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Abstract:
The use of video games for purposes other than entertainment has been on a steady rise in popularity over the last decade. The games, known broadly as serious games and deep games, enable possibilities for awareness and global social understanding, which could benefit modern society.

Many aspects of game design have yet to be considered for serious and deep games, which is why this thesis analyze and discusses the use of multiplayer and cooperation mechanics as a potential evolutionary development of these games. It does so through the history of serious games, the discussions of the problematic etymology, and by analyzing and comparing two serious game design tools and subsequently created a brief guideline. Afterwards, a serious game with cooperation mechanics was created to test the impact of multiplayer experiences in serious games.

The test concluded that there could be potential tendencies of the cooperation outweighing the individual's interpretation, but the game itself did not provide a clear enough message to determine this with certainty. However, the data supported the discussion of the etymology and the relative obscurity of these games.

Playing Seriously Together

A Study of Serious Games and Cooperation

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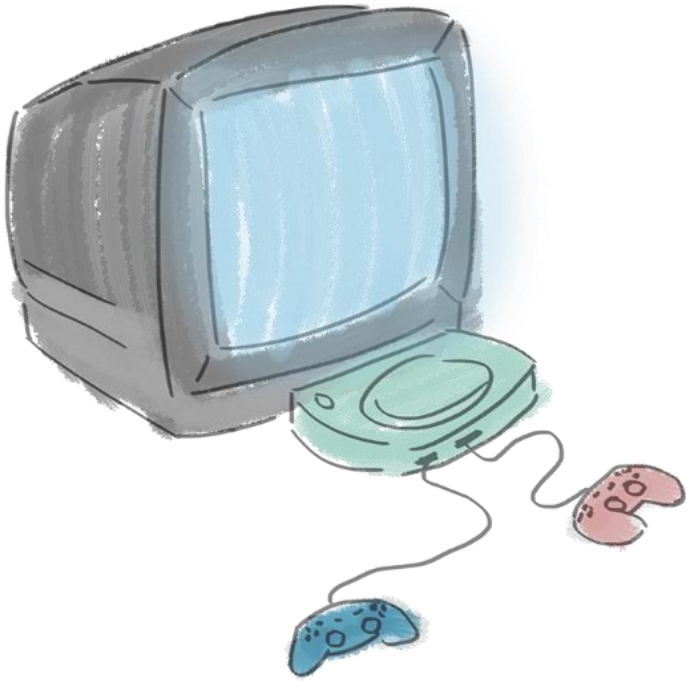
Aalborg University Copenhagen
Master Thesis
Spring 2017

Supervisor: Henrik Schønau Fog



1 Table of Contents

Preface

This thesis was written in the spring of 2017. It studies the concepts of serious games and cooperation through literature review, theories, a media-technological product, and an experiment. It will offer insight into the future potential of video games and hopefully one day be the first step to something great.

The appendix, provided digitally, will contain the report itself, the two games, interview transcripts, images used in the report, and a video production illustrating and summarizing the content of this project.

A special thanks goes out to my supervisor Henrik Schønau Fog of this thesis, Aalborg University for this five year journey, and Minority Media Inc. for their internship opportunity.

Another special thanks goes to Lyndsay Tunn, Steffen Pihl, Lisbeth Lyngbye Rasmussen, and my family.

1 Introduction

When I was growing up, games were a big part of my life. I played my first *Pokemon* game before I could understand English and continuously went to my father for translations when I got stuck, and *Counter-Strike* with my brother where we usually ended up playing hide and seek. I also remember playing video games at my school. We had some very specific classes that were dedicated to computer learning. In the beginning it was learning the '10 finger system' for keyboard writing through a game where we had to type out a predetermined story in order to get the full story. If we finished those exercises early, we got to play with a little library of other games. My personal favorite was a math game where the miner had to calculate how many diamonds there were in order to collect them.

That was my introduction to games that were used for something other than mere entertainment - or the concept that would become known as serious games and edutainment.

As video games rose in popularity and became part of societies worldwide, the use of them varied as well. Some were educational and at the start of the 21st century, the term started to gain traction. Over the past decade, the use of serious games has grown rapidly and is becoming more and more normal for independent developers with a perspective to share.

Serious games are more than educational games, they are games with a purpose other than entertainment, and the potential of them is what makes them so fascinating. These games have been used more and more for providing facts, stories and bringing awareness into social issues on a global scale. It is, however, still a niche genre of games and design theories for them are still being developed to this day.

Previous work for serious games has been slowly developing the genre and the concepts behind it, paving the way for even more research into the genre and its potential. Design concepts and considerations are providing a background from which to work from, to explore new aspects of serious games and new opportunities with them, but only if we study them.

The current state of serious games as a genre is tentatively accepting; the genre has become a stable within academics and the gaming community, but the deeper meaning of them are usually only understood by researchers, and the opportunities of the design aspects are only just beginning to be noticed. Therefore, it is important to study the concepts of serious games and take it to new heights, which will be discussed and examined in this thesis.

In order to investigate this topic, the thesis will contain an in-depth look on the current design frameworks and theories, which will provide a better overview and opportunities to look into even newer aspects of serious games. The research will be focused on serious games, design, and the potential of the genre by proposing that serious games have developments that are still undiscovered and should be explored.

It is a personal belief of mine that serious games can be ‘the next big thing’ and their importance is something that will be recognized globally. I want to find out where serious games stand, how they are understood, and how they are designed for in this day and age. More specifically, with this thesis, I wish to investigate what combining multiplayer experiences with serious game design could do to the genre and how it might affect its evolution.

2 Analysis

The focus in this analysis will be on presenting and discussing the research around the concept of 'serious games'. The chapter will start out with an introduction and presentation of the history behind the genre, and where it stands and how it is understood today. Following this, the etymology and subgenres will be presented and the specific issues around the naming conventions will be brought up. Then, serious game design and analysis into the genre will be presented, compared, and discussed. Finally, a new design aspect will be brought to light which will be finished by the primary research question.

2.1 Serious Games and the Concepts Surrounding It

2.1.1 History of the Medium

Gaming has become more popularized in modern society, which is especially prevalent with the growth of high budget productions, marketing, and community surrounding them. It has also brought forth the still ongoing discussion of whether games are an art form, which is a debate highly colored by individual opinions from both gamers and non-gamers alike (Stuart, 2012). While this debate will not be focused upon in this project, the concept of serious games does lean strongly towards this debate which will be evident later on.

It does, however, draw in an interesting parallel with other narrative-heavy mediums. The development of games and what games are used for can be compared to the development of other mediums. Take, for example, the movies. In the beginning of film history around the 1890's, it was technology that was marveled over, but were in the beginning considered a novelty (Bordwell & Thompson, 2003). A popular urban legend tells of how the 50-seconds short film '*Arrival of a Train at La Ciotat*' shocked and scared people unfamiliar with the format; it was as if the train jumped out at them. A similar concept is seen now, with the rise of commercial Virtual Reality (VR) equipment, as some players who try the medium for the first time can get scared and shocked by their experience. The film industry was one of entertainment; whether to show off the technology or amuse the audience. As the industry blossomed through the early 20th century, the narrative, technology, and editing developed with it and the first ever film documentary is said to have been filmed in 1926. This marked the start of using movies for more than simply entertainment; they could be educational. Nowadays, movies are used for a vast array of different topics and for different reasons, be it educational or entertainment.

The film industry went through a development and now, in the 21st century, is largely accepted as an art form. Games are going through something similar though the outcome of its own development is still unclear. Educational games as a concept was first introduced around the 1970s by Clark C. Abt who created a pen-and-paper type game to help educational efforts (Djaouti, Alvarez, & Jessel, 2011), and like the movie industry it slowly developed to become more. Now, the gaming industry is developing new genres and new aspect on the use of games, one of which will be the focus of this report; the serious games genre.

2.1.2 What are Serious Games?

The definition of serious games is one that is discussed. Generally speaking, it is widely accepted as "video games with a purpose other or more than entertainment" (Rusch, 2017)(Djaouti et al., 2011). From here, however, the discussion of what lies under the term is still ongoing. Rusch (2017), for example, defines it under a similarly understood but different term, deep games, while Djaouti et al. (2011) and Bellotti et al. (2013) define it within the broader spectrum but focus on the educational aspect of the genre. Other sources, such as Mitgutsch and Alvarado (2012), defines it more specifically as;

> *Serious games engage with the intention to "convey ideas, values, and sometimes at persuading the players". In addition, these games have the purpose of influencing the players' thoughts and actions in real life contexts, as well as exceeding the self-contained scope of the game itself.* (Mitgutsch & Alvarado, 2012, p. 121)

For this project, the broader descriptive understanding of serious games will be narrowed down and specified later in the Analysis chapter where the problematic etymology of the genre is discussed. First, however, the importance of these games will be highlighted.

2.1.3 Why Are They Important

Specifically why we should be making these kinds of games, Rusch explains this elegantly.

> *"Before we jump right in, maybe a case needs to be made on why anyone should make deep games. The simple answer is because we can! Games can communicate deep messages; they can make us think and feel deeply; and they can move us in a way no other medium can because games enable embodied experiences – meaning that, in a game, we learn by doing and by acting upon the gameworld and seeing the consequences of our actions just like in real life."* (Rusch, 2017, pp. xix-xx)

The medium itself lends to its uniqueness concerning this genre of games. The interactivity is unlike what you see in other mediums and the ability to directly interact with the virtual world presented to the player lends itself to a medium strong for embodied experiences. (Rusch, 2017)

Embodied experience is the concept of being able to try something real in a virtual space. The fact that you can become the avatar and directly affect the virtual world, thereby experience it as if it was real, means that the player's mind will consider it real to some degree. The impact that the avatar has in the game world will feel like impact that the player has had on the game world. What they do and experience is embodied - they live as the avatar and experience as the avatar. At the same time, it can be a 'real' experience, but it will always be in a virtual (or pseudo-virtual) safe space, opening up for experimentation, and a daring to actually try out situations you otherwise would not do in real life. (Rusch, 2017)
This means that video games can provide the feeling of impact for the player. They are the ones experiencing what they are playing and they are the ones affecting what they are playing, even if the

interaction is at a minimum. This is not something that can be replicated by other mediums. In books and movies, you can relate and empathize with the characters and their struggles, but you will be an observer because you do not have impact on the world itself. You can leave the movie theater with an understanding of a subject, but you will not have lived it yourself.

Video games as a medium also lends to the potential impact it can have worldwide. Nowadays, games are accessible and international. Games can be found in retail stores, online, and they can be developed by the gamers themselves without requiring formal training. There are many tools provided to budding developers or people who simply wish to tell a story and many distribution platforms to share their experiences. It is an open medium used by many people of many different generations, especially the younger one where games are popularized and normalized to a strong degree.

Having games that attempt to do more than entertainment, that have a purpose beyond this, could therefore potentially be amazingly beneficial for society and the world as a whole. For example, hypothetically, if a game can successfully show people how it can be to live with depression and share this perspective, it will provide a better understanding for the mental illness and a better social coherence in the world. (Campbell, 2013)
The importance of the genre is not lost, as schools are beginning to use educational games, and companies are created with specific focuses of games for social change and people such as Jane McGonigal (McGonical, 2017) promote games for creating something more than just entertainment.

