is a simulation of a project group working together with a project manager. We want the actions of the players to simulate a real-life situation. Therefor research must be done into trust in project work and project management to best create a scenario that is valid to reality. This is presented in the next section.
- The whole game is based around learning by doing. If people are passive and don't participate, nothing will be learned. It will be important to have the players engaged and motivated to participate in the game.

4. How to get started with the game

To get some insight in how to start the development of a game, Bassam Hussein at NTNU suggested speaking with other people who have developed educational games. He recommended Gert Jan Hofstede and Sebastiaan Meijer

Gert Jan Hofstede, a Dutch population biologist and social scientist in information management and social simulation had two main advice when asked about game development.

- Use your common sense. What do you want to teach your audience, and what can they do? How can you engage them?
- Try it out. You'll not get it right the first time.

In the interview with Sebastiaan Meijer, professor in health care logistics, specialised in gaming simulation and other interactive methods to involve the operational level of organizations in innovation processes, he recommended the book "The systems thinking playbook" (Sweeney & Meadows, 1995) as a source of inspiration for how to make games. He also suggested postponing the making of the game until as late as possible, to make sure you have a clear image of what you want to accomplish and the necessary knowledge acquired. He spoke of dry exercises, where you don't play the game, but talk through the process of the game with people. This was one of the main tools used in the creating the game in this master thesis.

4.1 The systems thinking playbook (Sweeney & Meadows, 1995).

This book is a collection of thirty games that cover different areas of learning. It is a great source of inspiration on how to develop "gameplay" in a game. The games in this book are not used in the main game of this master thesis, but they were of great help for learning different gameplay elements and their uses. Some good examples were "Thumb Wrestling", a game where players compete against each other and create a win-lose situation, where the obvious answer in the debriefing is creating a win-win situation through cooperation. "Community maze", a game that looks at the cost of missing the "win-win" opportunities. Two teams walk through an imagined maze. The maze is the same for both teams, and that start at the opposite sides of it. The teams will normally not cooperate. "5 easy pieces" which

explores our “knee-jerk” tendency to try to solve everything ourselves. The game is about solving square puzzles with shared pieces. Teams set out and solve their respective puzzles with their pieces. This leaves other teams with unsolvable puzzles as all the teams share puzzle pieces. These are examples of games that challenges the way a player thinks. Through the gameplay and the debriefing, knowledge is gained and shared. According to Sweeney & Meadows (Sweeney & Meadows, 1995), these games can:

- Reveal an individual or group’s unconscious way of interacting and solving problems.
- Engage participants who have a wide range of learning styles
- Help create a non-threatening environment in which participants test theories of effective social behaviour and evaluate real decision options. In a game it is possible to make a big mistake, but walk away without enduring consequences.
- Replicate the structure and behaviour of reoccurring patterns of behaviour
- Illustrate the power of habits, paradigms and values in identifying problems, gathering data and making decisions.

Many of these points coincide with the four concepts Gamification by engage participants, Transferability by replicating the structure and behaviour of reoccurring patterns of behaviour, learning by doing, illustrating the power of habits, paradigms and values in identifying problems and simulation by helping to create a non-threatening environment for experimentation.

4.2 Existing project leadership simulation games

This thesis is a continuation of a project assignment completed the previous semester done by the same author. The following two games were reviewed as examples of good and effective project leadership simulation games. The following presents and discusses the key inspirations to the game created in this master thesis.

4.2.1 Game 1: The Tower Babel (B. A. Hussein, 2015).

The game is played during a class at NTNU. The theoretical basis of the game is the importance of identifying project stakeholders, their real needs and the importance of their active involvement

through the project life cycle. The game is actually played during the first lecture to capture interest and to motive the students. It also helps put students in the right mindset of how projects and project management should be handled.

The game is played physically in person in teams of 5 to 7 people. The game itself takes 30 minutes, and the debriefing, should take about 45 minutes. There are two roles in the game: One is played by the instructor, who represents the client in the game, while the other role is the players, who represents the contractors. The basics of the game is simple. The instructor tells the players that the client wants them to build a tower from A4 sheets and tape. Some additional requirements are made to the players, the tower should be as tall as possible, built in the shortest time possible, should be made by the least amount of supplies and the tower should have a good-looking design.

The tower requirements are formulated to leave room for different interpretations and additional information is held back from the players. What the tower should be used for, the real needs of the client, if there are any other stakeholders, the environment of where the tower is located and no operational or functional requirements are given. The given information is clearly displayed and presented to the players who are then divided into groups. They are told that they have 15 minutes to submit a proposal of their tower. The proposal shall give an estimate for tower height, number of A4 sheets and the time it would take to construct the tower. They should also make a list of the possible risks that they might encounter. Throughout the process, the players are told treat the game as seriously as if they were real project managers focusing on the task at hand. During the proposal phase the instructor should be visible and available to the players.

When the time is up, all the proposals are gathers and displayed for all the groups. They are then told that they can make and changes they want based on what the others have done. When this is over all the groups are asked to start the execution phase. The instructor observes the groups through the planning phase and the execution phase and bases his or hers debriefing of the observations. In the article (B. A. Hussein, 2015), Hussein lists the typical observations made of the players. He then uses these observations in combination with the players response to observation during the game to show the impact of attitude, biases and heuristics on project outcome.

