From board games to video games

Implications for the adaptation from physical to digital

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Abstract

Board games have been around for millenniums and are seen as a stable in almost every household. However, recently these beloved board games have been adapted from their physical form to the digital medium of video games. Two of the games that have followed this trend are Codenames and Mysterium, which are two great examples of modern board games, which use a mix of hidden information and cooperation to facilitate an interactive experience. This study looks into these two games, by setting up playthroughs of both the physical and the digitally adapted versions. This is done through eights gaming session, with two different gaming groups of four people, which is video recorded and transcribed. After the recording sessions, all transcriptions were analyzed through a thematic analysis. Three overall themes were found and examined in this study: player-to-game, player-to-environment, and player-to-player. These all relate to the main focus of this study, which is to understand the user experience of both board game mediums. To do this, the study looked into how the communication and interaction dynamics changed whether the games were played physically or digitally.

The findings of the study showed that there are very specific aspects of the game encounters that are of importance to the overall experience, as well as how the user experience differs from medium to medium. The study looks into how both verbal and nonverbal communication works in relation to the game encounter, as well as how the digital environment can implement both of these and change the experience. This also means, that the study gives a better understanding of how sociability is created within each medium, and how both players, environment, and the game itself is part of creating this social aspect of board gaming. Additionally, it looks into how video game elements are incorporated into the adapted versions of the games, by using automation, animation, and changing the general overview and flow of the game.

The study differs from existing literature by working closely with the empirical data to showcase how the themes found could happen in praxis. Therefore, it does not make assumptions about either medium, but instead seeks to find implications with both mediums. Through examples from the data, conclusions are drawn that highlight these specific implications, and showcases how they impact the overall user experience for players.

Keywords: *Board games, video games, adaptation, video recording, interaction design, user experience, digitized games, design, communication, game encounter.*

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1.0 Introduction

Board games have been around for thousands of years, making them a staple in almost every home. However, in the past few decades, board games have had a renaissance, as they have grown in popularity and variety (Woods, 2023a, p. 5-10). These newer board games, often referred to as either *hobby games* or *modern board games*, have expanded completely in their scope compared to the more classic board games. Including incorporating new and exciting themes, elements, and mechanics, these games differ greatly from classic games such as Backgammon, Mancala, or Scrabble. And a big part of many of these modern games is focused on the social interaction between players and the game, with games that focus on collaboration, social deduction, or other new mechanics. Therefore, design elements such as interactivity, user experience, engagement and sociability are at the forefront of designers' mind as they create these games (Woods, 2023a, p. 7-13).

Alongside the growth of the physical board gaming scene, a new genre of games has arrived. The digitally adapted board game, which is a video game that is based on a board game. These allow the player to play their beloved board games online, which takes away the barrier of needing all players to get together in the same room, which can normally be a scheduling issue. These digital board games can be everything from very close adaptations to adaptations with more creative liberty, providing a slightly different experience to the original game (Derakhshandi, Kolahdouz-Rahimi, Troya & Lano, 2021, p. 2-6).

Taking all of this into consideration, the question of comparison is at the forefront. How does the gaming experience change when we choose to digitize a game? Board games are often praised for being a more social experience in an age where we are constantly online. This research paper therefore seeks to look at how the sociability aspect changes, when we take the games online. To understand this, the analysis will look into how communication and interactions change from one medium to the other, to get a better understanding of the players' user experience. Focusing both on player-to-game changes, player-to-environment changes, as well as player-to-player changes. There is therefore an underlying assumption that these elements together are of importance regarding providing a social experience, as is explored further in the literature review (section 3.0).

1.1 Problem formulation

Based on all these considerations, the following problem formulation has been defined, to guide the research.

How do interaction and communication dynamics differ when playing physical board games compared to their digitized video game versions, and what are the implications for designing adaptations?

The assumption then is that getting a better understanding of the interaction and communication dynamics will give insights into the overall user experience for the players. The study

seeks to discern the differences between the two mediums, within key areas, such as sociability, physicality, design and more. As is apparent in the last part of the problem formulation, the research is especially of importance to game designers. The reasoning behind this, is that there is an aspiration towards creating digitized board games, which still have a high level of sociability (Radtke, Santillan-Jimenez, & Mohr-Schroeder, 2020, p. 47-49). The demand for games to be available in multiple mediums is high, and having digitized board games opens the board gaming hobby to a broader audience. However, if a digitized adaptation is poorly made, or does not foster the ideal experience, it could negatively impact the board gaming industry. In addition to this, as we live in an age where everything is digitized, we also have a social responsibility in researching how the different mediums impact us as human beings. Looking into the communication and interactions of players and the game therefore provides useful insights into not only the board gaming world, but also creates an understanding of the human experience and how we socialize.

The following three research questions (RQs) will guide the analysis section, which have been formulated to best answer the problem formulation:

1. How do players interact with the games, and which opportunities/issues arise with each medium?
2. How does the environment play a role in the overall experience of the game?
3. In which ways do the interactions between players differ based on the two mediums?

The reasoning for these three overarching themes chosen for each of the RQs will be described further in section 5.0.

1.2 Research framework

Following Creswell and Creswell's framework for research (2018a, p. 43), the following section will discuss the *research design*, the *philosophical worldview*, and the *research methods* used in this study. This will describe why and how the study was conducted, as well as explain how the knowledge and insights were gained, and how the conclusions were drawn. This study is based on qualitative data, which permeates all sections of the research framework, as will be seen in the following three sections.

1.2.1 Interaction analysis

In relation to the research design, this study will utilize interaction analysis as a scientific framework. Interaction analysis is used for qualitative research, as it focuses on the interactions among humans as well as between humans and artifacts (Jordan & Henderson, 1995, p. 39-40). Interaction analysis is closely connected to the methodology of video recording, allowing the researcher to not only view the phenomenon in real-time, but also view it an unlimited amount of time afterwards as part of the analysis. This therefore means that interaction analysis is generally an inductive research design, as it focuses on making general conclusions based on very specific data. In addition to focusing on humans and artifacts, interaction analysis also focuses on both verbal and non-verbal communication (Sharp, Preece & Rogers, 2019, p. 333-334).

As a framework it has roots in ethnography, as it uses video and transcripts of real-life situations to gain insights into the understanding of humans. It differs from ethnography because of its inane possibility of replaying the situation over and over again in the analysis process. It therefore works off the assumption that multiple watches of the same video data will result in a more accurate understanding of the phenomenon. Additionally, interaction analysis has an underlying assumption that actions and knowledge are inherently social, rather than purely in the individual's thoughts. Social interactions are therefore the focus for interaction analysis research, more so than the perceptions and cognitions of individuals (Jordan & Henderson, 1995, p. 40-42).

As interaction analysis is focused on video recordings, the amount of data is usually limited, as the data collection and analysis process are strenuous. Therefore, it is seen as an exclusively qualitative research design. With the qualitative research framework comes a certain amount of interpretation, as the researcher goes through the findings to discern patterns. While these patterns can differ from individual to individual, it is the researcher's responsibility to ensure that the patterns highlighted are representative of the data collected. This can be done by relying on multiple validity procedures to counteract this potential issue (Creswell & Creswell, 2018b, p. 273-276).

1.2.2 Pragmatism

When it comes to the philosophical worldview, this research is conducted with a pragmatic viewpoint. While studies sometimes hide their philosophical worldview, having transparency in this area will allow others to understand not just the results of the research, but also the context in which it is conducted, as this can impact the overall research approach (Creswell & Creswell, 2018a, p. 44). The pragmatic viewpoint is all about creating knowledge through action. According to the pragmatic viewpoint, something is true, as long as it works at that moment. In that sense, pragmatism is grounded in real-life situations, that focuses on action and change (Creswell & Creswell, 2018a, p. 47-48). Pragmatists are therefore not interested in conducting research simply because it is of interest. Instead, the focus of pragmatic inquiry is creating knowledge that can be used in praxis, to actualize changes in real-life situations (Goldkuhl, 2012, p. 139). In this sense, pragmatism also focuses on the future, with the idea that research can help us create a better tomorrow through action.

In relation to this research project, the focus is finding out more about the user experience through an analysis of the interaction and communication dynamics. The knowledge in this study, as was previously described, is done through video recordings. The connection to pragmatism then, is the idea that through playing the games, as well as through creating a recording of this, insights and knowledge can be gained by doing these actions, as is an inherent part of the pragmatic worldview. All of this with the purpose of finding implications for the design of adaptations, which is knowledge that designers can use in praxis as they create games, which also relates to the future perspective of pragmatism.

1.2.3 Research Methods

Lastly, the research method refers to the chosen methods of data collection and data analysis. It also refers to the way in which we interpret the data, ask questions about the problems, and finally the validation of the research itself (Creswell & Creswell, 2018a, p. 43). This will be explained in the next section 2.0, in which all the chosen methods are explained. Of course, these are chosen based on the problem formulation, as well as in relation to the philosophical worldview of pragmatism and the qualitative research design paradigm.

1.3 Games definition

While video games can take on many forms, console games, mobile games and computer games, this study will focus on video games for the computer. It is important to make this distinction, as it is very likely that the interaction between a person and the game is influenced by the physicality and technology connected to the device. As computers are highly common, more so than the different gaming consoles, while still having a large screen area for game components, as differs from the mobile phone, the computer was chosen as the most suitable candidate for comparison of board game to video game adaption experience for this study.

In regards to board games, there are of course many different genres of board games, some have a boards with dice, as many classic games have, but the more modern board games go in many different design directions, some utilizing sounds from apps, some much more focused on the dialogue between players than the components, and some not even having an actual game board. In this study, the two games Codenames and Mysterium have been chosen to represent some of the different aspects of games, which will be explained further in the following section.

1.4 Game descriptions

This section introduces the two games chosen for this study. While all the rules will not be explained, it will still give a thorough enough introduction if you are not yet familiar with the games or their specific mechanics. Additionally, the reasoning for choosing these particular games will also be explained in this section.

1.4.1 Codenames

Codenames is a team-based game, in which two teams compete in what is essentially a word game. The ‘board’ in Codenames is a 5x5 grid of cards, each with a different word printed on them. This means that the game has a variable setup, which is where the initial setup of the game changes each time depending on the cards drawn (Engelstein & Shalev, 2020b, p. 236-237). An example of the setup can be seen in figure 1.

Figure 1 - Codenames setup

Each team in Codenames has one person who plays as a cluegiver, who has to give clues that relate to certain cards, and one or more people who are the guessers, who have to guess the cards based on the clues given. Based on the indicator card below, the red team has to guess all the cards which correlate to the red squares on the card, and vice versa with the blue cards. The cluegivers are the only players able to see which cards are their team's cards. This means that this game is based on hidden information, in which important information is deliberately hidden from certain players, in this case the guessers (Engelstein & Shalev, 2020b, p. 232-233).

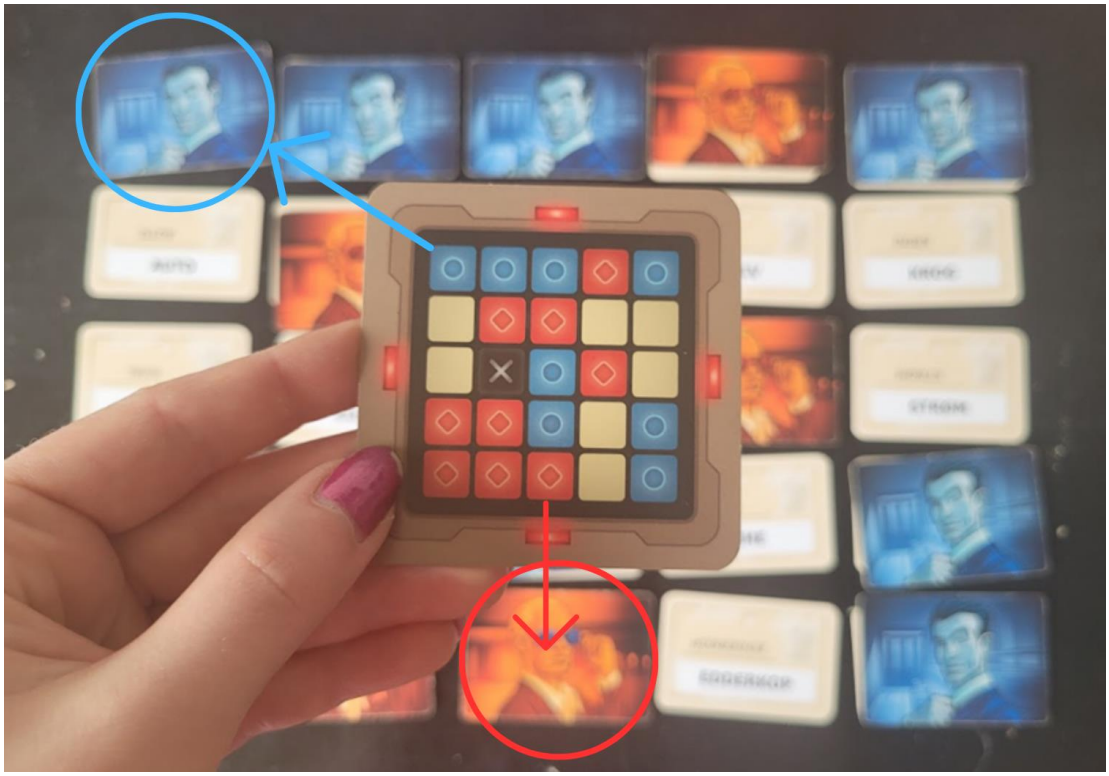

Figure 2 - Codenames indicator card

To give a clue, the cluegiver simply chooses a word, for example ‘fruit’, as well as a number, which describes the number of cards that correlate with that clue. Based on the clue ‘fruit, 3’, the guesser(s) then have to choose the cards, and if they choose correctly, an agent card will be placed on the guessed card(s). The team wins, once they have guessed all their cards correctly, or if they end up choosing the spy card, which is the one black card that will end the game immediately.

Figure 3 - Codenames end game

1.4.2 Mysterium

Similarly to Codenames, Mysterium is a game of giving clues, in order to guess the correct cards. Instead of being team-based however, Mysterium is completely cooperative. This means that all players play together to win against the game (Engelstein & Shalev, 2020a, p. 4-7). Again, one player is the cluegiver, in this game they are called the ghost, and the clues they give are not a word, but instead a ‘dream sight’, which is a card with rather abstract artwork, as can be seen in figure 4.

Figure 4 - Mysterium clue cards

The game is centered around a murder mystery theme, and each guesser has to find a possible murderer, murder location, and murder weapon. This is done through phases, where they get one or multiple clue cards, to guide them in their choice. Figure 5 below shows the full setup of the game, where all the possible murderers, locations, and weapon cards are laid out.

Figure 5 - Mysterium setup

The ghost player, or the cluegiver, is not allowed to give any indication of which cards the guessers should choose. To keep track of this, they have a player screen, which has each guesser's cards to guess, as shown below.

Figure 6 - Mysterium ghost screen

To win the game, all guessers have to get through all three phases, finding their corresponding murderer, murder location, and murder weapon. If they do this before their time is up, based on a limited number of rounds, the finale is triggered. In the finale, all the guessers individually have to guess which murderer did it, without being able to talk amongst each other. This is based on 1-3 cards revealed at the end by the ghost, and the number of cards depending on how high up the clairvoyancy track each player has gotten. If the majority of players guess correctly, the group has won the game.

1.4.3 Reason for choice

These games were chosen for this study for a couple of different reasons. First of all, they are both communication games, which have a certain level of limited communication. Limited communication games challenge the ways in which players would normally communicate, making them rely on inductive reasoning (Engelstein & Shalev, 2020b, p. 228-229). This will show how players communicate under difficult circumstances. The focus of this study is on communication, interaction, and sociability, and the communication element comes to view when looking at games with communication challenges, such as Codenames and Mysterium. The sociability aspect comes from the fact that the games are cooperative in nature, either completely cooperative, as in Mysterium, or team-based collaboration, as in Codenames. The underlying assumption is then, that cooperative experiences will create an even higher level

of sociability in the gaming encounter. Finally, the aspect of interaction, and in regards to this, the focus was on how the games had been translated to a digital version. These two games take very different approaches to the adaptation, and the interesting question then is, how does that change how players interact with the games. Based on these factors, the games were chosen because they both shared specific game mechanics, to allow comparison, while also differing enough to showcase different insights.

2.0 Methodology

The following section will introduce the methods used in this study to gather and analyze data. It will also explain how this is connected to the research framework, and the problem area as described in the problem formulation. For the study, it was chosen that two groups would be playing the two games, Codenames and Mysterium, in both their physical and digital form, while being recorded. All this is analyzed using thematic analysis and multimodal interaction analysis. The reasoning for these choices will be explained in the following.

2.1 Video recording

This study will use video recordings as the main data source for analysis. This relates to the interaction analysis research design, which uses video as a data source. These recordings allow the situation to be authentic, without too many interruptions (Davidsen & Kjær, 2018, p. 15-16). Video recordings provide the researcher with an opportunity to look at the data in two rounds, the initial session, in which field notes can be written, and questions that pop up along the way can be asked, followed by a more thorough investigation of the data afterwards. This means that you can both ask the big questions during the session, while also noticing the minute details of importance in the recording. (Davidsen & Kjær, 2018, p. 16-18). In relation to this, video recordings allow for both statements from the participants themselves, and how they interpret the situation, along with what they actually do, which sometimes differs from what they themselves will tell you (Davidsen & Kjær, 2018, p. 20-22). Video recording as a methodology is related to pragmatism, as it is anchored in everyday praxis (Heath, Hindmarsh & Luff, 2010a, p. 12-13). All of this concludes in an inductive methodology, in which specific observations and statements serve as a starting point for analysis and more general observations, a bottom-up methodology (Davidsen & Kjær, 2018, p. 29-31).

Video recordings can be an especially useful tool when you are working with a focus group, as it can be difficult to follow the many different interactions between the participants. As this study revolves around gaming in groups, it naturally becomes a type of focus group session. While focus groups are usually used in relation to interviews, it will in this study refer to the use of multiple participants at once during the session. Focus groups are interesting, because they allow the researcher to see not just what people will talk about, but also see how the participants interact amongst each other. (Bryman, 2016, p. 500-503). During the actual game encounters, players were encouraged to speak their mind by using the think-aloud method. Throughout the recording, players are prompted to explain their inner thoughts, by

using terms such as ‘I liked when...’ or ‘I felt frustrated when…’. This ensures that the interpretation of the data is much more reliable and valid, as it is based on direct statements from the users, rather than the researcher trying to interpret meanings without participant input (Charters, 2003, p. 68-76).

2.2 Sampling

When it comes to qualitative research, purposive sampling is the most common type of sampling (Mayan, 2009, p. 61-63). This type of sampling revolves around choosing study participants based on a specific purpose. This differs from non-probability sampling, which is often used in quantitative research, and which is all about ‘randomly’ or ‘specifically’ selecting participants to ensure an accurate representation of a certain group. Instead, purposive sampling, as used in this study, is all about choosing participants, who will provide useful insights into the topic at hand (Mayan, 2009, p. 61-63).

In this study, the focus is on how players will interact with each other and with the games in two different mediums. Each group would therefore interact with each of the games in both their physical and digital form. Therefore, it made sense to choose participants on the parameter of whether they were likely to try these types of games or not. This study consisted of two groups, each of four people, who are all gamers to an extent. Everyone chosen was familiar with both board games and video games, which was an important parameter. In addition to this, the participants were split into these two groups based on their internal affiliation. As this study seeks to create a natural everyday interaction, as mentioned in section 1.2.2 (pragmatism), it was preferred that all participants within a group knew each other, to ensure a less pressured situation. Because the study is based on two groups and two different games, it resulted in eight different gaming experiences, as can be seen in the table below. Each group would start by playing a game online, followed by an in-person session where they would play both games in their physical version, and finally ending up again with an online session. This was to ensure that there would be no bias in relation to trying a game first in either medium.