It is often said that video games foster violence, but if we can focus more on video games that foster understanding and empathy, we could be carving the way for something truly magnificent: A Better World. Of course, that is the grand picture - the wishful utopia, but perhaps we can gain a small section of this into our society tomorrow. It is about researching the genre of serious games so we can create well for the genre, and continue to use it properly as a medium for some truly significant changes.

It is ‘just’ video games, but games are international and games are a huge part of society today. If we can make serious games into an international commonality, not even the sky is the limit.

2.2 Etymology and Why This is a Problem

Understanding what potential the concept around serious and deep games can have, it is important that we understand where they stand currently and the shortcomings around categorizations and the naming conventions.

The term ‘serious games’ was introduced by Clark C. Abt in 1970, as a concept around pen-and-paper games and roleplaying games to improve education. However, in 2002, the term was redefined and connected to the video game industry, credited to Ben Sawyer and David Rejeski (Djaouti et al., 2011).
From there, the development of the term takes on a variety of names and a variety of definitions, often depending on individual opinion and purpose for the genre. Frequently, as explained above in

subsection 2.1.2 *What are Serious Games?*, the term is connected directly to educational use, but also understood in a broader perspective.

New terms slowly came into use as well, some used as journalistic buzzwords and others well researched subjects of interest, which made 'serious games' a broader umbrella term for the games with a purpose other or more than entertainment. With how popular the genre of serious games has become over the last decade, it also opens up for a lot of confusion surrounding these terms, what falls under these terms, and how we use them. In the following section, some of the misunderstandings will be discussed, followed by a brief overview of some of the more popular terms and how they are used, and concluding in which subgenre of serious games will be focused upon in this report.

2.2.1 The Misunderstandings of the Terms

There are a few different types of problems with the terms around serious and deep games, and also some of the subgenres of these. One of the bigger issues comes across when discussing serious games to a broader gaming and non-gaming audience unrelated to the ludoscience researchers. The names are often taken literally, which is logical considering how people would see other mediums if they were called serious.
If someone was to tell you that 'this is a serious movie', it would be generally considered a movie with a serious narrative. At the same time, a video game can both be serious and deep without being a serious or deep game.

This is, however, not a concern that is generally shared amongst the ludoscience academia. The researchers working with this field have an understanding of the term and how they themselves use the terms, often using it in direct connection of educational games, but there is no research in how these terms are really perceived by people. This statement of misunderstandings is based on personal design experience and a topic that was brought up to debate amongst indie developers and gaming journalist surrounding a subgenre of serious games - empathy games.

Empathy games is a term more commonly used as a buzzword within gaming journalism more so than in studies of video games (Campbell, 2013). It also falls under the same confusion as serious games, as it uses a common word for its term (in this case, 'empathy'). Arguably, empathy is something that can be experienced in any video game even with a minimum of narrative focus; we can empathize and relate to characters and it helps us understand their reasoning and our choices.

Anna Antrophy, however, is one of the people who has voiced a disagreement with using the term to describe games such as her own. Antrophy created the game *Dys4ia* (Dys4ia, 2012) in 2012 which focused around her experience with dysphoria and her decision to go into hormonal treatment. It is a brief experience. Ever since publishing her game, journalists have referred to it as an 'empathy game', and people have told her that they have gained empathy for people in her situation. That the game had let them 'walk a mile in her shoes' (D'Anastasio, 2015). Antrophy disagrees with this, however, saying that her game is not something that can teach empathy and that people rather use the game as

an excuse to say that they now have empathy for transgender people than actually going out and learning it properly (Antrophy, 2015).

> *"Empathy Game [a game created where people literally walked a mile in Antrophy's shoes] is about the farce of using a game as a substitute for education, as a way to claim allyship. You could spend hours pacing in a pair of beaten-up size thirteen heels to gain a point or two - a few people did! - and still know nothing about the experience of being a trans woman, about how to be an ally to them. Being an ally takes work, it requires you to examine your own behavior, it is an ongoing process with no end point. That people are eager to use games as a shortcut to that, and way to feel like they've done the work and excuse themselves from further educating themselves, angers and disgusts me. You don't know what it's like to be me."* (Antrophy, 2015)

Clearly, while these terms can help categorize a very niche genre of games and potentially provide a better basis for understanding, they can also be problematic and spread confusion and misunderstandings. Antrophy's experience can also be related to other subgenres and the literal meaning of the words used in the names further deepen the rabbit hole of the etymology.

Therefore, in the following section, an overview of the terms and their understandings will be provided, after which they will be narrowed down to what will be focused upon throughout this project.

2.2.2 Etymology overview

Serious Games and Deep Games

In this thesis, the terms 'serious games' and 'deep games' will be considered an umbrella terms for a larger variety of genres. They are understood as games with a purpose other than entertainment and games that reflect the human experience (Bellotti et al., 2013) (Rusch, 2017). Generally, researchers agree on the understanding of the term serious games, with some variations. For example, several researchers use the term more in direct connection to educational games and edutainment as explained in subsection 2.1.2 *What are Serious Games?*.

For this report, the broader understanding will be used; serious games are games with a purpose other or more than entertainment.

Deep games can also be considered an umbrella term and is defined as games that simulate the human experience. This can, for example, be games crafted by an individual who wishes to share their unique 'human experience'. In this context, the concept of human experience is very broad and flexible (Rusch, 2017).

Another term that is quite new and leans strongly on serious games and deep games is the more literal term of purposeful games. However, this term is still quite new and often used for companies developing for social change and awareness (Mitgutsch & Alvarado, 2017). The scientific nature of the term itself has not been researched and will therefore not hold a strong focus in this report.

Edutainment (Educational Games)

Derived from: Education and Entertainment.

Edutainment is the biggest, and most widely known subcategory of serious games - it is games with the specific purpose of teaching children through fun and entertainment. This genre of games can both be used in and outside the classroom, for example the Danish brand *Pixeline* which teaches math and languages.
The educational importance of the genre makes it a strong study of interest for many, and it is researched in-depth. To this day, it is still being worked on in order to find the perfect balance of learning and motivation (Dondlinger, 2007).

Gamification
Gamification is a commonly known concept, defined as taking game elements into the real world to 'gamify' a process. This can be used for various reason, such as user engagement, productivity, and physical exercise. For example, the exercise app *Zombies, Run!* (Zombies, Run!, 2017) which uses a narrative and unlockable levels to engage the users.

Persuasive Games
Persuasive games as a term was coined by Ian Bogost and Gerard LaFond in 2003 and is a term relating to games that have the specific goal of persuading changes in attitude and behavior in the real world through the game. The subgenre is generally studied for its procedural rhetoric and can be considered an opposite of gamification, as it reflects real life in the gameworld and uses its rhetoric to persuade change (Bogost, 2008) (Bang, Torstensson, & Katzeff, 2006).

Advergaming
Advergaming is heavily related to persuasive games in that it is a gaming genre with a specific purpose to change the player's attitude towards a specific product. Advergaming is mainly seen in small games and focused on children's products (Smith & Just, 2009).

Art Games
Art games is a subcategory that shares a specific trait with its name-kin - it is art and it can depend on the eye of the beholder. What qualifies as art games might depend entirely on the player or the viewer. These games are 'artistic' either in their actual in-game art or in the narrative. It is category that can be argued for or against (Parker, 2013).
Art games also share their name with a more literal category of games; games that are about making art - often aimed at kids.

Empathy Games
A newer subgenre of games that has been used more as a buzzword for gaming journalism and has not been more clearly defined. It is a genre of games that often defines itself in games giving empathy to the player. The actual nature of the empathy is discussed, and games that have been categorized by journalists as 'empathy games' argue against this (D'Anastasio, 2015).

2.2.3 Focused Subgenre

First of all, the terms serious games and deep games will be used interchangeably, as both are considered as umbrella terms and flexible. Several categories are already studied in-depth - the academic subgenres of serious games. These subgenres also hold a lesser interest for this thesis, as the most fascinating aspects of serious and deep games are the human experience and what can be relayed for a global social understanding. The terms serious and deep, while still indicating the broader definition, will be focused upon the type of games used for the human experience, like empathy games or art games.

As mentioned previously, however, the term empathy games can be considered a problematic title for some and games will not necessarily require empathy in order to inform and share perspectives. Instead, a phrase 'awareness games' will be presented in order to highlight the specific nature of serious games and deep games which works with presenting different perspectives and experiences. While the terms serious games and deep games will be used throughout this report, the understanding behind this etymology is that they are mainly focused around awareness games - games to raise awareness and inform.

The importance of this specific subgenre can be seen through the companies that have appeared over the past few years. Companies such as *Purposeful Games for Social Change* (Mitgutsch & Alvarado, 2017) and *Games for Change* (Games For Change, 2017) hope to develop games that will not only show different perspectives and different aspects of the human experience, but games that can foster better global social awareness and understanding (Mitgutsch & Alvarado, 2017) (Smith & Just, 2009). The potential of this specific subgenre of serious games will therefore be the overall focus in the remainder of the report.

An example of such a game is *Robin* (Robin, 2016). *Robin* is a short game that provides visibility about Chronic Fatigue Syndrome by letting the player be the character who suffers from this and can only do a very limited number of actions a day as it drains their energy – but there are many things that needs to be taken care of.
This game wishes to raise awareness on the illness and does so through an experience that allows the player live through it.

2.3 Game Design and Serious Games

After presenting the concept of serious and deep games and defining the terms, the following section will go into some of the design and analysis theories around serious games. This will provide a good indication of where serious game design is at the present time, and will highlight the possibilities for design into newer aspects of serious games. The design theories will be analyzed and discussed after which a guide combining these theories and concluding upon them will be presented.

2.3.1 Briefly on Serious Game Design

The discussion around designing serious games is not far from more classical design methods for video games, but can be drastically different depending on the intention of the developer. Keeping to the focus around awareness games and deep games, it also comes down to a question of why. As these games often express 'the human experience', what it is to be and feel human, it comes with some different reflections of the analytic and design processes, as will be presented in the two articles in this section.

As serious games can vary greatly from large production to a single-person development team, the scale of the video games themselves can also vary and affect the design reflections. They can follow the more common rules of game design with strong narratives, characters, and interesting mechanics, but also be very different, short, and with minimum interaction.
Therefore, when it comes to analyzing and designing serious games, the considerations that need to be taken often revolves around why and how you wish to share. This will be highlighted especially in the review of *Making Deep Games*.

In the following section, two sources of material will be studied more in-depth and discussed. These two publications hold a strong importance and are relevant to the subject of serious and deep games. They are the analytic model presented in *Purposeful by Design? - A Serious Game Design Assessment Framework* by Mitgutsch and Alvardo (2012), and the book of designing deep games, *Making Deep Games – Designing Games with Meaning and Purpose* by Rusch (2017).
They were chosen for their understanding of the subjects relating strongly to the concept of awareness games, while still working as serious and deep games.
After an analysis of each of the theories, they will be compared and a brief guideline will be composed of teh theories presented.