For example; one groups uses no time to discuss or try to understand the project context or contextual requirements. This group feels that the information provided was not sufficient, yet they still focus on only completing the output of the project, and not give any thought to the actual needs of the completed project. The debriefing tries to open the eyes of the players to these faults and tries to improve the way one thinks and approaches projects.

The fascinating thing about this game, is that it can be played without any prior knowledge. The knowledge learned is all based on the experience through the game. From personnel experience with the game, the thought process was: we are going to this well, we are going to do this quickly, we are going to be effective with the materials and well fulfill the given requirements. We had this full trust that the client had given us all the necessary information that was needed to complete the task to the desired requirements. As projects are dynamic and complex entities, trying to solve them as a regular math problem with only one right answer, is probably not the best idea. This small game is an example of opening the mind to a new way to look at and solve problems.

It is this same game concept that was used in this maste thesis. The game will be played in groups where they solve a task. How they solve the task and the results will be based on the performance of the players, and through their experience and debriefing, knowledge is gained.

4.2.2 Game 2: Verdict of the Jury (B. A. Hussein, 2015).

This game focuses on evaluation of project success and to provide students with an overview of factors that contribute to success or failure in projects. The game wants the players and the instructor to have a discussion of project success, and how to achieve it. The students are given a lecture or a video containing the base concepts and definitions of success as well as the definition of success factors and categories/dimensions of success criteria. This is to help prepare the students for the game.

The game starts by watching a 15-minute video of a real-life project from start to finish. The project went above budget, was finished after schedule and did not end up with the original specifications. The project also suffered many problems during its lifetime. After all this, the project outcome still satisfied the user and clients. After the video the players split up into groups that they of whatever size the players prefer. They are given the task to be the Jury who decides, unanimously, if the project was a

success or failure. They also have to back up their decision with what they thought caused this success or failure.

The main part of the game is the debriefing. Here the groups express their verdicts with their reasoning. All the information is gathered on the blackboard for all to see. This helps facilitate an open discussion that uncovers different perspective of success. Some might only focus on the output itself and say that the project was a success, while others will answer that the process was a failure, and there for the project was a failure. The game wants to show players that there are different perspectives to success, and that it is not as straight forward as it seems, and that it can be a subject of individual interpretation.

The game is divided into three phases: A 15-minute video that presents the full life of a project, 30 minutes where the groups come up with a verdict and a 45 minutes debriefing sessions and lessons learned.

The learning part here is in the debriefing. The game that was made for this master thesis will do the same. The game should be played with more than one group at the same time. The more the better. This way, different experiences can be shared and contribute to the learning process.

4.3 Starting the game creation process

So how do we create an educational game? The game for this thesis will focus on learning during the debriefing of the game. This means that the more people who participates, and the more diverse people are, the more varying results will be discussed in the debriefing. The game is designed to be played by students who study project management, but it can be played by anyone.

But what about the gameplay and the game itself? The gameplay is what the players experience, and it is from this that they draw reflections and experience. It is the experience with the gameplay that will be discussed in the debriefing. The gameplay must reflect real world situations of trust in project work and project management. This is only gained through research and experience. As Sebastiaan Meijer mentioned: create the game as late as possible. First get hold of the knowledge needed to create a game and give it purpose. This will be covered in the following section when discussing trust.

It must be mentioned that when creating the game one of the most effective tools was the dry exercises with volunteers. Gert Jan Hofstede mentioned this in the interview: “Try it out. You’ll not get it right the first time.”. Throughout this semester countless of innocent people have had to hear ramblings and ideas that made little sense to them.

5. Trust

Trust is interesting. It's a concept that most people know of. You trust someone. You can confine in them. If you don't trust someone you tend to avoid them or at least decrease your interactions with them. But how do you define trust? It's almost a philosophical question. From the dictionary it says "firm belief in the reliability, truth, or ability of someone or something". Or if asked people doing research on trust in construction projects, "Trust essentially is a belief or attitude held by one individual concerning another" (Swan, Cooper, McDermott, & Wood, 2001). Also, trust can be conceptualized as behaviour that conveys valid information, permits mutuality of influence and avoids abuse of the vulnerability of others (Zand, 1972).

This section will cover the concepts that were investigated about trust in projects. The game that was made needed to have grounds in reality to be of any use. It was important to speak with people with personal experience with working with projects, so interviews were conducted with both project managers and project engineers. These will be covered later.

5.1 Trust in project management and project work

When we are working in projects, in any role, trust is important. Numerous studies have focused on trust in projects. Studies have shown that trust has an effect on project results and performance. Lack of trust, or mistrust can lead to increase in costs (Whitney, 1994) or a decrease in project efficiency (Chan, Chan, & Ho, 2003). High trust showed increase in both work process performance and higher output performance (Zolin, Fruchter, & Hinds, 2003). Although some studies have shown that lack of trust did not prevent delivery of a quality result (Aubert & Kelsey, 2000). On the economic point of view, trust can lower transaction costs, because if there is absolute trust, there is no need to spend time on supervising and inspection the work (Meijer & Hofstede, 2003).

