

Automating Board Games:

A Study of the Effects of Chores on Social Interaction

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Chapter 1

Introduction

(The Introduction will provide analyses of articles and explain the area of research, as well as where the inspiration for the project stems from)

There are many reasons why people play board games and one of the most important is the social interaction between players. With the emergence of digital board games, games are becoming increasingly automated, meaning the game will automatically update the game state. Updating the game state includes, but are not limited to, moving pieces, counting points, re-shuffling decks and similar tasks and are called "chores". In analogue games these chores are carried out by the players as instructed by the game's rule book. It is my theory that removing these chores, may remove some of the features, that enables social interaction.

According to Xu et al. (2011) these chores are one of five categories of social interaction, which supports the other four, "*Reflection on Gameplay*", "*Strategies*", "*Out-of-Game*" and "*Game Itself*" (Xu et al. (2011)).

Many digital board games removes some of not all of these categories, which has resulted in some issues and tensions between developers, since designers of digital board game versions attempts to approach a "magical" experience (Rogerson et al. (2015)).

This report will introduce the readers to several different table-top game genres, where it is discussed which are most suited to the digital medium, as well as already well established digital board games, with evaluation on how well they represent their physical origin.

The success of these digital examples shows that there is some merit to the automisation of chores and this report explains how a the design and implementation of a digital prototype of

the game *Castle Panic* uses both automated and manual chores to try and create an engaging experience while retaining a perception of playing a board game.

Chapter 2

Analysis

This chapter will provide an overview of topics, that will form the basis for design requirements for a digital prototype which I will use to try and solve my Final Problem Statement, presented later in the chapter. These topics include different genres of table-top games, the board game metaphor, articulation and chores in board games and digitisation of board games, with examples of the changes the games have gone through from the physical to the digital form. Each section will be followed by a reflection of what I can use from those findings.

2.1 Table-top Games

Board games are a genre of table-top games, which are games that are typically played on a flat surface, such as a table. To understand the concepts used in this project and the problem it attempts to solve, I will present some terms, that are attributed to board games, so it is possible to distinguish between digital board games and other kinds of digital games (computer and video games). This involves certain elements common with table-top games as well as how we interact with such games, both analogue and digital and what effect these interaction have on the social aspect of playing board games.

2.1.1 Table-top Game Genres

To the uninitiated, any game played on a table is a board game, but calling *Warhammer 40.000* a board game will, in some communities, be perceived as an insult, even if the intent was harm-

less. This is the nature of "nerdism", where rigorous adherence to the correct classifications of concepts and objects is highly maintained. Many table-top games borrow elements from different genres, but there are plenty examples which purely belongs to one genre. Different genres of table-top games may fit better on digital platforms than other, which I will discuss in the following.

2.1.1.1 Board Games

Any game played on a table with premarked fields and moving around pieces can be called a board game. There are several sub-genres to this genre with varying complexity from highly strategic, with a complex rule set, to pure chance (it is arguable whether the latter is a game at all, since it requires no skill). Most trivia games, (*Trivial Pursuit*, *Bezzerswizzer* etc.) belong to this genre, as they involve moving pieces on a board. Games with no chance and high amount of strategy and a simple rule-set include *Chess* and *Go* and *Risk* is a classic example of strategy and chance. Childrens games like *Snakes and Ladders* is a game, that is purely based on chance, meaning the dice roll determines how far your piece moves on the grid, to which end the players have no influence. The rule-set is also extremely simple. *Twilight Imperium* on the other hand is extremely complex and involves strategy and as well as chance.

Board games often have a theme, which has either inspired the mechanics of the game (*King of Tokyo*) or simply a setting that can be slapped on existing mechanics - *Risk* is originally set in the 18th century war scene, but both *Star Wars* and *Lord of the Rings* has inspired versions of *Risk* with the same base mechanics. Related to themes are the style of board games, where Eurogames are focused on diplomacy and economy rather than conflict and random elements, such as dice or card drawing, are downplayed, if not completely absent. Usually all players survive until the end of the game, where victory points are counted to determine the winner. In American-style games (commonly Ameritrash) there is a high focus on the theme (zombies, horror, war, space etc.) and chance is greatly used. Player conflict is the main mechanic and players can, in some games, be eliminated from play and the last player remaining is the winner. Player interaction is often higher in American-style games (due to conflict) than Eurogames, where, in some cases, the players hardly interact to each other.

All these genres and styles often intermix and draw inspiration from each other, so one clas-

sification hardly covers all of one genre, but can be used as guidelines to try and explain what one can expect from a game. There is also a multitude of categories far too extensive to present here, that explains the themes of the games and to an extent, what mechanics that games might include, which can be accessed in **Appendix A** which also offers detail of the different mechanics.

There are many examples of digitised board games, but the sheer amount of different categories of board games makes it difficult to discuss whether board games in general would work well on any digital platform. It is more accurate to say that some would work well, while others would be impossible to recreate. It depends on what purpose the game serves as entertainment. If it is a game, where there are more optimal approaches to the given information and actions available, it is suitable for single-player use, as the computer can be programmed as opponent to perform the most rewarding actions. Then there are games that are based on physics, where players throw or shoot objects at other objects to win. These will obviously not work. And anything ranging in between.

2.1.1.2 Adventure Games

In adventure board games, each player takes the role of a character which improves throughout the game-play. Each character is predefined with traits, that are different from the other characters and the players must work together to complement each others' traits in order to overcome obstacles. Typically games in this genre are cooperative, meaning the players play against the game - with preset rules which explains what happens between turns and what new obstacles are presented to the players - or one player acts as the opposition, controlling the obstacles the other players must face. Again often with preset rules to keep everything balanced for an engaging and fun experience for all involved. Examples in this genre are the classic *HeroQuest*, *Arkham Horror* and the *Dungeons&Dragons* derivative *Castle Ravenloft*. Other popular and newer examples, which relies heavily on the cinematic feel and storytelling are *Mice and Mystics* and *Teenage Mutant Ninja Turtles: Shadows of the Past*.

Adventure games has a high potential for remediation into digital platforms. They can tell a story and be designed as a single-player experience, controlling one or more characters. As the games often has rules for how the opposing elements should act, these could be controlled by

the system.

2.1.1.3 Card Games

Also played on a flat surface (a floor might suffice), preferably in an area with no or little wind, card games share many of the attributes mentioned above, but where cards are the primary element in the game. As such they do not need a predefined surface, although it might help. They can either be played with a traditional card deck or cards, specific for the game. The most well-known card game is probably *Poker*, which has many variants (*Texas-Hold-Them*, *Five Card Draw* etc.) which makes use of the standard deck. The nature of the standard deck - all cards are similar on the back and have different values on the face - makes it perfect for games of chance, such as gambling. Most other card games follow this tradition, where the value remains hidden for all players, until one draws the card and then only that player knows the value until it is revealed through play.

One popular mechanic is called "deck-building", where each player must choose up to a certain amount of cards (40, 50, 60 etc.) from a global total, where the most powerful cards are the most random. The players pick their cards based on how well their effects work in combination and use this to defeat their opponents. In this nature, these games are competitive with tournaments of different scale held around the world. Games such as *Pokémon* and *Magic: The Gathering* are examples of this.

There are ample proof that some types of card games will work well on digital platforms. *Solitaire* and *Hearts* was one standard software on Windows computers. More recently a game such as *Hearthstone* has won popularity and is played against other players online with such a success that others have tried to follow suit (*Hex: Shards of Fate*, *Gwent*. It is inspired of *Magic: The Gathering*, which also has its own digital version called *Magic Duels* for the iPad.

2.1.1.4 Dice Games

As with card games, dice games also share many of the aforementioned attributes, but whereas card games can be completely without chance, the nature of dice serve to always include some element of chance. Pure dice games belong to a smaller group than pure card games or board games, but they often require very little space to play (*Liar's Dice*, *Mia*, *Yahtzee*).

Dice-building games are a type of dice game, where players collect dice, often in different colours, to overcome some obstacle. This helps overcome higher goals, by having more dice to reach a higher results, thus lessening the chance element (*The Lord of the Rings Dice Building Game*).

Pure dice games are less suited for digitisation than any of the other genres due to the random nature of dice. Random number generation is difficult to simulate 100% realistically, because computers acts according to what they are told and any random act is the result of a broken computer (Haahr, Mads (2017)). This does not make dice games impossible to digitise and physics engines could be used to try and simulate the randomness of dice throw.

2.1.1.5 Miniature Games

Miniature games evolves around moving small figurines or models around on a field and fight against each other and unlike board, card and dice games, miniature games always have a theme. Either the game is based on an existing fictional universe (*X-Wing: The Miniatures Game etc.*), an original fictional universe (*Warhammer, Warhammer 40.000, RuneWars etc.*) or history (*Flames of War, Wings of Glory etc.*). These games often have a set of very complex rules. In *Warhammer 40.000* each army has its own rule-book covering abilities and attributes (such as health and damage potential), which players must keep handy in order to reference it when playing. A game such as *X-Wing: The Miniatures Game*, the rules are lighter, but there is much emphasis on precisely measuring the movement of the models, as wrong positioning can have great effect on other models' movements. These games use specialised rulers to determine final position, while other games use measuring tape and approximation for positioning, since the number of models can range in the hundreds, rather than a handfull. Miniature games are in essence American style, since the element of chance bears so much weight and they revolve around conflict. A successful player aims to minimise the random elements, while having a tactical overview and react to the shifting circumstances during game-play.

Miniature games also have a great competitive community with tournaments around the world and some even reward players for skillfully customising their armies, which is an important part for *Warhammer* and *Warhammer 40.000* for instance. Games like *X-wing: The Miniatures Game* and *Wings of Glory* release pre-painted models, whereas the models in *Warhammer*

and *Warhammer 40.000* come in small pieces and must be assembled, allowing the player to build his army as he sees fit (within the confines of the game's rules, of course).

Probably the least suited for digitisation since miniature games often makes use of dice and they are difficult to overview on a screen, since miniature games takes up a lot of space.

2.1.1.6 Role-Playing Games

Much like adventure games, role-playing games (RPGs) lets players take on the role of character in the game world. However, the rules are much more complex in order to describe the world and its inhabitants. The rules allow the players to define their own characters (while preset characters are also available) and share the same statistics as the creatures they can encounter in the game world. These creatures are controlled by a game master, who also decides which events and obstacles the players encounter. How well the player characters handle these situations are determined randomly by a die throw. Rolling a die and reaching a certain threshold results in a success. In some systems (common term for different RPGs), surpassing the threshold by a certain margin results in a more favourable success, than the standard result. The opposite is also true, where a greater failure can result in a more dire outcome than a standard failure. The odds for these elements of chance can be improved by the players when a certain threshold is reached. In *Dungeons&Dragons* player characters collect experience points and "level up", when enough points have been gathered. Then some statistics increase automatically and some can be increased at the player's discretion. In other systems, the player characters gets stronger when reaching a certain point in the campaign, but many systems allow the game master to decide how players progress, if at all.