2.3.2 Purposeful By Design?

Introduction

Mitgutsch and Alvarado presented in their article from 2012, *Purposeful by Design?*, a framework with several points visualizing an analytic tool for serious games. They called this the *Serious Game Design Assessment Framework* (*SGDAF*), which contains six elements that should be considered when analyzing serious games.

Their understanding of the term serious games align well with previous discussions; that they are games with a purpose other than entertainment.

> *"On the contrary, the so-called serious games intend to fulfill a purpose beyond the self-contained aim of the game itself. Serious games engage with the intention to "convey ideas, values, and sometimes at persuading the players."* (Mitgutsch & Alvarado, 2012, p. 121)

They argue against the idea that serious games' successes are often based around the discussion that they can start and this holds a greater importance than the actual design choices, and instead they say that the design should enhance the game's specific purpose, without holding it above criticism. Which is why they present the assessment tool as there is a lack of these for specifically serious games.

Mitgutsch and Alvarado developed the six elements through a summation of three publications on serious games design, where they argue each of these publications has problems in designing and analyzing for serious games, which is why they create their own.
Brian Winn's *Design, Play and Experience Framework* (Winn, 2009) works mainly with a focus on educational framing and does not highlight the specifics of how the purpose is the center of the design focus.
Leonard Annetta and Stephen Bronack's *Serious Educational Game Assessment* (Annetta & Bronack, 2011) study, while providing useful theory-based criteria, does not reflect on the purpose of the game in its empirical study, making the cohesiveness unexamined.
Eric Sanchez's *Key criteria for Game Design. A Framework* (Sanchez, 2011) does not differentiate between the design and the play experience in its study, making the design choices around the purpose unnoticed.

Core Concept

Using different elements of the these publications, Mitgutsch and Alvarado aim to construct a framework for analyzing serious games.

> *"It is an attempt to offer a basis to study how the design elements are configured formally and conceptually in relation to the game's aim and purpose."* (Mitgutsch & Alvarado, 2012, p. 123)

The six elements are Purpose, Content, Mechanics, Fiction & Narrative, Aesthetics & Graphics, and Framing. These are considered in relation to each other and their impact on coherence and cohesiveness. They present these elements visually as seen in Figure 1 below, and they explain them through two game case studies; *Sweatshop* (Sweatshop, 2011) and *ICED* (ICED, 2008). Below the figure, the six elements will be given a brief overview.

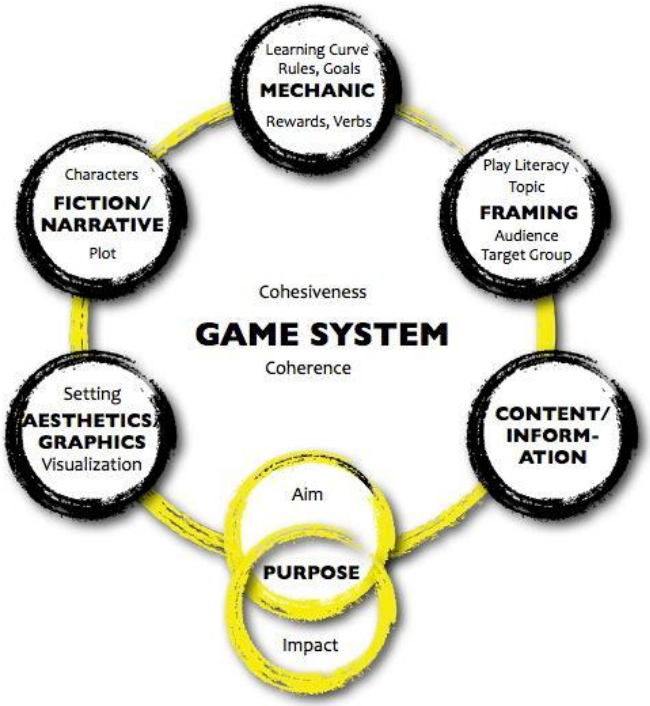


Figure 1: Mitgutsch and Alvarado's SGDAF model

Purpose

This elements looks upon the game's purpose explicitly designed to reach a goal beyond the game itself. Mitgutsch and Alvarado writes that "the purpose is reflected directly in the aim of the game and the topic, but also the designer's intentions and their goal to impact the players in a specific way." This is indicated in their model as well, with 'purpose' also containing 'aim' and 'impact'.

Content

The Content element is also called Content & Information to better reflect the intention of this element. It refers to the information, facts and data offered users in the game. The example they provided surrounds player stats, character information, and other written content visible and approachable. They also clarify that not all content needs to be relevant.

Mechanics

Mitgutsch and Alvarado define game mechanics as involving "the establishment of the rules that define the possibility space for operations in the game world." This relates to more classical design aspects such as if the game has reward systems, obstacles/challenges, and so on.

Fiction & Narrative

Fiction & Narrative introduce the fictional context to the games. It is the fictional space and its relation to the game's purpose, involving the setting, narrative, story, scenario, and so on. Fiction and Narrative is also said not to be required as the game can provide a mechanics-based space allowing for players' interpretation.

Aesthetics & Graphics
This comes down to the audiovisual language and presentation in the game. This element aesthetically binds the other elements into a visual definition and are therefore important for the introduction of purpose and impact.

Framing
The Framing works with the target group, play literacy and the broader topic of the game. These are design choices having to be considered depending on the target group and purpose of the game. They empathize the importance of the target group's play literacy as this can impact the experience negatively if not considered.

Coherence and Cohesiveness
Additionally, Mitgutsch and Alvarado argue that the cohesiveness of the elements are important for the serious game. This also includes how the purpose reflects in each element, and how the different elements works together in specific relations; content, fiction and mechanics, and finally the narrative and the mechanics.

Discussion of Purposeful by Design

Mitgutsch and Alvarado conclude their publication with presenting the *SGDAF* as a constructive framework for the assessment of serious games while still making it open for interpretation, but the importance of considering the purpose with all elements is further affirmed.

While the understanding and use of serious games aligns strongly with this thesis, the framework itself could be considered rigid. It is a good guide for starting the initial design discussions and assessments, but it does not appear to leave much room for an artistic or more personal perspective on both the development side and the player side. The framework strongly relies on the 'how' it is presented and a little less on the 'why', which would require more personal introspection depending on the actual purpose of the game. This could be due to the case study games that were chosen as those - *Sweatshop* and *ICED* - are awareness games reflecting global issues (sweatshops and immigration) with a broader perspective and a less personal perspective.

The framework works well for initial considerations both in analysis and development, but lacks perspective of the personal nature that serious games can have, which makes the article appear rigid and only covering some serious games.

2.3.3 Making Deep Games

Introduction

Published in late 2016, the book *Making Deep Games* by Doris C. Rusch opens up the discussion around deep games as a similar aspect of serious games, as also discussed in the subsection 2.1.2 *What are Serious Games?*. Rusch presents some of the design considerations for developing these games, both providing information and insightful first-person experiences.

Her understanding of deep games aligns well with aspects of serious games, which is indicated in the previous etymology discussions (section 2.2 *Etymology and Why This is a Problem*). Deep games revolve around 'the human experience' and representing these though game design, which is a concept shared by awareness games. The human experience, as the name suggests, involves what it is and what it feels to be human, but Rusch early on defines that the human experience is considered very flexible in her book.

> *"[…] by human experience or human condition, I mean the intricate web of thoughts and feelings we find ourselves entangled in and are trying to navigate and make sense of. It's the stuff of philosophy, TV series, movies, books, comics, poetry, art, and music, which all, in one way or another, explore what it means to be human – to love, to lose, to persevere, to grow, to die, to overcome, to avenge, to flourish, to dream, to hope, to have faith, to disappoint and be disappointed, and to deal with adversity. There."* (Rusch, 2017, p. xvii)

The book presents and discusses some of the design considerations on why and how the developer wishes to convey their perspective on the experience. The how and why are strongly connected in this case, as the how should be affected by why you wish to convey what you wish to convey. This will be further specified in the core concept presentation below.

Core Concept

Rusch's book contains two important sections; learning to understand the human experience, and learning how you should decipher this experience through the design choices.

Learning to Understand

The first part of Rusch's book is more focused on mindfulness when understanding the human experience, both your own and others. She speaks in length on how her own situation had been stressful which had made way for more introspection into herself and her feelings, which are some of the important aspects of designing games for the human experience. Several 'mindful' methods can be used in order to gain further introspection, but she specifically covers a few that helped her and helped her design choices for deep games.

The three tools for mindfulness that Rusch recommends are called morning pages, artist date, and discussions with the *Inner Game Designer (IGD)*.
Morning pages are three written pages done first thing in the morning, which should contain a 'stream of consciousness' writing. Nothing is out of the question for the morning pages, and the content that is put down can often help with introspection and finding themes within your own inner mind.

Artist date is a block of time, for example weekly, set aside as a date with your creativity. The morning pages are hugely helpful in this as they can be used as guidance towards themes and better understanding of your own experience. This does not have to be about producing something, but is more about nurturing a part of yourself that can help you towards, as Rusch writes, your true north.
Discussing with the Inner Game Designer comes as a result of better connection to yourself, where you have identified themes and gained a better understanding of your own perspective. These discussions can be imagined as discussions with another person, where you try to make your human experience tangible through game design choices such as game goals and win conditions. The *IGD* can potentially be considered a more logical aspect of yourself which inquires about the concepts and tools behind the feelings. A brief example provided by Rusch is quoted below.

> *"IGD: What makes letting go hard? What is the conflict?*
> *Me: Attachment makes it difficult.*
> *IGD: What creates attachment?*
> *Me: Love, I guess..?*
> *IGD: So the way to overcome attachment is to overcome love?*
> *Me: Now that you put it this way, it doesn't sound right. Love is important. If you had to overcome love to win, that would send the wrong message."* (Rusch, 2017, pp. 7-8)

These three tools help to track themes within the human experience and create better introspection for designing deep games.

The Design Questions and Consideration

Through Rusch's personal experience with designing deep games, she discusses some of the design choices evident in her own research and experience. She also states through these experiences that the design processes for deep games are often months long, as the art of 'nailing a pudding to the wall' is quite difficult.

Most of the chapters work on presenting the design considerations, how they were reached and what they can do for the game, and Rusch also uses many examples of both case studies and personal deep game design experience to help clarify her points. The book in the end summarizes the design considerations into nine questions, each of them given a larger explanation. Below is an overview of these questions summarized from the book.

The Nine Questions

1. *What is it about?*
    a. Based on another medium.
        - For example, an old theatrical play.
    b. Based on (somebody's) personal experience.
        - This also entails some aspect of perspective as people have different experience of the same theme.
    c. For a cause.
        - For example, making it easier to understand depression.