As a project manager it's important to keep optimal conditions for your project team. Trust is very important to maintain good team relations which is important for the success of a project. The development of trust is therefor and important tool for the project manager (Munns, 1995). Trust is critical to a positive project team atmosphere (Cristina Costa & Bijlsma-Frankema, 2007). A study showed that a characteristic for a superior project team was honesty and interdependence (Zolin et al.,

2003). If a project was to be in a situation where people had lacking trust in each other, it could increase resistance between partners by making motives and competence be called into question (Cristina Costa & Bijlsma-Frankema, 2007). This is not something anyone wants. Lack of trust, or mistrust cause problems for projects. The 5 main sources of mistrust discussed by (Whitney, 1994) are:

- Misalignment of measurements and rewards: Mistrust created from a mismatch of effort and reward.
- Incompetence: Through experiencing incompetence from people you develop a habit of supervising and inspecting the work, potentially wasting time and effort. A worst-case scenario is that this can lead to prejudice of people where you don't give people a chance to prove their competence because you feel you must supervise the process. This is the costliest mistrust.
- Lack of appreciation of a system: The lack of realizing that everyone is part of the team and working together towards a common goal. If some consider themselves more important for the success of the project than others, they can affect trust development.
- Untrustworthy information: With intent to hide deficiency or deceive, information can be shared that is incomplete or biased. This diminishes trust.
- Failure of integrity: Lying, stealing and cheating. Individuals or whole organizations. Ruins trust.

So how do we build trust or prevent distrust? A workshop revealed that trust was developed through communication and action between participants (Swan et al., 2001). Trust develops when two parties act in of co-operation towards each other. A normal situation for this to happen is during times of crisis or problems. When problems or the crisis is resolved through the effort of the co-operating party, trust between parties grow (Cheung, Ng, Wong, & Suen, 2003). This can be considered a trial and error proving process. When people work together you gain trust by proving you are trustworthy through your actions.

There are other variables that affect the rate in which trust is developed. Team members that are geographically separated had less personal communication which lead to lower trust (Zolin et al., 2003). It has been shown that face to face groups built trust better than groups working together from a distance using social technology (Aubert & Kelsey, 2000). Another interesting discovery was that teams

with members that possessed different expertise had higher trust than teams with members that shared the same area of expertise (Zolin et al., 2003).

We see that trust is developed through communication and actions between people. It could be assumed that trust and communication interdependent. Trust and communication are critical factors of project success and they are inseparable (Diallo & Thuillier, 2005). When different organizations work together through partnering, success relies on mutual understanding, honesty and good communication (Cheung et al., 2003) (Swan et al., 2001).

5.1.1 What does this mean for the game?

This research is done to obtain an overview of how trust effects people in projects and the project itself. It's a repeating fact that trust is important. It helps the process and it can give better results. The game was made to simulate a situation where the participants can experience the effect of trust and distrust on work results and work performance. Many articles tell of the effect of trust, but not how it effects it such as the details of why two people who don't trust each other are less effective than two people who do. To obtain a better understanding of the interactions between people in projects, an interview was conducted with various individuals.

5.2 Interviews with project managers and project workers

To gain insight on how trust affects people on projects on a personal level, people with actual experience were interviewed. This section includes the different interviews and what was discovered, as well as the results of how the interviews effected the game. The interview was based of two open ended questions:

What is your experience with giving and receiving trust in projects?

Do you have any examples of projects where trust had a specific effect the project process and/or results?

The purpose of the interviews was to get an insight on the perceived effect of trust through the people that had experience with it in projects. The questions were open ended to prevent leading interviewees

down on pre-determined thought paths and make them speak from the heart. The interviewees were told that everything was to be kept anonymous and they will all be referred to as “he”. The interviewees age ranged from 25-60 years of age, their educational background was from Batchelors to PhDs within IT, petroleum technology, geology, project management. Ages and education was not the bases of the people that was interviewed; it was a random selection of people with relevant background. All interviewees accepted that their stories and answers be shared anonymously in this master thesis.

5.2.1 Interviewee 1

Interviewee number one talked about how the amount of micromanagement from the project manager affected his performance. There was a line between positive and negative supervision. If the project manager showed interest in him and the work, he would feel more self-assured and positive. While if project manager would often come in contact to check up on if the work was being done he would feel that the manager did not trust him. This made him more unsure about his work.

He had an example of a project where trust affected the cost and time used to finish a project:

- *We were working on noise isolation for a room. After extensive work we found a solution and made out report with the rules and regulations as evidence to the why this specific choice of isolation was necessary. The project manager wanted them to find a cheaper option, which was not possible, as stated in their report. Tok over 1 year for the solution to be accepted. Lots of time and money was spent on consulting the case, all leading to the same solution. Each time the issue was visited, people were paid for work that had already been done.*

This is an interesting example of how lack of trust in the work of your people leads to an increase in cost and time span of a project. The cost was from consultations fees and overtime, and the time to finish was also increase because of all the extra interactions between client, project manager and project team that had to be held to solve the problem. There is no insight as to why there was mistrust in the work.

5.2.2 Interviewee 2

Interviewee number two received a lot of trust from his project manager early on. The company had a lot of extra work and was understaffed, this lead to there was less time for supervision and people had to trust in each other to get the job done. This motivated him to put in the extra effort and to better develop himself as a worker by learning from the people around him.