Game session #	Group A	Group B
1	Codenames, online Transcript A	Mysterium, online Transcript B
2.a	Mysterium, in person Transcript C	Codenames, in person Transcript D
2.b	Codenames, in person Transcript C	Mysterium, in person Transcript D
3	Mysterium, online Transcript E	Codenames, online Transcript F

Figure 7 - Sampling groups

2.3 Practicalities of video recordings

While having video recordings can be a very useful analytical tool, it is also a method that comes with many practical considerations in regards to the setup of the equipment, management of the large data sets, as well as ethical considerations. When recording, you need to consider what equipment you have available, and test the setup before the actual recording session. Some cameras have built-in audio devices, but the quality can be rather low, making it very difficult to hear (Mortensen & Hazel, 2018, p. 63-70). Another audio recording source might be needed, especially when working with multiple people at once. It is also possible that multiple cameras or microphones are needed depending on the specific situation, and how many people/angles you need recorded (Heath, Hindmarsh & Luff, 2010c, p. 53-56). While having many cameras might seem ideal, as it can show as much as possible, it is also important to remember that if participants are constantly reminded of being recorded, they might lose their immersion in the situation (Mortensen & Hazel, 2018, p. 68). Participants might also feel pressure and discomfort in video recordings, which means the researcher needs to establish a certain level of trust, to counteract this potential issue (Heath, Hindmarsh & Luff, 2010b, p. 15-17). It is especially important to have authenticity because both interaction analysis and pragmatism has roots in the study of real-life everyday situations, meaning if the participants feel too pressured, it might become too unrealistic, making the study invalid.

Organization of data is also important to consider, as the data files are usually rather large files. Everything should be copied and saved in multiple ways with back-ups, in case one file is lost or corrupted. They should also be organized in such a way it is easy to distinct each file. If you have multiple sources, multiple cameras, or audio recordings, you should consider how these should be mixed together or kept separate, to make the analysis process as easy as possible. Having a good editing tool can ease this process and allow you to make notes throughout long recordings (Mortensen & Hazel, 2018, p. 72-84).

Because participants will be recorded, both their statements, voices, and faces will be used for the analysis, making it important to consider the ethical implications of video recordings. Therefore, each participant needs a thorough description of the ways in which their likeness will be used for research purposes before they agree to participate (Asmuß, 2018, p. 47-54). They also need to sign a formal consent form, in which the legal issues are described (Heath et al., 2010b, p. 17-19). The consent forms are created using the Aalborg University consent form template and can be found in appendix 7.

2.3.1 Recording setup in this study

This section introduces the actual setup used in the study for the physical game meetups, as well as the online setup. This is meant to give an understanding into how the data used in the analysis was collected. This research is based on six different recordings, which used two different recording setups, based on whether it was the physical playthrough or the digital playthrough.

The physical game session recordings included three camera angles and one microphone. While all cameras also record audio, a single file with no interruptions is preferred when transcribing, which is why an audio-only recording was also used. Additionally, having a small microphone placed in the middle of a session prevents issues with directional sounds, allowing all players to be heard equally. To capture the actual gameplay, a camera was set up pointing directly down towards the board, as can be seen below. In regards to the analysis, this camera view also allows for context, making it much easier as a researcher to understand any given situation.

Figure 8 - Camera setup - game board camera

In addition to this camera, there were two other cameras, pointing at the players sitting at each side of the table, as can be seen in figure 9. These cameras are here to capture players' reactions, non-verbal communication, and interactions. Again, it also helps provide a sense of context for the analysis, and screenshots from these recordings will be used throughout the analysis.

Figure 9 - Camera setup - people camera

In figure 10 below, the setup of these cameras can be seen in a top-down view. The green and blue cameras film the people on the two sides of the board, whereas the red camera films the game table.

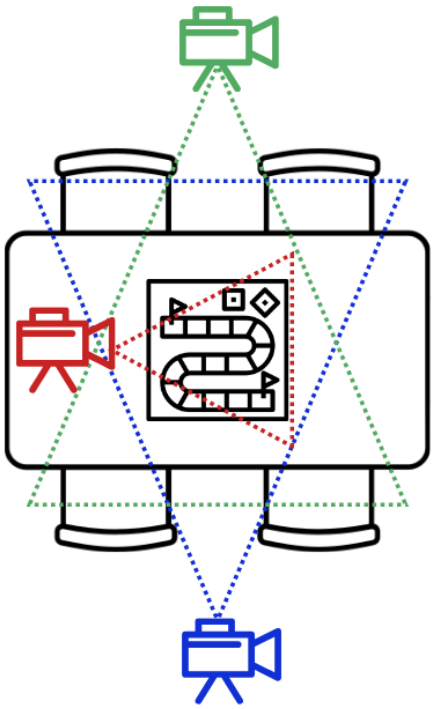
Figure 10 - Camera setup

The digital gaming setup was much simpler. All participants had their own cameras and microphones connected to their own computers, and by joining the online call, these were automatically connected. To create an online call, the program Discord was used, as all players were familiar with it. To record the actual gameplay, the recording software OBS was used, as it allowed the recording of both Discord video and audio, gameplay of both Codenames and Mysterium, and finally recording the researcher's own voice. In this sense, OBS connected all the different sources into one file, making both transcription and analysis easier.

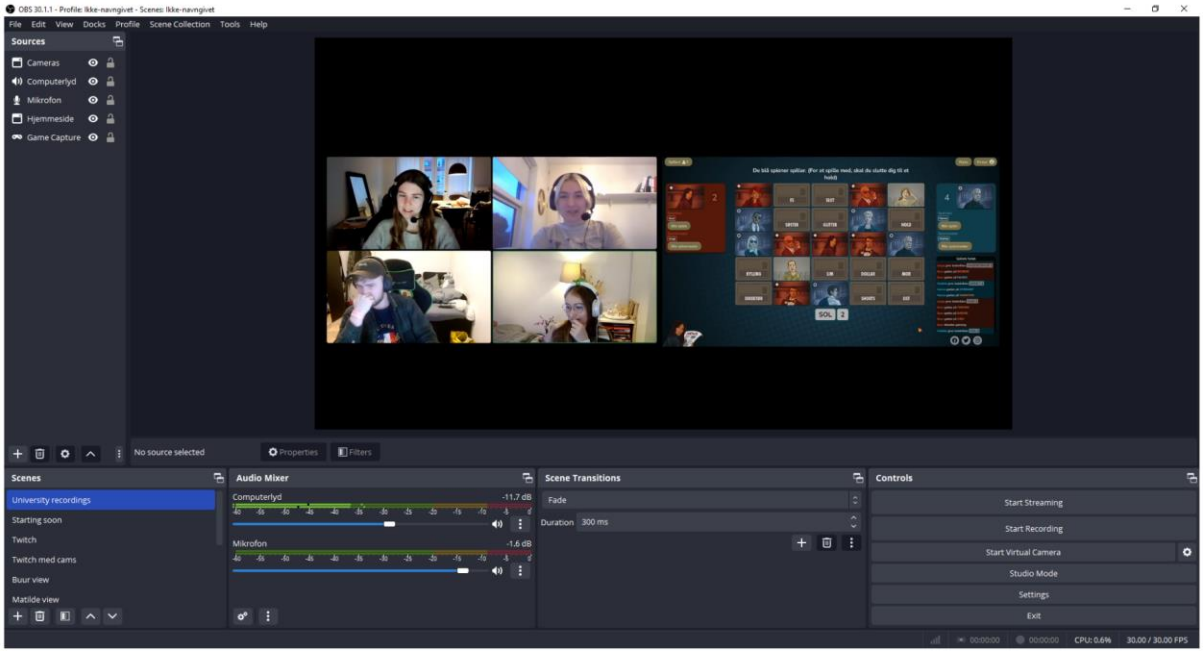

Figure 11 - Digital recording setup in OBS

2.3.2 Transcription

After the videos have been recorded, the next step is to transcribe them in order to be used in analytical research. Transcriptions allow the researcher to showcase the interactions originally happening in video form, by both writing down the words spoken along with the actions taken by participants (Bryman, 2016, p. 503). This is a useful tool, as it allows the researcher to not only analyze what is said, but also how it is said (Bryman, 2016, p. 479-483). Transcription works as a framework for the analysis, which means that to be able to compare different sessions, it is important all transcriptions are made following the same rules (Davidsen & Krummheuer, 2018, p. 87-89). Because this video analysis is focused on interactivity between participants and the game medium, the transcriptions will be focused on closely resembling the actual situations, unlike interview transcriptions, which do not include things such as actions, intonations, or people talking over one another. Having these included in the transcription allows the researcher to analyze a situation very closely, and to discuss instances which might normally be overlooked (Davidsen & Krummheuer, 2018, p. 90-93).

Before transcribing the recordings, it is important to choose which level of thoroughness is needed. As transcribing can be very time consuming, especially for longer recordings, you need to consider how much detail is needed. Depending on the research purpose, it might make sense to transcribe all material loosely, whilst other times it is more significant to

choose specific moments of a longer recording and describe them extremely closely (Davidsen & Krummheuer, 2018, p. 94-103). In this study, all gaming session have been transcribed loosely in appendix 1-6. However, the section chosen for the analysis have been translated, from Danish to English, and the approach to transcription is more thorough, adding in actions and descriptors.

2.4 Thematic analysis

The analysis in this study is based on a thematic analysis and coding methodology. This methodology is very prominent in qualitative research, as it is a very flexible toolset for analyzing large qualitative datasets. Thematic analysis is all about identifying patterns in your data, with the purpose of analyzing and reporting these themes in a research paper (Braun & Clarke, 2006, p. 77-81).

Braun and Clarke (2006) defined a six-phase approach to thematic analysis. Starting by *familiarizing with the data*, which in this report is done by transcribing the sessions as well as looking through the videos (Braun & Clarke, 2006, p. 86-93). Then comes *generating the initial codes*, in which the data is looked through with the idea of indexing excerpts. This is often done by writing notes in the margin, whenever something is of interest (Bryman, 2016, p. 581-584) This initial coding is not done with certain themes in mind but is only done focusing on the actual data. After the initial coding comes *searching and reviewing themes*, followed by *defining and naming themes* (Braun & Clarke, 2006, p. 86-93). This is the part of the process when the initial codes come together, and patterns are found. All codes and themes in this study can be found in the transcriptions in appendix 1-6, organized using a color-coded system. The final phase is *producing the report* (Braun & Clarke, 2006, p. 86-93), which is the chosen extracts that will be shown in the analysis. These have been chosen to best represent the present themes and give a rounded understanding of the full dataset.

Fereday and Muir-Cochrane (2006) additionally proposes that coding and thematic analysis can take on a hybrid approach. Switching between inductive and deductive in approach, the analysis will be based on a much more rigorous process (Fereday & Muir-Cochrane, 2006, p. 80-84). In this study, the coding used this hybrid thematic analysis approach, as the codes were partly based off the knowledge gathered from the literature review, which leans more into deductive reasoning, while also allowing for the possibility of new themes to arrive throughout the coding process, utilizing a more inductive approach.

Based on the thematic analysis, and this hybrid approach, this study ended up with three overarching themes: *player-to-player*, *player-to-environment*, and *player-to-game*. As mentioned, these were found partially based on the literature review, which highlighted some potential areas of interest, while also allowing for the data itself to bring new areas of interest into play. Under each of these overarching themes, this study will present a series of underlying themes. These can be seen in figure 12, and they were found during the analysis process, during which different categories started to form.

Themes found based on thematic analysis		
Player-to-game	**Player-to-environment**	**Player-to-player**
Overview	Distractions	Non-verbal communication
Video game elements	Flow and breaks	Cooperative interactivity
	Digital setup	Verbal communication
		Explosions of talk

Figure 12 – Themes and 'under themes'

The analysis follows the three overarching themes, as well as the underlying themes, to help guide the reader through the large amount of data. It is also important to note, that while the analysis will introduce examples from the data from each of these themes, not all examples will be brought up. This has been done partially for ease of read, and because of the scope of the research. All the color-coded transcriptions and themes, however, can be seen in appendix 1-6, which shows how the themes came to fruition in the transcriptions.

2.4.1 Multimodal interaction analysis

Multimodal interaction analysis is based on ethnography, conversation analysis and sociolinguistics. While conversation analysis is focused purely on the spoken words, multimodal interaction analysis focuses on all modi, such as body movement, facial mimicry, body language, and other actions in relation to the spoken words. In this multimodal interaction analysis, the underlying assumption is that both the spoken words and the actions of the body, is of equal importance for how humans understand interactions between each other (Paasch & Raudaskoski, 2018, p. 151-158). As this study focuses on the interaction between humans and a game medium, this analysis framework is useful for investigating both parameters.

The process of making a multimodal interaction analysis starts by going through all videos and doing the initial coding. You can code based on many different aspects, such as the different actors, specific actions, certain movements, objects, or other. After the overall coding, comes the process of choosing specific sequences for the analysis. As a multimodal interaction analysis consists of many transcription elements, it is generally common practice to choose extracts from a recording that showcases an interesting finding. This way, you can describe and analyze all the nuances of a given extract (Paasch & Raudaskoski, 2018, p. 158-165). The actual process is therefore very similar, albeit perhaps slightly simpler, than the thematic analysis. They are therefore used simultaneously in this study, as thematic analysis refers to the coding and theming of the written word, and multimodal interaction analysis focuses on adding these other actions, such as interactions that are focused on movement, objects, or other physical properties.

3.0 Literature review

The following section will introduce existing literature within the research field of adaptation of board games. The purpose of this review is to gain an understanding of what literature and knowledge that has already been acquired within the topic, to ensure that the research conducted in this study positively attributes to the research field as a whole.

3.1 Search and writing process

The process of conducting the literature review in this study was inspired by Machi and McEvoy's six steps model (2022, p. 6-9). This model is applied to guide both the preliminary searches, as well as the actual writing of the literature review. The first step is to *select and define a topic*, in which the actual problem of the research is reflected upon (Machi & McEvoy, 2022, p. 23-40). After this is to *develop the tools for argument* which is all about defining the process for gaining insights in the study (Machi & McEvoy, 2022, p. 47-67). Only after these preliminary exercises comes step three, which is the actual *search for the literature*, in which search terms are used to gather relevant literature (Machi & McEvoy, 2022, p. 73-96). The search terms, engines, and chosen literature is found in the following section 3.1.1. After the search was done, step four was about *surveying the literature*, where the findings are organized and analyzed with a logical structure in mind (Machi & McEvoy, 2022, p. 101-121). Additionally, step five is about *critiquing the literature*, which can showcase how some articles might agree or disagree, and how this particular study works in relation to these (Machi & McEvoy, 2022, p. 127-150). The final step of the model is the actual *writing of the review*, in which findings are presented in a readable and accurate way, to give an understanding of what basis the study is conducted upon (Machi & McEvoy, 2022, p. 155-179). While not all the steps are explicitly showcased in this section, for clarity's sake, the search findings will still be introduced in section 3.1.1 as well as the completed literature review in section 3.2.

3.1.1 Findings

The table below showcases the chosen search terms, written as boolean searches, the results, the search engine used, as well as which articles were chosen for the literature review. The reasoning for this is to ensure transparency in the research, and to explain the overall process of finding the literature that is of relevance.

Search no.	**Search terms**	**Results**	**Search engine**	**Source**
1	'board game' AND 'video game' AND 'adaptation'	6	EBSCOhost	Radtke, R., Santillan-Jimenez, E., & Mohr-Schroeder, M. (2020). Collaboration by Design: Development of a Video Game for Energy Literacy. International Journal of Designs for Learning, 11(2), 46-54.

2	-‖-	22	ProQuest	Booth, P. (2018). MISSING A PIECE: (THE LACK OF) BOARD GAME SCHOLARSHIP IN MEDIA STUDIES. Velvet Light Trap, (81).
2	‘-‖-	22	ProQuest	Martinez, L. é, Gimenes, M., & Lambert, E. (2023). Video games and board games: Effects of playing practice on cognition. PloS One, 18(3), 1-18.
2	-‖-	22	ProQuest	Olivares-Rodríguez, C., Villagra, P., Mardones, R. E., Cárcamo-Ulloa, L., & Jaramillo, N. (2022). Costa Resiliente: A Serious Game Co-Designed to Foster Resilience Thinking. Sustainability (Basel, Switzerland), 14(24), 16760.
2	-‖-	22	ProQuest	Maurer, B., & Fuchsberger, V. (2019). Dislocated Boardgames: Design Potentials for Remote Tangible Play. Multimodal Technologies and Interaction, 3(4), 1-24.
2	Pearl growing method	N/A	N/A	Kocurek, C. A. (2018). Play, Things: Games, Materialism, and the Production of Culture. The Velvet Light Trap, 81(1), 66-70.
3	‘board game’ AND ‘video game’	63	ProQuest	Thi Nguyen, C. (2020). The Arts of Action. Philosophers' Imprint, 20(14), 1-27.
3	-‖-	63	ProQuest	Derakhshandi, M., Kolahdouz-Rahimi, S., Troya, J., & Lano, K. (2021). A model-driven framework for developing android-based classic multiplayer 2D board games. Automated Software Engineering, 28(2), 7.

3	Pearl growing method	N/A	N/A	d'Astous, A., & Gagnon, K. (2007). An inquiry into the factors that impact on consumer appreciation of a board game. The Journal of Consumer Marketing, 24(2), 80-89.
4	'board games' AND 'Video games' NOT 'medical' NOT 'Augmented reality' NOT 'virtual reality'	365	Google Scholar	Frapolli, F., Brocco, A., Malatras, A., & Hirsbrunner, B. (2010). FLEXIBLE RULES: A Player Oriented Board Game Development Framework. Achi, , 113-118.
4	-||-	365	Google Scholar	Wallace, J., Pape, J., Chang, Y. B., McClelland, P., Graham, T. C., Scott, S., & Hancock, M. (2012). Exploring automation in digital tabletop board game. Computer Supported cooperative Work, , 231-234.
4	-||-	365	Google Scholar	Feng, Z. (2023). Heuristics for Board Game Usability Testing., 1-4.
4	-||-	365	Google Scholar	Kiss, G. Z. (2023). Changing Rules While Playing: On the Affective Potential of In-Game Rule Changes. Hungarian Journal of English and American Studies, 29(2), 401-419.
4	-||-	365	Google Scholar	Rogerson, M. J., Gibbs, M. R., & Smith, W. (2015). Digitising Boardgames: Issues and Tensions., 1-16.
5	'Video game' AND 'heuristics'	471	Google Scholar	Desurvire, H., & Wiberg, C. (2009). Game Usability Heuristics (PLAY) for Evaluating and Designing Better Games: The

				Next Iteration. (pp. 557-566). Springer Berlin Heidelberg.
5	-||-	471	Google Scholar	Ballew, T. V., & Jones, K. S. (2006). Designing Enjoyable Videogames: Do Heuristics Differentiate Bad from Good? Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 50(5), 646-650.
5	-||-	471	Google Scholar	Ozdowska, A., Sweetser, P., & Daiiani, M. (2023). A Scoping Review of Heuristics in Videos Games Research: Definitions, Development, Application, and Operationalisation. Proceedings of the ACM on Human-Computer Interaction, 7, 402-424.

Figure 13 – Findings in literature review

3.2 Related work - board and video games

The following section comprises central points and views from the literature introduced in section 3.1.1. The literature review will introduce main themes both within board game and video game research, as well as research revolving adaptation from one medium to another. The section has been divided into main themes for ease of understanding.

3.2.1 Introduction

Both the board gaming and video gaming industry have had massive growth within the last few decades, racking up approximately 150 billion USD for video games and 7 billion USD for board games (Martinez, Gimenes, & Lambert, 2023, p. 1). While the video gaming industry truly started flourishing with the widespread use of computers and consoles, board games have been around since ancient times (Derakhshandi et al., 2021, p. 5). Even though board games have been around for much longer than video games, the amount of academic research about board games is very sparse, especially when it comes to research about the user experience of board games (Maurer & Fuchsberger, 2019, p. 4). Which is rather exceptional considering most of the population owns board games, whether it be chess, Monopoly, or one of the more modern board games (Booth, 2018, p. 57). And while these games, especially the classic board games, have relatively simple rules and setup, making them accessible to most, even the simplest video game requires a complex development process of programming and design (Derakhshandi et al., 2021, p. 2-4). The modern board games are however also becoming more and more complex, meaning that creating either game is an arduous process.

3.2.2 The sociality and physicality of games

While some board games have been digitized, it is far from the most common practice, and the research on this digitalization, or adaptation, from board games to video games is rather scarce (Martinez et al., 2023, p. 3). Therefore, the following section seeks to determine some of the similarities and/or differences between the two mediums, focusing mainly on the sociality and physicality of games, while section 3.2.5 will go into the few research examples there are available on this adaptation process.