RPGs can be played using miniatures to help visualise the world and the circumstances, but these are optional and all the players need are a piece of paper to write the modifiers for their dice roll. Which leads to the commonly used terms "pen-and-paper" RPGs. Players are also encouraged to act out their intentions and their interaction with the game world's inhabitants and some systems puts more emphasis on this aspect with rules for increasing the players' chances of success if they act out an interaction well. Systems such as *Dungeons&Dragons* and *Pathfinder* has a lot of focus on combat, where a wound can be easily healed, while other systems focus more on investigation and drama (*Call of Cthulu*, *World of Darkness etc.*), where

combat is downright lethal and players are encouraged to resolve conflicts with diplomacy or subterfuge.

There are computer RPGs already in existence which makes use of the exact same rules and mechanics as some RPG systems, such as *Baldur's Gate*, *Neverwinter Nights* and *Star Wars: Knights of the Old Republic* which all uses the d20 system (referring to the use of a 20 sided die for almost every interaction with the game world) from *Dungeons&Dragons 3.0 Edition*. Interestingly, the options presented to the player is far fewer than what they can do in pen&paper RPGs, since the imaginative world created by the game master is much more fluid and responsive, than that of a rigid computer program.

2.1.1.7 Tile-Based Games

Tile-based games makes use of pieces and usually requires no pre-marked surface to play. Usually tile-based games revolve around placing tiles in meaningful combinations, which will score the player points. *Dominoes* are a generic set of tiles which, like the standard 52 card deck, can be used to play a variety of games. *Mahjong* uses specialised tiles to create scoring combinations and skill, tactics and calculation are important aspects, a player must consider, as well as an element of chance. This makes the game ideal for gambling, similar to the card game *Rummy* which has its own tile-based variant, *Rummikub*. *Scrabble* is a very popular tile-based game, that uses letters, which players must combine from seven tiles, obscure from other players. This game makes use of a pre-marked board and players can add letters to an already played word to score points.

Tile-based games can easily be translated to digital platforms. I can imagine a game where tiles snap in place to each other in a 2D space. The smart phone game *Wordfeud*, which is an almost direct copy of the *Scrabble* rules became hugely popular and it could one-on-one with many different players at the same time.

2.1.1.8 Summary

With the sheer amount of different table-top games, it is near impossible to say that all of them will be well suited for a digital platform of any kind. There is one genre that will definitely cause issues, which is miniature games. Some takes up a large amount of space, which can be difficult

to manage on a screen with limited input methods. In *X-wing: The Miniatures Game*, precision of manoeuvring the ships is very important and sometimes it requires both players to help each other move one ship, by marking other ships and temporarily remove them and hold in place the markers, while moving the first ship. This can be managed by the system, surely, which could even make it more precise, but since bad manoeuvring can cause a ship to lose important actions or deny its attacks, eye measurement is an important skill to master when playing. If the digital version fails to represent the scale and angles properly, the players will often attempt to execute the wrong manoeuvres. Then there's is the associated hobby aspect of painting and customising the miniatures, which will be completely absent in a digital version.

Another aspect that makes miniature games unsuitable for this project is the time required to set up and play one game, which they share with RPGs. Not only that, it also requires a lot of work beforehand to get into the rules and build a character or army, that is on par with more experienced players'. For testing purposes, it is an advantage if the players can learn the rules and play the game all in 30-40 minutes. This also includes adventure games, to some extent, since they often revolve around the completion of objectives and, while not as extensive as RPGs and miniature games, they also often take a long time to set up. This also makes games, that requires a certain level of skill and mastery of the mechanics to fully enjoy, less suitable, as they would require several play-throughs. This includes a large number of tile, dice and card games.

It will probably be amongst the diverse range of board games, that I will find the game that best suits my goals and it can be narrowed down to one which is quick and easy to learn, takes less than 40 minutes to play and involves all players equally, to account for the social interaction.

2.1.2 The Board Game Metaphor

Ask anyone what a board game is, and they will probably say something along the lines of "moving around cardboard pieces and reading cards and rules, maybe throwing dice". There is a recognisability to board games that many adheres to, which involves the physical components and the interaction with these. This recognisability can be translated to board games, or to put it differently, adopt the board game metaphor. Hamilton (2000) describes a metaphor in interaction design context as something that "utilizes well-understood concepts or attributes from one domain to make points or provide insights about another." In the context of digitising board

games, the metaphor translates into having components in the digitised version look and behave like their physical counterparts. In essence (and in spirit of the metaphor), digital board games are still board games, but often with enhanced, "magical" functionalities, such as automatically moving around pieces and tracking scores. Rogerson et al. (2015) explains that these "magical" features may need additional explanation in a game otherwise recognisable and with an easy to understand interface to the experienced player.

Hamilton (2000) explains how the board game metaphor has been adopted in native digital games, such as *Hearthstone* (which also utilises metaphors and tropes from *Dungeons&Dragons* and other fantasy sources) and that in some digitised versions of board games, designers have created new metaphors to explain functions of a piece - by animating its behaviour according to players' actions - rather than adopting its appearance. Hamilton (2000) explains how this may conflict (and create tensions) with the developers' wish for freedom in creating an engaging experience for 'non-hobby' gamers and the desire to stay true to the source material, to cater for the passionate fans of the board games in question.

For a digital prototype, that will resemble a physical game, in order to enhance that perception, the digital version should have objects, that looks like cards, plastic or card-board tokens and other pieces and a board (if available).

2.1.3 Articulation in Play

Strauss (1988) has termed the types of work required to negotiate and organise collaborative, team-based projects as "Articulation work". Crabtree et al. (2007) reflects that games are social in nature and closely resembles cooperative work, the concept of Articulation work can be used to describe the tasks players must perform to make the play happen - "chores or housework", as put by Xu et al. (2011). These chores are described as updating the game state between turns and are not explicitly a part of the game, but necessary for the progress of the game. Rogerson et al. (2015) draws parallels between Strauss (1988) and Xu et al. (2011).

1. "Insuring the flow of resources" Strauss (1988) - "manipulation of physical objects" Xu et al. (2011)

2. "Making arrangements about the division of labor" Strauss (1988) - "discussion about turn taking" Xu et al. (2011)

3. "Supervising delegated or assigned responsibilities for task performance" Strauss (1988) - "enforcing and/or learning rules" Xu et al. (2011)

The first relates to moving pieces and other objects, such as tokens, cards, meeples etc. that represents players, value, resources victory points etc. Players can act and have fun by reacting on how much gold - represented by tokens - they receive. Or how little, creating a entertaining setting for the group, increasing the social interaction. The second applies when players are discussing the events of each turn and how circumstances change before the next player's turn. In some games, players can get to take an extra turn, skip one or more players, reverse the order of the turn (clockwise to counter-clockwise) or other factors decide whose turn it is (the player with fewest points etc.). The third relates to players' understanding of rules. Rules can range from very simple to extremely elaborate, incorporating books upon books of special rules for special engagements, so in many cases it is easier to learn a new game, by playing with a veteran, which can act as a enforcer of the rules.

It is on these three points the digital games differs from their physical counterparts. Often turn-taking is managed by the system.

Managing resources and manipulating objects are more complicated. In many games, they are windows, where they have the option of performing different kinds of actions (typically some sort of resource management), with the option of skipping that window all together, moving on in the turn order to the next player. In *X-Wing: The Miniature Game*, players takes turns based in the ships' pilot skill value, so each player gets as many turn as he has brought ships on the table. In the "Activation phase", each ship performs a manoeuvre and then has the option of taking one of several actions available to that ship. The rules allows for the player to skip this step - but will not normally gain anything from it - so if a player forgets this step, it is allowed by the rules, but the opposing player is permitted, but not obliged, to remind the first player about taking an action. Omitting to remind the other player would put the second player at an advantage, so it can be a viable (and legal) strategy to "forget" to remind the first player. In many digital games, these things either happens automatically (if only one option is available) or the players are reminded of performing an action by the system. The movement of physical objects and resource management also explains how and where the resources are generated, whereas in digital games, these steps happens automatically, his may confuse players, especially after

many things have occurred and also provide a lesser understanding of the game's rules.

Digital games enforce game rules, whereas the physical games are more fluent and allows house rules (home-made rules). The digital version can therefore act as both an authoritative source of rules or as a learning tool, with tutorials, moving the role of teaching and enforcing the rules from the players to the device. Rogerson et al. (2015) summarise how developers sometimes sees rules as an obstacle to play, rather than the enabler of play. That the digital version is a cleaner and more magical experience, rather than a literal interpretation of the source material, where recognising the need to "kick their friends' butts" is higher than understanding the mechanics of the games. Players and researchers sees articulation work as an essential part of the experience of play, while developers sees chores as unpleasant and best avoided.

With the importance of these three aspects to the social interaction of playing table-top games, the effect is best achieved if the players are in close proximity i.e. watching the same screen for a digital version. The enforcement of rules can be governed by both the game and the players, or by either, which presents an opportunity to create a system, that is flexibly in how much it enforces the rules and manages other events, such as turn-taking. A touch screen interface seems ideal for this, as players can manipulate objects in a more one-to-one manner, as opposed to using a mouse or a different kind of interfacing equipment. They can, for instance, drag-and-drop an object using their finger, much like pushing around a piece on a table. Touch screen interface, however, does not allow the picking up of objects, an effect users could achieve with virtual reality, but that would conflict with the previous notion of looking at the same screen.

2.1.4 Chores

As already mentioned, chores in board games are the "housework" needed to make the play happen. This is necessary to update the game state based on the players' actions, so everyone can react on the new information presented. Depending on the game, this step can happen in small part after each player's turn or in larger part after all players has had their turn. Players count points and strategise on their future actions. Xu et al. (2011) has found rich social interaction in performing these tasks, such as act it out the result of a dice roll in a humorous and/or dramatic manner, externalising the tension of the game-play and elevate the intensity of

emotions. Enforcing the rules are also a part of the chores as it can be required during play to check up on a certain rule, when it is brought in question. Social interaction is engaged here as players must all understand how the rule works. Players can also agree to interpret a rule different from how the creators intended, or add their own rules. This is called "house rules" and is enforced as mutual agreement either before play or when a situation arises during play, that is not covered by the rules. Xu et al. (2011) reflects that while discussions takes time away from the game and can be tedious, correcting illegal moves and discussing and observing other players' moves supports the collaborative learning and makes it a part of the game-play. These interactions can also take place between players waiting for other players to finish their turn, as well as discussing their own previous moves and the turn-based structure of board games results in attention shift in the group that prevents dominant behaviour.