- *I want to do good work to show that the trust placed in me is worthwhile. It motivated me to go the extra mile. I want to prove that I deserve the trust given to me.*

He had an example of where the trust affected a project he was working on:

- *One time we were without a project manager for some time because of changes in the company. I was asked to step in as acting project manager for a couple of days. I felt confident enough to accept this responsibility, because of the trust given in me earlier. Because of this the project did not have to be delayed.*

This is an example of how placing trust in your people can motivate them to perform at a higher level, but also make them more confident in their abilities. Although it could be argued that too much confidence can be affect negatively if “you bite over more than you can chew”.

5.2.3 Interviewee 3

Interviewee number 3 had an interesting experience by first working on a project, and then becoming the project manager during the project lifetime. At first, they were given free rein to complete the project with little management. They felt an increased sense of responsibility to complete the project. When one of team members stopped performing well, he lost trust in him. This lead to him having to follow up on his team member to make sure he did his work. This led to him spending his time on something else than his specified work assignment within the project.

When he was put in charge of the project he experienced the following:

- *Something happened that made the client distrust the work of one of my team members. Because of this the client started questioning the work of the other team members as well.*

This made him quality check the work of the other members of the team to keep the clients satisfied. This increased the workload and the time it took to complete the project.

5.2.4 Interviewee 4

Interviewee number four had the experience that trust increased efficiency. As trust increased, there was less need to follow up on assignments to make sure they were done. It was not necessary allocate a lot of time to extra quality assurance when you trusted the people who did the work. He also mentioned that there was often more trust between team members in the same company, compared to trust of team members from other companies. He said that there could sometimes develop a "we have done our job, now you do yours" mentality. Sometimes, mistrust in the effort of the others and their motivation to use more time and therefor make more money. If someone had a bad rumour, it was difficult to look passed it or remove it. Lastly, he talked about how he has experienced the importance of trust when it comes reporting and problem-solving. If people did not trust that management had their best interest at heart, people would try to avoid bringing up problems because they could be blamed for them.

- *People would not bring up occurring problems because they were used to being "thrown under the buss". If a problem was solved, management would take the credit, if it was not solved, the reporting people would get the blame. This is more a problem when working with British companies. It's not a big problem with Norwegian companies.*

This presents trust as an important factor in the quality of the results of a project. If there is fear of punishment because of distrust, problems will not be fixed and you will be left with a poorer quality product. It's also important note the cultural difference between countries that is brought up.

5.2.5 Interviewee 5

Interviewee number five talked about the importance of trusting your project manager and team mates. You have to trust in everyone to do their part and deliver on time. If you know that the project manager is skilled and follows up and support you, then work moral is much higher.

- *When the project manager had trust in my work and did not continuously check up on me, the work went better. When I feel I am continuously check up on I feel that the project manager does not trust me to do my job. It is a bad feeling.*

If you don't feel trusted with your work, it effects your motivation. Also, time spent checking up on assignment and tasks is potentially time that could be spent on other parts of the projects progress.

5.2.6 Interviewee 6 and 7

Interviewee six and seven were limited on time during their interview, however both expressed similar experiences and opinions. They were both top management in different companies and the following statements is a summary of both interviews.

- If I feel I cannot trust my team to do what is asked I have to waste a lot of time to make sure that the job is done and done correctly. This is time I could be using on other projects.
- When I lack trust in the abilities and motivation of my workforce I have to spent time contacting them and checking up on the progress of the given tasks.

5.2.7 Interviewee 8

Interviewee eight shared an experience he had from working offshore. A boat captain who had ignores the directions given by the commander in the control room of a rig. The boat came to close to the rig and was asked to leave. This meant that the planned work for the boat had to be postponed. Even though the boat had the best equipment for the job, it was not welcomed back. A different boat and crew had to be sent out to complete the work.

- *If the boat and the captain came out for another job, it would usually be sent back. This led to a lot of time being lost.*

This is an example of how trust is difficult to regain and can affect the timeframe of a project. Even though it had the best equipment for the job, the commander could not trust the captain of the boat with the safety of the people on the rig. In the offshore sector Safety is very important.

5.2.8 Interviewee 9

Interviewee nine said it was very important for him to be perceived as trustworthy. It was important to know that people took responsibility of their work and that they could handle their assignments. His responsibility was the company representative between his company and the clients. It was important that he could have quick and effective communication with his colleagues to give the clients the information that they wanted. As he was not perceived as an engineer, but more of a middle man, he would often experience mistrust from the clients where they would contact him to make sure his team was working on their order. Each time he was contacted he would have to take time from his work and time from his team members to reassure and confirm to the client that the project was being worked on.

- There once was a misunderstanding between the tech department in my company and the project manager of the client's team. The project manager did not think we were capable to do the work, so he contacted their upper management, who contacted out upper management, wo contacted our sales team who contacted out project manager. Luckily for us, our project manager trusted enough to know what there must have been a misunderstanding This was cleared up when it reached us. Unfortunately, a lot of time was wasted for all parties before the problem was resolved.

This is again an example of how a lack of trust can lead to lost time for both you and your team mates.

5.2.9 Interviewee 10

Interviewee ten talked about his experience where too much trust led to problems. A client, who had no IT competence, were very vague with their requests. While the developers trusted that the clients knew what they wanted and that the information given was enough. Because of this, each iteration of the product was lacking because important functions were not included. It can be argued that his has more to do with insufficient communication.