While some video games are to be enjoyed as multiplayer, the majority of video games are a solo experience. The opposite is true for board gaming, whereas some games can be enjoyed solo, the majority of board games are played in groups in person (Martinez et al., 2023, p. 3). This of course lends itself to the question of how big a part of board gaming is the sociality aspect, and how this differs from video games. Because playing board games is inherently a social activity, it can be described as a facilitator for togetherness amongst people (Maurer, & Fuchsberger, 2019, p. 1). While video games can create a feeling of connectedness in some cases, it can almost be seen as a requirement for board gaming, as you are simply not able to play most board games without directly meeting with people and communicating (Martinez et al., 2023, p. 3). The sociality of games is also connected to the physicality of games, as we sit down around the table to play a board game, we set up the game board, give each player their own components, pass dice from one another, move around pawns or coins or cards etc. The physicality is a shared experience that is largely unique to board games, as compared to video games (Maurer & Fuchsberger, 2019, p. 1).

Of course, there is also a tactility connected to playing video games, as you click around with your mouse and keyboard, or perhaps the feeling of pressing the buttons on your controller, as well as the light that emanates from the computer, the sound of the fan or other small tactile experiences (Kocurek, 2018, p. 66). However, compared to the social physicality of board games, these experiences pale in comparison. When discussing the social physicality of board games, you can see players hiding their cards from one another, or moving cards so that they are displayed in your preferred way, you might fidget with pawns or chips, as you wait for a particularly slow player, and in cooperative games you can easily point or pick up things that you are discussing. These are all tactile experiences that you would not see in video games or digital adaptation (Maurer & Fuchsberger, 2019, p. 16). According to Maurer & Fuchsberger, there are four themes of materiality in board games; 1) the game box, in which the game is packaged, 2) the games' component and board, which the games is played using, 3) the actual environment within the game is played, which relates to everything physically around the game and the players, and lastly 4), which is all potential customizations that the players have made (2019, p. 4).

The idea that not only the board game itself is part of the physicality, as apparent in the first two themes, but also other surrounding physicalities, the last two themes, impact how we experience the game, is very significant when we discuss the actual play experience. It means that the board game itself, as you buy it, is only responsible for a part of the experience

(Booth, 2018, p. 58). As you open op the game box, set up the game board and pieces, look through the rulebook, you as a player are interacting with the physical product of the game. But it is not actually a game until players sit down to play it and interpret this physicality. (Booth, 2018, p. 58-59). Board games are therefore dependent on the players, and the game encounter can almost be seen as a co-creation between the players and the board game (Olivares-Rodriguez, Villagra, Mardones, Cárcamo-Ulloa, & Jaramillo, 2022, p. 4), as we interact with not only the physical components, but also the people surrounding us, and the physical environment in which the game is played. Sociality and physicality are therefore closely connected when we discuss board games. A big part of game design is focused on not just the game itself, but on the actual active play experiences. Being able to create a space in which the choices seem interesting, or the movement of the components cause excitement, is very important in regards to the players' experience of the game (Nguyen, 2020, p. 5).

While it is of course possible to try and ingrain some of these physical and social aspects into a digitized game, for example by adding animation and sound effects to a dice roll, to emulate this experience and thrill (Maurer & Fuchsberger, 2019, p. 16), or by adding animation or video chatting, to also add the non-verbal signaling (Maurer & Fuchsberger, 2019, p. 11), the physicality of board games will always remain higher than video games. You could also argue, that because video games have less physicality, they get around certain issues related to the physical properties of games, such as card bending, accidentally revealing your cards, or spending a long time setting up the game (Maurer & Fuchsberger, 2019, p. 10-12).

3.2.3 The 'good' game

To understand the user experience of games, it is also important to understand what makes a game 'good'. In the research paper 'An inquiry into the factors that impact on consumer appreciation of a board game', d'Astous and Gagnon (2007) looked into some of the distinct factors that make a board game enjoyable. They looked into seven factors: comprehensibility, entertainment value, rhythm, unexpectedness, player control, challenge level and fantasy potential (d'Astous & Gognon, 2007, p. 82). All these factors impact player appreciation; however, some are of higher importance than others. For example, among their test participants, practically everyone agreed that for the game to be enjoyable, the rules should be clear and concise, relating to the comprehensibility factor (d'Astous & Gognon, 2007, p. 81). In general, one of the biggest obstacles in game design, both for video games and board games, is in how to clearly define the rules and how to teach them to the players in ways they can understand (Derakhshandi et al., 2021, p. 19). In board games, it is most common that one player learns the rules from the rulebook, and then subsequently passes these rulesets along to the other players. In video games however, the rules are usually taught by the game itself, meaning that the agency in rules teaching is passed from the player over to the game system itself (Maurer & Fuchsberger, 2019, p. 13). In a way, this is connected to the factor of player control, as you pass this responsibility over to the game, you are no longer able to course correct along the way, for example, if a player makes a mistake, because they misunderstood the rules, a video game does not usually allow you to go back a turn or two to redo an action. On the other hand, giving up this control could perhaps make the learning experience easier, if

the rules explanation is clearer and more concise when giving from the expert that is the game system. Another factor that practically everyone agreed to was that a game should be entertaining (d'Astous & Gagnon, 2007, p. 86). While this might seem self-explanatory, it is also one of the more difficult to measure factors, as an entertainment value is a very subjective parameter, that most likely differs greatly from person to person. This also explains why modern board games cover a variety of different genres, game mechanics, and complexities, so that everyone can find a game they think is entertaining.

When it comes to unexpectedness, or the level of surprise, as well as the rhythm of the game, d'Astous & Gagnon found a difference between male and female participants. The element of surprise was significant amongst male players' appreciation, while amongst female players it was not significant. And the situation was flipped when it came to the rhythm of the game, which was of significant importance for women, but not for men (d'Astous & Gagnon, 2007, p. 86). What we can determine based on this, is that while these two factors can impact player appreciation, the lack of universality must mean they are not of equal importance as the comprehensibility and entertainment value factors are.

Other researchers highlight different aspects of importance, when discussing the enjoyment of board games. Such as Rogerson, Gibbs and Smith, who highlights sociality, intellectual challenge, variety and materiality (Maurer & Fuchsberger, 2019, p. 4). Interestingly, this idea of intellectual challenge, which is highlighted in both Maurer & Fuchsbergers', and d'Astous & Gagnons', research, is an area to be debated. In Martinez et al.'s research paper 'Video games and board games: Effects of playing practice on cognition (2023), they argue that people who play board games, are often people in the 30–40-year range, who are highly educated. So, while there is an idea that board games should impose an intellectual challenge, it is also possible that it is impacted by the general board game audiences' level of education and desire for intellectual challenge (Martinez et al., 2023, p. 14). This also relates to one of the motivational factors that d'Astous and Gagnon highlight in their text, called sentiment of competence (2007, p. 81). This refers to the satisfying feeling of making the puzzling nature of the game come together. In addition to this, they highlight four other motivational factors, 1) intrinsic satisfaction, 2) stimulation, 3) perceived freedom, 4) pleasure, and 5) sentiment of competence (d'Astous & Gagnon, 2007, p. 81). While these are not direct indicators of what makes a game 'good', they still indicate why people enjoy playing games, making them periphrastically connected.

3.2.4 Game categories

One aspect that was discussed in multiple articles was how to determine and distinguish the different game classifications and 'features'. While most articles refer to this with different terminology, they describe similar areas of interest, which is what type of game it is, and what the game consists of.

One way of determining the features of a board game is distinguishing between structural features and behavioral features (Derakhshandi et al., 2021, p. 27-28). The structural features refer to the physical components or game states, such as the board, cards, dice, how many players etcetera. The behavioral features however are more grounded in the interaction elements, such as moving elements, changing turns, throwing dice, playing sound etcetera. These can both refer to player interaction, or in the case of video games, how the system acts. They also distinguish these behavioral features by whether they are compulsory game features or arbitrary game features, which can be a helpful distinction when it comes to the adaptation design process (Derakhshandi et al., 2021, p. 27-28).

Another way of categorizing the game features is to distinguish between what is referred to as task variables, situational variables, and individual variables (d'Astous & Gagnon, 2007, p. 81). Task variables refer to features such as the rules of the game as well as the different possible actions a player can choose between. Situational variables refer to how other players' move throughout the game, or how the game state changes at certain times. Finally, the individual variables refer to the individual people surrounding the table, such as their individual level of expertise or competitiveness (d'Astous & Gagnon, 2007, p. 81).

A third way of looking at games is through three lenses, especially with a focus on remote games, which are; physicality, agency, and time (Maurer & Fuchsberger, 2019, p. 2). The first lens, physicality, refers to how the physical elements of a board game are adapted into a virtual game, such as how the game components, communication and other physical elements can be emulated in a digital environment. Agency refers to how the player is able to impact and change their situation. In the case of an adapted game, the video game will take away some of the agency, as it automates certain processes, such as moving your pawn, rolling the dice, or other actions. Usually, agency is unique to humans, however, in this case, you can talk about the video game having non-human agency. The third lens is time. In regards to playing board games, there are often natural delays, as the game is set up, a player is thinking or talking, cards are shuffled or someone needs to leave early. All of these can impact how the game flows, and while some might also happen in a digitized version, there are certainly some aspects that are different from a time perspective. It is also possible for a digitalized adapted game to be asynchronous, which will also have a clear impact on the flow and rhythm of the game (Maurer & Fuchsberger, 2019, p. 10-15).

3.2.5 The adapted game

While plenty of games have been adapted from board games to video games within the last decade, the amount of research within the topic is very lacking (Booth, 2018, p. 57). However, some examples do exist, with different focal points and which highlights some of the issues with the adapted game designs. Some of the following examples focus on mobile apps instead of video games for the PC, and some of these are focused on educational games, rather than games purely for entertainment. Despite the slightly different focus, they do still

present useful insight into the adaptation process, which is why they are still of relevance for this study.

One example is a research paper published in 2021, in which the researchers Derakhshandi et al. looked into creating apps based on some of the classic board games such as backgammon. Interestingly, even though they wanted to create an experience that was as close to the real board game as possible, while making the app as simply as possible, they argue that another level of design is necessary in video game design; the user interface (UI) (Derakhshandi et al., 2021, p. 16-18). While a board game usually has a physical board and a rulebook, in which the layout is important, this still differs from a digital UI layout. In the illustration below, they showcase some of the elements that are needed for the digital game to be functional, some of which are unique for the digital medium.

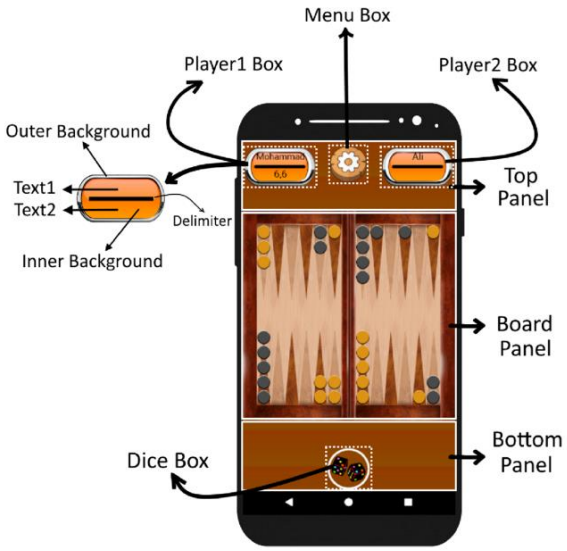

Figure 14 - UI for an app-based board game (Derakhshandi et al., 2021, p. 17)

In this picture alone, with the very simple classic game of Backgammon, you can easily detect some of the extra features that you need to add in the adaptation process. All video games have a settings menu, in which you can change settings such as music, sound effect, graphics settings, and more. You can also see that there has to be considerations in regards to the placements of all elements. While this example seems basic, they still need to choose where you can roll the dice, by clicking at the button at the bottom, and you need to choose if the board panel is flipped dependent on who is playing, like it would if you were physically sitting at a table, or if it should be static. This example showcases that even the most basic of games can be very complicated to adapt to a digital video game (Derakhshandi et al., 2021, p. 16-18).

Another article was published in 2022, in which researchers Olivares-Rodriguez et al. worked in collaboration with students to adapt an educational board game into an educational video game. Their concept being that video games in general are much easier to share and distribute among different geographical locations, as well as being able to update and up-scale at a later

time (Olivares-Rodriguez et al., 2022, p. 7). After creating the game in both mediums, they tested both using questionnaires, in which they tested the six parameters: immersion, playability, challenge, support, social experience and achievement (Olivares-Rodriguez et al., 2022, p. 13). The mechanics, the rules of the game, and the challenges were the exact same, however, their research showed that the video game scored slightly higher in all these parameters compared to the board game version. They argue that the automation of the rules teaching, as well as the new audiovisual design elements, were the main reasons for the slight advantage to the video game, because of the lowering of the cognitive load. They also discuss that the level of interactivity, dynamism, and feedback is also higher in the video game version (Olivares-Rodriguez et al., 2022, p. 8-13). Of course, it is important to recognize that as a game used in an educational context, this game is mainly created for engaging children, which might influence the results of the research.

Similarly to this, Radtke, Santillan-Jimenez, and Mohr-Schroeder (2020) also worked with adapting an educational game. They discuss how the original game was based on a choose-your-own-adventure type board game, which they chose to adapt by reworking the experience. They did this by changing the visual layout of the game from using a game board in the original version, to creating a flow by going through different screens in the video game version (Radtke et al., 2020, p. 51). Another adaptation example in this article is going from using physical flashcards in the board game version, to adding pop-ups to the video game version. This allows for more engagement from the user, as new information is presented along the way (Radtke et al., 2020, p. 52). Both of these examples showcase that sometimes, especially with the more complex board games, you need to not only digitize the game, but also rethink how the flow changes when you adapt a game from one medium to another.

Finally, Rogerson et al. (2015) looked into three different board games and their adapted counterparts: Puerto Rico, Agricola and Ascension. They found that different game adaptations have different levels of changeability. This means that some digitized games are focused on being a more direct translation of the original game, while others try to translate and enhance the experience (Rogerson et al., 2015, p. 5-6). How much you should change the game to be functional and enjoyable in a digitized version seems to be of discussion. Original fans of the game, as well as the original designers, might be more inclined to a direct translation. While newcomers, especially people who usually only play or design video games, might prefer a different approach, where the translation takes advantage of the fact that it is a different medium, by adding new elements that are not possible in a physical version. A very clear example is in the scoring. Usually, board games will utilize a scoring track, so that the players are not expected to remember their score, or to write them down manually each time they change. In a digital version, you could of course choose to still have a visual scoring track, however, as the number itself is the only important value, you could also simply have the number automatically go up or down, as the players' score changes. Changes like this are focused more on the experience than on being a direct translation of the board (Rogerson et al., 2015, p. 7).

3.2.6 Automation and flexibility

When looking at board games that have been digitized, there are two aspects which are discussed widely: the use of automation and the need for flexibility. Within these two areas, the discussions have not yet landed on a complete answer, as to how much a digitized board game should use automation or allow flexibility. The following will therefore go through some of the discussions around these aspects and explain why they are important to consider.

Automation refers to any process that in the physical board game would be done by the players themselves, but which is now done automatically by the digitized game. There are four different types of automation in regards to digital board games (Wallace, Pape, Chang, McClelland, Graham, Scott & Hancock, 2012, p. 232). First off, is *routine based activities*, such as shuffling cards, handing out resources, setting up the game etcetera. Secondly, is when the system acts as an *impartial referee*, by enforcing the rules of the game, reminding players of their options and what they are potentially forgetting. Thirdly, automation can work as a *logsystem* or *bookkeeper*, to help the players keep track of what they have done throughout the game, and what options they have available at the current time. Finally, automation can be used to provide *multisensory experiences* using digital elements such as animation, music, pop-up prompts etcetera (Wallace et al., 2012, p. 232). All together, these different types of automations can contribute to a game session in which players have less meticulous work, making the game easier and faster to set up and learn, and generally lowers the cognitive load of the game (Olivares-Rodriguez et al., 2022, p. 8-13).

However, while utilizing automation can ease some processes, it is also important to consider the potential negative effects of automation, as it can completely change the flow of the game. One potential issue that arises is lack of game awareness (Wallace et al., 2012, p. 231-234). As players are no longer manually taking actions such as shuffling the cards, giving out resources, and moving up the point track, and enforcing the rules, it can make it more difficult for players to understand what is happening ‘behind the scenes’. While this change of agency lowers the barrier of entry, it also means that a player might become confused, if the system takes agency over complex processes. Some administrative chores might seem arduous in the physical board game, however removing them from the players actions might bring with it a lack of understanding from the players. These processes might even be a part of the social interaction element of board games, as they are a part of communication and excitement around the table (Rogerson et al., 2015, p. 8-9).

On the flip side of automation is flexibility, which refers to the level of which players can personalize and modify their gaming experience. The term ’house rules’ is usually used to describe these flexibility aspects, as they refer to modifying the game in a way to make the experience more enjoyable (Wallace et al., 2012, p. 234). Examples of common house rules includes incorporating balancing factors, if a particular card, character, or strategy is too powerful compared to others, as well as reducing or lengthening the duration of play, by adding rounds, or fixing potential design flaws in the game, that everyone agrees is uninteresting (Frapolli, Brocco, Malatras & Hirsbrunner, 2010, p. 115). There are also sometimes implicit rules at play, which are the rules that the players follow, but do not talk about. For example, if

one player is clearly losing, it is common to take actions that work against that player (Kiss, 2023, p. 403). In addition to house rules and implicit rules, some board games also have different variants, which can provide further flexibility, often by making the game simpler or more complex. Flexibility in board games can also be actions such as re-doing your last turn because you simply forgot something, or misunderstood something. While many of these processes are simple to do in physical board games, incorporating this level of flexibility in digitized games can be very difficult (Frapolli et al., 2010, p. 113). Therefore, it is not surprising that in Frapolli et al.'s study from 2010, they found that 90,7% of gamers have modified their physical board game experiences, while only 38,1% have been able use this level of flexibility in a digitized game (p. 115).

3.2.7 Gaming heuristics

When it comes to designing products, designers often rely on guiding principles, such as heuristics, design principles or design guidelines, and in this regard, games are no exception (Ballew & Jones, 2006, p. 646). However, when looking at the research articles between board game and video game heuristics, we see an imbalance. Multiple articles propose a set of heuristics, or general design guides, in regards to video games (Ozdowska, Sweetser & Daiiani, 2023, p. 415), whereas there is a general gap in board game heuristics. However, a study from 2023 by Feng seeks to bridge this knowledge gap, by creating a set of heuristic guidelines for board game design. In this article, Feng seeks to formulate a heuristic ruleset focused on usability for board games, as he argues they differ from video games, because of the earlier discussed sociability element (2023, p. 1). This resulted in ten heuristics, each belonging to a usability dimension. The first three usability dimensions, *effectiveness*, *efficiency*, and *satisfaction* are the common dimensions used for most product designs, whereas the last dimension, sociality, is specific to this new board game heuristics list. The following will briefly explain each of these heuristics.

Starting with the efficiency dimension, which in a board game relation refers to the way in which players learn the game and play a round (Feng, 2023, p. 2-4).

H1 - *Understandable training*: The first heuristic is focused on the setup of the game, and the ability for new players to learn the needed skills.
H2 - *Well-defined rules:* This heuristic is more focused on customization elements, and potential problematic combinations or errors. Whether the game differs when playing with only two players, or, if there are cards or effects that could be counter-intuitive or in conflict with one another, what does the player do?
H3 - *Clear display of status*: The final heuristic of the efficiency dimension is a clear display of status, which is all about how easy it is to see the current status of the game. Things like point trackers, player's locations, player's abilities and more can work as an expression of the status display heuristic (Feng, 2023, p. 2-4).

Moving on to the satisfaction dimension, which focuses on the emotional aspect of the players, such as their motivation, engagement and overall satisfaction and enjoyment of the game.

H4 - *Difficulty balance:* Relates to having a balanced level of challenge as well as causing the players to be motivated to keep playing, even if they are behind.
H5 - *Consistent engaging flow:* About adding new elements, situations, or changes, to engage and interest players, while also not adding too many new elements, so that players get confused.

The third dimension, effectiveness, is about player understanding, whether the game feels meaningful and whether the narrative makes sense.

H6 - *Immersive theme:* About how the theme and narrative of the game is both exciting and logical in play.
H7 - *Design patterns:* This heuristic is all about how to guide players to making choices, and how they can learn the different patterns of the game (Feng, 2023, p. 2-4).