Chores enables other kinds of social interaction in board games, Xu et al. (2011) found; reflecting on game-play, discussing strategies, reacting to out-of-game events/subjects, and joking and commenting on the game's content.

While these chores are automated in digital games and in extension removes many of these instances where social interaction can occur, Rogerson et al. (2015) reflects that online play can offer an opportunity for play, when there are no players around physically.

By automating chores, the digital versions of a game removes many of the opportunities where social interactions can happen. This seems like an obvious error, but there must be reasons to why designers choose to automate these chores. By having a flexible systems, that allows different chores to be turned off and on I could attempt to measure what effect these chores have on the social interaction and the enjoyment of the game.

2.2 Digitisation

Digital devices offer new ways to play and enjoy board games and some digital originals draw inspiration from board games and the board game metaphor (*HearthStone*). Digitised versions of board games behave more or less like the original, but most have enhanced, "magical" functionalities. I will review a few examples from Rogerson et al. (2015) and some applications from my own experience and use them as a basis to reflect how well they employ the board game

metaphor.

2.2.1 Examples of Digitised Games

2.2.1.1 Agricola

A fan-made online portal called play-agricola.com by Chris Deotte Deotte, Chris (2011) allows fans to connect online and play *Agricola* at a virtual table. Players are required to move resources themselves, as opposed to have the system do it automatically.

In 2013 Playdek released an iOS *Agricola* Playdek (2013) app with both offline and online multi-player and offline single-player. The offline multiplayer functions as pass-and-play, where players pass the device along between each other in turn order. The game features the original art work of Klemens Franz with some elements being animated and action cards shown as buildings in a village instead of cards on a table. There are options for variant rules through in-app purchases. The game has been praised by both players of the board game and players, who originally played the digital version (Rogerson et al. (2015)).

In 2016 DIGIDICED released a digital version of the two player game *Agricola: All Creatures Big and Small*, from Uwe Rosenberg, by the same name for Android and iOS and for Steam in 2017 DIGIDICED (2016). It also features both online and offline multi-player, but only for two players, as well as single-player. Again it has the original artwork, but without animations. Scoring is applied automatically and it focuses more on ranch-building than farming.

2.2.1.2 Puerto Rico

Puerto Rico Evolver is a spreadsheet simulator that "trains" AI players against each other and then the winners breed new, higher skilled AI players. It features only the mechanics from the original game, none of the art and offers tough AI opponents for players who enjoy the core mechanics and increasingly difficult opponents (Rogerson et al. (2015)).

On the web platform *Brettspielwelt* (BSW) from 1998 Zbiek, Alexander, users can organise into "cities", which functions much like guilds in *World of Warcraft*, and play against human opponents in real time. It is possible to play several different board games and the rules are implemented precisely according to the original version, due to the close relationship between

BSW and publishers (Rogerson et al. (2015)). In the case of their version of *Puerto Rico*, the interface uses the original artwork, but relies on user generated menus and command line interfaces, which can feel clunky and dated.

In 2011 Codito Development Inc released an iOS version which, like BSW, used the original artwork and included a tutorial, as well as "Hint" and "Help" functions and difficulty levels (Rogerson et al. (2015)).

2.2.1.3 Ascension

Ascension was released for iOS and Android in 2011 and was acclaimed as an outstanding digitisation of the card game with great utilisation of the graphics and layout to display large amount of information and players even claim to prefer the digital version over the physical (Rogerson et al. (2015)).

2.2.1.4 Wordfeud

In 2010 *Wordfeud* for iOS and later Android became a World-wide phenomenon with millions of users and countless spin-offs. It was an unofficial digital version of *Scrabble* from 1938 and features the same design and rules as the board game. Players played 1vs1, but could have several games going at the same time, as each turn progressed much as a text message would. A player then had a time limit to finish their turn, inciting a game that could last a foreseeable amount of time, but with enough time between turns to think about which word to post. There is very little interaction between players, but due to the game's popularity, it was often brought up in conversation between friends and family, especially if they had a game running.

The game was so popular that hundreds of websites spawned which offered to help write the highest scoring word from the letters available and the words already on the board and it caused *Scrabble* to in be back order in many game stores around the world and a digital spin-off *Words with Friends* by Zynga even had its own physical version with the same name.

When trying to create a word in *Wordfeud*, the users would be alerted if the word was legal, removing the need for having a dictionary nearby, but *Wordfeud's* vocabulary of legal words was a bit more lenient than that *Scrabble*, since it allowed slang, names and destinations as well.

2.2.1.5 Tabletop Simulator

After a successful Kickstarter campaign, Berserk Games released *Tabletop Simulator* in 2014. In itself it is not a game, but a virtual sandbox, where users can play any tabletop game made available for the application. Upon purchase it comes with unlicensed classics such as *Chess* and *Poker*, but there are thousands of games available as community created content. Users can spawn and drag game pieces, which are subject to virtual physics and will fall to the ground, if they move past the edge of the virtual table. There is even an option for graciously showing defeat by clicking a button, that will flip the table, sending pieces and cards flying in every direction.

Different from other digital games, *Tabletop Simulator* games are not managed by the system in any ways, save for random number generation (which can also be simulated by throwing digital dice) and snipping to a grid (which can be turned off), but the users themselves manage turn-taking, score keeping and to some degree the moving of objects. Several objects can be selected at once by holding down the mouse button and dragging a square over the objects or they can be selected individually by holding shift and clicking on them, much like selecting several files on a Windows desktop. The board can also be reset by a single click of a button and there are "undo" and "redo" options as well. This makes the chores part of the game dynamic; the players are still in complete control, the system just allows for simpler and fewer movements. This also allows the players to introduce house rules and play any game as they see fit, as the system does not enforce the rules.

2.2.1.6 roll20

roll20.net is a web portal - primarily - for table-top role-playing games (RPGs), where players can join games and play on a virtual table-top. Players can communicate via a chat or microphone (although players may opt for a third party option such as Skype or Google Hangouts) and use the mouse to move avatars of their player character (PC) or draw on the map or other images lain on the interactive screen. The game master (GM) option allows for more visibility and options of interaction, while players have limited control of the environment. Players roll dice with using random number generation by simply clicking the dice needed and the result will show in the

chat stream. They can also type commands, such as `/roll 1d20+5` for rolling one 20-sided die and adding 5 to the result. These commands can also be stored in macros, which will appear at the bottom of the screen, for easier access to often rolled checks.

Similar to *Tabletop Simulator* - although only in 2D - the users are managing turn order, chores etc. The rules are usually enforced by the GM, or the player with most knowledge of the often complicated and exhaustive rules, with the GM acting as the final judge. One curious observation from using this portal compared to face-to-face play, is that players are much more focused on the game itself and refrain from talking about subjects not particular to the game, probably due to the fact that this will disturb the other players. While this may be more enabling to the play, it also takes away the specific role-playing of the game, the small in character chit-chat, that can further establish the PCs and the game world.

2.2.1.7 Summary

The digital versions of *Agricola*, *Puerto Rico* and *Ascension* all use art that resembles the original or is simply taken from the same source, which enhances the recognisability for players familiar to the physical game. This is true for *Wordfeud* as well, and all the community contributed games for *Tabletop Simulator* also resembles the source, while *roll20.net* offers features, that allows for users to use their own images or official art. This familiarity allows players to quickly learn how to use the digital versions if they already know the rules from the original (Wallace et al. (2012)). Given the success of these examples, the game which forms the basis for the prototype for this research should also resemble the source (e.i. shape and colour of pieces, text and font of cards etc.).

They also feature automated functionalities, many of which removes some chores. The most common is score keeping and notifying a player if a move was legal, and the examples above can be used as inspiration for chores, that the prototype game could include. On the other hand, automisation removes the ability to include house rules and discussion of legal moves, which further amplifies the interesting aspect of creating a flexible system, that allows the researcher to enable and disable automatic functions, to figure out which chores are less desirable.

2.3 Final Problem Statement

To which degree should chores in a digital version of a board game be automated, in order to retain social interaction, but still provide an engaging (“board game”) experience?

2.4 Delimitation

At this point it might seem like the most optimal solution to test the final problem statement is to develop a digital board game from scratch and design it for test purposes. There is no time, however, to develop a working rule-set that would require testing, balancing, re-design and then some more testing and balancing until I get to a point where the game is entertaining for all players and commercially feasible. Instead, I attempted to find a released game, which best suited my needs.

2.5 Design Requirements

Based on the analysis in this chapter, I determined some design requirements. These form the basis for the design choices explained in 3, which are used to create a prototype game, which will help investigate my final problem statement.

- *Game*

There are several factors to take into account when deciding on a game, that is both useful for test purposes, but also fun for the test participants.

1. As discussed in **2.1.1.8 Table-top Games**, the game must not take too long to play or require too much set up time as it will take time away from the actual testing.
2. It should be quick and easy to learn, as to make testing a foreseeable task.
3. The game should be fun and exciting from the beginning and not use several turns to build suspense.
4. The game should enable social interaction between players.

- *Chores*

The game should include several chores, all of which can be automated without tampering with the game's rules. These automated chores should be able to be disabled and require the players to perform the necessary chores, as discussed in 2.1.4.

- *Visuals*

As mentioned in **2.2.1.7 Digitisation**, the different game examples use the original art from the physical game, or at least tries to represent the original work in meaningful way, so should the prototype, as some test participants may have experience with the game beforehand and should thus be able to recognise the pieces and their function. However, they should also be easily visible on the platform chosen for the prototype.

- *Platform*

The game should be played on a touch screen.

Chapter 3

Design

At the conclusion of 2 I determined some design requirements **2.5 Design Requirements**, which formed the basis of the design of a prototype game I used to solve my final problem statement (2.3). The choices for the design is detailed in this chapter.

3.1 Delimitation

Due to time constraints that impedes on implementation time, the prototype focuses on one single automated chore, that can be turned off and on and will provide the basis of the comparable data between two test groups, instead of having all the chores automated. The rules of the game was not implemented either, instead the original pamphlet from the physical game was provided for reference.