5.2.10 Interviewee 11

Interviewee eleven said that he was motivated to work harder when he felt that the project manager trusted him. They way trust was displayed was not being called and check up on when he was working on the project. If he had questions he would make contact, and if changes were to occur, the project manager would contact him. He felt that this made him have better focus on the task at hand.

5.2.11 Interviewee 12

Interviewee twelve is a new project manager. The responsibility he has received has made him more motivated to work harder. When you are trusted with more responsibility you want to perform your best to prove that they were right in trusting you. He continued by talking about the importance of trust in the information he receives. That he can be sure that it is correct and that he receives all necessary information. If he feels that information is passed “behind his back”, then he feels he has less control. This makes it harder to focus on his main tasks of the project, because he is uncertain if he has all the necessary information. It is also disturbing to feel that people are keeping information away from you. Even if it is bad news, he feels that it is important that the people on the project can trust him to come to him with problems.

- I was once on an offshore rig. We had a boat that was too full and people were afraid that we would not be able to get all the necessary equipment off the boat in due time. I overhead someone say “make sure our equipment does at least get on board”.

He was unsure why the situation was handled this way, and because he overheard it he was unsure of why he had not been notified of the problem.

This interviewee, similar to others, mention how being trusted effects his motivation. He also states that when he feels that he is not trusted he loses focus as he wonders what the problem is.

5.2.12 Interviewee 13

Interviewee thirteen stats that for him, trust is important. Without trust, people are more closed off. To solve problems, it is important for people to be open and honest. During a project he felt that the team

he was on trusted each other. This led to the team to have much more efficient discussions, and no one was afraid to voice their opinions. There was a trust issue with the project manager. This was because management kept breaking promises. This affected the project because they never knew which information was valid. People become disappointed and negative. It effected people's effort and commitment.

He also talked about his experience with teams that had different degrees of trust. When working in smaller teams with the same people, he would always know that the work would be done to the correct time. Because of the mutual trust there was never an issue to put in the extra effort, because it would always be rewarded by the other members with more effort. On the other hand, there was another team where people almost never completed their assignment on time, basically did the bare minimum. This affected everyone's effort and no one tried to improve the situation;" if no one else give the extra effort, why should I?"

5.2.13 What was learned from the interviews

Many of the interviewees talked about how they experience trust as an important part of project efficiency. When there is little trust in project participants, time is used on supervision and handholding. Less trust leads to more time being used on to monitor progress and work. This does not only affect the people doing the supervision, but also the people being monitored. Every time someone needs an update, a person has to their limited time to answer. If everyone is doing their job, these interactions or transactions of information does nothing to help the project, except give project participants a peace of mind that the work is done.

It was also discovered that when trust is present between project manager and project participants that motivation is improved. People want to prove that the trust is worthwhile. Sometimes it can lead to people going the extra mile and do more than is expected of them.

There is less trust between different companies then internally in a company. If one individual was deemed untrustworthy, it could affect other individuals of the same group.

If trust is lost, it is difficult to regain as reputations sticks with you.

5.3 Deciding on what the gameplay must try to reflect

What has been learned so far in this master thesis is how research defines trust and how people have experienced the effect of trust in projects. The game will try to simulate a situation where these findings can be explored and discovered by the players themselves. As a simulation game, players can experiment without the fear of failure or consequences. The game will be based on the reoccurring principal that trust makes projects more effective. Time is more proficiently utilized when there is high trust internally between team members and also between project team and project manager. It will also try to include a way to introduce different types of mistrust and degrees of trust to explore how it affects the players and the simulated project. The game itself will be described later.

When the game is played, participants gain experience and knowledge through the gameplay. At the end of the game session, a debriefing will be held where the players discuss, with the help of the game leader, their experiences with the game. The more players share and discuss what happened during the game play, the more they will learn from each other.

6. The Game – Should I trust you?

This game is focused around time. Time can either be measured with a clock, or with moves, e.g. how many moves did it take to complete the game. What the game is meant to simulate is a project situation where trust or mistrust and its effects can be simulated through the efficiency of the participants.

The game was based on the simple idea of how we react to the unknown or hidden dangers. If you blindfold a person, place them in an exposed situation, for example, on top of some desks. If you were to ask the person to move a across the table, they would do so slowly, while feeling there way towards the edge, being very careful not to overstep. If you had someone hold their hand and guide them across the table, the process would be faster, but there would still be some hesitation. If you were to take of the blindfold (simulating full trust) the person would probably reach the end of the table in the most efficient time.

This is the developed game:

Name: **Should I trust you?**

Number of people: As many can fit in a lecture hall in groups of 3-5 people.

Time: 5-10 minutes

Equipment per group: Secret instructions. A paper with a grid. A paper with the same grid, but this paper has harm locations marked on it and instructions. The harm locations making a maze from the entrance to the exit. The two different papers are showed below.