2. *What is the purpose / communicative goal of your game?*
   These elements are not mutually exclusive to one another.
   a. Personal games for self-expression.
   b. Raising awareness.
   c. Object to think with.
      - This refers to providing a more encompassing understanding of an issue. A bigger focus on 'how it works'. Also games that promote a sense of inquiry.
   d. Changing behavior/perception.
      - This comes back to persuasive games and can be very hard to achieve as it is very individual.
   e. What you do is what you get.
      - The game itself is the purpose. For example, health games with the goal of making the players healthier.
3. *Literal or metaphorical approach?*
   - Raises the question whether the developer wishes to focus more on literal presentation, or a metaphorical presentation. Both can have pros and cons depending on the theme and how the game is designed. Literal can provide better understanding while metaphorical can provide better insight into the emotions.
4. *The right metaphor for the experiential gestalt.*
   - The concept of the experiential gestalt is presented earlier in the book, and provides an overview tool for very basic understanding of an experience. A gestalt contains five elements - participants, parts, stages, linear sequences, purpose. This design question highlights that one gestalt can have several metaphors which makes the experience different and should therefore be considered.
5. *How it works versus what it feels like.*
   - These two important aspects can also be considered a kind of perspective that the developer wishes to have. The 'how it works' can be considered a broader, literal and external perspective to an issue, while 'what it feels like' works more with emotions through metaphors and introspection. Which perspective is chosen can make for a drastically different experience.
6. *Zooming in versus zooming out - how much shall be modeled.*
   a. What complexity of the source issue should be presented?
      - Zooming in: Modeling a small part of a real life issue to make provocative statement. A more subjective approach - how it feels.
      - Zooming out: Modeling a broader picture, for example how a company functions. Cognitive appreciation of dynamics of complex systems - procedural rhetoric on how it works.
7. *From which perspective shall the player interact with the system?*
   - This relates to perspective on the issue, but also prompts to look into more unusual perspectives to provide a different angle. For example, a relationship focused game from the perspective of the nosey neighbor. It should be noted that changing the perspective means changing the experience.

8. *Do core mechanics reinforce meaning?*
    - How does the core mechanics convey the theme and generate meaning. Do they add or subtract (which should be avoided unless intentional)?
9. *Player-Avatar alignment.*
    - Considering the alignment of player and avatar becomes important when working with deep games. If there is a dissonance of player's reason and avatar's interpretation, it can be frustrating. In order to have the player walk in the avatar's shoes, it is needed to put them in the avatar's mindset.

These nine questions are Rusch's presentation of important design considerations when working with deep games. They help define a vision and deliberate design choices, but Rusch also empathizes that a big part of making deep games is several iterative playtests as what we perceive to design might not be what the player perceives while playing.

Discussion of Making Deep Games

Unlike the *SGDAF* presented by Mitgutsch and Alvarado (2012), the nine design questions appear less rigid with the multitude of information provided prior to the presentation of these, as the book also goes deeper into why we design and perceive as we do and how we can get better at understanding our own and each other's experiences.

Rusch's own perspective and understanding of deep games and the importance of them also align very well with this thesis. Her passion for the craft and the potential for it is one that is shared. Likewise, the book presents its points with a multitude of video game case studies and personal anecdotes on designing deep games for a variety of purposes.

That being said, the nine design questions can appear to get a little lost in the book as a whole, and appears more as a summation of the book than a framework or model itself. While the book adds a lot to the understanding of how we design and how we experience, it can be considered a little vague in its final presentation.

2.3.4 How They Compare

As can possibly be understood from the two articles, they are both strong and valid, with some different issues. While the *SDGAF* appeared very rigid with less understanding of the emotions and introspection, the nine design questions focus on this more.

Some of the elements of the *SGDAF* and the nine questions align well, however, which indicates that both publications have a good understanding of the serious and deep game genres. For example, the Purpose element in the *SGDAF* compares to the second design question "What is the purpose / communicative goal of your game". The Content and Fiction & Narrative align well with "1. What is it about" and "3. Literal or metaphorical approach" respectively.

Rusch's nine design questions do, however, overlap with its own points more so than Mitgutsch and Alvarado's framework, which can provide a more complicated overview.

In conclusion, the two publications cover two different aspects of working with serious and deep games, both valid and useful for independent developers and companies alike. Based upon these, the comparison, and knowledge obtained throughout the research, this thesis presents a game design guideline for focused serious and deep game design.

2.3.5 The Three Layers Guide

The Three Layers Guide is a brief guideline mainly focused on small independent or solo developers who wish to create a game within the awareness game genre – especially the solo developers. A lot of serious games with the purpose of sharing something or bringing awareness have a personal aspect or perspective that should be given more focus as these are the games which takes part of social change.

Therefore, below is presented my Three Layer Guide into developing a serious or deep game within the awareness genre, when you are a small team or a single person who wishes to share something new, a personal experience, or a perspective.

Layer One
The 'What'

- Find out what it is you want to share; what is your theme? Perhaps you have a feeling that you think would make an interesting experience or you want to bring more visibility to an issue that is important for you. The 'What' is the very basic of what you want to work on and figuring this out will provide the start.

Layer Two
The 'Why'

- The next step is figuring out why you want to make a game and why you want to work with the subject of the first layer. This layer digs more into the intention, perspective, and emotions of your own reasoning. Figuring out 'Why' can help you figure out an easier access into the next layer. Perhaps you have a particular perspective you want to bring up, or a feeling you want others to feel. This layer is the more focused version of the first layer where the reasoning could be broader.

Layer Three
The 'How'

- The interesting aspect of this layer is that it can be very broad. Using the introspection and reasoning of the previous two layers, you have to figure out how best bring this to light.

This is where you consider how to make your game the intended experience.

The thing is, these games fall on a very personal and, some would say, artistic spectrum. While some classical theories of game design can be considered, it can also be set aside in order to let yourself experiment with your reasoning and your development. There is, however, one thing that is especially important for developing these games:

- *Start now and fail faster.*

There is no one single solution to developing serious games. They are personal and some can forego basic understandings of what a game is in favor of bringing out its purpose. It is, however, difficult to bring out your one message when there is a world of interpretation with each individual. Therefore, start immediately and try something that will most likely not work as intended. Start now with paper prototypes and digital prototypes. Fail faster so you can make iterations to try something new or different

The Three Layers Guide is provided for a brief, easy overview into designing the basics behind serious games with a focus on more personal perspectives and experiences. It is one of many guides and frameworks and can be combined with other design theories, for example Fullerton's (2008) book on game design.

To summarize:
Layer One – The What
Find your theme
Layer Two – The Why
Find your perspective, reasoning and let this direct your design
Layer Three – The How
Start now and fail faster

There are, however, aspects of game design that are still not considered into the serious games genre, and the potential for them is interesting. In the following section, the multiplayer aspect of games are introduced as a great potential for serious games.

2.4 Multiplayer and Cooperation as the New Potential

Cooperative and competitive play are a huge part of the gaming community. They are commonly referred to as multiplayer games and are seen throughout the medium, for example some of the more consistently played and popular titles such as *World of Warcraft* (Blizzard Entertainment, 2017), which is a Mass Multiplayer Online (MMO) game.

Many games are designed around the multiplayer experience through developed theories, which makes sure to enhance the experience between the players (Hansen, 2014). Some games can even be saved from the mediocre thanks to playability with friends. A game that is buggy and broken might

be annoying playing it alone, but can become hilarious if played with a friend and then the friend suddenly is not affected by gravity. This makes it interesting for research into serious games, because it is a largely untapped research field – developers do not design serious games with the multiplayer experience in mind.

It is not only and specifically MMOs which rely heavily on the multiplayer experience - arguably, you can play *World of Warcraft* on your own without interacting actively with other players. While online games have the most noticeable example of cooperative and competitive play, smaller experiences also use mechanics and setups that allows for multiplayer experience - whether it be cooperative or competitive.

Online
Multiplayer play conducted online where the people playing with or against each other are not in the same physical location. Online games can be played both with friends and strangers.

Couch/LAN
Play that is conducted in the same physical space and named after playing on the same couch or playing over the same Local Area Network (LAN) connection. This sort of play can be both on one screen, or several, but has a layer of familiarity as players are usually gaming with friends.

Cooperative
Multiplayer experiences where two or more players are together in a common goal. This can be intimately the same goal - e.g. get to the exit - or cooperating in a larger setting with many others – e.g. MMOs.

Competitive
Games played against others, either individually or in teams against others. Often seen in First-Person Shooters, and can be considered partly cooperative - defeat the other team - but is always classified as competitive

Cooperation and competition is also a game mechanic that can be used to make something more fun to play. Playing a game with decent characters, a slightly boring story, and buggy gameplay can be annoying or at worst boring when playing it alone. On the other hand, if you are playing this buggy game with a friend, the bugs can go from being annoying to being absolutely hilarious.

In a way cooperation can alleviate a lot of focus from other elements, allowing them to lack more in context because now that you are playing with a friend, that act itself is entertaining - a bit akin to watching a terrible movie with a group of friends

When it comes to serious and deep games, however, this field is largely ignored and under researched, except for using cooperation in educational games to teach social interaction and group work. However, the concept of awareness games, and games similar to this genre, does not utilize

multiplayer experiences. Despite rigorous searching, it appears that interest in this subject has yet to be explored.

This can largely be because the studies of serious games and deep games are still relatively new. It has only recently become popularized in the medium itself, which then opens the doors for research into the concepts and how they are used, how they can be used, how they can be adapted and so on. Cooperation for these games might have naturally arrived at some point after other subjects were covered (such as the use of them and the etymology), but I believe it is due time to let the cooperation and competition be tried.
It can also lend to a discussion however, because many of these games, like Rusch indicates in her book, *Making Deep Games*, can be introspective and be interpreted by the individual. Theoretically, this is where it becomes interesting, as this may or may not impact the purpose behind a serious or deep game, and thereby ruin it. On the other hand, cooperation has been shown to have strong basis for making experiences better or more fun, and competition is a great motivational factor in games.

Designing for cooperative serious games can potentially be positive or negative for the game itself - does the fun of playing with others overshadow the interpretation players may otherwise have?

2.5 Research Question

As such, this thesis presents the research question for what has become an interesting conundrum. Cooperation can be used to enhance the gaming experiences - make it more fun and sociable. Serious games, however, can often be subjective and interpreted differently. Hypothetically, making serious games that are cooperative could significantly enhance the playing experience. However, it could just as likely interfere with the individual's personal experience and interpretation, ruining the impact.

How does cooperation in serious or deep games impact the experience and could this make cooperation in serious games important or obsolete?

3 Methodology

In order to test how cooperation and cooperative play impacts the experience and interpretation of serious and deep games, a game has to be created by the author of this thesis as no serious and deep games have multiplayer functionality in a cooperation aspect.

The game will be constructed by the author, using knowledge achieved through the analysis and through prior experiences. Some necessary design requirements will be presented first, after which the test method will be discussed. Finally, the game will be designed, and then implemented.

3.1 Design Requirements

For the game, some requirements will be presented.
As this is a single-person development and serious games have been discussed to be a several months long design and development process, the game itself will be simple and short.
The premise of the game is to test how cooperation affects the interpretation and experience of a serious or deep game. In order to test this, it will require a cooperative serious game. A comparative test will be most useful for this sort of experiential test, to see both if the cooperation can affect positively and negatively, which therefore will require two near-identical versions of the same game - one of which is single player and one of which is multiplayer.