3.2 The Game

To fulfil the requirements, the game should take about 30-40 minutes to set up and finish, including learning rules. This excludes all role-playing games, miniature games and adventure games, as they often require long set ups and include extensive rules. More likely candidates are so-called filler games, which usually takes about 20-30 minutes to finish (hence the term filler, as they can be played in-between other activities).

Some quick games still requires some level of mastery and skill to fully enjoy, including many

dice, tile and card games, such as *Munckin*.

Many Eurogames, that are otherwise easy to learn and can quickly be set up, enables little interaction between players. A game like *Ticket to Ride* is one of the best-selling games in the recent years, but several minutes can pass between players speaking to each other. They simply sit around the board and collect cards and plan their moves, which enables deep tactical thinking and is greatly rewarding when the strategy comes to fruition. This requires a lot of build up and the action only happens, when someone makes a move and buys a train route.

The game chosen for the project is *Castle Panic*. It lasts for about 45 minutes including setup. Ideally a group of three people will be playing for the test, which brings the game time down to 30 minutes. The rules are very simple and easy to learn. It features colour-coded rings, that tells the player where on the board he can interact with his cards and the turn order is always present on the board, so if the player is confused as to what the next step is, she can always refer to that. A detailed explanation of the game's rules and how it plays can be found in **Appendix B**. The game is fun from the beginning and becomes more dramatic as it progresses, as the players are up against increasingly difficult odds. The game has an advantage not considered in the requirements, in that it is a cooperative game. This means the players play together against the game. Besides offering ample opportunities for completing chores, the cooperative elements enables social interaction between the players, as they need to work together to best progress. This involves trading cards between them and discussing the best possible moves for the active player. This also naturally shifts the attention to the currently active player, which provides a dynamic social atmosphere.

There are some other games, that would function well, one being *Forbidden Desert*. Also a collaborative game, it is the goal of the players to find parts of an airship and build it to escape a desert that is gradually becoming more dangerous over time. The game gradually becomes harder as more tiles are becoming inaccessible and will end either when the players succeed in building the airship or the desert is completely buried, in which case the players lose. While cooperation is strong in both games, *Castle Panic* delivers more immediate satisfaction during play as you defeat monsters. *Forbidden Desert* is more transparent, and players are able to realise that success is impossible or achievable several turns before these events occur, which feels more rigid and locks the players to certain approaches. In *Castle Panic* the players may at times

feel confident, but the "draw monsters" mechanic may cause their planned actions to be for naught, forcing them to adopt new tactics, which keeps the game exciting to the end.

Another advantage of *Castle Panic* is the play order for their turn, which is available to all players at anytime and shows the sequence of the actions a player can or must perform (see **Figure 3.1**). This makes the chores visible and tangible as these steps describes all the house-keeping work that makes up the game. This makes it very suitable for testing purposes, since I know from experience that by playing this game, the players will perform these chores.

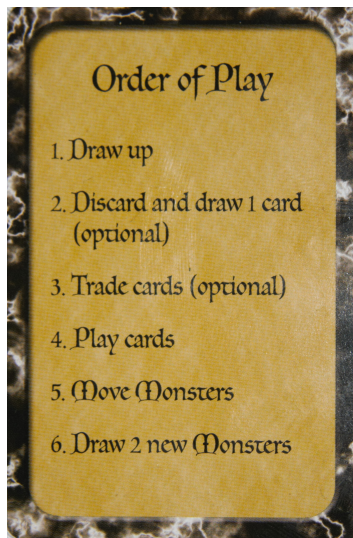


Figure 3.1: The Order of Play, as it appears in the physical version of the game.

3.3 Chores

The focus of this project is chores, or rather how they are implemented on digital platforms and to what effect. Digital adaptations of board games often make use of "magical functionalities" which removes the option of performing chores. It was my theory that this removes some of the board game experience and retaining some measure of chores might prove a great option for developers to consider.

Castle Panic offered several different chores that could be designed as automated and player-driven chores. These chores are typically managed by the active player, although the game allows any player to remove tokens and so on, without diverting from the rules. That is the flexibility the player-driven chores should provide, while the automated system would run the

chores when players have decided on their moves. This section describes how the step of moving monsters functioned in the two different versions; one (**Player**), where the players activated the chore themselves and enables an experience as close to the physical origin as possible; and a second (**System**), which describes how the system handled the chore attempting to leave only the decision-making to the players. Besides that it describes the rest of the steps in the play order, that had to be altered to some degree due to the re-mediation process. These steps are described in the order they appear on the play order card.

3.3.1 Drawing and Discarding Cards

The players each in turn drew the appropriate number of cards from an icon representing the deck on the screen. To do that the player tapped on the deck icon. This was a necessary difference from the original, as it is impossible to physically grasp the digital card between two fingers. To discard a card, she could simply drag a card to the discard pile and to draw a card she could simply tap on the deck of cards.

3.3.2 Trading Cards

Player: The active player could at any point give a card to another player by dragging it to that player's button. Then to trade, the other player dragged another card to the first player.

3.3.3 Playing Cards

To play a card, the player said out loud what she intended to do (or she could opt not to and just do it) and then perform the action. If she damaged a monster, she tabbed the monster token and its HP decreased. The tokens was designed only to show one large number for higher readability. If she played the "Fortify Wall" card (gave 1 wall one extra HP), she dragged one of the two fortifications to any wall. If she played "Draw 2 Cards", she drew 2 cards from the deck. If she played "Tar", she placed the tar token onto one monster, and did not move that monster this turn. If she played 1 "Brick" and 1 "Mortar" card, she replaced a destroyed wall by dragging it to the preferred spot. If she played "Scavenge", she dragged the cards from the discard pile, until she found the desired card. If she played "Nice Shot", she simply removed the corresponding

monster from the board (dragged it to the monster graveyard) and discarded the corresponding card. If she played "Push Them Back", she moved one monster back to the "Forest" ring in the same arc. If she played "Missing", she simply did not draw any monster tokens that turn.

3.3.4 Moving Monsters

Player: The active player had to move each monster one step closer to the centre. If that caused a monster to collide with a wall, she had to drag the wall outside the board and tap the monster if it has more HP left or drag it to the monster graveyard, if it was killed. **System:** In this step everything happens automatically and the players watched the monsters move one step closer to the castle or clock-wise, if they were inside the castle ring.

3.3.5 Drawing Monsters

The active player tapped the icon for the monster pile and resolved the effect. If it was a monster, she could tap the die icon, which generated a random number and she could drag the monster to the corresponding space. Players could also choose to roll a physical die, if they had one at hand. If she drew any of the effects, that told her to draw more monsters, she had to keep track of how many she had left. This might have caused her to draw too few or too many, but it was the job of the players to keep track of this.

3.4 Visuals

As the colour-coding easily guides the players, the digital version of the game included similar colouration featured on the cards and other pieces. In adherence to the board game metaphor (2.1.2) cards in the digital version had the shape of cards and the pieces had the same triangular shape as those from the original game. The purpose of this, was to help players recognise their function and when the rules mentioned cards, they would know what was referred to.

As an attempt to keep the style of the game, but make the objects more visible on a touch screen, any images, that serves no purpose other than aesthetics will not be included, but the font of the card text will be replicated and the text enlarged so it can more easily be read. These

are steps that will make it easier to communicate the purpose of the pieces to the players, when interacting with the game.

Any other objects will retain the same shape and coloration as the physical counterparts. They already communicates there purpose to a satisfactory degree.

3.5 Platform

The game was played on a movable, 10 inch touch screen. The objective was to make the testers experience playing a digital board game in a setting similar to any other setting where they would play a board game. So the tablet was placed on a flat surface, such as a table to represent the board. The advantage of a touch interface, was that the players could interact with the objects in a one-to-one manner, instead of using peripherals such as a computer mouse. The goal was to create something that is reminiscent of pushing around pieces on a board. The large size of the tablet would not only make the objects easier to see and interact with, it would also act more as a board game. It was the centre of attention for the players as all actions takes place on the screen.

Chapter 4

Implementation

The implementation will be based on the considerations performed in **3 Design** and includes two major parts; the graphical implementation and the technical implementation.

4.1 Graphics

As stated in the previous chapter, the graphical expression must resemble that of the original game. *Castle Panic* uses colour coding to represent the different uses of the game's components. In an effort to replicate that, I extracted the colours of the original art and reproduced my own versions of the game's components. Other than that, I tried to maintain the style and font of the text. To make the objects easier to read on a small screen, I did not use any images, but text only.

4.1.1 Cards

There are six different card colours in *Castle Panic*; red, blue and green for the soldier cards and three soldier cards with all three colours. Then there are purple cards that represents different effects and lastly cards with no colours, which are brick and mortar cards, used to build walls. The colours are shown on small circles in the corner of the cards (see **Figure 4.1**).

For more visibility I instead made a the background the colour the card belonged to and maintained the gold border and the grey and sandy text-boxes. For simplicity's sake, the multi-coloured cards were added to the grey cards (see **Figure 4.2**).



Figure 4.1: Examples of player cards in *Castle Panic*.

The text was greatly enlarged to allow for better readability. This applies to both the title of the cards as well as the explaining text.

The backside of the cards was used as an image for the deck. It was recreated by making a grey box and adding details with a spray effect, trying to make it look like the bricks on the original card backs (see **Figure 4.3**). The bricks were re-sized and placed on a brown background, which again was placed on a gold field with a white radiant (see **Figure 4.3**). The text was rotated to try and replicate the original card as closely as possible.



Figure 4.2: Examples of player cards for the prototype.

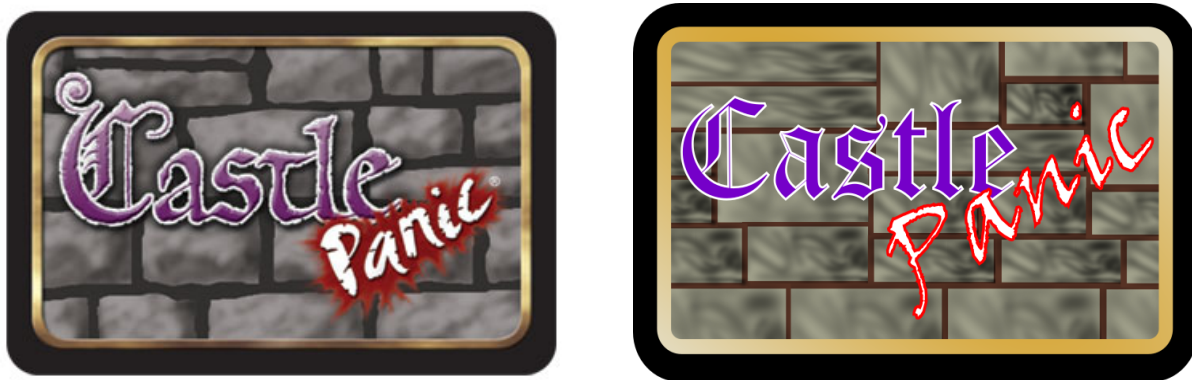


Figure 4.3: On the left the back of the original cards. On the right the image used for the deck in the prototype.