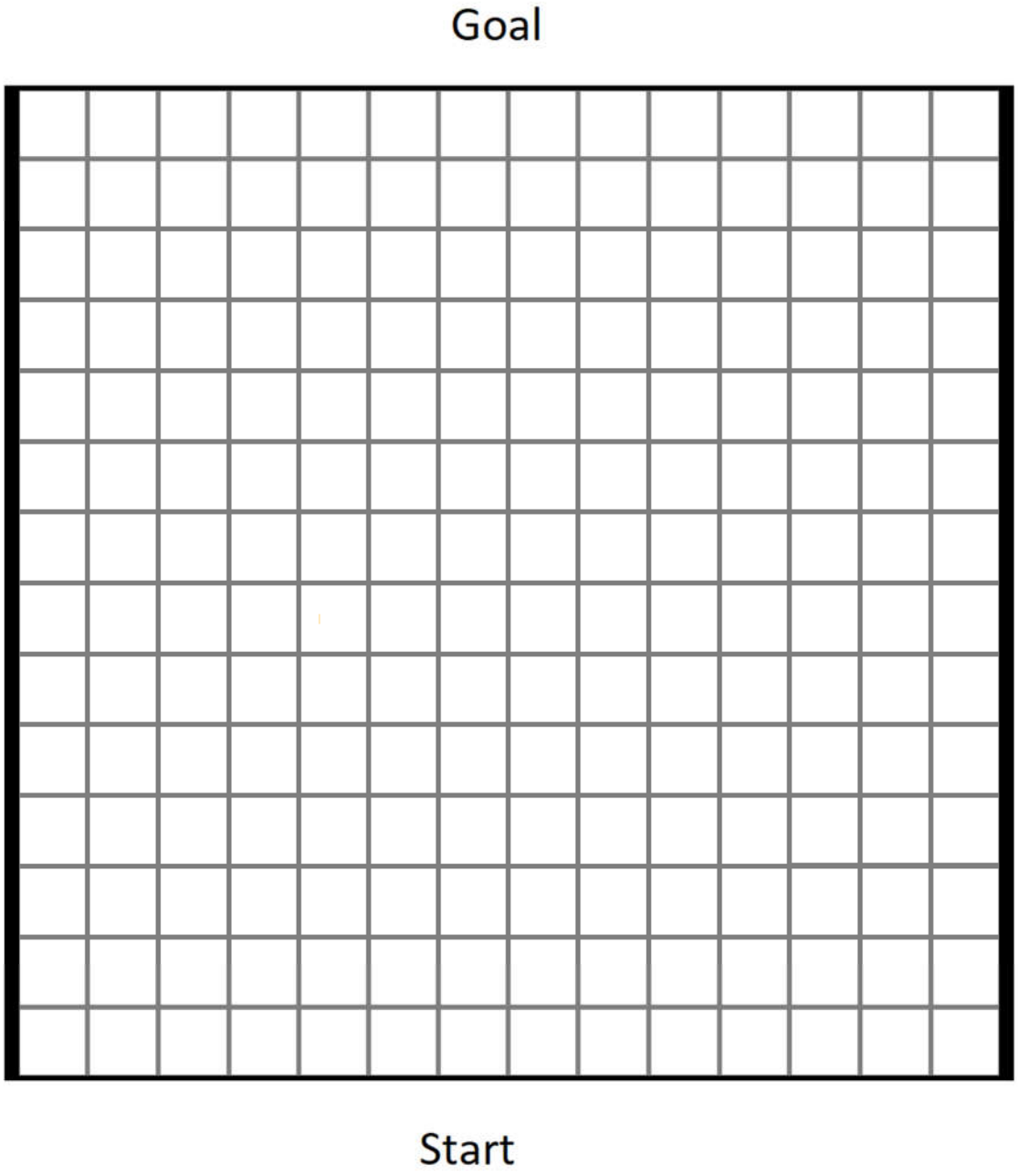

Figure 1: Empty grid

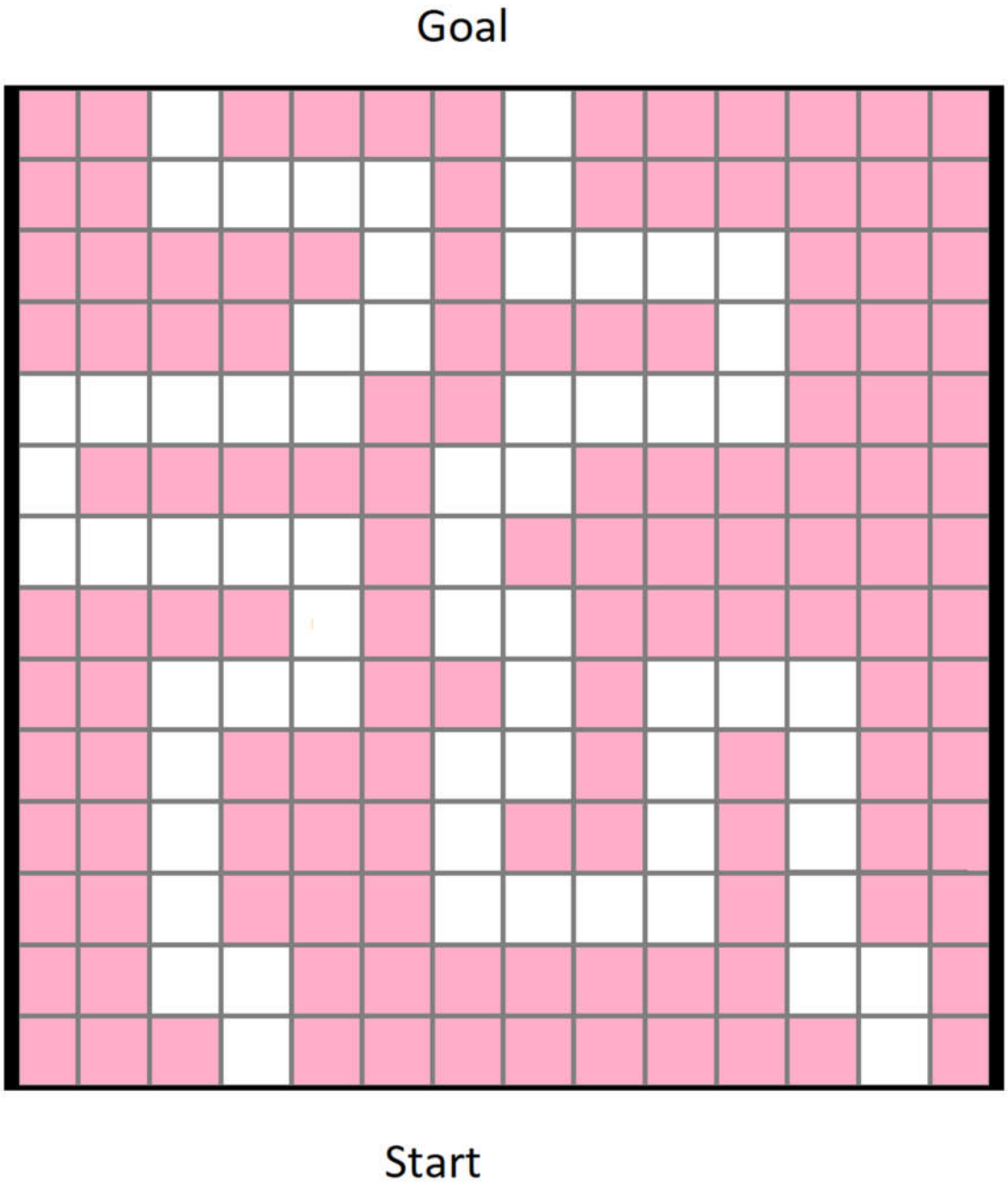

Figure 2: Grid with entrance, exit and harm location

Project manager secret instructions:

You are a project manager. The engineers next to you are tasked with leading you to the project goal. They will be solving difficult problems to figure out the correct direction for you to take and when you are at the end of the project. One of the engineers is rumoured to like working overtime.

Project engineers instructions:

You are a team of project engineers. You work well together. Your job is to get this project to its goal. You have never worked with this project manager before. Remember, you have the competency in this field.

First split the players into groups of 3-5 people. One person represents the project manager or the state of the project, the rest are project engineers. The project manager is given the paper with the empty grid and the secret instructions. The project engineers are given the paper with the grid showing the harm locations. Everyone is asked to be quiet and read their respective papers.

The project manager places his empty grid in front of him and awaits guidance from the engineers. He starts at the entrance of a grid. At no point are the engineers to show the manager their paper. The only communication between project manager and project engineers will be the directions the engineers want the manager to move on the grid (up, down, left, right or by pointing at the square they want him to move). No other word or form of communication is allowed. The project manager can only move once square at the time. The project manager can choose to follow the direction of the engineers or search the closest grid squares for harm. By doing this he can find his own path, but it will be much less effective than following the directions of the engineers.

The point of the game is to get the project manager to the exit as quickly as possible. Make the project managers step away from their groups for 3 minutes while the engineers plan the path. Time passes with each step, but also when stepping into harm. One step equals one “time unit”. One harm equals 5

"time units". The twist is, there is no way through the grid without passing through harm. The project manager does not know this. The project engineers have to decide on the quickest path with the least harm. The interesting part is how the dynamics change, after the project manager is guided into the first harm.

The game is done when the project manager reaches the end of the grid. The "time unites" are tallied and noted.