The game will require a purpose or message, which should be in the category of bringing awareness or presenting a perspective. As the time for research is limited, this will be best if it is a personal experience, or something that I can relate well to, in order to provide my own perspective.
As serious games can still work with minimum narrative and aesthetics, the game will focus more on the mechanics and the feelings related to the experience.
A cooperation mechanic of some sort, preferably somewhat unique for a better experience, will be required.

To summarize, the design requirements will be mainly focused on simplicity, short experience and personal aspects in relations to feelings. It will require: a purpose, two versions, and a cooperation mechanic.

3.2 Test Method

In order to test what sort of affect cooperation has on the experience and interpretation of playing serious and deep games, a comparative test will be conducted. The comparative experiment will provide results that can be compared between the groups to signify any differences and trends in the data.

The test will likewise be a between-group experiment rather than a within-group experiment, to avoid bias of the experience itself (playing it twice in a within-group test procedure) and the results of the test (Field & Hole, 2003).

As the experiment will work mainly with introspection, emotions and individual interpretation, the sought after results should be qualitative over quantitative. Qualitative data is usually data concerned with understanding human behavior and experiences, which fits well when working with serious and deep games (McLeod, 2008). This data is usually collected through observations and interviews, and the data will mainly be collected in a post-game session through an open-ended interview (also known as a semi-structured interview). This interview type will provide a guideline for the discussion but still leave the participants open to discussing amongst themselves (in the multiplayer groups) and with the researcher (Cohen, 2006).

The questions asked at the interview will be covering their interpretation/understanding of the message/purpose/point of the game, the experience of the game itself (how was it, their thoughts, its elements), and a discussion of the concept around serious and deep games and their understanding of this. The main subjects were determined in order to construct the questions and a series of questions were built in order to start a conversation for the open-ended interview.

The results of the experiment should be coded according to the concepts and trends found in the transcripts themselves - open coding. This will help visualize trends and potentially indicate differences between the two compared groups. Open coding is a segmentation process for analyzing qualitative data. The coding can be linked to various aspects of the data depending on what is needed, for example words, lines, or understandings. Open coding's main aim is to provide insight into the data and develop categories (Flick, 2009).
Finally, the amount of participants will be 15, five tests in each group (ten participants in the multiplayer group and five participants in the single player group). As the data is qualitative and will be evaluated upon the trends and concepts, which are presented through the participants themselves, ten tests will provide data for analysis and be within the scope of the project.

To summarize, the experiment will be:

- Comparative
- 15 participants - five tests in each group
- Between-group testing
- Qualitative, open-ended interviews
- Open-coding according to trends and concepts

A demographic questionnaire will also be provided but will be used minimally as there are not a lot of participants for statistical analysis.

The test procedure shown below was constructed by the researcher to provide a stable guide throughout the test to avoid variation bias. Below this, the demographics questionnaire is presented.

3.2.1 Test Procedure

Core test: Qualitative, open-ended interviews focusing on the cooperative experience and interpretation of serious games.
Experimental Design: Between-group testing.
Participants: Five tests per group. Ten in total. 15 participants.
Comparing: The single player experience versus the multiplayer experience.

Guidelines:
The test participants will be found in and around the campus of Aalborg University, Copenhagen. The test does not require the players to be specifically gamers, as the game is simplistic and brief.
The players will be asked to fill out a short questionnaire for demographic purposes - this is on paper (it will contain - age, gender, education, gaming experience, favorite genre of games)

The players will be guided to take a seat and will be told;
Single player:
'You will play a short game where your goal is to collect pieces of a jigsaw puzzle. The pieces will be given to you physically as they are picked up. Once you have gone through all four rooms, make sure to collect the puzzle before proceeding to the exit in game. Instructions are provided in the game. Once you finish the game, you will be asked a few questions which will be open for discussion.'
Multiplayer:
'You will play a short game where your goal is to collect pieces of a jigsaw puzzle. The pieces will be given to you physically as they are picked up. You will be playing together with the other player. Once you have gone through all four rooms, make sure to collect the puzzle before proceeding to the exit in the game. Instructions are provided in the game. Once you finish the game, you will be asked a few questions which will be open for discussion.'

The players are set to start the game - game is brief and should not take more than five minutes. Researcher stands to the side and only gives the jigsaw puzzle pieces. No comments on the gameplay or answering questions. Try to avoid staring and/or eye-contact, especially when they are looking for the last puzzle piece.
Once they decide to go to the finish line, start the open-ended interview.

Questions:
Single:
Their thoughts of the game (this is for brief overview, can be used to guide into next question)
Their understanding of the purpose/point of the game
- How they interpreted and why
- What distracted them?
- What enhanced the experience?

Did they feel the game lacked elements (can be used if they did not think the game had a point also)

Experience with the concept of ‘serious games’?
    Discussion of the concept of serious games and their opinion on this
(No bars held, they are told about the intention of the game)
Discussion of the intention of the game and their perspective on it.

Multi
Their thoughts of the game (this is for brief overview, can be used to guide into next question)
Their understanding of the purpose of the game
    How they interpreted and why (different opinions are encouraged, make sure to get both points of view - that they saw nothing by it is also acceptable)
    What distracted them?
    What enhanced the experience?
How did their cooperation affect their experience - was it distracting, enhancing?
Would they rather have been without the cooperation for this game?
Experience with the concept of ‘serious games’
    Discussion of the concept of serious games and their opinion on this
Experience and opinion of cooperative games
(No bars held, they are told about the intention of the game)
Discussion of the intention of the game and their perspective on it.

Finally, they will be thanked, provided cookies or fruit and asked not to talk to their peers about it as said peers may also get asked to test.

3.2.2 Demographics

Participant Number: _____

Age: _____

Gender:

☐ Female

☐ Male

☐ Other

Occupation: _____

Favorite type of games (You can mark multiple choices):

☐ I don’t play video games

☐ Action/Adventure

☐ First Person Shooter (FPS)

☐ Mass Multiplayer Online (MMO)

☐ Multiplayer Online Battle Arena (MOBA)

☐ Strategy

☐ Puzzle

☐ Platformer

☐ Role Playing Games (RPG)

☐ Narrative-driven games

☐ Educational games

☐ Casual games

☐ Other: _____

4 Design

The following section will present more in-depth discussions on the design of the game and the choices that were made. It will be covering the purpose/message, the game format, the cooperation mechanic, and the aesthetics.

4.1 The Purpose/Message

To make the process of designing for a human experience the easiest possible, working with personal experiences is advisable as this build on prior knowledge and provide an immediate perspective - my own (Rusch, 2017).
The core message of the game will surround the theme of 'Identity', with the specific perspective around missing a part of your own identity. This will be metaphorically represented with the use of a jigsaw puzzle with a piece of the puzzle missing as this relates well to 'missing a part of yourself' as this is a metaphor that has related to my own view on identity. This specific metaphor can, however, also be up for individual interpretation as some might relate it to a missing person in their life, or to, for example, a faulty memory. These different understandings will not be worked against, however, as it will allow for more potential of people getting a message out of a minimally developed game.

The game will, in accordance to Rusch's fifth design question (how it works versus what it feels like), be more focused on the 'what it feels like' as this aligns well with the metaphorical design aspect and the variety of interpretations. In this case, the 'what it feels like' will be the feelings of frustration over not being able to find the last puzzle piece, as this aligns well with the aspect of missing a part of yourself and not being able to figure it out, and most of the other interpretations - this is also based around personal experience.

Aside from the feelings of frustration, there will be little to no literal explanation of the purpose in the game itself, and will be only metaphorical.

4.2 The Game Format

In order to construct the game within the required timeframe and abilities, the game format will be a 2D platformer experience for simplicity. This will be possible to make despite minimum programming expertise, and will also align well with making a short, straightforward (in terms of the platforming) and metaphorical game.

The game will consists of two parts. The first is for the participants to find the jigsaw pieces. For simplicity, the jigsaw will be a three-by-three puzzle meaning it will have nine pieces and only eight can be found. In order to not make it immediately obvious that a piece is missing, the pieces should be split equally into the levels. This can either by four pieces in two rooms, two pieces in four rooms or all eight pieces in one room. I chose to design with two pieces in four different rooms, which provides some variety and more room to have basic tutorial levels.

As the players should have the ability to go back into the different areas and look for the missing puzzle piece, the player will start in a hub room with four doors (each level) and an exit so that they can leave at any time. The exit should clearly be indicated and the players should be told in-game that the exit finishes the game.

4.3 The Cooperation Mechanic

The cooperation mechanic for the platforming and cooperation was an idea that I have had for a longer period of time, and one that is rarely seen. The players will be able to attach themselves to the wall (without sliding and jumping off) and has to use this mechanic in order to proceed. In the multiplayer version of the game, the players can then attach to the wall and use each other as platforms in order to reach higher ground. The players can also stack regularly to reach higher platforms.

This mechanic requires the player to cooperate in order to collect the puzzle pieces. At the same time, the attaching to walls can be used for simpler single player platforming to avoid bias.

4.4 Aesthetics

The aesthetics was planned to be very simplistic and dependent on the various programming problems that might happen. Initial concepts were inspired by the game *Thomas Was Alone* (Thomas Was Alone, 2017) created by Mike Bithell in 2010 which can be seen below in Figure 2, because this style did not require much time and would not be intrusive to other elements.

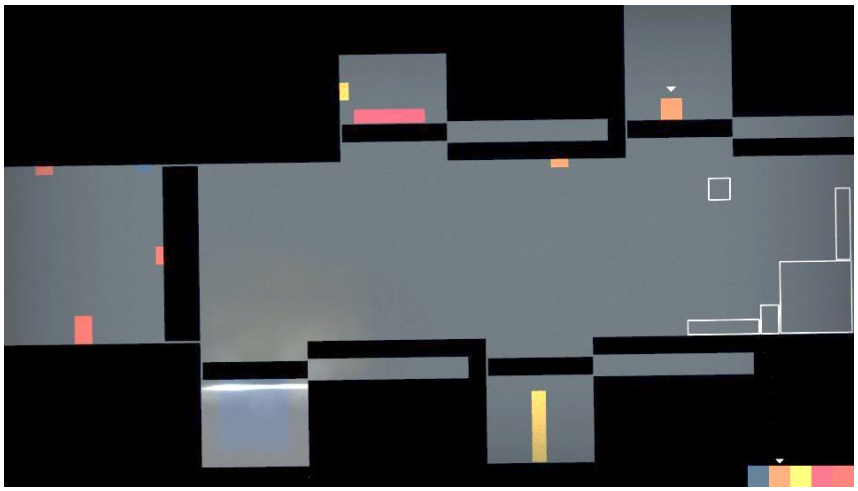


Figure 2: Screenshot of Thomas Was Alone

It will be minimal but not disruptive to the purpose and thereby the interpretation. Other aesthetics inspirations were also found for further development of the aesthetics if time allowed this. All of them are considerably simplistic, but hold different atmospheres and could be good for the overall experience.

Figure 3: Screenshot of Demo packet

Figure 4: Screenshot of Switch

Figure 5: Screenshot of Little Bug

5 Implementation

The game was implemented in Unity3D, using its 2D engine due to familiarity in work space and programming. The style was settled to be simplistic to avoid potential clashes with the purpose.
I decided to do the jigsaw puzzle as a physical puzzle due to programming restraints and to bring the cooperative puzzle out into the physical space to potentially have them relate the puzzle more to themselves.