The final new dimension, sociality, is focused on the interaction among players.

H8 - *Identifiable player relationship:* This is about how players differ from each other in the game, based on abilities, characters, teams, colors or other, and how this encourages different relationships among the players.
H9 - *Coordination support*: About offering players features that can help coordinate their actions. Things such as a first player marker, round marker, player order tracker and more can be seen as coordination support features.
H10 - *Comment platform*: The final board game heuristic is about creating opportunities for players to comment on the state of the game or each other's actions. The idea being that comments will heighten the level of communication, creating a more meaningful play experience (Feng, 2023, p. 2-4).

The interesting question is then how board game heuristics differ from video game heuristics, and how this all relates to digitally adapted board games. Video game heuristics differ from other products as they are not only interested in the functionality of the game as a product, but also in the human perceptions of the game. How the player feels about the challenges, the story and how they interact with the game, is also a part of the overall usability, adding an additional complexity to the heuristics (Ozdowska et al., 2023, p. 405). One of the most popular sets of video game heuristics is called PLAY (principles of game playability), which introduces three categories of heuristics; *game play, coolness/entertainment/humor/emotional immersion,* and *usability and game mechanics*. As there are a total of 19 heuristics in this list, each of them will be explained very briefly in the following overview.

Starting with the game play category is all heuristics related to the interactions between players and the game (Desurvire & Wiberg, 2009, p. 560-561).

H1 - *Enduring play:* The game should be fun and keep the players interested throughout.
H2 - *Challenge, strategy and pace:* There should be a balance in the difficulty, ensuring the game is challenging, but without becoming frustrating.
H3 - *Consistency in game world:* The player needs the game world to react to their actions,

and these actions need to be consistent throughout the game.
H4 - *Goals*: The goals need to be clear, rewarding, and possible with the current skills and level.
H5 - *Variety of players and game styles*: The game should be balanced for different play styles.
H6 - *Players perception of control*: Players should feel in control of the game and like they can influence the world.

The next category is coolness/entertainment/humor/emotional immersion and is therefore related closely to the players perception of the game (Desurvire & Wiberg, 2009, p. 561-562).

H7 - *Emotional connection:* The player should be connected emotionally to the world, their character or the story.
H8 - *Coolness/entertainment*: The game should have an element that is different from other games to gain interest.
H9 - *Humor*: The game is humorous or causes funny interactions.
H10 - *Immersion*: The player becomes immersed in the game when it utilizes visual and auditory elements to heighten immersion.

Usability and game mechanics as a category is focused on the background processes of game design (Desurvire & Wiberg, 2009, p. 562-564):

H11 - *Documentation/tutorial*: The player should not need a manual or tutorial to be able to play.
H12 - *Status and score*: The game controls are intuitive and follow standard conventions, and the state of the game is obvious and available at all times.
H13 - *Game provides feedback*: Feedback should be given based on the players' actions, including visual, auditory, visceral or text-based feedback.
H14 - *Terminology*: The goals of the game and how to reach them should be described clearly.
H15 - *Burden on player*: The game should not feel burdensome for the player, and should be playable by novice and advanced players alike.
H16 - *Screen layout*: The interface should be efficient, consistent and visually pleasing.
H17 - *Navigation*: Navigation in the game world should be intuitive, consistent and logical.
H18 - *Error prevention*: Player error should be avoided, and the potential interruptions should be easily solved and supported.
H19 - *Game story immersion*: Games with a storyline should encourage immersion.

Obviously, there are elements that are highly similar between both board game and video game heuristics, as well as there are differences. As this study is focused on a third type of game, the digitally adapted game, it seeks to find potential areas of interest that could be used as a heuristic guideline for designers in the future.

4.0 Theories

The following section will introduce a selection of paramount theories within the subjects of interaction, design, communication, and gaming. As one of the main focuses of this research study is gaining an understanding of the user experience, as well as how the user experience changes from one medium to the other, the following theories have been chosen, to be able to analyze this exact focus. To do this, there are two overall sections of theory, the first of which is focused on interaction and communication in a more general sense, introducing concepts such as interaction design, interaction and cooperation, and communication. These will work together to understand general user experience in terms of how players interact with each other and their environment. The other theory section is more focused on existing game theories, both within board and video games. It will introduce concepts such as gaming encounters, the magic circle and flow, cost and reward, and uncertainty in games. Therefore, these theories are especially of interest when analyzing how players interact with and experience the game and their environment. These theories within gaming have been chosen in accordance with the data and the thematic analysis process, so that the analysis can be based on theories which can heighten the understanding of the excerpts of interest. All these theories will help guide the analysis in addition to the knowledge found from the literature review.

4.1 Interaction design

Game design is all about interactions between game components and players. Therefore, understanding interaction design is paramount to this study. Interaction design as a research field is an interdisciplinary field that draws from many different research fields including psychology, design practices, human-computer interaction, computer science etc. It focuses on the design of products that support interaction and communication, and it can include both physical and digital products. To explain interaction design, the common terms are user interface (UI), which refers to the interface of the design, whether digital or physical, while user experience (UX) refers to how the user perceives and interacts with the design (Sharp et al., 2019, p. 9-10). Interaction as a term itself is all about having a relationship between two elements that exchange information. Games serve as a type of designed interaction. Designers give players components and a framework to work from, as well as a context to play within. In doing so, a connection between player actions and outcome is created. What brings the individual elements together, is the design of the interaction between elements and players. This means that game designers need not only to understand each of the elements that they add to their game, but also how the players might interact with these elements. Designing with interactions in mind means being able to create meaningful games (Salen & Zimmerman, 2004a, p. 1-5). This is the main reason why this study is focused on the user experience of these two game mediums, to find insights into how they can create more meaningful gaming experiences.

To comprehend the quality of a certain interaction system, we look at how the system responds to player choices. Having meaningful choices in a game, no matter if they are rational, intuitive, or arbitrary, will be the causation of a meaningful game. To understand how players

choices are made, Salen and Zimmerman (2004a, p. 8-10) have formulated five questions, which together are described as the anatomy of choice:

> "1) What happened before the player was given the choice? 2) How is the possibility of choice conveyed to the player? 3) How did the player make the choice? 4) What is the result of the choice? How will it affect future choices? 5) How is the result of the choice conveyed to the player?"
> (Salen & Zimmerman, 2004a, p. 8).

4.1.1 Interaction and cooperation

As mentioned in section 1.4, both games chosen for this study have a cooperative nature, either everyone working together, as in Mysterium, or having teams in which the two team members play cooperatively, as in Codenames.

When people play together cooperatively, it affects the way they interact with one another. Suddenly, the game is not only about your ability to win or lose, but whether your team wins or loses. This puts a level of social pressure on each player, as they feel a need to contribute positively to the team (Elias, Garfield & Gutschera, 2012a, p. 62-64). If you are not contributing enough to your team, it will create problematic cooperative interactivity, such as tense and uncomfortable social situations. This new goal of contributing can influence both the way players play the game and take their actions, as well as how they are communicating amongst each other.

Additionally, cooperative games run the risk of having one player, most likely an expert player, make all the decisions. The game then becomes more of a group following their leader, rather than directly communicating, and taking actions based on the discussions. This is a completely different interaction dynamic, which is usually frowned upon in games, as players like to make their own decisions. In general, as humans are social animals, we enjoy cooperative interactivity, as long as we have the option to influence the outcome of the game. Of course, telling each other what to do can be good in certain amounts, as you help one another, but if it always one specific player telling others what to do, the other players will not feel needed in that interaction, and will not feel as though they are contributing to the team (Elias et al., 2012a, p. 65-67).

If we are looking at team-based games, you might be directly or indirectly influenced by each other. A common occurrence when another team is far ahead of another, is to react by adopting a riskier press-your-luck strategy, where things can go very wrong or very right. On the other hand, if the opposing team is far behind, players might opt for a more conservative strategy, to try and diminish any possible mistakes, to ensure the gap between each team stays the way it is (Elias et al., 2012a, p. 44-45).

4.1.2 Communication

Directly connected to interaction and cooperation then, is communication. In general, communication studies are split in two: verbal communication and non-verbal communication.

When discussing communication with the focus on interaction, verbal communication and conversations are seen as a co-construction process that goes back-and-forth between speakers. As part of the ethnomethodological movement, a research field interested in understanding everyday speech branched out, which is commonly referred to as conversation analysis. The focus of this theory is to understand how normal everyday conversations still follow a certain structure. This structure is all about turn-taking, how people signal that they are done talking, when others interrupt, and how to overlap in a regular cooperative conversation (Rocci & Saussure, 2016, p. 165-180). Conversations therefore have the ability to give prominence to discourses and social contexts, as well as establish a sense of trust (Rocci & Saussure, 2016, p. 181-201).

When it comes to non-verbal communication, there are six types of modalities (Hall & Knapp, 2013, p. 129-329). The micro modalities, which are concerned with smaller motions and behaviors, as well as macro modalities, which are connected to the larger movements of the body.

Starting with micro modalities, are facial expressions, which are used to convey emotion. Then there is vocal behavior, which can indicate personality traits through vocal, not verbal, changes (Hall & Knapp, 2013, p. 131-204). Eyes as a modality are seen as a way to look into someone's soul, and eye behavior is therefore connected to reading others' intentions and emotions on a very primal level (Hall & Knapp, 2013, p. 229-262). Finally, face and body physiognomy relates to people's physical and personal attributes (Hall & Knapp, 2013, p. 263-294).

In relation to macro modalities there are gestures and body movements, as well as proximity and haptic interactions. Gestures and body movements can be used both in relation to speech, to highlight points, or on its own, to indicate the speaker's thoughts, emotions, attitudes and more. When gestures are given in relation to the verbal speech, it is called illustrators, as they visually illustrate what the speaker is trying to convey. Emblems, on the other hand, are gestures which stand apart from the spoken word, and they are usually intrinsically connected to a specific meaning. Lastly are regulators, which are body movements that guide the conversation, such as waving, nodding, pointing etc. (Hall & Knapp, 2013, p. 205-228). Proximity and haptic interactions are also an important part of non-verbal communication, especially when discussing face-to-face communication. This relates to the proximity of how close people are when talking, where they are directed etc. Haptic interactions revolve around the physical touch between people, whether they hug, shake hands, and touch in any form (Hall & Knapp, 2013, p. 295-286).

4.2 Gaming encounters

Goffman (1961) argues that you need to consider three key concepts when talking about gaming encounters; Interaction, communication, and the individuals (p.31-59). To get a better understanding of these, he proposes three formalizations which impact the key concepts. Firstly,

is the *rules of irrelevance*, which refers to an implicit ruleset, which players need to adhere to in order to play fair. This means that you set certain elements aside, out of frame, as you sit down to play the game. Factors that are outside of the game, such as the quality and looks of components, as well as the individual's life and status outside the game, are disregarded in play. While rules of irrelevance are about all the things that are not part of the game, *realized resources* as a formalization are focused on what is part of the game. This includes game-meaningful events, game-generated roles and identities, and world-building activities. Lastly are the *transformation rules*, which are all about the boundary between the external real world, and the focused gathering or encounter, which people join as they play games. When choosing roles in a game, for example, it often occurs that external matters, such as status, play a role when deciding who does what. While rules of irrelevance usually cut off most of these external factors, some will inevitably always come through. Sometimes, when an external factor passes through the boundary and into an encounter, it can become reversed in meaning. For example, the person with the highest status might allow the person with lower status to start, or be given an advantage, as a courtesy (Goffman, 1961, p.18-31).

Goffman also discusses how gaming encounter dynamics can take place in a focused game session. One key term in this context is spontaneous involvement, which he defines as the players' ability to become completely engrossed in the game. Having a shared spontaneous involvement among all players can provide a sense of relatedness, closeness, and mutual respect. However, if one or more players are not experiencing spontaneous involvement, they are likely to become bored, or distracted, as well as change the flow of the game for other players alike. This brings forth another key term of ease and tension in a gaming encounter, as players who experience spontaneous involvement are much more at ease rather than tense. The players in an encounter are obliged to perceive the game world, however, this spontaneous engrossment can end up elsewhere, making the game encounter feel uneasy. If one individual is not actively involved in this mutual gaming activity, others might also have a weakened involvement as a result. Additionally, *incidents* might occur that break the natural flow, such as *leaky words* or *sign situations*, in which a player accidentally breaks the rules of irrelevance. Another example of incidents can be when players *flood out* with an explosion of emotions, such as bursting out in laughter. This can often make other players loose tension and ease up, but in certain cases it can have the opposite effect. Any incident can be seen as a distraction from the play (Goffman, 1961, p. 31-59). Goffman also discusses the bases of fun within games. One example he discusses is modification of the transformation rules, which fits to the specific players. Such practices can be balancing teams, adding an element of luck, giving handicaps or limits to players, in order to balance the experience, and thereby create a gaming encounter which is fun for everyone. Elements such as courtesy, manners and etiquette are therefore also part of the gaming encounter dynamics (Goffman, 1961, p. 60-72).

4.2.1 The magic circle and flow

Similarly to Goffman's formalizations, is the term *the magic circle*. This relates to when players are actually playing the game, and when the game begins and ends (Salen & Zimmerman,

2004b, p. 1-6). This is called the frame, and it refers to the intersection between the real-life situations, and the artificial game world. The boundary between these two 'realities' is called the magic circle. As players sit down to play a game, they enter into the magic circle, and they allow themselves to suspend their disbelief, as they enter into the game world. The players take on roles, as if it was themselves, and they act based on this role or the world they find themselves in. The boundary between this artificial game world can either be closed, not allowing any outside influences, or open, allowing some parts of reality to enter into the frame. While the magic circle can, as the name implies, create a powerful sense of magic in the artificial world, it is also very fragile, and can easily fall apart if the players are not allowing themselves to stay within the circle (Salen & Zimmerman, 2004b, p. 1-6).

Related to this, is the flow theory, originally written by Csikszentmihalyi, which is the idea that people, when focusing their attention on a specific task, can enter a state of *flow*. In this state, they are so engrossed in whatever they are doing, for example the game they are playing, that they completely forget about external elements (Woods, 2012b, p. 146-149). Being completely engrossed in the magic circle, can therefore be seen as achieving a flow state within the game.

4.2.2 Cost and reward

Playing games can be a rewarding experience, but it usually comes at a cost. Not only the literal cost of the games, but also the cost of spending your time scheduling the game encounter, learning the rules, setting up and putting away the game (Elias, Garfield & Gutschera, 2012b, p. 167-170). All of this is reliant on the players' ability and willingness to put in effort. Of course, with the expectation is that putting in the effort will generate something worthwhile.

One of the characteristics of cost is *downtime* (Elias et al., 2012, p. 178-184). Downtime is all the time during the game, in which a player is not concurrently playing. It has the ability to turn players into spectators, as they wait for other players to take their turn. Downtime is inevitable in all turn-based gaming, whether the game is digital or physical. In general, downtime is seen as a negative attribute to gaming, as a part of the cost, simply because most players find the section of the game where they themselves make choices to be more interesting. However, it can also provide players with a calming sense of having a break. Especially in more tense games, having some downtime, in which you can relax for a short period, without the fear of making a mistake, can ease up the gaming experience. Video games especially struggle with downtime, as we are used to having much faster response time when playing games, which means we are less tolerant to such issues (Elias et al., 2012b, p. 178-184). In addition to downtime is *busywork*. This is all the upkeep, which is necessary for the game to function. Setting up the game, dealing out cards, adding up points, moving around tokens etc. Busywork is similar to downtime, as the players here also do not focus on their actions, but rather the upkeep of the game (Elias et al., 2012b, p. 184-188).

The rewards from playing the games can take many forms, of course there is the general enjoyment and pleasure from winning or simply from playing (Elias et al., 2012b, p. 174-178). However, there are also other rewards, such as escapism, entertainment from the social aspect of gaming, pleasure from the pure challenge, adrenaline rushes, or enjoyment of the aesthetics elements within the game. Some games, often video games but not exclusively, can additionally have more tangible rewards, such as gaining experience points used to advance in levels, getting loot such as character customizations or gaining virtual currency. Within the board gaming scene, tangible rewards would often be playing for money, such is often the case in poker, however in some tournaments, for example the card game magic the gathering tournaments, you might win game components, such as new card packs, dice, game mats etc. (Elias et al., 2012b, p. 174-178). The relationship between the reward and the players' efforts and costs, should be concordant to create a positive experience. This can be very group dependent, as players who define themselves as hardcore gamers might be more likely to put in more effort, whereas more casual players want minimal efforts (Elias et al., 2012b, p. 189-191).

4.2.3 Uncertainty in games

Another aspect of gaming is the concept of *uncertainty*. Uncertainty is intrinsically connected to having a meaningful gaming encounter (Salen & Zimmerman, 2004c, p. 1-2). The way it is intrinsically connected is very intuitive; if we already know who will win, taking away all uncertainty, the game will not be fun. At the same time, adding too much uncertainty will make the game feel too random, and players will feel as if they have no agency over the game. The relationship between uncertainty and meaningful play is therefore almost paradoxical in nature, as having no uncertainty will make a game lose its fun value, and having a lot of uncertainty will make the game lose its fun value. You therefore need to consider the amount of uncertainty any given game has, as it is so closely connected to the idea of meaningful play (Salen & Zimmerman, 2004c, p. 1-2). Additionally, it is important to understand that the mathematical sense of randomness and uncertainty is not necessarily significant, rather it is all about how the players feel. If a play feels particularly risky or uncertain, that in itself is enough to be of value. In the same way, if something feels too random for players, then that itself creates a sense of having too much uncertainty (Salen & Zimmerman, 2004c, p. 3-4).

5.0 Analysis

The following section will go through the analysis and results of the eight different recorded and transcribed gaming sessions. There will be three overall sections to guide the analysis, each of which represents a theme derived from the thematic analysis. Starting with the player-to-game theme, as this theme is closely related to the actual gameplay, giving the reader a better understanding of the gaming encounter. After that, the player-to-environment theme will be in another section, in which the analysis will start to look at factors surrounding the game as well. Finally, player-to-player is the final theme for the analysis, which looks into communication and interactions between the players. While this is more loosely con-

nected to the game, it is very strongly connected to the user experience of the gaming encounter as a whole, making it closely related to the problem formulation of: *How do interaction and communication dynamics differ when playing physical board games compared to their digitized video game versions, and how can designers create successful adaptations?* This way the focus of the analysis shifts slowly from game, to what surrounds the game, and to the actual game encounter, going from very specific observations to broader concepts of interaction and communication. Each of these themes will look into different implications of both the physical and the digital board game, by using the theories introduced in section 4.0.

5.1 Player-to-game

As presented in the literature review, D'Astous and Gagnon (2007) looked into several factors that make board games enjoyable, including for example comprehensibility and entertainment value. However, these factors are rather broad descriptors with much subjectivity, so the following section will look directly into how the participants experience the game through interacting with it. Additionally, the following section will look into themes of automation and flexibility, as Wallace et al. (2012) and Olivares-Rodriguez et al. (2022) highlighted as elements that need to be balanced between, in addition to other video game elements. This analysis section seeks to look at how the players directly interacted with both games, in their physical and digital form. This will showcase how the design choices of each medium changes the players' experience. The focus in this section is formulated in the following RQ: *How do players interact with the games, and which opportunities/issues arise with each medium?*

5.1.1 Overview

Both Codenames and Mysterium are board games with a lot of components. As they do not have the traditional board in the middle but are instead composed of mainly cards laid out to form a 'board' of sorts. The two video game versions take two different approaches to translating this 'board'. Using Rogerson et al.'s terms (2015), the two adaptations have different levels of changeability, meaning they translated the board in vastly different ways. Therefore, the following section will look into the overview of the two games, both physical and digital. Using interaction design terms, you could say the following section will look into how the user interfaces of both the digital and physical mediums impact the actual user experience of the games (Sharp et al., 2019, p. 9-10). This section of the analysis will therefore be based mainly on theories focused on interaction design (section 4.1), as well as parts of the literature review (section 3.2).

Codenames uses an approach that is very closely resembling the original physical board game, with a low level of changeability, as can be seen in figure 15 and 16.