4.1.2 Monster Tokens

The monster tokens received the same treatment. But instead of having a number in each corner showing the amount of health points left, I made three different images with a different number, from 1 to 3. The boss monsters had an orange colour instead of the grey for the regular monsters. Special effect tokens had a thicker brown edge to distinguish them from the monsters (see **Figure 4.5**).



Figure 4.4: The original monster tokens.

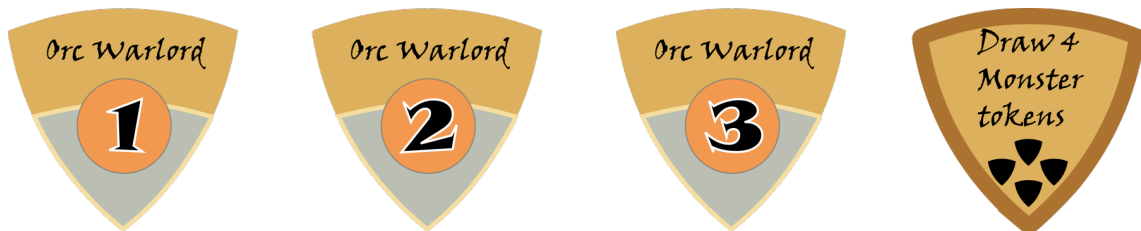


Figure 4.5: The monster tokens used in the prototype.

4.2 Technical Implementation

The prototype for this project was created using Unity 5.5, which is great for creating mobile platform games. I aimed the prototype for Android, as it does not require any special licenses to

develop prototypes for. I will here focus on the code I made for the movement of the monsters, as it is the automated feature and therefore the focus of this project.

In the scene hierarchy I created a UI button. For its UI text component I changed the text to "Move Monsters". I then created an empty game object and named it "Center" and placed it in the middle of the board. This was the game component the monsters should move towards and around clock-wise, when they got close enough. I then created a script to attach to every monster token and named it "MoveMonsters". All monster tokens were placed outside the camera view, when the game started, all at the same location.

In the script I created some variables to use as conditions for if statements, to check the distance between the monster tokens and some other game objects and position. The monster tokens were only supposed to move when they were not too close to the monster graveyard (meaning they were defeated and removed from play) and when they were at their start position (they were not in play). **Figure 4.6** shows all the variables and their initialisation in the MoveMonster script. 'center' and 'graveyard' are the two game components, whose distance the script checks for, while 'outSide' is the start position of the monster tokens. 'distance' and 'distanceToGrave' are variables that hold the distance to the 'center' and 'graveyard', respectively. 'moveDistance' is the distance the monster tokens should move towards 'center' when the button is pressed.

```
public GameObject center;
public GameObject graveyard;
private float distanceToGrave;
private float distance;
public int moveDistance = 80;
public float dead = 2.0f;
public float ringOne = 2.0f;
public Vector3 outSide = new Vector3 (1000, 20, 0);
```

Figure 4.6: The variables and their initialisation in MoveMonster.cs.

When the button is pressed, the public function 'Move' is called (see **Figure 4.7**). It runs through an if statement that first sets 'distanceToGrave' to the distance between the 'graveyard' component and the monster tokens, the script is attached to (denoted by 'this'). It then checks if that distance is larger than 'dead' which is instantiated as 2.0 or if the current token's position is equal to the start position. If neither is true, the next if statement checks if 'distance' is larger

than 'ringOne', which is instantiated to 2.0. If it is, it is outside the center and it moves towards the center. If it is not, it inside the center and the monster tokens is moved clock-wise. This script is attached to every monster token in the scene.

```
public void Move(){
    distanceToGrave = Vector2.Distance (this.transform.position, graveyard.transform.position);
    if(distanceToGrave > dead || this.transform.position == outSide){
        distance = Vector2.Distance (this.transform.position, center.transform.position);
        if (distance > ringOne) {
            transform.position = Vector2.MoveTowards (new Vector2 (transform.position.x,
                transform.position.y), center.transform.position, moveDistance * Time.deltaTime);
        } else {
            transform.RotateAround (center.transform.position, Vector3.back, 60.0f);
        }
    }
}
```

Figure 4.7: The public function Move.

In order for the button to know when to run the script, it must first be set up to run the function 'Move' in the button's 'On Click' function. This is done by accessing the inspector while having the button selected. In **Figure 4.8**, the drop-down menu to the right selects the script, whose function we would like to run. Then chose 'Move'. This must be done for every monster token in the scene, except the ones, that are not supposed to move, such as the special ability tokens.

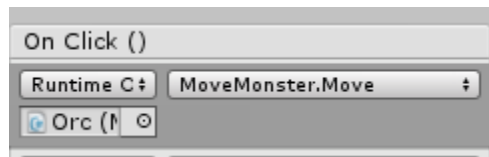


Figure 4.8: The 'On Click' setting in the button inspector.

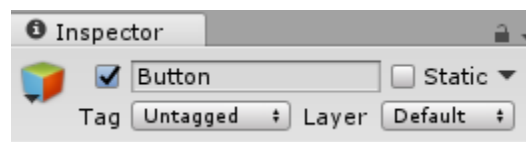


Figure 4.9: How to disable a game object in Unity.

This covered the automated function. To set up the program for manual monster movement, I simply selected the button and in the top of the inspector next to the name of the game object,

I disabled the check-box (see **Figure 4.9**). Then I made two builds of the game; one with the button enabled and one without.

Chapter 5

Test Procedure

This chapter presents the test method used to try and solve my final problem statement and interpret the gathered data.

5.1 Test Design

As board games are in general played in groups and that holds true for *Castle Panic* it was an obvious choice to perform the test as a group interview. The groups was be sized in three participants, which allowed for shorter testing time and more potential groupings, while maintaining the feeling of playing as a group, thus making it a mini focus group discussion, compared to a regular focus group discussion, that consists of six to twelve people (Bjørner (2015)). As the subject of the effects of automated functions - such as chores are - have not been studied in previous works for comparison, this project will be labelled as exploratory research.

The goal of the research was to see if there was a difference in the users' enjoyment of the game in a social context, when they were playing the version with the automated function, compared to the version without. Every other group was therefore presented with a version, where the automation was enabled and the other groups presented with one, where it was disabled.

All participants was strangers to this researcher and the context of the project, as to best avoid bias. Using friends and family might lead them to formulate their answer in a way that they expect would be most positive for the outcome of my research. And if the participants know of the context, they might pay too more attention to the automated functions of the game

than an oblivious participant would.

5.1.1 Test Setup

The participants was arranged in an environment that best simulated that of meeting up and playing a board game. To this end I provided some soft beverages and snacks and the participants was placed around a table, that held the tablet. The players was introduced to the game and it's rules explained to them by me, acting as test conductor. They would then decide on who should start and continue until they ran out of cards to play. When the last card was drawn from the castle deck, the active player finished his turn and the first part of the test was over.

5.1.2 Data Gathering

During the playtime, the conversation between the participants was recorded with a camera and microphone. The reasoning behind this was to see if the participants said anything interesting about interacting with the automated function and whether or not they had any comments on how the prototype worked.

After each play session, the test continued as a focus group interview. It was important that every participant had a chance to answer, to get a nuanced response and the conductor acted as a moderator, making sure to ask every participant the same questions. The questions were designed as open-ended questions (Lazar et al. (2017), Turner III (2010)) in order to inspire the participants to carefully consider their answers. The questions also had to be as neutral as possible, as to not colour the participants' answer. For example asking them "Did you find the experience great?", could have resulted in an unwanted, positive bias. Instead they were asked about their general experience ("What was your general impression of the game?") in order to establish the degree of enjoyment they felt. As the prototype is designed to simulate the original, physical game as closely as possible, they were asked in depth about each of the six chores, they performed ("What did you think of how the card drawing worked?", "What did you think of how the discarding and redrawing worked?", "What did you think of how the trading worked?", "What did you think of how playing the cards worked?", "What did you think of how the monster movement worked?", "What did you think of the drawing of monsters and placement?"). Each

question was formulated similarly as to avoid any bias towards a certain aspect of the game, since a differently formulated question could lead the participants to think special attention was paid to one mechanic. The question regarding the movement of monster tokens - the automated chore - was no different from the one category of test groups to the other. This was to ensure that the best possible measurement in the difference of the participants' experience of the magical function was achievable. The Participants were asked if there was anything they would like to change, as a way to measure if there were some aspects of the design I may have overlooked and if they had suggestions to other automated functions. If they suggested automated functions, it could be an indication that they thought some of the chores were too cumbersome to perform. Finally they were asked if it felt like playing a regular board game. Doing so I might be able to measure if the experience was similar to a physical board game and that the game was engaging.

5.1.3 Consent

Before testing, each participant was asked to sign a page of consent, that stated that the data would be handled anonymously and confidentially and only used for the purpose of this research.

5.1.4 Evaluation

As the data was gathered from interviews, it was not known which method of evaluation to apply before the end of the test sessions. Therefore I used the 'traditional coding' method from grounded theory as interpretation of the expected data (Gallicano (2013)). This method uses four steps: organising, which is preparing the data for analysis. In this case I watched the recordings of the interviews and transcribed the participants' answers to the questions. For convenience I have carefully translated the answers to English, attempting to maintain the context and meaning of the answers to my best ability. In some cases, all members of one group agree to one participant's answer with nodding or other affirmation. These instances has been noted in the documents simply as '[all agree]'. The second step, recognising, arranges the data in concepts, themes and events. In this case it is simply arranging the data from each group in to the

corresponding offsets, meaning all the answers from all the groups to question 1 is collected, then all the answer for question 2 and so on. Then for coding, the third step, I organised the data into categories and subcategories. Main topics was categories that was related to the final problem statement, unique topics was categories that appeared from the data, that might have an impact on the results and residual topics related to the design of the prototype. Lastly the interpretation step analyses the categories, which will be presented in **6.1 Evaluation**. For the open coding procedure, the data has been split into two documents; one for the groups participating in the automated tests; another for the groups participating in the non-automated tests. The organised data can be found in **Appendix C**.