Two versions of the game were created, one multiplayer and one single player. In both games, the players could move left and right and jump. They entered doors by being near them and clicking the space bar. In the multiplayer game, both players used the same keyboard for movement and shared the space bar, which could also provide some sense of cooperation.

All instructions for movement and similar were provided in the game. The hub room told them how to move, jump and enter rooms. The first room was very simplistic platforming to introduce them to the jumping. The second room introduced the stacking in the multiplayer version, and some more advanced platforming in the single player version. The third room introduced the sticking to walls in both versions and provided them with appropriate challenges. In the fourth room a ‘danger’ was presented in forms of spikes, which were unavoidable in order to get a puzzle piece, but going into them just put the player back at the door. This was named the ‘sacrificial puzzle’ and held a metaphorical meaning of a leap of faith.

Below in Figure 6, the rooms of both versions is presented (a large version of this image can be found in the digital appendix).

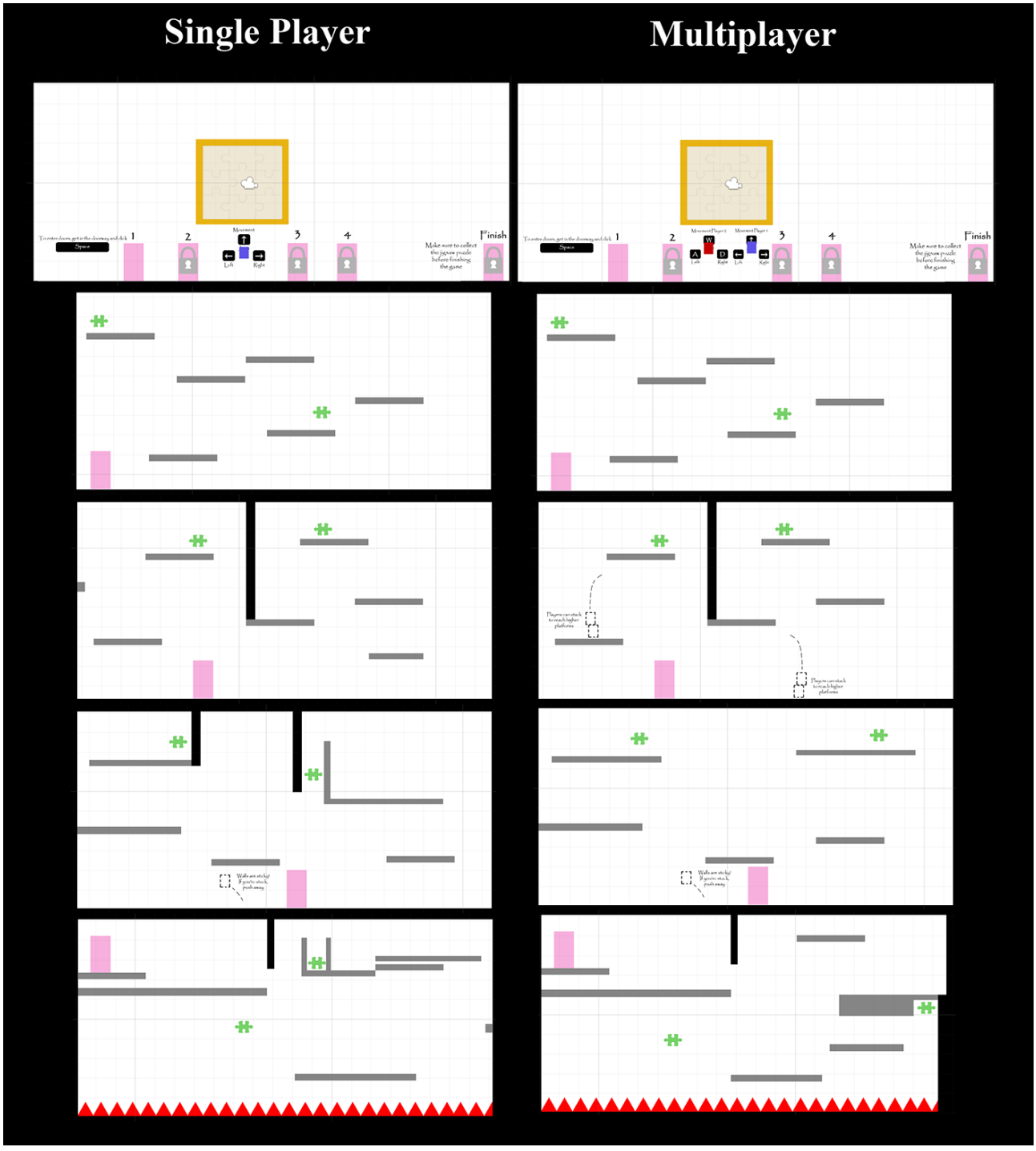


Figure 6: All the rooms in the two different versions

The jigsaw puzzle was drawn on thick paper and then cut into appropriate pieces. It resembled a very simplistic face in order to indicate the aspect of identity without making the drawing look like someone specific. The middle right piece was taken out. This can be seen below in Figure 7.

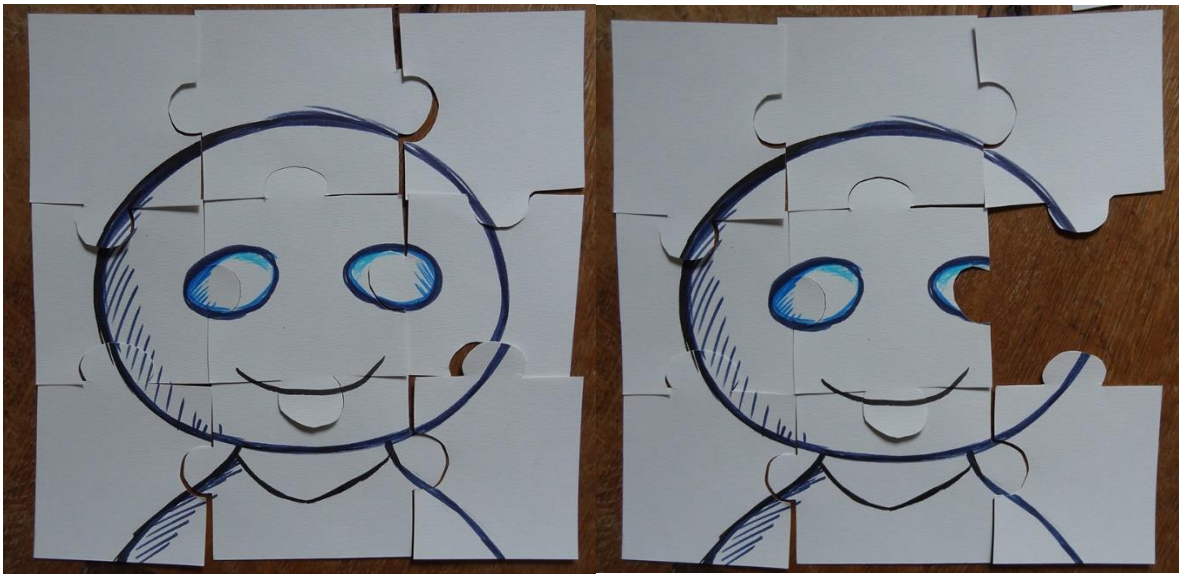


Figure 7: The jigsaw puzzle

5.1 Challenges

The main challenges were connected to the programming. The code was C sharp in the Unity3D engine. A basic movement code was easy enough to pinpoint, and the attaching to wall was a modified 'sliding down walls' code example (Staib, 2016). The majority of the issues were in the rooms themselves.

As the rooms would have to be open for going back and exploring, the initial idea with having each room be a 'scene' or a level that was loaded up when entering the door did not work, as the puzzle pieces would reload. This was solved by transporting the players every time they went through a door and having the rooms spread out enough so that the different rooms could not be seen in a distance.
The doors themselves posed a few problems. The first one was that the players had to both be close to the chosen door in order to transport. At first the players did not require this function, as I believed it would make way for a few different puzzles, but unfortunately if both players stood in two different door and clicked to move, the game would get confused and send them through the potentially wrong door. This was fixed through a line measuring players distance and checking it when entering the door.
Another issue with the door was that they would have to be done out of order, and unfortunately I could not trust the players to go through the doors even if they were numbered. Figuring out how to code a locking mechanism turned me through more hoops than I care to admit. After a few iterations, I figured out how to get the doors to check the locked state of another door and by implanting an invisible 'door zero' that was open, the first door would look at this and be open, then the second door would look at the first door and when this was entered, open itself. This was also visually represented with a lock symbol disappearing from the door.

Over and all, while some of the programming gave me trouble, it was all ultimately solved and the short experience of the game was created. The only known bug of the game is that because each avatar consider the other avatar an obstacle, if timed correctly, the two players can jump and attach

in midair, suspending them in the air. Since this was not considered a game breaking bug and not likely to happen, it was ignored.

In the digitial appendix, the two games, TestGame1 (single player) and TestGame2 (multiplayer) are provided. Links are also provided for downloads of the games in the appendix.

With the game made, the test could be conducted and evaluated upon, which will be covered in the following chapters.

5.2 Demoday Iteration

Halfway through the implementation process, an iteration was tested on a few participants at Aalborg University's demoday, which is a day midway through the semester where a few students meet (in this case, a few from semester 10, semester 8, and semester 6) show up and run their prototype and any potential testing.

On the demoday, the game was run through usability testing with several individuals in order to observe their in-game behavior and then discuss with them the principles behind it. This version of the game was aesthetically pretty similar to the finished version, however a bit more simplistic. The game itself had a few problems with the coding of the doors, as this was before much of the locking mechanism.

The main issue that was discovered for this iteration was that the finish door was not marked clearly and was very close to the other doors meaning that the players would head for the door and go through it before they collected the jigsaw puzzle and a few times the players believed that the last puzzle piece was through the last door.

The test provided helpful information where some of the problems were with the doors and level setup, as well as some initial reactions to the cooperation mechanic itself which was generally received positively.

6 Evaluation

The test was conducted according to the test method presented in the Methodology chapter. The test was conducted at Aalborg University's Copenhagen campus over the course of a day. In the following chapter, the results of the test will be presented, evaluated, and discussed upon. The evaluation will take a qualitative analytic perspective. The interview results will also be coded and grouped according to these codes to locate trends in the data.
Following this, the results will be summarized, and the Discussion chapter will begin where several subjects of the data will be argued further upon.

6.1 Procedure

The test was as conducted at the Copenhagen division of Aalborg University, in and around the areas were the students have their group rooms. Therefore the general consensus was that all the test participants were students, most of which were from the Medialogy department, but various semesters. Two students were from the Sound and Music Computing department and two other participants were unemployed and student of Technical University of Denmark respectively.