Figure 15 - Codenames physical version setup

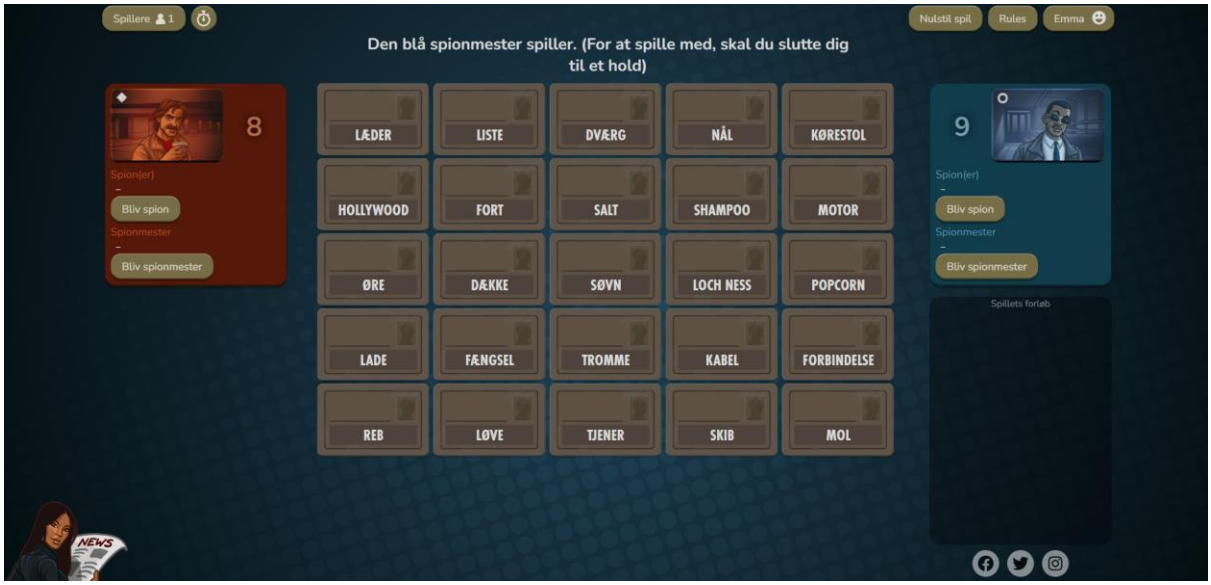

Figure 16 - Codenames digital version setup

In these photos we can see that the 5x5 grid in both versions are the same, without any big changes. However, as Derakhshandi et al. found in their study, even the simplest adaptation processes can be complicated, as the overall interface will always be slightly different in digital versions (2021, p. 16-18). In Codenames, there are two interface changes you can see already in the setup. On the left and right side of the grid, you can see who the red and blue

teams consist of, as well as how many cards they have left to guess (8 and 9 in this example). Additionally, below the blue team information, you can see the log, in which all clues given will later on in the game be shown.

Another major change in accordance with the initial setup, is how each team's cluegivers can see which clues are their teams'. In the photos below from the physical version, it is apparent how each color on the indicator card translates to a word card in the 5x5 grid. The one at the top left corner pointing upwards, corresponds to the top left corner away from the cluegivers of the grid, almost as if pretending to lay the indicator card flat. Having this indicator card means that the two cluegivers have to sit side by side in close proximity, as rotating or moving the indicator card would change the status of the game.

Figure 17 - Team colors in Codenames physical version

However, in the digital version, the setup will look like the following for the cluegivers. Instead of using an indicator card, this version simply color indicates the cards on the board directly.

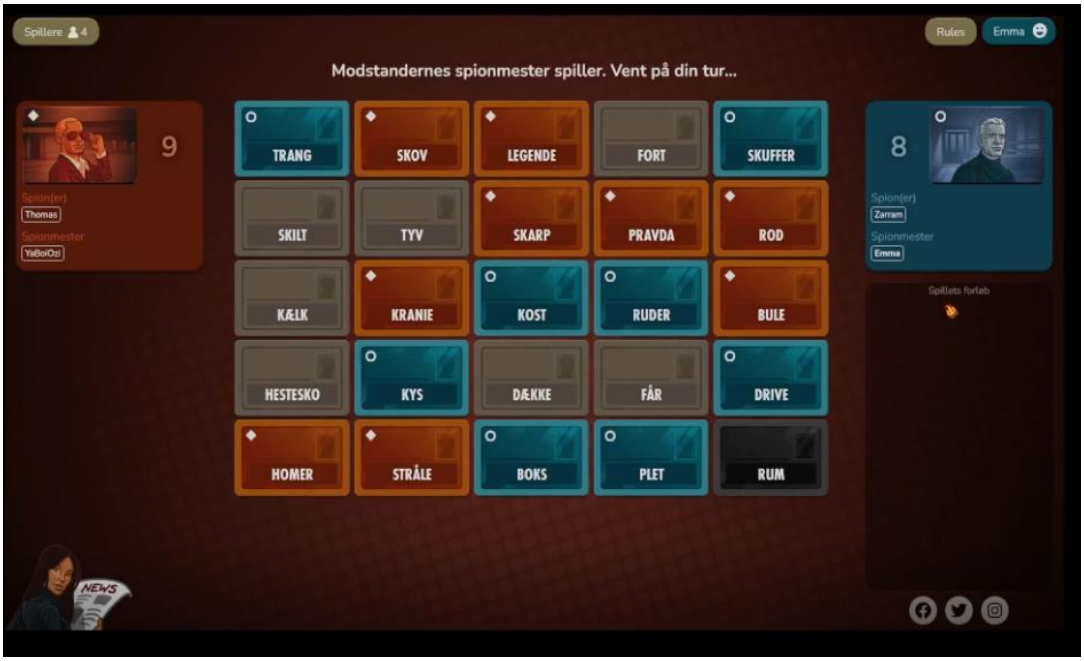

Figure 18 - Team colors in Codenames digital version

While Codenames generally is a very closely related digitally adapted version, with a low level of changeability, we can still see some of these smaller changes. The question is then, how do these changes in the overview impact the players' user experiences? In general, the changes were very positively received. For example, one of the groups explains how these overview changes, especially this choice of getting rid of the indicator card in the online version, made it easier for the cluegivers.

Matilde [01:25:32 - 01:25:50] Okay. My first thought was, that it is very easy to see, what you have to deal with online actually- Now, I wasn't one of the people who had to make clues. But that thing about having a little piece, where you have the red ones. Then you have to sit and count, to be sure where yours are.

Nanna [01:25:50 - 01:26:11] Yes, and you can misunderstand, and that is a little annoying, because it is like, is it this one, is it really this one? But it's also that thing about, because you are double-checking again, then you are sitting and looking at your card, and are like, is it this one? Then you are looking so much in one direction, and if there is only one left. If I am like, what should I choose for that one? Where was it again? And the, I am sitting and looking directly at it, then you know, that you can cut away everything from here, because I'm looking in this direction.

Matilde [01:26:12 - 01:26:18] On the online version, there was just...the red, you could see they were red, and the blue were blue. It was very easy.
(Transcript C, [01:25:32 - 01:26:18])

In this excerpt players talk about how the digital version makes it easier for players to decipher which cards are their own. Additionally, they explain how this can be an annoyance in the original game. As the focus of the game is all about giving and translating clues, and not about deciphering which cards are your own teams, the physical dimension prevents an easy understanding of this. Because the focus is on the actual clues, having the players think about something completely different could take them out of their flow. Instead of trying to find a good clue, they find themselves spending time trying to, as Matilde explains, counting to ensure they are looking at the right cards. This might seem like a small thing, but you can easily imagine how it could lead to an incident, as Goffman calls it, if a player gives a clue to the wrong card. Suddenly, you find yourself in a situation, in which a team makes a mistake, not because of their inability to give good clues, but because they simply saw the wrong card as their team's color. This could easily feel unsatisfying for the players on that team, or perhaps even end up feeling unfair. And as Goffman states when discussing rules of irrelevance, an unfair game will lead to friction in the group and a game which lacks meaningful play (Goffman, 1961, p. 18-31).

A similar point is made, when Matilde discusses how the cards in the original version are laid out in a certain direction, which can make them hard for some players to read:

Matilde [01:26:17 - 01:26:19] I also think, that is is annoying, that the cards are written like that. *Points to the cards*

Sofie [01:26:19 - 01:26:22] Yes, it's written like, it is a lot easier to read the white, but you are sitting from a direction.

Matilde [01:26:22 - 01:26:24] I actually end up reading it upside down, instead of reading the grey.

Sofie [01:26:24 - 01:26:28] I actually do that too.
(Transcript C, [01:16:17 - 01:26:24])

The problem they are referring to in regard to the gray and white texts can be seen in figure 19.

Figure 19 - Directional word cards in Codenames physical version

While the words on the cards are written in two different directions, so that people all around the table can read them, the choice of writing them in a highlighted white version and a grayed-out version, means that players end up reading the cards upside-down. This could again lead to an incident, in which a player misreads a card, simply because they are reading it upside down. As the digital version is not reliant on the people sitting in certain directions, they got rid of the two directional writing methods, and simply stuck to one word, which everyone could see. In general, the players share the following sentiment:

Magnus [01:26:56 - 01:27:06] But there is a way better overview, when you are looking at the...on the online version. There are visual helping tools.
(Transcript C, [01:26:56 - 01:27:06])

The overview of the digital version of Codenames has been very slightly modified by the designers, but changing out a few of the potential struggles, by making small user interface adjustments from the original version is a great way of adapting the game. It allows players to have an experience which closely resembles the original game, while also adding an extra level of something new, in this case a better overview of the game.

Mysterium on the other hand, takes a slightly different approach, largely because of the scope of the game. The pictures below show how the game looks after setting it up, and as is apparent, there are a lot more cards and moving parts to this game. This means that a direct adaptation, as was seen with Codenames, would be very difficult. The computer as a medium has a very strict restriction in its size, being confined to a single screen, whereas physical games can easily take up everything from a small to a very large footprint of the table.

Figure 20 - Mysterium physical version setup

Figure 21 - Mysterium physical version setup

All these different elements would physically be rather difficult to see on a smaller computer screen. Instead of this, the designers of the digital Mysterium game decided to have the players go through four different main screens, one for each of the clue sections (the murderer, the murder location, the murder weapon, and the final who-did-it). Examples of these screens can be seen below.

Figure 22 - Mysterium digital version (murderer choice)

Figure 23 - Mysterium digital version (murder weapon choice)

Changing up the user interface in this way, allows the players to only see the cards they need to see at any given time. Meaning that while a player has to decide which murder weapon, for example, is correct, they will only see the possible murder weapons (on the bottom of the screen in figure 23) as well as the clue cards they have been given from the ghost (on the right-hand side of the screen in figure 23). While this could allow for a more narrative flow, moving through the different phases, it still lacked something important for the players, especially in terms of the overview. In the one group, they expressed it in the following way.

Thomas [01:27:10 - 01:27:13] I mean, there was more setup time in this version for sure.

Emma [01:27:13 - 01:27:15] Yes, in the physical version? Yes.

Thomas [01:27:15 - 01:27:33] However you get the whole...you get a better overview of the game. Because you can see what you are moving through. And you don't do that in any way in the online version. You are sitting more on your own. It was also easier to keep an overview of what other people guessed, and the vote on that.
(Transcript D, [01:27:10 - 01:27:33])

Similarly, the other group formulated the issue in a comparable way.

Nanna [01:13:12 - 01:13:30] But one thing about the physical...that thing about looking at each others clue cards, I thought was a bit annoying, that you had to click back and forth, what each other had. Whereas physically, you just had it lying around, and then you can see, okay, they have the card, and then you think, okay, what was it they could have?
(Transcript E, [01:13:12 - 01:13:30])

What is especially intriguing about this, is how the change in the overview ended up having a large impact on the sociability of the game. In this digital version, each player has their own

‘screen’ depending on how far along they are. You start out on your own screen, seeing only your own hints, but you can click on the other characters (top-left on character icons), to see what hints the other players have gotten.

Connecting this to Salen and Zimmerman, they describe a meaningful game as a game with designed interactions in mind (2004a, p. 1-5). The original design of the physical board game encourages players to collaborate and discuss each other's clue cards, as each player receives their cards and immediately have the ability to show their card to other players. The players often utilized this throughout the physical playthroughs, and example of which can be seen in figure 24.

Figure 24 – Players showing each other cards (Recording C, [07:03])

However, in this digital version, players are split away from each other to different screens, not directly allowing players to show cards to each other. What this means is that the interaction they have designed encourages individual play, rather than social play. Of course, players do have the ability to look at each other's cards in the digital version as well, but as one player expresses in the following statement, it simply makes it slightly too difficult for players to do this.

Oliver [01:15:29 - 01:15:40] It is just that you have to click, instead of just looking. You have to spend 2% more of your brain. You know, I just don't have that capacity, man.
(Transcript B, [01:15:29 - 01:15:40])

Physically looking around with our eyes is a lot less demanding than clicking back and forth between different screens. This also connects to Salen and Zimmermans anatomy of choice (2004a, p. 8-10), as the players might end up making their choice based only on their own

cards, simply because it is deemed too bothersome or complicated to look at the other players screens.

Another user interface design choice, which hindered this communication between players, was understanding which of the characters were which. In figure 25 below, you can see a close-up of the top left corner of the screen, where you change between each players' views, which is how you see the clue cards they have been given. Additionally, you can see part of the chat, which tells us that Nanna is the ghost player, and that Sofie for example is Conrad.

Figure 25 - Close-up of profile pictures in Mysterium digital version

The players described the following issue in relation to this:

Sofie [01:13:31 - 01:13:40] You can also clearly be a bit confused about who is who. That was the case in both games. It was you that was green, wait am I black, am I blue?

Matilde [01:13:40 - 01:13:44] Why did we not get like a...what's it called? A profile picture, that you just always have.

Sofie [01:13:44 - 01:13:44] That's the thing.

Nanna [01:13:46 - 01:13:50] Maybe a profile picture, but at least that the name was written there.

Sofie [01:13:51 - 01:13:52] Yes, if only the name was written there.

Nanna [01:13:52 - 01:14:09] Because there were names, as soon as you joined, but then there was no names. For example, because it is fine enough, when you go in and join, then it technically has the names written above. But Matilde, like here, you were the last to join and then it just starts, when the last person joins, so you don't have an option to see, who is who.

Matilde [01:14:10 - 01:14:22] Yes, and in the chat, it said like, Nanna is Arthur, or something like that, and then I was like, I don't know who Arthur is though.
(Transcript E, [01:13:31 - 01:13:52])

Throughout the digital playthroughs with both groups, you would hear this question often: Wait, who were you again? If a player asked for help with their clue card, the other players would first have to figure out which character they were, and then click on their profile, just

to help each other in an otherwise collaborative game. This obviously makes the communication and sociability process much more difficult, and it could be the reason why some players found the downtime in the online versions of the game to be longer than in the physical versions of the game (Transcript B, [01:12:41]). This relates closely to one of the video game heuristics presented in the literature review, which is H15, the game should not feel burdensome for the player (Desurvire & Wiberg, 2009, p. 561-562). Again, from a design perspective, the designers presumably tried to make the overview easier, by only showing you a small part of the game (the phase which the player in question has reached), but in doing so, they have created a game which makes it harder for players to engage and interact with each other. Of course, it is still possible, but if the design was more focused on the interactions between players, it would be easier for the players to have a meaningful gaming encounter.

5.1.2 Video game elements

The following analysis section will look at how mainly the digital adaptations of the games incorporate elements and mechanics from video game design, such as rewards, animations, automation, and lack of flexibility. This will then be compared to how the physical versions of the games originally handled the play without these elements, as well as how these modifications changed the overall user experience. This section of the analysis will therefore be based mainly on theories focused on games (section 4.2 - 4.2.3), as well as parts of the literature review.

As mentioned in section 4.2.2, rewards can come in many different forms, and are quite commonly used in video games (Elias et al., 2012, p. 174-178). Especially the digital version of Mysterium has added multiple different ways of rewarding the players at the end of each game. The most apparent reward they use is giving the players experience points based on their accomplishments throughout the game. This shows up as a pop-up after the game is done, which can be seen in figure 26.

Figure 26 - Experience point pop-up (Recording E, [36:10])

As you can see in this illustration, the players are rewarded points for guessing the killer, the location, the weapon, and finally for winning the game. This is completely new material added to the digital adaptation, and as you rise in level, you unlock new elements, such as additional cards to play with. In the following excerpt, the players initial reaction to this newly added points system is apparent.

Magnus [35:47 - 35:49] I got 5.000 points. Just saying.

Matilde [35:51 - 35:51] Yeah.

Nanna [35:52 - 35:52] Look at that, game.

Magnus [35:55 - 35:57] Entirely 8.000. I don't really know, what we use them for. What should we? Well, onwards.

Nanna [35:57 - 36:00] No, in total I have 11.000.

Magnus [36:01 - 36:01] What

Matilde [36:02 - 36:04] Hahaha. That is so cool.

Nanna [36:04 - 36:12] 11.000. Win the game, 5.000. And then I have like a... The killer, 2.000. Location...

Sofie [36:12 - 36:16] Okay, so you unlock cards and stuff like that. Yes, you unlock cards. That's pretty cool. Hmm. That is fun.
(Transcript E, [35:47 - 36:16])

In general, the response to this was positive. This could partly be in relation to the fact that experience points as a reward can help the player feel as if they did a good job throughout the game. As Elias et al. highlights, a player in a cooperative game should feel as if they are contributing to the team (2012, p. 62-64). In the end of this digital version of Mysterium, a player can clearly see their accomplishments, and determine that they did indeed contribute, as they found their killer, location, and weapon, for example, and they have been rewarded accordingly with points.

This rewards pop-up was also an element the players did not expect, a surprising element, which could be part of the reason why they were happy with it. This aligns closely with a sentiment that both groups shared with me at their final session, which was, that a digital version of the game should have something more than the physical version (Transcript E, [01:23:44 - 01:24:31] + Transcript F [43:19 - 43:50]). Players expect that the adapted version has something new, whether that is easier setup, new game modes, other cards and characters, or a new reward system. Or, as one of the players framed it:

Nanna [01:24:22 - 01:24:31] There is something, that should have a reason for, why choose the online, over the physical, if you know the physical game. Unless there is a reason.
(Transcript E, [01:24:22 - 01:24:31])

Adding new things is something that the Mysterium video game has incorporated heavily. Other than the reward system, they have also added new game modes, including blitz mode for quicker gameplay, and solo mode, for a completely solo story playthrough. This report will not go into depth with these modes; however, it is clear to see that the players found the idea of these to be very enticing, which itself is enough to keep them playing a little more than they might have normally played.

Sofie [01:29:31 - 01:29:35] But other game modes, I think sound a little intriguing. Yes.

Nanna [01:29:36 - 01:29:38] I saw story mode, and I thought, uuuhhhh, story mode.

Sofie [01:29:39 - 01:29:57] The game is only fun, as long as there are new cards. It's also a little refreshing, but if it's completely the same, it could be a bit tiring, right? When they spice it up with online mode, which is an option, then I think it's cool. Or with new cards and that sort, like, it is cool. Mm. Nice.
(Transcript E, [01:29:31 - 01:29:57])

According to Elias et al., there are many different ways of rewarding a player (2012b, p. 174-178). While the physical version of Mysterium is perhaps more likely to reward the players with the enjoyment of physically being social with your friends, the digital version now offers other alternatives, such as these new game modes and point system. This keeps a sense of balance between the cost and the reward for the players.

Mysterium also utilizes animations at many different points of the game, including in the final reveal. This is the tensest part of the game, as it directly corresponds to whether the group has won the game or not. The animation, which can be seen in figure 27, shows the three options the players had to choose between, which then fades out one by one using a blue mist and fading the cards to gray. The last group of cards standing is the correct choice, and after it has been revealed, the game will tell you either victory or defeat.

Figure 27 - Animation in Mysterium (Recording B, [01:10:40])

These slower ways of revealing whether players have made the right choice directly corresponds to the theory of uncertainty in games. As Salen and Zimmerman (2004c, p. 1-2) mentioned, a meaningful game has to have moments of uncertainty, that makes the game exciting and tense. In revealing things slowly, either with animations in a video game version, or with players slowly dragging out the reveal in the physical version, they create these moments of uncertainty. These moments are crucial for the players' enjoyment of the games, which is why the animations of Mysterium could perhaps even be slower and more dramatic, as one of the players mentions in the following excerpt.

Matilde [01:22:11 - 01:22:24] And like, the way they did it, could perhaps have been a bit more mystified, like. Mmm. But I really liked that element.
(Transcript E, [01:22:11 - 01:22:24])

A similar observation was made by a player, after they had played the physical version of Codenames. They discuss how the way in which they put down a card, depending on whether or not it was correct, almost has a theatrical element to it.