Chapter 6

Discussion

This chapter will present the evaluation of the data gathered from the tests and described in **5 Test Procedure**

6.1 Evaluation

I will now present the data by drawing some of the answers from the **Appendix C** and use them as quotes to evaluate the results.

Each group did at some point during the interview mention that the screen was too small ("it was difficult to find space for the cards [all agree]", "[the screen] was too small to play properly [all agree]", "the screen was too small [all agree]") - for reference, a 10 inch tablet was used for the experiment. This resulted in some derived issues; there was not enough space on the screen for the cards ("not enough space on the screen for the cards [all agree]") or some text was difficult to read ("a bit hard to read the text on the small tokens"). These issues caused some frustration among the participants ("I didn't get a real impression, as we fiddled around with what to do; it didn't make sense where to move the walls and towers", "Too small screen or too large icons, I don't know. I tried to zoom in again and again, but you couldn't and then I accidentally moved some of the objects, which messed up the game a little [all agree]"), though most liked the game itself and some highlighted the fact that you play together ("I liked that we had to work together"). A few members of one group did not like the game, but it may not be the fault of this particular game ("A bit boring, I don't like games like this", "Me neither, board

games are not my thing"). This particular group took a different approach to the game than the rest. Because they thought the interface was lacking, something they shared with the other groups ("The drawing worked fine, but it was confusing as to where to place your cards", "it was a bit too fast and unintuitive, since the first card stayed on top"), they played the game their own way, by drawing one card at a time and then played it and repeated that 5 times, before moving on. If they drew a card they could not use, they could choose to discard it and draw a new one. They simply merged three steps together to create their own rule-set, which made more sense to them ("it was better to draw one card, then play it, then draw another", "We kind of did it our own way", "Yes, we drew one card at a time and played it up to five times and if we couldn't use it, we could discard it and draw an extra one").

Most answers regarding the chores revolved more on how the mechanics worked than on the actual execution of them. Everyone seemed to understand the mechanics ("a pretty basic mechanic, really", "I can't really see how it could've worked differently"). With the exception of the cards, the interface did not cause troubles for the players - besides the size of the screen in general - but the size of the cards and how the system handled them caused some issues, as when tapping on the castle deck, the first card would appear and every subsequent card would spawn directly beneath it, which was not apparent to the users. When trying to move a card and there was another beneath it, they would move the lower card instead("When drawing more than one card, the first stayed on top, so we thought something was wrong and kept tapping, until we realised they were all below that card", "It was difficult to look through your cards and pick the one to discard", "Again it was it little difficult to get the cards you wanted, if you stacked them and you wanted the top card, you had to move every card below that first"). One group managed to figure out that they could enlarge and minimise the cards, making they play easier ("But you could enlarge or minimise the cards, which was nice", "I liked that I could make them smaller, as they were too large to begin with") and one mentioned he would like to that in other games (" it's something I would like to do when playing other games").

In regards to the question about the monster movement, the one chore that was different from the two groups, there was not much that indicated a different in the experience. The automated groups stated that it worked well until the monster tokens reached the castle and they had to move the monsters back, if they passed through a wall. In the game rules, when a

monster moves into a wall, it keeps its position, loses 1 health point and the wall is removed. When the prototype did not account for that, the monsters moved through the wall ("Weird that you had to move some of the monsters back", "it worked fine until they got to the middle"). Some mentioned that the instantaneous movement was a flaw and it could have looked better with a smooth movement ("with some smooth movement, it could've looked good", "but they shouldn't move instantly"). The non-automated groups, on the other hand, found the interaction simple and one group mentioned it was the mechanic that worked best ("It was the thing, that worked best", "Very simple compared to the cards", "it was simple [all agree]"). One observation made during the play time of the test, was that the non-automated groups in general discussed the movement of the monsters ("oh, that one must move as well"), while the automated groups discussed the result of the movement ("oh no, they're getting close now").

Concerning the changes they would like to see, all groups were in agreement that the screen had to be larger and most groups suggested a better interface and feedback system ("oh, and special effects!", "put feedback on the die roll"). Three of the groups suggested some mechanics become automated ("Make some more stuff automatic, like the drawing of monsters", "when you draw a card, it should just move to your hand", "swipe the cards in the direction of the recipient") and one group discussed that if the game was to be multi-player, it should be online rather than on the same screen ("maybe not make it multi-player" followed by "maybe make it online? [all agree]").

The non-automated groups all felt to some degree that the game felt like a regular board game, but that the interaction with the system somehow made the game slower ("to some degree", "it was like playing an interactive board game, using the screen as a board instead of cardboard", "yes, but it was slower somehow"). This reverberated in the automated groups ("it was like some of the things were more difficult to do and others were easier"), but one group disagreed and felt that the perceived physics was an impediment ("there was a lot of physics things, that didn't work").

6.2 Discussion

All of the groups mentioned several flaws in the prototype design at some point during the interview. The main problem seemed to be the size of the screen, which was amplified by the sizing of the objects in the game, such as the cards, that were too large, and the monster tokens, that were too small, according to the participants. This caused frustration for several participants, which may have impacted their experience of the game as a whole. But these flaws were similar for every group and the execution of the tests were all alike, so this will likely not have affected the difference in the experience between the version of the game with the automated chore and the other version. The groups in the latter category seemed to like their version well enough or at least found it simple and easy to perform. The group trying the automated version instead found it troublesome, that they had to move some of the monsters back, when they moved too far. Judging from the reactions alone, it would seem the non-automated version was more successful, but I must consider the option, that the automisation was not implemented well enough. The monsters were not supposed to go move forward, when they encountered a wall. That is a direct deviation from the intent of the rules of the physical game and caused more work upon the players than intended and necessary. Had the monsters stood still, when tapping the "Move Monsters" button, it is possible the mechanic would have made more sense. In its current iteration it is instead a cause for confusion.

The interface of the prototype was also the target for several suggestion for improvement. Besides the obvious resizing of the screen, the combination of the small screen and the size of the cards made it difficult for the participants the get a clear overview of which cards they had on hand in those situations, where they had to use them, which were half of the steps in the "Order of Play". A couple of the groups suggested that the interface included some sort of hand management. Either there should space allocated for cards for each player or there should be a pop-up menu holding the cards, which the players could activate when they neede access to the cards. In the light of the head-wind the interface got, this seems like some very appropriate suggestions, which should be considered, in case there will be more development on the prototype. One group did however figure out a solution to the cards size issue. They found out they could enlarge and minimise the cards and turn them as well, which made the

management easier. While somewhat positive, this was an unforeseen feature, or rather a side-effect of the script asset, that controlled the dragging function of the objects. As the developer, I should have familiarised myself more with the asset I used, as it had more features, than I initially had wanted.

Another major issue on the interface was the flawed manner, with which the objects behaved when placed on top of each other. The top object was not the one, the user moved, when holding down on it and dragging it, but rather one of the lower placed objects. This was an issue, that caused unnecessary frustration with the participants and should have been resolved before the testing.

Seven of the eight groups did find the game similar to a physical board game, which indicates, that the retention of the board game feeling has been successfully executed. But from the data, it is impossible to know to which degree, they felt this. Two groups said they could imagine it as a board game, while others mentioned it seemed slower and more cumbersome. This can be linked to the messy interface that impeded on the participants' actions and made everything a little more inconvenient than necessary. But it was the fact that they had to do move the objects around themselves, that made them feel like it was a board game. This indicates that if the game had been fully automated, they might not have had the same experience. Whether or not the experience was more engaging is impossible to say at this juncture.

Most of the groups liked the game-play and the fact that they worked together. But this is product of the game's rules, rather than the execution of the test and the design of the prototype. The cooperative nature of the game enabled social interaction, but this interaction would have happened anyway, had the participants played the original game. And while the actual tests were executed according to plan, the fact that the answers from the participants relates more to the game itself, rather than the prototype is an indication that the method of extracting data was lacking. The questions could have been more pointed or explicit, or a different approach, such as a questionnaire with Likert scales might have worked better for this purpose.

One thing that was very positive was the one group that found the interface so obstructive, that they agreed on their own way to play the game. They even mentioned that it would not have been possible in a digital game. Instead of drawing up to five cards on their hands, they drew one at a time, which seems balanced according to the rules and my knowledge of the game. This

is positive in the sense, that the rigidness of digital games rarely allows the user to customise the experience themselves. Some of the other groups had suggestions for other automatised features and had they had the ability to turn them on, they might have had more enjoyment from the experience.

Chapter 7

Conclusion

This project aimed to find a relation between the automated features of digital board games and the implicit social interaction that helps create an engaging experience according to the following problem statement

To which degree should chores in a digital version of a board game be automated, in order to retain social interaction, but still provide an engaging (“board game”) experience?

Chores, or "house-work" - the actions the players must perform to update the game state - is both an enabler of play and social interaction. It was my opinion that automising these chores in digital games would remove elements of social interaction. In order to try and prove this, I designed and developed a digital version of the board game *Castle Panic* played on an Android tablet. It had a single automated chore, the movement of monsters, and it could be disabled to compare the experience of one group of test participants with another group, playing with the automated feature. The prototype, however, ended up having so many design flaws, that the process of performing task, that in physical games would provide little effort, such as the drawing of cards, became an obstacle to the players. Even the automated function, intended to make the game-play faster and more fluid, as it were in examples shown in **2.2 Digitisation**, coupled with the messy interface, instead made the users do extra work to redo some of the movements.

The participants liked the game mechanics and the team work it enabled, but that is a merit

of *Castle Panic*, rather than the prototype, but the fact that the players had to perform many of the chores themselves retained the perception of playing a board game. It also allowed the players to invent their own house rules, as were the case with a single group, something that is not allowed in most digital board game adaptations currently available.

These factors, along with the data gathering and evaluation methods, is not enough to solve the final problem statement. I cannot ignore the effects the flawed interface has had on the participants' experience of prototype, which leads me to believe, that this project is inconclusive. However, the one group that took advantage of the open system and made their own rules paired with the groups that wanted more automisation, shows me that there is potential in this research, which may help developers design "magical" experiences, that offers opportunities for both the casual player and those, who wants to customise their experience.