The test was conducted over the course of one day, with the researcher locating people in the building who would be willing to test for the researcher. The test took roughly ten minutes depending on the participants, with five minutes of gameplay and five minutes of questions. The demographics were recorded through a questionnaire on paper (Age, occupation, gender, type of gamer) while they were being presented with the test, after which the game was started. The script for this process can be seen in subsection 3.2.1 *Test Procedure.*

Overall, the tests were conducted without a hitch, except the last few where the camera used to record the interviews died. The specific interview where it died was luckily towards the end and a few notes were taken on paper. The remaining interviews were recorded in poor quality through the computer.

The transcripts from the experiment (the interviews) can be found in the digital appendix.

6.2 Results

In the following section, the results will be presented; the data from the interviews will be presented, coded, and then discussed upon. Correlations between these, if there is any, will be highlighted, and problems will also be brought up. Following this, a brief discussion of these will be conducted.

6.2.1 The Raw Data

The raw data can be found in the digital appendix. This will contain the demographic questionnaires of the participants, the notes on their actions when faced with the missing puzzle piece, and transcripts

of the interviews. The different group participants are coded as, for example, 1-1 for the single player group and the first participant, while multiplayer groups were noted as 2-1a and 2-1b.

6.2.2 Presented Data

The interviews were open coded according to concepts and trends seen through the answers to the questions. In the following section, the grouped data will be presented for overview and analysis. As mentioned, the raw data can be found in the digital appendix.

6.2.3 The Process of Coding

The data was open coded using the transcripts and grouped together in the tables below. The process was defined by the questions that were asked and the answers provided. The most important subjects were related to thoughts of the game, understanding the purpose, and understanding the concept of serious games. The transcripts were analyzed according to these subjects and the answers were noted in the tables, grouped together by common terms (for example, good and nice are similar positive phrases). As the interviews were open-ended, some searching was required to find answers as, for example, one participant only mentioned their opinion on the game later on.

Below are the three main subjects categorized to later be analyzed upon, and an additional table (the first, Table 1) is the actions that the participants took when they had collected all the puzzle pieces and were missing one.

Table 1: Participants' actions once they realized final puzzle piece was missing:

	Went Looking	Did not look
Single player	2	3
Multiplayer	3	2
Total	5	5

Table 2: Thoughts on the game (can have more than 10)

	Single player	Multiplayer	Total
Good/nice	4	2	6
Okay		2	2
Neutral - slightly annoying controls	1		1
Intuitive		2	2
Good proof of concept		2	2

Fun		2	2

Table 3: Purpose/message/point of the game

	Single player	Multiplayer
Being challenged	1	
Has none/can't see it	4	
Collaborate/cooperate/communicate		5

Table 4: Understanding of serious and deep games (multiplayer group totals in ten results due to multiple people)

	Single player	Multiplayer	Total
Serious/deep narrative	3	3	6
Games with hard pressing issues (e.g. war or famine)	1	1	2
Games with purpose other than entertainment	1	4	4
Games that inspire critical thinking		1	1
Games that has several layers and require exploration/ playthroughs		2	2

6.3 Discussion of Results

In the following section, the results will be discussed using the tables and quotes from the transcribed interviews found in the digital appendix. This will help provide an overview of the different questions and their corresponding results, which can help to answer the research question of the impact of cooperation on the serious game's purpose.

The quotes will be cited according to the interview number similar to how they are presented in the appendix. For example, the game was defined as short (2-3) or "*This can be stated by the participants*" (2-3) which indicates the specific interview found in the appendix.

6.3.1 Initial Opinions of the Game

The initial reactions to the game itself were overall positive. As can be seen in the coded data above in Table 2, many of the test participants thought the game was fun or other positive aligned opinions. Eight of the participants stated it as good/nice and a good proof of concept and two directly said that it was fun.

The game was also noted to be a decent proof of concept, saying "*If you go for the assumption that it's going to develop it into a full game, I think there's potential in making it* […]" (2-5), and "*It was a decent proof of concept*" (2-3), while also mentioning it as short (2-5) and potentially lacking some narrative elements (1-3) and complexity (2-5). This indicates that while the game itself did not impact the players negatively by being boring or otherwise annoying, its simplistic nature made it feel like it lacked some elements while not impacting the experience negatively. Most of the players enjoyed the game or otherwise related some positivity towards it as a proof of concept, with the exception of the participant of 1-3, who said he got annoyed with the sticky walls mechanics because "*I really like that jumping off wall thing*" (1-3).

When asked if the game lacked elements that potentially distracted them from the experience itself, generally the participants mentioned that they could not think of any (1-1, 1-2, 1-4), that there was a lack of a narrative element (2-4), it could use some complexity (2-3), and as one group mentioned some more interesting visuals (2-2). However with these examples, it was not about if something distracted them, but more what they would have liked to have seen. This however, could also be what they might desire in order to bring a clearer purpose of the game, which will be shown in the following section

6.3.2 The Purpose of the Game

When the participants were asked about the purpose, point, or message of the game, there appeared to be a split in the two groups. The multiplayer group all agreed that it was about cooperation and communication with the partner in order to reach the end, while the single player group's answers varied from 'challenge yourself' (1-1), to find the puzzle pieces (1-4, 1-5), or that they simply did not see a message with the game (1-2) or the correlation between the digital and physical pieces (1-3).

Despite this, some of the participants who went back to look for the last puzzle piece (1-3, 1-5, 2-1, 2-3, 2-4) still felt some of the intended feelings of frustration about not being able to find the last puzzle piece which is indicated with "*It annoys me really that we didn't find the last one.*" (2-1) and "*For me it was a little frustrating, it seemed pretty obvious that we got everything but obviously we were missing something.*" (2-3)

In relation to the participants' thoughts on the game, this provides a strong indication that while the game was fun, and while some participants got the intended emotions out of it, the general message of identity was perhaps too simplistic and vague, which made some participants unsure on the intention of the game when they were playing it alone. This will be discussed further in the Discussion chapter.

6.3.3 Knowledge on Serious Games

When asked about the understanding or experience around the concept of serious games and deep games, the participants had various opinions on these. A rough outline of this can be seen in Table 4.

As can be seen, quite a few of the participants took the name on face value and misjudged the genre much akin to how the etymology was discussed in the section 2.2 *Etymology and Why This is a Problem*. This can be seen in Table 4 with such examples as "[…] *if the tone, the starting note of the whole game is very serious, its gonna be serious.*" (2-1) and "*Depends on what we define as serious. Of course, for instant we imagine some serious storyline. This is where I would see it more as an interactive experience.*" (1-1). Other groups had variations of the term still relating it to a 'serious' narrative, like participant B from the 2-1 group who said it was games that inspired or encouraged critical thinking specifically with "*I think immediately of The Witness. You know, a very serious and very… like, you gotta think, more like critical thinking* […]", or group 2-3 who both agreed it to be games that required in-depth exploration to be provided with the full narrative. "*I wouldn't say, not because they're deep but they leave things intentionally shallow or vague so they leave everything up to the player*."

Approximately three groups had definitions of the terms serious games and deep games that are considered closer to the determined definitions in the Analysis chapter. These groups were 1-3, 2-4 and 2-5 with definitions such as "*I understand it as games that tries to teach something. […] So like a simulation of real life*." (2-4) and "*I think of something that's realistic or tries to teach you something or it's trying to make you feel in a certain way or something like that.*" (2-5). Interestingly, two of these three groups had prior experience in working with serious games, specifically in the terms of awareness games as seen with "*I also spend a bit of my bachelor semester on developing a… it was supposed to be a serious game but it didn't work very well. At least increasing awareness of loneliness something something.*" (1-3) and "*We have worked where we tried to inform people about something*" (2-4). At the same time, one of these two groups, participant 1-3, who had worked with awareness games relating to loneliness, said he found the genre paradoxical and that making the games too serious makes it no longer a game. This is also a discussion that can be related to the discussion of when a game is a game, which was not put into focus in the Analysis chapter. This discussion is generally also surrounding whether or not interactive experiences such as visual novels can be considered games, and so on.

The results of this question visualize the discussion had in the Etymology subsection surrounding the misunderstandings of the various games, specifically the umbrella term of serious games and deep games. This will also be discussed further in the following Discussion chapter.

6.4 Findings

To summarize, there were four important results which will be discussed in the following chapter. First off, half of the participants did not look for the missing puzzle piece for a variety of reasons (trusted their memory or simply did not think to look), which would have had an impact on their experience as the game's purpose mainly laid upon the process of finding the last piece.

Second, the game was generally well received and the players had fun and believed it to be a nice proof of concept, which then does not impact negatively on the experience.

Third, the purpose of the game was not understood, and the participants playing the multiplayer version all agreed that it was about cooperation and communication, which does indicate that the purpose could potentially be ignored in case of a cooperative serious game.

Fourth, the concept of serious and deep games were generally misunderstood, most often to be considered games that are serious or deep in narrative. This is especially indicated strongly as almost all participants were Medialogy students working with games or game concepts, so to the general population and gaming community, these misunderstandings might be more evident.

7 Discussion

In the following chapter, the project as a whole will be discussed in relation to the analysis, research question, and test. It will discuss trends observed in the test, how this relate, and how the work can be used in the future with various subjects and tests which could be looked into.

7.1 Discussion of the Research Question

First off, the primary research question will be recapped and discussed.
Cooperation can be used to enhance the gaming experiences - make it more fun and sociable. Serious games, however, can often be subjective and interpreted differently. Hypothetically, making serious games that are cooperative could significantly enhance the playing experience. However, it could just as likely interfere with the individual's personal experience and interpretation, ruining the impact.

How does cooperation in serious or deep games impact the experience and could this make cooperation in serious games important or obsolete?

As discussed in the Analysis chapter and presented in the research question, I theorized that cooperation could potentially impact the experience both positively and negatively, as cooperation and companionship in games can add a layer of fun to a game (as discussed in 2.4 *Multiplayer and Cooperation as the New Potential*), but potentially also outweigh the individual's perspective and insight into the story.

The test conducted did visualize several trends according to this, while also highlighting both failures and successes of the game itself. As can be seen in the Evaluation chapter, where the results are presented and discussed, all of the multiplayer participants agreed that the game was focused on communication and cooperation. On the other hand, the single player participants varied their answers slightly, but mainly consisted of uncertain answers and nothing near the intention of the game itself.

This can potentially show a trend that the cooperation and the multiplayer aspects in serious games can outweigh the individual's experience and therefore put less impact on the interpretation. It can, however, also indicate a weakness in the game itself as a test subject, as cooperation and communication can easily overtake the purpose of the game, if the intended purpose of the game is too vague or the experience too short to be obvious.

It could also show a trend in the specific design of the game, as it was designed with Rusch's design aspects in mind; for the game to be metaphorical and focusing on introspection. This sort of game can be considered the more subtle genre and often relies on relaying the feelings behind the subject rather than the direct intention. While the weaknesses of the game created for this test could have had an impact on experiencing the purpose or the intention of the game, it could also potentially be linked to the specific design choices of a more subtle game. Further testing would have to be conducted, which will be covered later on in the Discussion chapter.