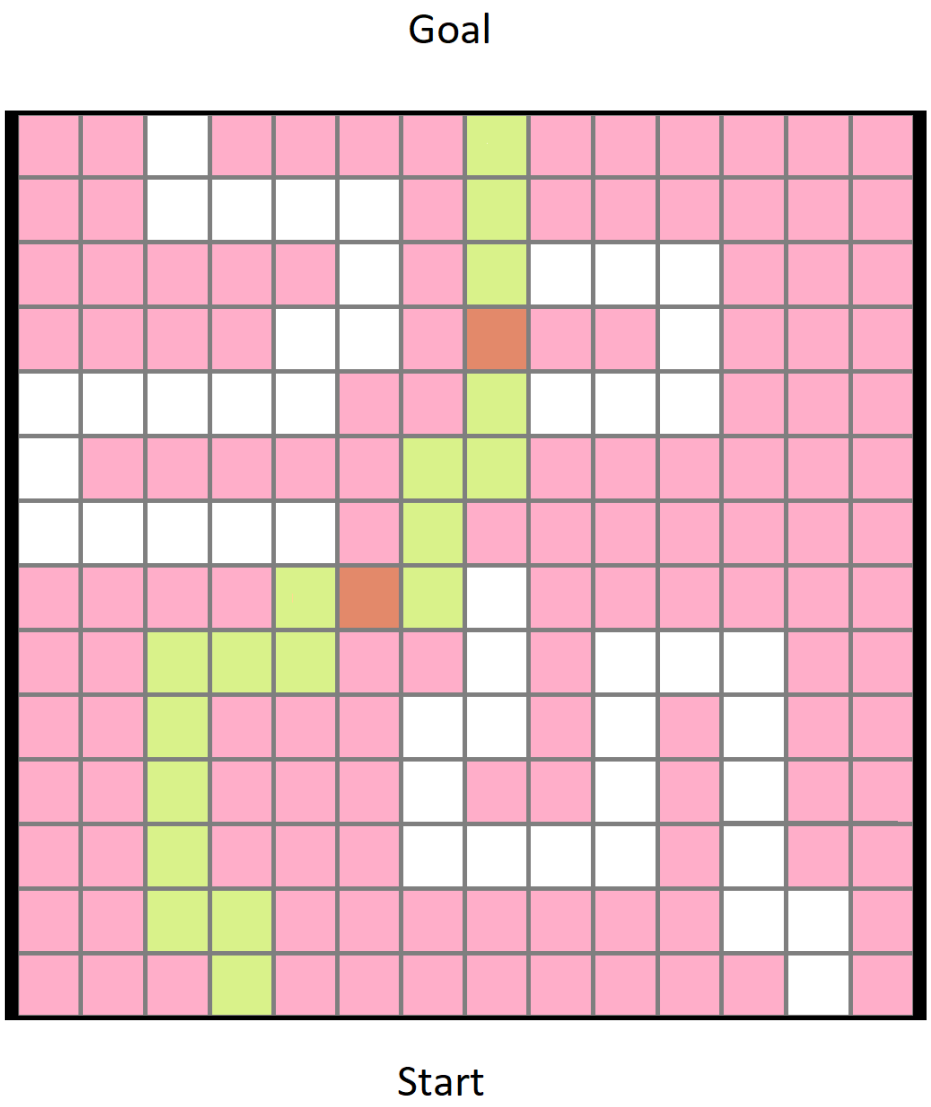

Figure 3: An example of the quickest route through the grid

When everyone has made it to the end the debriefing starts. During the debriefing people can note down on a blackboard the time it took the groups to get through the grid, from start to finish. Now everyone can discuss their experiences. People will probably comment on how difficult it was to plan after the project manager walked into the first harm. Did the project manager stop trusting their guidance? Did they have to make new plans for other paths? Try to make them talk about how this affected them. Remember to include the project managers as well. What did they think at the beginning? After the first harm? Did they take full control or did they continue to trust in the guidance of their engineers?

It is important that to note that that the examples here are simple. It is possible to make the grids more difficult.

7. Improvements and future developments

Firstly, more time and effort should have been put into the interviews of the game developers. They were a valuable source of information that was not properly used. It was difficult to know what to ask about as game development is a new field for the author of this thesis. The interviews were to open ended. The supervisor, Bassam Hussein, was not utilized enough by the author.

Secondly, the interviews with the project workers and project managers should have been more thorough and structured. It would have been easier to compile and analyse the answers from the interviews if there had been a specific set of questions. Also, the interviews should have been auto recorded preferably in person. This would better capture the responses of the interviewee and would also capture everything that was said. The interviews were transcribed on the computer while they were conducted over the phone by the author. This led to the transcripts being more a summary of the interview with keyword. Also, larger and even more divers batch over interviewees would give more representative results, but also a lot more work.

The development process should have been better documented. As the game was continuously developed during the semester, sketches, key words, ideas were noted down when ever inspiration struck. The process was creative and very hard to control. Idea came out when you least expected it. The evolution should have been documented, it would be useful to better represent the process of developing a game. In this thesis the end result is the only thing presented.

Due to lack of time the game was not tested on the intended players. It was continuously tested on people around the author when he worked, but this was more to see if people understood how to play, not the effect of the game.

7.1 The future

The game should be tested on students who are studying project management.

8. Conclusion

This master thesis was based on the goal of exploring how to learn about trust in project work and project management through a game. A game was created and was based on research through articles on trust in projects work and project management, and the shared knowledge from people with experience with project work and project management. The game simulates a simplified real-life situation where trust effects the people working on the project and the project itself. It is unfortunate that the time to create a finished game took longer than anticipated. Because of this no real testing was done of the game on its intended players.

Relevant articles found had a general consensus that trust was good for the project. That mistrust could increase costs and that trust was built through interactions between people. There was little on specifics of how trust effects the project, or why trust is a positive thing. Through interviews a clearer image of this was discovered.

The gameplay was based around the occurring theme from the interviews: Trust leads to more efficient time management. Costs are increase because of increase in time to complete tasks when trust is lacking. People have to supervise each other's work to make sure that things are completed to the right time with the correct quality. Trust also increases the motivation of people in projects. It makes them want to "go the extra mile" and prove that the trust placed in them by their team mates are justifiable. The game also tries to introduce varying degrees of trust through gameplay elements to see how this effects the participant, and then see how this effects the project. The main part of the learning is to be done through the debriefing phase at the end of the game session. Here participants discuss their experiences and findings during the game session and compare them to other groups and participants.

The game did not stay the same throughout the process. It continuously evolved as more research was done and interviews were conducted. With new knowledge the game could change entirely.

This master thesis has proven the hard work that is put into developing a game. Creating a game is a creative process which takes time and dedication and is not developed over night. However, it was a creative experience with high level of education which emphasizes the goal of utilizing games in education.

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