Matilde [01:29:35 - 01:29:41] There is also something dramatic about the fact that it is us, that put them here. Because it doesn't just get revealed when you end...

Magnus [01:29:41 - 01:29:42] Yes, there is a bit of a...

Matilde [01:29:43 - 01:29:48] I remember at one point Nanna looked at something down here, and I was like, the black one.
(Transcript C, [01:29:35 - 01:29:48])

In these cases, both in Mysterium and Codenames, the player with more information is almost teasing the players with hidden information. The players themselves are responsible for creating this tense moment between each other. However, in the digital adaptations, the reveal is instead done by the game itself, which could easily lend itself to a less dramatic reveal. Animations, perhaps used with sound effects, could be exaggerated even more, to create a more meaningful experience. Of course, in the actual rules of the game, you simply have to reveal whether the players are right or not, but if players themselves always interpret the rules to add this theatrical drama, then the experience designed digitally should probably reflect this wish from the players. This also relates to some of the video game heuristics presented in the literature review, such as H6, players should feel in control of the game and like they can influence the world, as well as H10, players become immersed in the game when it utilizes visual and auditory elements to heighten immersion (Desurvire & Wiberg, 2009, p. 560-562). If the player is not able to add the drama themselves, then the game should be able to make the reveal as dramatic as the players themselves would have done.

Another element, which video games can utilize, that would be impossible to incorporate in the physical games, is automation. The automation that all players enjoyed was automating the setup, which Wallace et al. (2012, p. 232) would call routine-based activities automation.

Especially in Mysterium, because of its many moving parts, this automation saved a lot of time, as is explained in the following excerpt.

Morten [01:28:47 - 01:28:54] But on the other hand, what online games do, is they set everything up for you. You just click play, go, and then you are ready.

Thomas [01:28:54 - 01:28:59] We spent a least 15 minutes, probably 20 minutes, setting up.
(Transcript D, [01:28:47 - 01:28:59]

This also relates to the idea of cost versus reward, that Elias et al. (2012, p. 174-178) discusses should be balanced. If a game is very time consuming to set up, it should be worth that wait and that busywork. However, because the digital version is a lot faster and easier to set up, the cost can be seen as lower.

The potential issue with automating the setup, however, is the lack of flexibility. In the following excerpt, the players have just started playing Codenames, and they end up discussing a word on one of the cards, which they have never heard before.

Oliver [01:41 - 01:46] I have to fucking Google, what one of these are.

Emma [01:47 - 01:49] Is there some difficult words?

Thomas [01:49 - 01:50] Is it Pravda?

Oliver [01:50 - 01:51] Yes.

Thomas [01:51 - 01:52] Yeah, I don't know, what that means.
(Transcript F, [01:41 - 01:52])

In the physical version of the game, you could easily just remove one single card, which players do not understand, however, in the online version, you would have to completely restart the game, to get a new setup. This is just one of many examples that showcase how there is a lack of flexibility within digital games. While something seems easy in real life, such as replacing a card, it would be a rather difficult thing to program for a game. These potential changes are what Frapolli et al. refers to as house rules, and it is a type of flexibility within gaming (2010, p. 115). It is where players change something in the rules of the game, to allow a more fun experience for that specific group. While they can be difficult to implement online, it would be beneficial for designers to consider, if there is one or more house rules that are particularly important, that they could add as game modes or settings. In the settings for Mysterium, for example, you have the option to choose whether to play with clairvoyancy tokens or without, as well as choosing the difficulty of the game, as can be seen in the screenshot below.

Figure 28 - Game setup choices Mysterium

Codenames was also praised by the players for having what Wallace et al. (2012, p. 232) would call a logsystem. In this log, players can see both which hints had been given previously, as well as which guesses they had already made, as can be seen in figure 29.

Figure 29 - Codenames logsystem (Recording A, [22:21])

Sometimes a player has to leave what Salen and Zimmerman refers to as the magic circle which is when players are completely engrossed in the game and its world (2004b, p. 1-6). The players sometimes leave the magic circle for many different reasons, either because they lose focus on what they are doing, for example through conversations not related to the game, or if they physically have to remove themselves from the situation, for example going to the kitchen to grab a drink and snack or going to the bathroom. Having a logsystem helps the

player get back into the flow and into the frame of the magic circle, allowing them to remember what they were doing, and which hints they have gotten already. As they explain in the following, this is seen as a great addition to the original physical game.

Matilde [52:00 - 52:04] I want to say an advantage here. That is the fact that you can see everything you have written earlier. Normally you have to remember this.

Sofie [52:04 - 52:05] You can just scroll up and be like. What was it actually that is was earlier and such.
(Transcript A, [52:00 - 52:05])

In the physical game sessions of Codenames, it can be seen in effect how the logsystem in the digital version, as well as the fact that everything has been written out, helps make the game cleaner and easier to understand. The following excerpt is from the physical version of Codenames, in which the given hint is discussed, as it could not be seen written out in the log.

Sofie [01:10:13 - 01:10:20] Yes. What did you click? Fuck man, it's going fast. 'Legs' and 'head'. Did you say 'the body' or 'body'?

Nanna [01:10:21 - 01:10:22] 'Body' for three, wasn't it?

Magnus [01:10:22 - 01:10:23] What? Body?

Sofie [01:10:23 - 01:10:24] Did you say 'body' or 'the body'?

Magnus [01:10:25 - 01:10:29] I said 'body'. Why should it be 'body' or 'the body'?

Sofie [01:10:29 - 01:10:31] It could make a...that there is something to it.
(Transcript C, [01:10:13 - 01:10:31])

Similarly, when the other group also played Codenames physically, they sometimes had to spell things out, to ensure everyone was on the same page with the meaning of the word.

Morten [17:34 - 17:37] Okay, I'll say 'shoes, 2'.

Oliver [17:37 - 17:38] Shoes, 2.

Morten [17:39 - 17:43] S-H-O-E-S, Shoes, 2.
(Transcript D, [17:34 - 17:38])

What automation does in this game, is diminishing potential misunderstandings, making it easier for players to know exactly which clues have been given. All players in this study really enjoyed this feature, especially in a game so heavily focused on figuring out hidden information. This means that there was a relatively good balance in both games between automation and flexibility.

5.1.3 Partial conclusion: Player-to-game

This analysis section was focused on answering the RQ of: *How do players interact with the games, and which opportunities/issues arise with each medium?* In the analysis we saw how the game Codenames had a low level of changeability, while also fixing some of the potential incidents, as Goffman calls them, by making actual changes in the user interface. This causes an overall better user experience for the players. On the other hand, the game Mysterium had a higher level of changeability. However, the changes made caused more confusion among the players, heightening the barrier of cooperation, as each players' view felt more detached. This caused a lower level of sociability, as well as heightening the amount of downtime felt.

We also saw how each of the digital versions of the games utilized different video game elements. Mysterium in the digital version, for example, used many different types of rewards, including a points system and multiple different game modes. This added reward felt exciting to players and made them even more interested in the digital version of the game. We also saw how Mysterium utilized animations to create immersion, however, the players still found this lacking in comparison to the physical version of the game. In regard to Codenames, we saw how logsystems as a type of automation was positively received by players as providing a better user experience and allowing players to quickly enter back into the magic circle.

Overall, the interaction between players and the games certainly differed in multiple ways when comparing the digital and the physical version of the games. However, by making changes in the digital version, the overall user experience would remain positive, as either utilizing video game elements, or simply fixing issues in the original physical games, are only possible when making these adaptations of the games. We also saw that there is an expectation from players, that the digital game will introduce something new. Whether that is creating a better overview, or by implementing fun alternative playstyles, or other video game elements, this slight change is seen as imperative.

5.2 Player-to-environment

Multiple of the sources mentioned in the literature review talks about the idea of physicality, and the fact that our environment, as well as the physical product that is the board game, are a part of the gaming experience. Kocurek (2018) talks about the tactility of both board games and video games, and Maurer & Fuchsberger (2019) argues that the physicality of board games creates a much higher sense of sociality compared to video games. The following section is therefore focused on how the environment, both physical and digital, impacts the user experience for the players. Especially focusing on comparing the physical environment with the digital environment, and how each of them impacts the gameplay. Therefore, the RQ is formulated as follows: *How does the environment play a role in the overall experience of the game?*

5.2.1 Digital setup

This section will be focused on the digital environment that players have when playing the online version of the games. As Kocurek (2018, p. 66) argues, there is still some tactility connected to playing games online. Therefore, the discussion of how players interact with their digital environment, compared to the physical environment, is of interest.

The first important thing to note is that most of the players in this study used a two-screen setup. This means that they could have one screen with the gameplay showing, and one screen with their videos, as is illustrated below.

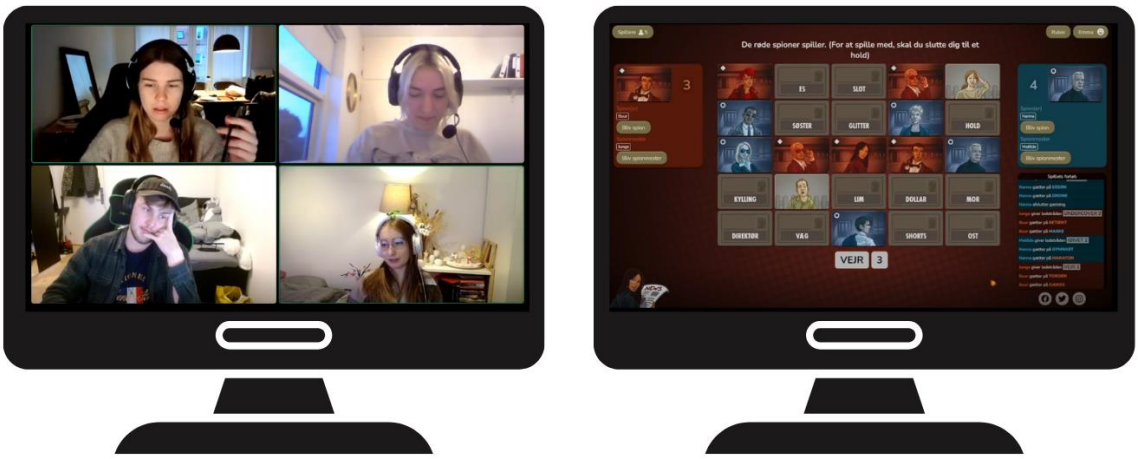

Figure 30 - Two-screen setup

Having this type of setup allowed the players to quickly switch between focusing on the gameplay and focusing on the other players through the videos. The audio would always play, no matter where the player would focus their eyes, meaning the verbal communication was always available. An initial question then, regards to when players are looking at each of the screens. Players explained that they would usually look at the gameplay screen, whenever they would be the ones having to give or decipher a clue. However, when waiting for other players, they would usually turn to the video screen, as is explained in the following extract.

Nanna [01:27:33 - 01:27:43] In Codenames, I thought, I looked more here *looks directly at the camera*, because you would sit for a long time, while each other sat and waited, then you could sit and talk in a way. (Transcript E, [01:27:33 - 01:27:43])

The other playgroup shared similar experiences, as they explained in the following.

Morten [40:39 - 40:48] Whenever I didn't have any game-action, then I sat and looked at the cameras. Yes. And then you are sitting and making jokes or doing something fun or other, then I normally look over at the cameras. (Transcript F, [40:39 - 40:48])

This resembles the physical playing experience rather closely. Whenever players would be given a card or a clue in the physical playthrough, their focus would immediately be drawn

back to the physical game components and the board, looking mainly downwards, as can be seen in the screenshot below, from the physical playthrough of Mysterium.

Figure 31 - Mysterium physical play, eye focus (Recording C, [30:49])

Whereas whenever players found themselves waiting, or simply being very invested in a conversation, they would turn their gaze directly to each other. This can be seen in the example below, where one player, off to the right, starts to tell a story, and all other players immediately look at that player.

Figure 32 - Mysterium physical play, eye focus (Recording C, [58:46])

Eyes in general is seen as a modality within non-verbal communication, and it is often used on a very primal level to create a connection between people, which is also why eyes are referred to as the windows to the soul (Hall & Knapp, 2013, p. 229-262). In this example, while players could easily continue having the conversation while looking at the gameplay, they still choose to look at the player talking, to show that they are listening to the story. And the same can be seen in the digital playthroughs, in which players will turn their heads towards their other screen, whenever someone is telling something interesting like a story. While it is easy for players to quickly change from looking at each other, to looking at the game, it is important to recognize that players, both in the digital plays and the physical plays, are not actually able to look at both at once. This is important, as it shows how closely the digital environment can replicate the physical, if players, as in this study, chooses to utilize a two-screen setup, where they can quickly switch from looking at each other to looking at the game. While not everyone will be able to have this equipment in their homes, it is important for both researchers and designers to realize that it is becoming much more common to have for example a home office with multiple screens, microphones, and cameras.

A big part of the digital environment, compared to the physical, is the idea that player do not directly share the environment. While this of course removes some of the sociability, as players are no longer sharing the physical space around them, it also allows players to personalize their own digital environment. An example of this personalization is for players to add elements, such as music, to their gameplay experience. In this study, we saw players occasionally using sound effects through the call, to create humorous moments and reactions (Transcript B, [03:20 - 03:49]). Additionally, in the excerpt below, a player describes how they had chosen to add a soundtrack to the playthrough of Mysterium.

Sofie [00:22:41 - 00:22:44] Fuck, that music that i put on in the background. It is sort of like tense now, it goes like duh-duh-duh-duh-duh.

Magnus [00:22:45 - 00:22:46] Oh yeah, I have completely turned off the music. I have full focus.

Matilde [00:22:47 - 00:22:47] Is there music on?

Nanna [00:22:48 - 00:22:48] Is there music on?

Sofie [00:22:49 - 00:22:51] I have this ultimate mister robot original tv series score music for hacking, coding, and programming on.

Matilde [00:22:51 - 00:22:54] Oh, you put your own music on? Fuck man, there will be hacking.

Emma [00:22:57 - 00:22:58] There is hella hacking happening right now.

Magnus [00:23:00 - 00:23:02] I'm imagining a video, where there is just someone sitting like *Magnus hunches over the computer, and pretends to tap away like a hacker*

Sofie [00:23:01 - 00:23:01] I like listening to this sort of this while I'm sitting and doing stuff.

Magnus [00:23:01 - 00:23:032] I can understand that.

Matilde [00:23:04 - 00:23:05] Yeah, I get that. So you are just sitting and getting a bit stressed or?

Sofie [00:23:16 - 00:23:18] It just had a sort of dramatic tone. It fitted perfectly now that I don't now the answer to this one.
(Transcript A, [00:22:41 - 00:23:18]

This type of personalization shows that there can also be an element of flexibility to digital play. This is interesting, because flexibility is often seen as being much harder to achieve in digital games, as compared to physical games (Frapolli et al., 2010, p. 113). Of course, players do have the option to play music while playing the physical version of the games, but this is something that has to be decided and chosen within the group. In the digital versions, however, a player has the flexibility to choose how they want to personalize their gaming experience to their individual needs. As the flipside to flexibility is often seen as automation, as Wallace et al. (2012, p. 234) claims, there is an expectation that the digital versions of games might be lacking in flexibility, as they utilize automation. This might be true in terms of the actual gameplay, however, when looking at how players interact with the digital environment, for example by personalizing their experience by listening to music, it is clear that digital environments also allow for a certain amount of freedom and flexibility.

5.2.2 Flow and breaks

Both Codenames and Mysterium have players taking turns to give clues or hints to other players. This means that while the cluegiver is considering their options, the other players have to wait. This creates a natural break from the otherwise tense situation, but how players react to this can differ. It is interesting to see, while players are awaiting their turns, how the environment plays a part in both their way of taking a break, but also the overall flow of the game.

While players could stay in silence as they wait, this is rarely a desirable outcome. Instead, most players like to fill these natural breaks with conversation, as was the general tendency throughout the different game sessions. These conversations could be pertaining to the game, such as discussing which card to choose next turn, however, they often were about something completely separate. The interesting notion in this case, is how these breaks can interfere with the player's flow. As mentioned in theory section 4.2.1, flow refers to a state in which someone feels 'in the zone' and is completely engulfed in a situation (Woods, 2012b, p. 146-149). As there is always only one person who gives clues at a time, this means that while other players are out of flow, having a separate conversation, the cluegiver has to remain in flow.

In the example below, we have one player, Magnus, who has been spending a longer time figuring out which clue cards to give in the game Mysterium. Because it took him a while, other players ended up having a conversation, which Magnus then feels like he has to interrupt, to get players back into the game and into a flow state once again.

Magnus [01:06:18 - 01:06:20] *Said in a slight whisper/low voice* I'll just wait with sending it till you are done talking.

Sofie [01:06:22 - 01:06:23] Is that in Copenhagen?

Nanna [01:06:23 - 01:06:23] Yes.

Emma [01:06:24 - 01:06:25] Maybe I should get it back then.

Nanna [01:06:25 - 01:06:30] It's located in different parts of the country.

Emma [01:06:30 - 01:06:32] Could you send a link? Before I forget.

Nanna [01:06:32 - 01:06:32] Yes.

Sofie [01:06:32 - 01:06:33] It sounds very smart.

Nanna [01:06:33 - 01:06:35] Magnus, you can just choose.

Magnus [01:06:35 - 01:06:38] Super, I have already chosen, I'm just waiting till you are ready. Hahahah.
(Transcript E, 01:06:18 - 01:06:38)

In this example, the other players barely noticed that the cluegiver was ready to give out clues. In fact, because he speaks in a low voice, he seems almost apologetic about stopping their conversation. It almost seems as if the conversation between players, and not the game, becomes the center of attention. Which could be why Magnus, using Goffman's terms, feels tense trying to break the conversation up, even though he is the one engrossed in the game. This situation could therefore also be seen as him getting out of flow, out of his spontaneous involvement, as he tries to get the other players attention back to the game.

In both the digital and physical environments, conversations were used to fill out any silence. However, players did mark a certain difference between the mediums. For example, one player highlighted, that the downtime felt longer online.

Oliver [01:12:41 – 01:12:47 It feels as if there is more downtime in this [digital version], rather than when playing it in person.
(Transcript B, [01:12:41 - 01:12:47]).

So, while conversations happen online, they might be a little sparser, or they might simply be regarded as less important. In another session, Sofie adds to this sentiment, as she explains how she would fill up the break time online in a different way.

Sofie [01:30:02 - 01:30:23] Then there is the thing of, if you are online, then you can sit and do other things, while the others…for example here, we had some damn hard things to combine, then we had a OK amount of…I know I would have sat and browsed Pinterest or something like that. There was much empty space, but that is when I'm sitting and talking instead.
(Transcript C, [01:30:02 - 01:30:23])

Having the internet available at all times during a play of the online board game means that the other players, as well as the game, are almost competing for the players attention. So, while conversations did still frequently happen during the digital game sessions, individuals might be distracted by the opportunity to go look at i.e. Pinterest or other websites, which could be the reason why, as Oliver expressed, that the downtime, or breaks, felt as if they

were more prevalent. The digital environment then, can impact the overall flow of the game. Additionally, in the digital playthroughs, it was more common for the players to spend their breaks doing other activities, such as get up to get a drink (Transcript A, 13:13), close a door (Transcript E, 48:18), or grab an item (Transcript E, 54:29). It would therefore seem that players find it more socially acceptable to go completely out of frame during the game when playing in an online environment, as this does not directly impact others, and perhaps also because it is possible to do it in a slightly more concealed way.

5.2.3 Distractions

A theme which is connected closely to both the digital and physical environment, as well as the flow and breaks in games, is distractions. While the main focus of a gaming encounter is the game, as well as any conversations that occur throughout, it is still very likely that distractions show up as part of the encounter. These are interesting for this study as they showed themselves in quite different ways depending on whether they happened in the physical or digital environment.

The first example is in the playthrough of the physical version of Mysterium (Transcript D, 01:07:01-01:08:34), in which part of the physical environment, in this case a cat, serves as a distraction.

One of the player's cat shows up

Thomas [01:07:01 - 01:07:03] Hi Lilly, what are you doing?

Emma [01:07:07 - 01:07:10] Oh hi! [*Cat starts licking one of the players*] Her tongue is so rough!

Thomas [01:07:31 - 01:07:36] She is talking. We are not quite sure she can meow.