7.2 The Testing Method

Conducting exploratory tests on a new subject makes the testing method itself open for debate, as it can be difficult to say exactly which test method will provide the best data. The test method that I decided to go with, the open-ended qualitative interviews was fitting for the more exploratory aspects of it, but it can also be discussed that future tests would benefit most from quantitative questionnaires. The quantitative experiments can provide broader perspectives on the trends and potentially, with statistic calculations, show significant difference between two compared groups. However, the qualitative method can be significantly better for observing the human experience and getting the participants unique perspective.

Both methods, the quantitative and qualitative, have pros and cons compared to one another, but in this aspect, I believe that the better option for the initial exploratory study was the qualitative interviews, as it opened up for more discussion and communication both between the participants and between the participants and myself (the researcher). The qualitative test methods are also central to testing emotions, interpretation and the human experience, as it allows for more in-depth discussions.

The methodology itself did not limit the results, as much of the problems surrounding the test can be traced to the game itself, which will be elaborated in the following section.

7.3 The Game

The game is a big part of the test itself. While the research and the concepts behind serious and deep games does not change, whether my own game was obvious enough or too vague/subtle could have had a big impact on the results themselves. At the same time, the specifics of the cooperation itself could also have had an impact, as there are many ways to cooperate and communicate in games.

For example, the data could have been different and potentially interesting if the cooperation was presented in another manner. A test that has been considered for the future is a test around a serious or deep game that is in its core a single player experience with choices made by the individual, but instead having two players discuss the actions that they wanted to take in the game.

However, it does not dispute the fact that the game for the test had weaknesses as well as it had strengths, which was presented in the Evaluation chapter, subsection 6.3.1 *Initial Opinions of the Game.*
As was discussed in the section above, the game generally did not present its message of identity very clearly. While it did elicit the intended frustration in some of the participants of not being able to find the last puzzle piece, it was not clear enough what the message of the game was. This comes down to the lengthy process of designing serious and deep games. As Rusch presented in her book, which was analyzed and discussed in subsection 2.3.3 *Making Deep Games*, the type of games that focus on emotion and the human experience can take several months and a lengthy iterative process to successfully design. Noting the ‘successfully’ is important in this case, because the games can be fun,

be interesting despite having a short design period, but they can also 'miss the target' when it comes to bringing out the message of the game - the players miss it or they interpret it differently than intended. In Rusch's experience, this happened apparently often when relaying the human experience and the games that she herself designed with a team often required several alterations or complete changes.

The weaknesses of the game for this specific test mainly lied within the comprehension of the game's purpose. While the multiplayer groups found the message to be about cooperation and communication, the single player groups generally did not find a purpose with the game other than collecting puzzle pieces.
This comes down to a few factors in the design which will be discussed: The length of the game, the lack of a clear narrative, and the process of the missing piece.
The length of the game, while long enough to experience the cooperation, was quite brief and with the lack of an obvious narrative the game was very simplistic in its nature. While a narrative could potentially have enhanced the purpose of the game, it was also important that the intention of the game did not become spoon-fed as the game focused more around the feelings of frustration, however, a narrative could potentially have linked these feelings to the message of the game in a clearer manner.
The final problematic aspect of the game surrounded the missing piece itself, as several participants ended up going through the door before they had gotten a chance to realize they were missing a puzzle piece, despite the games own warning of collecting the puzzle before finishing the game. The final multiplayer group also experienced a disagreement as one participant wanted to go look for the piece and the other accepted it as missing and clicked to go through the door before the first participant could protest.
This indicates that the environment design around the finishing door potentially should have been clearer to stop such instances - potentially by darkened the level towards the door or asking the participants to confirm if they want to finish the game.

The game generally was accepted as interesting and fun, which helps the discussion of 'when is a game a game' as it did not take out elements of general game design. It also makes for a good foundation in developing further in the future, as participants believed it to be a good proof of concept, and reminiscent of other developed games - such as *Super Meat Boy* (Super Meat Boy, 2017) and *Thomas Was Alone*. The cooperation itself also appeared to successfully get the participants to work together and discuss their way through the platforming. It was also interesting to watch the participants who went back to look for the final puzzle piece, generally searched the hub room by trying to reach as high as possible together.

To conclude on whether the game was successful or not, I believe that it was so, partly. It held elements that made the experience fun and interesting, but much further development could be used to better bring out the message of the game, so that the comparative testing would be less uncertain in its trends.

7.4 Etymology Confirmation

The data strongly indicates that the etymology discussion in the Analysis chapter (section 2.2 *Etymology and Why This is a Problem*) is indicative of the general perspective surrounding the naming conventions of serious and deep games. Namely, that they are confusing and often misinterpreted by the more casual players. The data presented in the Evaluation chapter, and likewise discussed briefly, ten out of 15 of the participants took the name 'serious games' very literal, to mean games that are serious in their narrative like the game *The Last of Us* (The Last Of Us, 2013) or statements similar to this.

This, as presented in the Analysis chapter, can be detrimental to the genre itself as it evolves. If clearer guidelines are not established and more research is not conducted into the genre, it will be easier to misunderstand and potentially dismiss. While few of the participants appeared to have the similar understanding of the genre as has been defined previously, the majority of the participants were Medialogy students and students of game design, and even then only two groups who where Medialogy students knew what it was (group 1-3 and 2-4). The final group (2-5) had a basic understanding of the term, despite not being specifically Medialogy students.

The problem with this lack of knowledge on this genre is that it is less likely to be understood, researched, and actively sought after. The genre itself has slowly become more known within gaming journalism and the specific subgenre of educational gaming or edutainment is more widely spread, but there are still misunderstandings and discussions. The potential importance of the genre as a tool for spreading global social understanding, which has been discussed in the Analysis chapter (subsection 2.1.3 *Why Are They Important*), might be lost if the genre itself is not looked further into.

What can be done to solve this and why should we? As has been presented throughout this thesis, there is potential in the various uses of serious and deep games, be it through the educational focus or a focus on global and social awareness. As these games are a niche genre still in development, some actions could be taken to educate on these. Research into the genre is a place to start, but it is also important to educate people who are unfamiliar with the meaning and uses of these games, so that they can become more common. Potentially adapting naming convention could lead to fewer misunderstandings, but most importantly, we should encourage design, research and development of serious and deep games to show their full potential.

7.5 Future Works

In the following section, the discussion of future works will be brought up, and interesting tests will be suggested for further research and benefit of the genre. The suggestions can be considered exploratory as no formal research has been conducted of this nature with specifically serious and deep games in mind.

7.5.1 Development of The Game

As previously discussed, the game was potentially too subtle to bring the message of identity through, despite occasionally relaying the emotions of 'the missing piece'. Despite this, the game was fun and interesting for the participants. The first, most obvious, future work would be to develop the concept of the game further and much more in-depth. With a clearer game and a more specific message, potentially relayed through its narrative, the test should be conducted once again within the same premise to solidify the trends that were presented in the Evaluation chapter. The game should hold the same message, but through an actual narrative relate the feelings of frustration to the concept of identity.

7.5.2 A Different Game and Different Cooperation

More directly, it could be interesting to change up the game itself potentially using pre-existing games with different messages and bring in different types of cooperation. There are currently quite a few different serious and deep games, but none that have cooperation as a direct game mechanics. Instead, taking such games, the cooperation could be more focused on a communicative cooperation. An example of this is the game *Depression Quest* (Quinn, 2013), which is a game as an interactive novel, giving the player choices. Two people could be sat down and told to play this game and figure out their choices together to bring in cooperation in an otherwise single player experience. While this itself could potentially show trends in the players interpretation of the game, it could also be compared to people playing it on their own.

7.5.3 Intention Bias and Anticipation Bias

Another aspect that could be interesting to work with would be around the bias towards this genre of games. Being that serious games and deep games are a more niche genre, they are often played by people who intentionally seek them out for the special experience. This could be considered intention bias and studying this might lead to seeing if it is only specific people who really want to play these type of games. On the other hand, anticipation bias could be interesting to look further upon. A game that Rusch used as an example in her book was called *The Marriage* (Humble, 2017), which used symbols and movement to indicate actions and a narrative. Without the name of the game, however, the intention of it can be hard to decipher. It could be interesting to see if a specific name for the game tested upon would affect the experience. The test conducted for this research project aimed to tell the players as little as possible to not potentially bring bias around the message of the game, but there is a potential test in telling the participants exactly what the game is about prior to them playing it, and then seeing how this colors their interactions and cooperation.

7.5.4 Competitive Serious Games

The final future research which will be presented here is the concept of competitive multiplayer experiences. As presented in the Analysis chapter, section 2.4 which talks about cooperation and communication, competitive also holds a firm spot in the multiplayer type of games. Competitive games are also the ones that are often considered more literally serious, with the rapid growth of the e-sport market. There is, however, interesting research which could be conducted into the competitive

nature of people and the concepts behind serious and deep games. While cooperation can make dull experiences more fun, competition can make gaming experience more literally serious and less about the fun. If there is incentive for players to beat each other in a game, this could both outweigh the fun and the purpose of the games itself. This would require, however, games built for this as competitive elements and serious games are much harder to adapt out of pre-existing games.

As can be seen, there is a lot of potential for further exploring the genre and the different elements of it in the future. Since the genre and the research surrounding it can still be considered in its infancy, many different aspects could potentially bring a whole new perspective to the genre and further enhance it for the general population.

With the future works finished, the thesis will be concluded in the following Conclusion chapter.

8 Conclusion

The primary research question was based on the following statement.
Cooperation can be used to enhance the gaming experiences - make it more fun and sociable. Serious games, however, can often be subjective and interpreted differently. Hypothetically, making serious games that are cooperative could significantly enhance the playing experience. However, it could just as likely interfere with the individual's personal experience and interpretation, ruining the impact.

How does cooperation in serious or deep games impact the experience and could this make cooperation in serious games important or obsolete?

This was then studied by looking into the concepts of serious games, design and conducting an exploratory test with a game created for this specific purpose.

As has been discussed in the findings, there is an indicative trend in the test data of the cooperation potentially outweighing the deeper intention of the game, however, the game itself had some weaknesses which could have biased this. Specifically, the metaphorical presentation of the message and the lack of a visible narrative might have made it so there was no clear purpose for the cooperation to even outweigh. In order to determine this further, future testing through a variety of games and possibly a variety of types of cooperation should be conducted.

Through the literature review, it can be concluded that the confusion and misunderstanding around the etymology of serious and deep games appears to be correct. This could be further studied in order to bring more of the topic forward on how we present serious and deep games.

Finally, the research regarding the design and analysis of serious and deep games, and the subsequent overview presented in the Analysis chapter, provided to be a helpful guide when designing my own serious experience despite the limited time to create it.

In conclusion, there are indicative trends in the data, which shows that the use of multiplayer aspects in serious and deep games could potentially outweigh the personal interpretation and experience. This is evident with the statements of the participants as all multiplayer participants said the game was about communication and cooperation, while the single player participants had varied answers. However, the game used for the testing could also have created a bias and further testing should be conducted in order to determine the usefulness of multiplayer mechanics in serious and deep games.

This thesis presented a study conducted on serious and deep games, and where the genre stands in society today. It then conceptualized new design considerations about including more classical game aspects, which could potentially be expanded and developed upon in the future. If the academic world continues to research and develop the concepts around serious games and multiplayer experiences, we could make way for playing seriously together.

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