Appendix A

Ludography

A.1 Games Mentioned

Agricola - <https://boardgamegeek.com/boardgame/31260/agricola>

Agricola - All Creatures Big and Small - [http://www.pockettactics.com/reviews/review-agricola-all](http://www.pockettactics.com/reviews/review-agricola-all-creatures-big-and-small)

Arkham Horror - <https://boardgamegeek.com/boardgame/15987/arkham-horror>

Ascension Deckbuilding Game - [https://boardgamegeek.com/boardgame/69789/ascension-deckbuild](https://boardgamegeek.com/boardgame/69789/ascension-deckbuilding-game)

Baldur's Gate - <https://www.baldursgate.com/>

Bezzewizzer - <https://boardgamegeek.com/boardgame/32441/bezzewizzer>

Call of Cthulu - <https://www.chaosium.com/call-of-cthulhu-rpg/>

Castle Panic - <https://boardgamegeek.com/boardgame/43443/castle-panic>

Dominoes - <https://boardgamegeek.com/boardgame/2394/dominoes>

Dungeons&Dragons: Castle Ravenloft - [https://boardgamegeek.com/boardgame/59946/dungeons-drag](https://boardgamegeek.com/boardgame/59946/dungeons-dragons-castle-ravenloft)

Chess - <https://boardgamegeek.com/boardgame/171/chess>

Dungeons&Dragons - <http://dnd.wizards.com/>

Flames of War - <http://www.flamesofwar.com/>

Forbidden Desert - <https://boardgamegeek.com/boardgame/136063/forbidden-desert>

Go - <https://boardgamegeek.com/boardgame/188/go>

Gwent - <https://www.playgwent.com/en>

Hearthstone - <https://us.battle.net/hearthstone/en/>

Hearts Deluxe - <https://www.microsoft.com/da-dk/store/p/hearts-deluxe/9wzdnrcrfj3wl>

Hero Quest - <https://boardgamegeek.com/boardgame/22192/heroquest-advanced-quest>

Hex: Shards of Fate - <https://www.hextcg.com/>

King of Tokyo - <https://boardgamegeek.com/boardgame/70323/king-tokyo>

Liar's Dice - <https://boardgamegeek.com/boardgame/45/liars-dice>

The Lord of the Rings Dice Building Game - <https://boardgamegeek.com/boardgame/130912/lord-rings-dice-building-game>

Magic Duels - <https://magic.wizards.com/en/content/magic-duels>

Magic: The Gathering - <https://boardgamegeek.com/boardgame/463/magic-gathering>

Mahjong - <https://boardgamegeek.com/boardgame/2093/mahjong>

Mia - <https://boardgamegeek.com/boardgame/41247/mia>

Mice and Mystics - <https://boardgamegeek.com/boardgame/124708/mice-and-mystics>

Munchkin - <https://boardgamegeek.com/boardgame/1927/munchkin>

Neverwinter Nights - https://www.gog.com/game/neverwinter_nights_diamond_edition

Pokemon Trading Card Game - <https://boardgamegeek.com/boardgame/2165/pokemon-trading-card-g>

Poker - <https://boardgamegeek.com/boardgame/1115/poker>

Puerto Rico - <https://boardgamegeek.com/boardgame/3076/puerto-rico>

Risk - <https://boardgamegeek.com/boardgame/181/risk>

Risk: The Lord of the Rings Trilogy Edition - <https://boardgamegeek.com/boardgame/8107/risk-lord-rings-trilogy-edition>

Risk: Star Wars Original Trilogy Edition - <https://boardgamegeek.com/boardgame/22551/risk-star-wars-original-trilogy-edition>

Rummikub - <https://boardgamegeek.com/boardgame/811/rummikub>

Rummy - <https://boardgamegeek.com/boardgame/15878/rummy>

RuneWars Miniatures Game - <https://www.fantasyflightgames.com/en/products/runewars-miniatur>

Scrabble - <https://boardgamegeek.com/boardgame/320/scrabble>

Solitaire - <https://www.microsoft.com/da-dk/store/p/classic-solitaire-free/9wzdnrcrfj2sm>

Snakes and Ladders - <https://boardgamegeek.com/boardgame/5432/snakes-and-ladders>

Star Wars: Knights of the Old Republic - http://store.steampowered.com/app/32370/STAR_WARS__Knights_of_the_Old_Republic/

Tabletop Simulator - http://store.steampowered.com/app/286160/Tabletop_Simulator/

Teenage Mutant Hero Turtles: Shadows of the Past - <https://boardgamegeek.com/boardgame/180771/teenage-mutant-ninja-turtles-shadows-past>

Ticket to Ride - <https://boardgamegeek.com/boardgame/9209/ticket-ride>

Trivial Pursuit - <https://boardgamegeek.com/boardgame/2952/trivial-pursuit>

Twilight Imperium - <https://boardgamegeek.com/boardgameexpansion/22821/twilight-imperium-th>

Warhammer 40.000 - <https://warhammer40000.com/>

Warhammer: Age of Sigmar - <https://www.games-workshop.com/en-NO/Warhammer>

Wings of Glory - <http://www.aresgames.eu/games/ww1-wings-of-glory-line>

Wordfeud - <https://play.google.com/store/apps/details?id=com.hbwares.wordfeud.free&hl=da>

Words with Friends - <https://boardgamegeek.com/boardgame/132717/words-friends>

World of Darkness - <http://www.white-wolf.com/>

World of Warcraft - <https://worldofwarcraft.com/en-us/>

X-Wing: The Miniatures Game - <https://www.fantasyflightgames.com/en/products/x-wing/>

Yahtzee - <https://boardgamegeek.com/boardgame/2243/yahtzee>

A.2 Categories and Mechanics

Categories - <https://boardgamegeek.com/browse/boardgamecategory>

Mechanics - <https://boardgamegeek.com/browse/boardgamemechanic>

Appendix B

Castle Panic - How to Play

It is a cooperative game, where the players play against the game. The objective is to defend a castle in the middle of a hexagonal field from a horde of monsters approaching from each side. The field is divided in three colours (red, blue and green), which are separated further into two, creating six arcs in the hexagon. Inside the hexagon are five rings, running through each of the six arcs; the outer ring, called "Forest"; three inner rings called "Archer", "Knight" and "Footman" respectively; and the centre ring is the "Castle" ring. The "Castle" ring holds six outer walls and six towers. When all towers are lost, the players are all loose. The players can defeat monsters by attacking them with the cards on hand and besides some special cards, they can only attack monsters in the three inner rings. The card they use to attack must correspond with the ring and the colour the monster is placed in: if a player wants to attack a monster in the "Swordsman" ring in one of the red arcs, he must have a red swordsman card. When a monster has no more hit points (HP), it is removed from the table. When no more monster tokens are left in the pile, the players win the game. Monsters have a point value and the player with the highest score becomes "Master Hunter" and wins the game a little more than his fellows. This offers another opportunity for social interaction, as players can try and coerce the other players to do actions, that will benefit themselves the most. The rule set also offers the option to play without points so the game becomes only cooperative.

Each player takes a turn, one at a time and a turn runs as follows:

1. **Draw up.** The player draws cards until she has a full hand of cards. The amount depends on the number of players; 6 cards for 2 players; 5 cards for 3 to 5 players; 4 cards for 6 players

(each player starts the game with randomly drawn cards of the same amount).

2. **Discard and draw 1 card.** This is optional, as the player may be able to use all the cards, now or in a later turn. The discarded card goes into a discarded card pile and the active player may only discard one card per turn.

3. **Trade cards.** Also optional, the player can choose to swap a card with another player (if six players, they can swap 1 card with 2 players or 2 cards with 1 player). This enables tactical debate amongst the players, as they will try to figure out the sequence of the monsters movement and trade cards accordingly.

4. **Play cards.** The active player can play as many of the cards she has on hand as she wants to attack monsters. But it may be a good idea to hold on to a few, so she can trade them with another player. They can play the cards in any succession as long as they corresponds with the text printed on them. A played card goes into the discard pile. If a player attacks a monster, the monster loses 1 HP. Some monsters have just 1 HP and are thus removed from tables. A monster token is triangular and if a monster has more than 1 HP, it is represented by a number in a corner of the token. If a monster takes damage and has more HP left - the current amount of HP is pointed towards the centre of the board- the player must rotate the token so the current amount of HP points towards the centre. If it is reduced to 0 HP, it is removed from the table.

5. **Move monsters.** The active player moves all monsters on the board one ring closer to the centre. This may cause a monster to collide with a wall or a tower, in which case the wall or tower is removed and the monster takes 1 damage. If the monster is reduced to 0 HP, it is removed from the table and no player receives points for that monster. If a monster moves to the "Castle" ring and has more HP left, the next time it moves it is moved clockwise to the next arc.

6. **Draw 2 new monsters.** The active player draws 2 monster tokens from the pile. The tokens may not be a monster, but a special effect that causes players to lose cards, move the monsters or force the active player to draw more tokens this turn. She may also draw a boss monster, which can have a special effect on its own. These effects must be resolved resolved as they are turned. If it is a monster, then the player rolls a six-sided die, one side representing each arc and places the monster in the "Forest" ring in the corresponding arc.

This order of play is also available to each player in form of a card and is printed on two corners of the square board. This was also available to players of the prototype, as they can then easily keep track of their actions.

Appendix C

Data from Interviews

C.1 Questions

What was your general impression of the game?

Hvad er jeres generelle indtryk til spillet?

What did you think of how the card drawing worked?

Hvad synes I om den måde, man trak kort?

What did you think of how the discarding and redrawing worked?

Hvad synes I om den måde, man discardede og trak et kort?

What did you think of how the trading worked?

Hvad synes I om at bytte kort?

What did you think of how playing the cards worked?

Hvad tænkte I om at spille kortene?

What did you think of how the monster movement worked?

Hvad synes I om den måde, man flyttede monstrene?

What did you think of the drawing of monsters and placement?

Hvad synes I om den måde, man trak monstre på og placerede dem?

In regards to that, was there anything you would change?

I forlængelse af det, var der noget I ville ændre?

Was it a similar experience to playing a regular board game?

Var det en lignende oplevelse ift. at spille et normalt brætspil?

C.2 Answers

C.2.1 Question 1: What was your general impression of the game?

C.2.1.1 Automated groups

Group 1:

It was fun; a bit hard to read the text on the small tokens; weird how we had to read the physical manual; some of the objects were too small; not enough space on the screen for the cards [all agree]

Group 3:

interesting to work together for once; the size difference between cards and other things

were too big; too small text on the monsters, but readable if you looked close; I wanted to have been able to continue, as I think we could've won

Group 5:

A bit boring, I don't like games like this; Me neither, board games are not my thing; I found it interesting, it was easy to get into

Group 7:

Too small screen or too large icons, I don't know. I tried to zoom in again and again, but you couldn't and then I accidentally moved some of the objects, which messed up the game a little [all agree]; But you could enlarge or minimize the cards, which was nice; Very confusing interface, not pretty.