Emma [01:07:40 - 01:07:44] Haha, cute! You are allowed to move these. It was these, that were correct, right?

Thomas [01:07:44 - 01:07:52] Ja. Lilly, what are you doing?

Emma [01:07:53 - 01:07:57] Nothing. Don't do it. Don't even think about it.

Morten [01:08:00 - 01:08:00] She's gonna jump.

Thomas [01:08:01 - 01:08:04] She's gonna do it.

Oliver [01:08:04 - 01:08:07] I'm gonna throw these five away, [*gestures to cards*] because I can't do anything.

Thomas [01:08:09 - 01:08:17] Lilly down. No. Paws. Paws. Oi! Down with your paws.

Emma [01:08:18 - 01:08:19] She won't.

Morten [01:08:21 - 01:08:24] She knows. She is just...

Emma [01:08:24 - 01:08:27] Just want to see, can I? I don't know if this is gonna work.

Thomas [01:08:29 - 01:08:30] She is testing the limits.

Ghost hands out the clue cards

Emma [01:08:32 - 01:08:34] Okay, but then we have...we have some food here.
(Transcript D, [01:07:01-01:08:34])

In this excerpt, we see a very clear physical distraction, as a cat shows up around the players. This is at a point in the game, when three of the players are waiting for clues, so they do not have any specific game actions they are supposed to be doing. While distractions as a term have negative connotations, it is not necessarily negative. One complaint some players might have for both Codenames and Mysterium is that while the cluegivers consider which hints to give, the other players have a certain amount of waiting time. This is what Elias et al. refers to as downtime, and it is seen as a cost of playing the game (2012, p. 178-184). Because players need time to consider their actions, there will always be a certain amount of downtime associated with playing games, and both Codenames and Mysterium have clear downtime points throughout the game. A distraction can therefore be seen as a welcome alternative to this downtime. Additionally, having a shared distraction can add to the feel of sociality amongst players, as they become distracted by the same thing, in this case the same cat, which sparks up an entire conversation about cats.

On the other hand, distractions online can both be shared and be individual. In the online game of Codenames, group A ended up distracted in a few different ways. One thing they are distracted by on multiple occasions is a wand as a physical object. At one point (Transcript A, [00:05:56]) a player mistakes a paint brush on another player's video as a wand as can be seen in figure 33.

Figure 33 – Paint brush or wand (Recording A, [05:57])

This shows that having the camera film each person can serve as a shared distraction, as you can still be distracted by whatever is in frame. You could therefore argue that having the participants use a camera setup can add to the sociality of the online gaming experience. Later on, one of the players shows off a newly purchased wand to the other players, as is apparent in figure 34. However, he ends up apologizing for taking everyone's attention away from the game to look at his wand.

Figure 34 – Player showing off wand distraction (Recording A, [07:04])

Magnus [00:07:36 – 00:07:37] I'm sorry, I'm distracting, I'm distracting. [...] It's part of the tactics. (Transcript A, [00:07:36 – 00:07:37]).

The idea showcased here is that distractions are not a negative reaction to the games, but could potentially be a tactic, or simply part of the natural flow of games. It also shows that physical objects within the environment can be part of the digital gaming encounter as well.

However, there is an expectation, from player to player, that the focus of the session, even in the digital environment, is still to have a game encounter. Playing online means that the game has to compete with all the possibilities that come with being on the computer connected to the internet. When players sit down to play a game in person, the game and the players are usually in focus, as there are not many other things to do in the given situation. A player could turn to their phones, if they were bored, however, this would generally be considered rude. However, opening a new tab on the computer, while still being part of playing the game, is impossible for other players to see. This means that players could easily get distracted, and start to browse online, instead of focusing on the game. This relates to Goffman's

terms of realized resources (1961, p. 18-31), which refers to what is actually part of the game. There is an implicit expectation, when players game online, that the focus should remain on the realized resources, the objects of the game as well as the other players, rather than allowing yourself to get distracted. Even if other players would not be able to see this, it would still be considered rude, much like bringing out your phone to the game table. What this means then, is that players need to be able to trust each other to the degree that everyone is willing to focus on the realized resources and enter the magic circle together.

Players did on multiple occasions use the internet to help their gameplay, especially in the game Codenames, to find hints that could be helpful. Either by checking the spelling (Transcript A, [00:29:00]), ensuring that the hints were real words (Transcript A, [00:11:07]), or to understand a clue they had been given, but did not know what meant (Transcript A, [00:31:45]). The players did find this to be very helpful, and sometimes they even turned to Google in the physical plays of the game (Transcript C, [01:07:36]). In this sense, using the internet in small doses, can become part of the game, and therefore part of the realized resources. The line between when it is socially acceptable to browse around, and when it is not, could easily be blurred.

At this point, it is important to clarify that the theme of distraction is not directly mentioned in any of the literature presented in the literature review. However, as it was seen at multiple points of this research's data, it is potentially an important discovery in relation to both the physical and digital environment, which impacts the players' gaming experience. While the distractions are naturally shared when playing games in the same room, they are not necessarily shared online. The best way to counteract this, is having the players online share both surrounding sounds and images with a camera and microphone.

5.2.4 Partial conclusion: Player-to-environment

This analysis section was focused on answering the RQ of: *How does the environment play a role in the overall experience of the game?* In the analysis we saw how the digital environment can closely resemble the physical environments if players utilize a two-screen setup, so that they can both see and hear each other while simultaneously playing the game. Players can then be able to go back and forth between having a conversation while looking at each other, to having full focus while looking at the gameplay. This follows the natural breaks throughout the gaming encounter, as they also occur in physical environments, and which can change the flow of the game.

Digital play can allow each player to personalize their individual environment to their liking, for example by choosing whichever music they want to listen to, which differs from the physical environment, in which all players have to agree to environmental changes. We also saw that when players sit together in the same room, distractions can often be welcomed, as they remove some of the downtime players can otherwise find bothersome. However, when sitting at home on their computer, it is easy to be distracted on your own by your computer. At this

point, it is significant that players can trust each other to remain focused on the game, so that everyone can continue to be simultaneously engrossed in the gaming experience.

5.3 Player-to-player

As presented in the literature review, playing board games is an inherently social activity. Maurer and Fuchsberger (2019, p. 1) argue that board games are a facilitator for togetherness. In relation to this, the following section will look into how this sociability differentiates between the physical games and their digital versions, especially focusing on the communication and interactions between players. It will use examples from both games interchangeably, as the focus of this section is more on the players, rather than the games. Additionally, this section will look into how the overall user experience is impacted by the player-to-player interactions. The RQ this section seeks to answer is therefore: *In which ways do the interactions between players differ based on the two mediums?*.

5.3.1 Non-verbal communication

When we are discussing the communication between player to player, it is important to recognize that we do not only have verbal communication to look at, but also non-verbal communication, such as facial expressions and gestures. This topic is particularly interesting when looking at differences between the digital game session and the physical one. As discussed earlier in section 5.2.1, all participants were asked to have their cameras on while playing, to best simulate a real-life gaming experience. This was also chosen to see how much the participants would end up relying on the cameras when they were available, or if they would simply ignore them.

Both Codenames and Mysterium are games that limit your verbal communication to a degree, as you use clues to guide your partner(s). This means that the non-verbal communication could potentially play a part in the game, guiding the players. On multiple occasions, both in the physical and the digital versions of the game, players talked about how difficult it sometimes is not to use non-verbal communication. An example of this is the following section, in which the players discuss how they feel as if they have to keep their faces neutral, almost as if they were playing poker.

Magnus [00:10:26 - 00:10:30] But, again, I have to…I have to not make any grimaces. So I'm just sitting like hides the bottom part of his face with his hand* hoooah.

Sofie [00:10:31 - 00:10:35] Yes, I know that. You very much so have to sit like. *Sofie opens her eyes wide, moving them quickly from side to side*. Mmmm.

Matilde [00:10:35-00:10:36] Okay I just have to…

Emma [00:10:36 - 00:10:39] A real constipated look.

Nanna [00:10:43 - 00:10:46] I think, that is a thing I've never thought about, this face that you can't make a face.

Sofie [00:10:48 - 00:10:50] Nanna just has a permanent poker face.
(Transcript A, [00:10:26 - 00:10:50])

This example was from the online playthrough of Codenames; however, similar remarks were made in the physical playthrough of both Codenames and Mysterium. In this case, the non-verbal communication modality would be the eyes, or general facial expressions, as they are seen as a way of looking into someone's true intentions or emotions (Hall & Knapp, 2013, p.229-262). Being repeated on multiple occasions lends me to believe that this issue of non-verbal communication is a concern for most players. It is potentially a point of friction, especially in Codenames, as there are two teams competing, so one player giving non-verbal communication to their team, whether intentionally or not, can put them in the lead. After the group had completed the physical playthrough of Codenames, Magnus expressed this in the following:

Magnus [01:27:43 - 01:27:54] Now I think there is the psychological part, I can see, when you guess correctly. For example, when you **points to Nanna** said 'small', and you **point to Nannas teammate Matilde** said 'microscope', 'scorpion'. I could just see on Nannas face, oh I don't have to do anything, I don't have to do anything, I don't have to do anything. **Everyone laughs** I can just feel it.
(Transcript C, [01:27:43 - 01:27:54]).

While everything was said in a lighthearted tone, which we can see because everyone laughs, this is still an expression of how the game can turn out to be almost unfair if players rely on their non-verbal communication. You could say that when players step into the game encounter, there is an expectation that they will keep the game fair, disregarding external influences, such as non-verbal communication. This relates to Goffman's formalization term of rules of irrelevance, as players should be able to separate which elements and factors should be kept outside of the game to ensure fairness (Goffman, 1961, p.18-31). Not adhering to these have a potential to cause friction, and while this is all done lightheartedly in this example, another group could potentially take this issue more seriously, causing friction in the group.

Non-verbal communication can also be used outside of the game frame, to create a sense of sociability among players. An interesting example of this is during the online playthrough of Mysterium. In this example, we see how the players directly interact with one another using their webcams and their non-verbal actions. In the first example, the players are pointing their drinks towards the camera as they say cheers.

Oliver [08:22 - 08:30] I am feeling very visionless right now.

Morten takes a sip from his Faxe Kondi Booster

Oliver [08:22 - 08:30] Fuck, we are so gamers. Did Morten just bring his Booster?

Emma [08:30 - 08:34] Yes. Oh wait, how do I do this?

Oliver [08:34 - 08:36] Who has got the Doritos at hand then?

Morten [08:37 - 08:38] No one. It's that shit.

Thomas [08:38 - 08:39] I have an Amber. Morten, cheers!

Thomas and Morten cheer their drinks towards the camera, and Oliver holds up his Doritos bag towards the camera

(Transcript B, [08:22 - 08:42])

Figure 35 - Cheers with illustrator action (Recording B, [08:44])

This type of non-verbal communication is referred to as an illustrator, which is a type of gesture which is used in relation to a verbal statement (Knapp & Hall, 2013, p. 205-228). As players both verbally express the want to clink their glasses together in a cheers, they also do the illustrator gesture towards their camera, to feel as if they are indeed clinking their glasses together as they would in person. While one might doubt how much non-verbal communication you can get when using webcams, this example clearly shows how players can still interact both verbally and non-verbally when playing games online. This is of course very group dependent, however, during the data collection, this tendency to utilize the camera on multiple occasions was seen with both groups. An example from the other group, was when one player had to get up to go grab something in her room, the other players noticed her outfit, and they immediately started a conversation about her new clothes (Transcript E, [55:47 - 56:10]).

In the literature review, I saw that researchers make a direct connection between the sociality of games with the physicality of games, saying that the physicality creates a shared experience (Maurer & Fuchsberger, 2019, p. 1). Based on the game sessions in this study however, it is evident that having the webcams on also provides a level of physicality and sociability to the gaming encounters. While this most likely is not to the same degree as the actual physical playthroughs, it does still bring forth an interesting discussion of how we choose to play games online. If having webcams is a way to create a higher level of sociability, then the designers of these digital board games should perhaps consider this aspect.

5.3.2 Cooperative interactivity

As mentioned in section 1.4, the two games chosen for this study, Codenames and Mysterium, were chosen because they had a level of cooperation. The following section will look into how this cooperation influences the interactions between players, both online and in person.

As Elias et al. (2012, p. 65-67) highlights, team-based games will provide the players with not just the goal of winning, but also the goal of contributing to the team. This goal could be seen on multiple occasions in the data set, however, in this particular study, it often took on a different character. Instead of highlighting to the team, when they felt like they played a particularly good play, they would instead complement each other when other team players did well. In the following example, one player tries to explain her reasoning for choosing a card in Mysterium, which the players had struggled to guess, to which the other player takes all the blame:

Matilde [42:32 - 42:40] Here I was just like, there is a lot of grass here. It's something like playing golf, and then here is a small…small mini golf course. It's very…Perhaps it was a little too cryptic.

Sofie [42:41 - 42:43] No, they were super good. I was just completely blank.
(Transcript C, [42:32 - 42:43])

While all players might want to feel as if they are contributing, as Elias et al. argues (2012, p. 65-67), this can be done in multiple ways. In some games, where you add up points for example, it would be easy to judge when a player did better than another player. However, in these collaborative games, where the 'feel' of which cards to choose is so important, it's hard to judge how something actually went wrong. It could both be that the cluegiver gave bad clues, or that the guesser was bad at translating that clue. Therefore, in the example above, while Sofie is directly taking the blame for the misunderstanding, it is most likely not because she wants to diminish her own ability to provide for the team, but rather that she wants her cluegiver, Matilde, to know that her efforts were appreciated. This way of almost complementing each other back and forth is very interesting, as it is a very round-about way of letting everyone know they contributed to the team, in a way that seems very polite and courteous. This tendency was seen on multiple occasions, both playing Codenames and Mysterium, and both when playing the games online and offline.

Another example of players being courteous towards one another was obvious from their ways of helping each other out. In the game Codenames, if one of the teams were very far behind the other, meaning they very likely would not win, the other team would often find ways to help the team far behind. In the following example, one team (Magnus and Nanna) are 5 cards behind, making it almost impossible to catch up. Therefore, the other team (Sofie and Matilde) decided that instead of choosing an 'easy' clue, they would rather give a 'fun' clue.

This gives the other team a chance to catch up, as well as allow the game to take on a more silly, and less competitive nature.

Sofie [00:40:18 - 00:40:23]I have a really...I have a really boring one, where you will guess it immediately, so we don't want that. That is..no...that is not fun.

Nanna [00:40:24] No.

Matilde [00:40:26 - 00:40:27] No, we should have a fun one.

Magnus [00:40:28 - 00:40:30] Nanna, just give me 7 and let me see.
(Transcript A, [00:40:18 - 00:40:30])

This shows how courtesy in a game, even a team-based competitive game, can be seen in the interactions between players. In this example, the players value the fun-factor of the game higher than their ability to win the game. The goal here is for everyone to have fun, and not only the winner to have fun. This relates to what Goffman (1961, p. 60-72) calls modification of the transformation rules, in which players make changes to the encounter to balance it, such as giving players handicaps or limits, or showing courtesy to one another. By adding a certain element as luck, in which the team behind technically could win if they were lucky to choose the right cards, the players are essentially modifying the dynamics of the encounter. Additionally, you could argue that some of the external factors, that are usually meant to be disregarded as you sit down to play a game, have come through to the actual play. These players are friends and are therefore interested in not only winning the game, but remaining good friends, by not causing too much friction by being too competitive. Or, explained simply, they showed each other courtesy for the sake of having fun.

The data collected in this study also has an example of players not being quite as courteous and encouraging to each other. Throughout one of the digital playthroughs of Codenames, one of the teams struggled with communicating their clues to each other. The cluegiver got frustrated, because they felt their clues were very good, while the guesser got frustrated because they simply did not see the connections between clues and the cards. All of which resulted in the following excerpt:

Oliver [26:27 - 26:33] I can't find any for 'stone' by the way. I can't find anything at all, that I think matches with 'cliff'. Well, there is on and another.

Thomas [26:33 - 26:39] Okay, okay, then you are...I'm sorry, but then you are decidedly stupid, because...Come on!

Morten [26:41 - 26:45] No Thomas, I can see the words. It doesn't make sense for me either.
(Transcript F, [26:27 - 26:45])

In this example, the cluegiver Thomas expresses his frustration in what Goffman (1961, p. 31-59) would call a flood out incident. This is an incident in which a player's emotions have been bubbling until it reaches a point in which it can no longer be held in. In this case, the

emotion is frustration with his teammate, which results in him calling his teammate stupid. By saying this, he is also indirectly saying that he himself is contributing to the team, but his teammate is not contributing. This differs greatly from the previous example, in which the players would take the blame for each other in a polite manner. It results in a more tense situation, as the other players have to interpret whether or not this is a serious incident, and how to handle the situation. Morten, the other cluegiver, who can see which cards are meant to be guessed, then steps up to Thomas, and explains that it does not make sense to him either. On the one hand, he steps up for the guesser, Oliver, who could easily end up taking offense to the statement, while he also tries to smooth over the situation for Thomas. In this case, Morten is the one who shows courtesy, but not for the purpose of being polite, but rather with the purpose of bringing back a sense of calm and fun into the situation.

This particular situation, in which a player expresses their frustration, was not the most common reaction. In fact, even in the slightly more competitive team-based game of Codenames, players would from time to time help each other across the teams, saying things like:

Morten gets the clue 'veterinarian' (or 'animal doctor' in Danish)

Thomas [33:06 - 33:10] But what, I know I'm not on your team, but what, what makes it a 'doctor'?

Morten [33:12 - 33:14] That I don't...I...I just think you...

Emma [33:14 - 33:15] That's too good of a question.
(Transcript D, [33:06 - 33:15])
While the game is technically competitive, the players still at times decide to help each other out, as Thomas and Morten do in this example, even though they are on different teams. It is difficult to understand exactly why a player might do this, as it can be done with good intentions of helping each other, but also easily can be used as a distraction for the other team, to mention cards that are not correct. This was seen done on multiple occasions, as players would try to make connections between cards that were so far-fetched, that it was seen as a joke distraction, as can be seen in the following.

Thomas has the clue ‘sewing’ and is trying to figure out which cards to choose

Morten [28:53 - 28:57] Do you know how they build the pyramids, Thomas? They sewed them…It was pretty crazy actually.
(Transcript D, [28:53 - 28:57])

Followed almost immediately by:

Morten has to guess the clue ‘drive’

Thomas [29:10 - 29:12] Do you remember how they got the pyramids to Cairo? They drove them there.
(Transcript D, [29:10 - 29:12])

Both of these examples are clearly joking, as all players laughed after each of these statements, as they were very ridiculous in nature. However, in all these examples, we see the two

‘competitors’, the guessers of both teams, who are helping each other by talking about which cards could be, or could not be, the ones to choose. This is interesting, as it showcases that these players, even in a slightly more competitive game, will prioritize having fun, talking together and making jokes, over winning.

For a designer, this means that the games should foremost foster a sense of fun. It also means that while a game will tell you certain rules, such as which types of words you can or cannot say, as well as how much you are allowed to communicate, players will always choose to play the game in the way they want to. This correlates to what Booth (2018, p. 58-59) mean when he says that the actual game is only responsible for half the experience. The rest is up to how the players choose to play the game. Players can be courteous to one another, or they might be mean to each other. A good game, whether online or physical, should create an experience in which players have the opportunity to have fun, and especially in games of a cooperative nature, a designer should allow all players to feel as if they are contributing to their teams.

5.3.3 Verbal communication

This section will discuss how the verbal communications between players takes place, especially focusing on some of the differences between communicating in person versus communicating online.

As both Codenames and Mysterium are games in which one player knows more than others, players often find themselves trying to, as they say, ‘read that player's mind’. An interesting observation in this regard is, that while this tendency happens in both the physical and digital playthrough, it takes on a slightly different form. In the following excerpt of the digital game session of Codenames, we see one team, Matilde, and Nanna, who are physically very far from each other, versus another team, Sofie and Magnus, who live much closer to each other. This resulted in a discussion of how to transfer your ‘brainwaves’ across the country.

Nanna [00:02:16 - 00:02:22] Matilde Matilde just say something, and then, then I'll read your brainwaves all the way down from Lolland. Don't worry.

Matilde [00:02:25 - 00:02:29] Cool, cool. Good plan Nanna, good plan. OK.

Emma [00:02:29 - 00:02:29] Strong brainwaves.