C.2.1.2 Non-automated groups

Group 2:

I liked that we worked together, so we could help each other when someone didn't know what to do; it was difficult to find space for the cards [all agree]; the background didn't fit with the rest of the graphics

Group 4:

[the screen] was too small to play properly [all agree]; I didn't get a real impression, as we fiddled around with what to do; it didn't make sense where to move the walls and towers

Group 6:

It was a bit boring that we had to move everything; but that's just like a real board game; the screen was too small [all agree]; fun mechanics;

Group 8:

I liked that we had to work together; the screen was waaaay too small, or the cards too big; yes, some of the other things were too small in comparison;

C.2.2 Question 2: What did you think of how the card drawing worked?

C.2.2.1 Automated groups

Group 1:

Okay, but the first card stayed on top, when you drew more cards; nowhere to put them; too little space

Group 3:

I would have liked some animation or something; and a space to place the cards, just like the discarded cards [all agree]

Group 5:

it was a bit too fast and unintuitive, since the first card stayed on top; it didn't make sense, as there was nowhere to put the cards; it was better to draw one card, then play it, then draw another

Group 7:

Again, too small screen; here I tried to zoom out; but you could turn the cards and make them smaller, so it worked; but it was tiresome

C.2.2.2 Non-automated groups

Group 2:

The drawing worked fine, but it was confusing as to where to place your cards; it was underwhelming, but I don't know what to expect

Group 4:

When drawing more than one card, the first stayed on top, so we thought something was wrong and kept tapping, until we realised they were all below that card; otherwise fine [all agree]

Group 6:

It didn't; it seemed to complicate things more than it should; it wasn't fast enough, like in real life

Group 8:

it was okay, I guess; I liked that I could make them smaller, as they were too large to begin with; it's something I would like to do when playing other games; a better interface could fix that, like a pop-up menu

C.2.3 Question 3: What did you think of how the discarding and redrawing worked?

C.2.3.1 Automated groups

Group 1:

It was actually pretty fast - move one card to the discard area, then draw one other [all agree]

Group 3:

It was difficult to look through your cards and pick the one to discard; it was simpler [than drawing], as it always only one card;

Group 5:

We kind of did it our own way; yes, we drew one card at a time and played it up to five times and if we couldn't use it, we could discard it and draw an extra one; it worked great for us, don't know if it screwed with the game, though

Group 7:

a pretty basic mechanic, really; there wasn't much to it - move one card here, tab, move another card there

C.2.3.2 Non-automated groups

Group 2:

It was okay, pretty basic [all agree]

Group 4:

I can't really see how it could've worked differently; there was this problem with the cards, that when one was on top of the other, you could move the one below, which sometimes made it difficult to choose the right card; wait, we could discard the cards?

Group 6:

it would've worked better if you chose a card and then got a new one, kinda like Solitaire or Hearts on older Windows versions; it was a bit bothersome, agreed; it happened at an annoying step - I wanted to do it before trading cards;

Group 8:

I kept forgetting I could do it, but the others reminded me; it was great that I could skip a card I didn't need, even if I got something equally useless, but then I could trade it later;

C.2.4 Question 4: What did you think of how the trading worked?

C.2.4.1 Automated groups

Group 1:

It was an okay mechanic, but I would've liked to be able to trade more cards; I guess that was to not make it too easy [all agree] Group 3:

It worked well enough. We discussed what to do and planned ahead and traded accordingly [all agree]

Group 5:

I didn't like how the management of how one's cards worked; it was a bit cumbersome; it made sense that it was only one card you could trade

Group 7:

I don't think I did it; you had to be careful not to push around wrong objects;

C.2.4.2 Non-automated groups

Group 2:

It made great sense; the big cards took up too much space and it was a little annoying pushing them back and forth from the screen; but the mechanic made sense [all agree]

Group 4:

Again it was a little difficult to get the cards you wanted, if you stacked them and you wanted the top card, you had to move every card below that first; very counter-intuitive [all agree]

Group 6:

it worked better than drawing the cards, but not much; maybe we were lucky with our cards, but it didn't seem like it was necessary to trade them

Group 8:

I think this was the core of working together, discussing who used what cards at what turn, compared to how the monsters moved [all agree]

C.2.5 Question 5: What did you think of how playing the cards worked?

C.2.5.1 Automated groups

Group 1:

Liked how you could just tap at a monster to attack it, like I'm hitting THAT monster and then it lost a life, or health point; it was awkward to try and get an overview of your cards with the small screen; some of the cards were difficult to understand in the beginning; it was fun to use the cards and say "I use this on this" and then move the card to the discard area and then hit or kill a monster

Group 3:

It went pretty fast once we had discussed all the possibilities from trading. So it was executed quite quickly [all agree]

Group 5:

yeah it was kind of just pushed together with drawing the cards; yes, we played them instantly; it was pretty easy to understand what the cards did

Group 7:

Again pretty basic, the colours represented the area and the name of the soldier the range; agreed, very simple, but the cards kept being in the way of each other

C.2.5.2 Non-automated groups

Group 2:

it was fun to figure out who should have which cards and play them; great collaborative play [all agree]; but the size of the cards made it a bit difficult to find the right one

Group 4:

the same with the previous answer - the top card were not the one you moved; very frustrating really [all agree]; I didn't understand when the monsters destroyed walls [all agree]; so we just improvised [all agree]

Group 6:

This was fun. We were doing pretty well, I think; discussing which monster were best to attack and laying a strategy worked well; it was pretty transparent to see which moves were the

best; I don't think we lost a wall at any point

Group 8:

this is where our planning came to unfold; "if you do this, then I can do this" is how we worked; it was great to see how what you have talked about worked and the monsters died and you rebuilt a wall; almost like clock-work [all agree]

C.2.6 Question 6: What did you think of how the monster movement worked?

C.2.6.1 Automated groups

Group 1:

okay in the beginning, but it was confusing when they just went through the walls and you had to move them back; and weird how they turned when inside the castle; but otherwise it worked fine [all agree]

Group 3:

weird that you had to move some of the monsters back; it was a good effect when they encroached on the castle; but they shouldn't move instantly

Group 5:

that was pretty cool, that we didn't have to do it ourselves; it worked fine until they got to the middle

Group 7:

I don't see why we couldn't do it ourselves; sometimes we even did, when they went too far; with some smooth movement, it could've looked good

C.2.6.2 Non-automated groups

Group 2:

It was the thing, that worked best; yes, there wasn't much to it, just move a monster here and there; the monsters were a bit small, so it took some tries sometimes

Group 4:

Very simple compared to the cards; it had the same problem with the cards [with latter drawn monsters spawning under the first]; I sometimes forgot to do it before drawing new monsters

Group 6:

it was easy enough to understand; we killed most of the monsters before they got to the walls, so we only had to think about that once or twice;

Group 8:

it was simple [all agree]

C.2.7 Question 7: What did you think of the drawing of monsters and placement?

C.2.7.1 Automated groups

Group 1:

it was a bit too exciting - at one point I drew the one, where you have to draw 3 extra and then 4 extra, so there was a lot of monsters on the board; that we had to read the rules for some of them was a bit droll;

Group 3:

this could also have used some animation; maybe worked automatically like when they moved, as it was boring

Group 5:

compared to the card drawing it was easier to perform; yeah, but I didn't like how we sometimes had to read the rules - I'd prefer the game tells me what to do

Group 7:

it was as simple as drawing the cards [all agree]

C.2.7.2 Non-automated groups

Group 2:

Same as before, a bit too small; weird that the black [monster draw] icon was a bit larger than the rest; the die could have used some sort of indication when it was pressed, because you can't know if it's a new random number, when the result is the same

Group 4:

Easier than the cards; it was pretty simply - draw a monster, roll the die, or tap the button as it were; it was an annoying break when you drew some of the special effects and had the look in the rules to know what it did

Group 6:

it was a pretty easy mechanic, but having to read the rules for some of them were a little annoying; the die roll may not have worked properly, since it showed the same number after tapping; but you can roll the same value on a real die as well [all agree]

Group 8:

it made the game exciting, since you didn't know where the monsters would attack from; so we had to figure out new tactics and that was pretty fun [all agree]

C.2.8 Question 8: Was there anything you would change?

C.2.8.1 Automated groups

Group 1:

the size of the different things [all agree]; make some more stuff automatic, like the drawing of monsters; larger screen; oh, and special effects!

Group 3:

Larger screen [all agree]; better interface and more feedback

Group 5:

Use a larger screen or maybe not make it multiplayer; maybe make it online? [all agree]; it should definitely have a better interface

Group 7:

larger screen, better interface, change some of the graphics [all agree]

C.2.8.2 Non-automated groups

Group 2:

Use a bigger screen or make the board larger; there was a lot of size issues, like too large cards and too small monsters; put feedback on the die roll

Group 4:

The cards!; make it so the last card drawn are on top of the others; some more space on the screen would be nice; or maybe just a larger screen [all agree]; do something about the towers, I don't know what;

Group 6:

Definitely a larger screen! [all agree]; when you draw a card, it should just move to your hand; and then the thing I said about the redrawing [it would've worked better if you chose a card and then got a new one]

Group 8:

the screen was way too small, so use a bigger one or design the interface, so you can play it on a smaller screen; make it so you could trade more cards between each other; yeah, and swipe the cards in the direction of the recipient, could be a cool effect

C.2.9 Question 9: Was it a similar experience to playing a regular board game?

C.2.9.1 Automated groups

Group 1:

no, not since some of the things were too small; there was a lot of physics things, that didn't work;

Group 3:

I could see it work as a board game; it was like some of the things were more difficult to do and others were easier; the interface and screen size could've been causing that [all agree]

Group 5:

I don't have much to compare with, but the fact that you had to do everything yourself kind of made it like a board game; we made our own rules - you can't do that with [digital] games [all agree]

Group 7:

I usually play more advanced board games, but I did feel like a board game; I felt it was confusing - the game was simple, but the interface made it messy

C.2.9.2 Non-automated groups

Group 2:

I guess so; to some degree; you basically had to do everything yourself, like with a board game, but the size of the screen and the weird controls just made it more inconvenient

Group 4:

except for the cards, yeah; it was like playing an interactive board game, using the screen as a board instead of cardboard; especially since the rules were lying on the table like that;

Group 6:

yes, but it was slower somehow; the small screen and the big cards made everything a bit messy, so it complicated things; I've never played a board game like this before [there are several games, where you work together] oh, then I guess it was pretty much like a board game. But a bit slower, yes.

Group 8:

I've heard of cooperative board games before, and I could imagine it worked like this; you can say that it's much like a board game, since you had to move things around yourself and the game didn't do anything for you

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