Nanna [00:02:30 - 00:02:32] Yes, hardcore.

Magnus [00:02:35 - 00:02:40] Then it's a good thing, that my brainwaves don't have that long to go. That's cool. It's just right around the corner down to...

Emma [00:02:41 - 00:02:43] Damn, so you have an advantage, what the hell.

Matilde [00:02:44 - 00:02:44] Yes, it's actually cheating.

Sofie [00:02:44 - 00:02:45] That's how it is.

Magnus [00:02:46 - 00:02:46] That's how it is. The signal here is really good.

Sofie [00:02:46 - 00:02:47] Tough luck.
(Transcript A, [00:02:16 - 00:02:47])

While all of this is said in a joking manner, it is interesting because it can influence how players regard their own ability to 'read each other's minds' or rather, understand each other's clues and win the game. A little later, when team Matilde and Nanna are struggling in the game, with some difficult clues, they continue this 'brainwaves' metaphor.

Nanna [00:20:50 - 00:20:59] I don't know why I'm looking at 'cheese'. 'Cheese' and 'sun'. I don't know what's. Matildeeee.

Matilde [00:21:02 - 00:21:07] Nannaaaaa. Remember the brainwaves Nanna.

Nanna [00:21:08 - 00:21:11] Yeah, I think the connection got lost around Møn or something. They are not up here yet.
(Transcript A, [00:20:50 - 00:21:11])

Suddenly, the metaphor is not only focused on reading brainwaves, but is also associated with the idea of having a strong Wi-Fi connection. Players end up relying on this metaphor to ensure blame is not on anyone in particular. It is a way of saying, it is not your fault or my fault, that we are currently losing this game, but instead it is because of the bad connection to the Wi-Fi, making our brainwave connection weaker. This relates back to the idea that all players want to feel as if they are contributing to the team in a meaningful way (Elias et al., 2012, p. 65-67). Being online gives the players a way to push the blame of losing to the internet, instead of onto each other, or themselves. Again, this allows the players to show courtesy to each other, and make jokes about the connection, to cause a gaming encounter which is less tense. Again, this also relates to Goffman's term of rules of irrelevance, as you would normally keep certain things outside of the frame of the encounter (Goffman, 1961, p.18-31), however, in this situation, the idea that players are far away from each other physically is used almost as an excuse.

Another interesting part of verbal communication, which changes drastically between digital and physical play, is the idea of roleplaying. Especially in the game Mysterium, in which one player takes on the role of ghost, the players discuss this. In the physical version of the game, players found themselves sometimes pretending to be the characters in the game. For example, when players have chosen which cards they want to guess, they would address the ghost directly to ask them whether they were right or not. The rules of the physical game even encourages players to engage in a bit of roleplaying at this point.

Magnus [03:19 - 03:20] Ohhhh, ghost.

Matilde [03:20 - 03:21] You are not correct.

Magnus [03:21 - 03:22] Ah, damn.
(Transcript C, [03:19 - 03:22])

Similarly to this, when the ghost player would use their crows, which is a once or twice in a game ability, that gets them completely new cards in their hand, the ghost player would pretend to be the crow, and make crow sounds.

Matilde [22:16 - 22:17] Ah! Ah! *Matilde makes crow noises*

Magnus [22:19 - 22:20] With sounds on. That was actually pretty good.

Nanna [22:21 - 22:24] Matildes crow noises. I'm pretty sure that's obligatory.

Matilde [22:25 - 22:25] Yes. You have to make those.
(Transcript C, [22:16 - 22:25])

This relates strongly to the magic circle theory, as the players truly live in the roles given to them. In the first example, by addressing Matilde not by her name, but instead by the role given to her, the ghost. In the second example, we see how the players themselves can also be part of adding to the world building of this artificial world they are playing in in the game. What we can see here is that the players, because of these roles and world building, find themselves engrossed in the world, and are actively within the magic circle of the game.

However, in the digital version of Mysterium, all of these opportunities for role-playing or world-building have been automated. The crow noises play via sound effects, and the game system will automatically show the players if they were right or wrong. This creates a sense of distance between the players, who are not interacting when the sound effects or animations pop up on their screen. The players themselves also noticed this issue.

Sofie [01:21:15 - 01:21:27] I think, I find it more fun to say, oh ghost, tell me if I have...I feel like there is some fun interaction which you are missing out on there.
(Transcript E, [01:21:15 - 01:21:27])

The players do not naturally find themselves in the magic circle as easily in the digital version of Mysterium. The role-playing and world-building is no longer in their hands, which breaks up some of the verbal communication between players, as they no longer interact with this in mind. This relates to the sixth video game heuristics, which says that players should feel in control of the game, and like they can influence the world (Desurvire & Wiberg, 2009, p. 560-561). Players are used to feeling in control of their own roleplaying and world building, however, in the digital playthrough of Mysterium, this is no longer in their control, and instead the computer automation has the agency over the situation. If the roleplaying aspect is an important part of the original game design, then it is clear that this has not been adapted well into the digital game version.

5.3.4 Explosions of talk

Because both Codenames and Mysterium are games in which players work with hidden information (Engelstein & Shalev, 2020, p. 232-233), there is a very special thing that happens once a game is over. This is what can be best described as an explosion of talk. Suddenly, as the game ends, no matter if the players won or lost, they are suddenly allowed to talk about all the things that happened throughout the game, which they had to keep hidden. This relates to what Goffman describes as a flood out incident (Goffman, 1961, p. 31-59), in which a player's emotions burst out after the game is technically over. Players have been wanting to talk about their clues the entire game, but have not been allowed to, until this point. Therefore, they often share their thoughts in a flood of information. An example of this transition between gameplay and being done with the game, is seen below.

Oliver [01:24:07 - 01:24:10] Should we go through your clues? Just so that I can explain my thoughts.

Thomas [01:24:11 - 01:24:13] Yes, mine are over there.

Emma [01:24:13 - 01:24:18] Mine are here. You said you wanted to explain something in relation to mine. I had these ones.
(Transcript C, [01:24:07 - 01:24:18])

This can also be seen as a release of the tension and uncertainty that a player has been sitting with throughout the game, which Salen and Zimmerman (2004c, p. 1-4) highlights as an important element in meaningful play. This is a moment in which players can finally breathe. Because of this, it can be seen as an important part of making the experience meaningful, as the tension and ease, as well as uncertainty is closely related to meaningful play, as explained in section 4.2.3.

When this explosion of talk happens, there is an interesting difference between the digital and the physical playthroughs. To understand this, the following will introduce two examples from the game Codenames, right after the game had officially ended. The first excerpt is from the physical game session, in which Sofie and Magnus were the losing team, and Nanna and Matilde were the winning team. The important thing to understand in this excerpt, is how the communication is structured, rather than what is being said by the participants.

Sofie [01:22:06 - 01:22:07] Was it 'Centaur' that was 'body?

Nanna [01:22:07 - 01:22:08] It was 'high' wasn't it?

Matilde [01:22:08 - 01:22:09] Was it 'hear'?

Magnus [01:22:10 - 01:22:11] It was 'high', that was 'body'. 'Centaur' was 'high'.

Nanna [01:22:13 - 01:22:15] We have just looked up, that like, centaurs are usually like three meters tall.

Sofie [01:22:15 - 01:22:16] 'Hear' was 'body'?

Magnus [01:22:16 - 01:22:17] 'Hear'...ear?

Sofie [01:22:18 - 01:22:22] Oh, okay. I thought Centaur was body, because you know...it had two bodies.

Matilde [01:22:23 - 01:22:23] It had a body.

Magnus [01:22:23 - 01:22:24] Yes, there was one, where I thought, it could be...

Sofie [01:22:23 - 01:22:25] I can see, that it was some difficult cards.

Magnus [01:22:25 - 01:22:29] So I also had 'though', 'crispy', and 'knot'.

Nanna [01:22:30 - 01:22:31] I really liked the, what was it? With the fish...

Emma [01:22:31 - 01:22:33] I thought that 'dough' was 'tough' and 'knot'.

Nanna [01:22:38 - 01:22:41] You choose 'oar'.

Matilde [01:22:38 - 01:22:41] Yes? Yes.

Magnus [01:22:33 - 01:22:37] That was also what I was thinking last, when I thought...I thought, it can be also be 'crispy' and 'knot'.

Nanna [01:22:38 - 01:22:41] That was not what I had. I thought of... as in the holes they make. It was in the direction that it should be fishing things.

Magnus [01:22:38 - 01:22:41] Then you are talking about it, and then she just say, it can't be that.

Matilde [01:22:40 - 01:22:4] Yeah, yeah, yeah. That was also what I was thinking about with 'oar', because you sail out like...

Sofie [01:22:41 - 01:22:48] That is, because ??? can be both 'crispy' and 'knot'. You are probably right, it can't be. I thought, that you 'stir' a 'dough', so that was relatively safe.

Nanna [01:22:49 - 01:22:54] Yeah, so when you choose that, I was totally like, that's fine, because I was really sitting like, what word can I find, where there is fishing without 'fish', because 'fish' it there.

Matilde [01:22:51 - 01:22:51] Yeah, yeah.

Magnus [01:22:54 - 01:22:56] The worst about it all, is that I thought 'stir' as in 'pipe'.
(Transcript C, [01:22:06 - 01:22:56])

What we see in this excerpt, is a true explosion of talk, in which both teams are talking simultaneously. This means that there in reality is two conversations happening at once, the one between the losing team, Magnus and Sofie, and another between the winning team, Nanna and Matilde. That is also the reason why reading the actual transcript can be very confusing, because every two conversations are happening across each other. This is what is often referred to as a turn-taking conversation structure with plenty of overlapping (Rocci & Saussure, 2016, p. 165-180). Players are not waiting for each other to finish sentences, instead they are all taking in an overlapping and simultaneous manner. This is possible in real life,

because we can direct our bodies and ears away from one person, and over to another, effectively blocking out the sound of the other teams' conversation. It's therefore both related to the verbal and non-verbal communication theories, as we here see an example of the proximity modulator. This refers to how people are having the conversation together in terms of their relative proximity to one another (Hall & Knapp, 2013, p. 295-286).

The interesting discovery, then, can be seen when we look at the following excerpt, which is how the exact same group communicated right after finishing Codenames in the digital version. In this excerpt, the groups were Sofie and Matilde, who won, versus Nanna and Magnus, who lost.

Sofie [00:46:07 - 00:46:09] I mean, if you do not accept 'HueyDewey' as a word, then I understand it, but then I would have written like 'duck sound', or 'animal sound'.

Nanna [00:46:10 - 00:46:11] You could also just write 'duck'?

Sofie [00:46:12 - 00:46:30] No, because then there was 'animal'. It was also difficult to have 'platapus' without 'animal', but yes, you owned it. That was also the reason I wrote 'colored', so like 'colored', not 'color', 'violet' is a co-lor, it is not co-lored.

Matilde [00:46:13 - 00:46:14] Oh, okay.

Sofie [00:46:31 - 00:46:32] But I can see, it's still bad, so.

Matilde [00:46:33 - 00:46:35] Because...it's like, we have colored the red shoes, kinda? Was it something like that?

Sofie [00:46:40 - 00:46:42] Yeah well, they was just colored, like red.

Matilde [00:46:43 - 00:46:44] Yeah, okay I see, I see.

Matilde [00:46:45 - 00:46:49] Yes, yes, but it was exactly because I thought 'Violet', that was Nannas. It is that name there.

Sofie [00:46:50 - 00:46:59] Yes, and then 'civil servants'. They are the ones, who work for the state. I am a 'civil servant' because I work for the government, so you do not necessarily have that much power. I don't know why it's called that. I am a 'civil servant'.

Matilde [00:47:01 - 00:47:05] Yes, because on Wikipedia, it says like...uhh...it says something like. It is not something used in Danish legislation anymore.

Sofie [00:47:03 - 00:47:08] Yes. I have also opened it. Well, it is, because I when I got hired, they said, you are a 'civil servant' now, but you know.

Matilde [00:47:11 - 00:47:11] Oh, okay, well well.

Sofie [00:47:13 - 00:47:18] So it was 'police' and 'judge' that was for 'civil servant', and then I was out in something with choosing, or something.

Matilde [00:47:20 - 00:47:20] I can see that.

Sofie [00:47:20 - 00:47:22] But there was also 'teacher' so it was like...

Magnus [00:47:23 - 00:47:28] The cool thing about it all is, I guessed wrong four times, but I could...there was only one that was neutral.

Emma [00:47:30 - 00:47:31] That is actually pretty impressive.

Magnus [00:47:33 - 00:47:36] Thank you. I choose wrong...right.

Matilde [00:47:37 - 00:47:37] That you did.

Magnus [00:47:39 - 00:47:41] 'Cable'. What was 'cable'? Was it 'switch'?

Matilde [00:47:42 - 00:47:43] 'Socket'. 'Electrical' 'socket'.

Nanna [00:47:43 - 00:47:46] Yeah, because it was like 'charger', 'cable'.

Matilde [00:47:47 - 00:47:49] That was because...it was the first that I thought about. It was like 'electrical socket'.

Emma [00:47:50 - 00:47:50] Yeah, I thought about that too.

Nanna [00:47:51 - 00:47:58] And then...then I saw how many Magnus had clicked on everything else before that, I just thought, fuck man.

Magnus [00:47:58 - 00:48:04] We talked about positive and negative in regards to 'pole', and then I just thought 'cable', because it has a positive and negative charge.

Nanna [00:48:05 - 00:48:08] Yes, yes, well, I saw it afterwards this, and then I thought, whoops, that wasn't particularly good.
(Transcript A, [00:46:07 - 00:48:08])

In the online discussion afterwards, it is very clear that firstly one group, in this case Sofie and Matilde, have their explosive talks about the cards and hints they chose, followed afterwards by the other team, Nanna and Magnus, who can then discuss their struggles throughout the game. When playing online, you cannot simply move your body, and thereby change your proximity, to only talk to one person. Because everyone's voice volume is the same, if one person talks, everyone else is usually quiet, because you simply cannot hear anything if everyone talks simultaneously. The actual conversation structure online is therefore very different, with much less overlapping and interruptions, and instead has the teams take turns conversing about their choices throughout the game. What this means is that the explosion of talk, which usually causes much excitement for the players, is possible for only one team at a time. The other team has to wait a short while, as their excitement and tenseness eases. Taking into consideration how much tense, ease, and uncertainty is connected to meaningful play (Salen & Zimmerman, 2004c, p. 1-4), it could mean that players end up with a slightly less excited and meaningful end of the gaming encounter. It can also mean that because the re-

ward is slightly delayed, it is regarded as slightly less rewarding, skewing the relationship between cost and reward, which Elias et al. (2012, p. 167-170) mark as very important in relation to creating a meaningful play encounter.

5.3.4 Partial conclusion: Player-to-player

This analysis section was focused on answering the RQ of: *In which ways do the interactions between players differ based on the two mediums?* In the analysis we saw how non-verbal communication is something that always happens between players both when playing online and digitally. We looked at the specific usage of illustrators as non-verbal communication when the players said cheers and pointed their drinks towards the camera.

We also saw how the players showed each other courtesy throughout the game, by praising moves made by each other. This is directly corroborating to the idea that players always want to feel as if they are contributing, as Elias et al. (2012, p. 65-67) highlights. We also saw an example of what happens when a player has an outburst of emotions and feel overwhelmed with frustration.

When analyzing verbal communication, we saw that players would use the term 'brainwaves' to describe whether they were doing well or bad, putting the blame not on an individual, but instead on the bad connection between players. We also saw how the players in the physical version of Mysterium enjoyed roleplaying their characters and building the world, however, in the digital version, the agency over this roleplaying aspect was transferred to the game itself.

Finally, this analysis section looked at how players, at the end of a game, would have a sort of explosion of talk, as they wanted to discuss all their actions throughout the game that they had to keep hidden. Through looking at the actual structure of these ending conversations, we saw how there is a massive difference between the level of meaningfulness for players during the physical versus the digital versions of the games.

6.0 Discussion

This discussion will explain how this study works in relation to the research field. This is done by comparing the results and methodology to the existing literature introduced in the literature review. This section will also discuss limitations within the methodology, as well as possibilities for future research.

As explained in the literature review, the actual existing literature of the topics discussed in this study is still lacking. Most existing research about the adaptation of board games to video games either focuses on the educational design development, such as Olivares-Rodriguez et al. (2022) and Radtke et al. (2020) or the technical development of the board game adaptation, such as Derakhshandi et al. (2021). This therefore lacks the interaction and communication part of design, as well as the general understanding of players with a user experience perspective. Throughout the thematic analysis in this study, it was found that three overall categories directly impact how the user experience of the game differs between the physical and

digital versions of the same game, which in this study is referred to as player-to-game, player-to-environment, and player-to-player. This is therefore adding to the existing literature by categorizing the implications that might arise when adapting a board game from the physical to the digital medium, working to bridge the knowledge gap.

Additionally, some existing research is focused more on quantitative data, such as d'Astous and Gagnon, (2007) in which the focus is on trying to understand what players themselves find important in games. This is potentially ambiguous, as players themselves might not think of or realize all the things that are of value. On the other hand, some existing research, such as Rogerson et al. (2015) is very specific about the design process of the games, but without explaining their exact process of inquiry, or without adding the personal gamers' perspective. This new research study then adds to the existing literature by having a qualitative framework that closely examines the intricacies of the interactions between players and the game/environment. It is also interesting because it seeks to directly compare the experiences between the mediums, without making assumptions about either.

Almost all the literature introduced discusses how the social element is a big part of the gaming experience, however, they do not go into details when it comes to how this can actually be seen, instead working as an underlying assumption. By working closely with the empirical data, this study shows not only that sociality is a big part of playing games, but also how this sociality manifests both in the physical and digital gaming encounters.

In relation to future research, there is still plenty to be explored in relation to the digital board gaming adaptation scene. This particular study was very focused on a specific type of gamer, people who play both video games and board games, and it also focused on a very specific type of game, with a communication focus. It would be interesting to see, if other types of gamers and games would yield similar results, or perhaps bring forth new knowledge that could be useful both for designers and for information science researchers.

7.0 Conclusion

This research paper was focused on the following problem formulation: *How do interaction and communication dynamics differ when playing physical board games compared to their digitized video game versions, and what are the implications for designing adaptations?* To answer these questions, the study had three analysis sections, each of which focused on a significant area of user experience between the physical and digital versions of the games Codenames and Mysterium.

The first analysis section discussed the interactions between the players and the games. Here we saw that the two games chosen for the study have very different levels of changeability in their translation to the digital adaptations, which caused different user experiences. We also saw that the overview, or the user interface, used can highly impact how the players interact with each other in relation to their level of cooperation. Finally, this section looked into how

the digital adaptation utilizes video game elements such as automation, animation, points systems and log systems, which showed that the relation between cost and reward is different based on whether the game is physical or digital.

The next section was focused on how the physical environment in which players usually play games is translated to a digital environment. It is discussed that the players who use a two-screen setup, in which they can see both gameplay and other players' cameras, more closely resembles the physical environment and the sociability connected with this. We also saw that breaks will naturally occur throughout the game, which is sometimes caused by distractions. These distractions can be conversations, physical distractions, or online distractions, and they can either take players out of the magic circle, or it can serve as a welcome use of downtime.

Finally, the last section looked into the communication and interaction between players, and how this impacts the user experience in both mediums. We saw that having the video camera available while playing means that players will end up looking at each other, using non-verbal communication to interact with one another. This creates a shared sense of physicality and sociability even when playing online. We also saw examples of how players interact with each other in a cooperative sense, both by showing each other courtesy, but also what happens in a situation with friction. It showcased that players always will choose to play the game in whichever way they find fun, even if that means modifying the transformation rules of the encounter. Lastly, we saw that once the games had technically finished, there would always be a type of explosion of talk, as the players discuss their choices and struggles throughout the game, which they otherwise had to keep hidden. In the actual analysis of the structure of this conversation, we saw that the physical playthrough allowed players to talk simultaneously and explosively about this, while the digital medium caused the players to only talk one at a time, to even be able to hear what was being said. This correlated directly to the excitement and meaningfulness of the encounter, as well as skewing the relationship between cost and reward.

In conclusion, this study showcased specific examples on the design implications that occur when playing a physical board game versus its digital adaptation. It also showcased how interaction and communication dynamics impact the overall user experience of the games in both mediums, as well as how these dynamics are both part of the player-to-game, player-to-environment, and player-to-player interactions.

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