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Interactive Digital Media
By
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GAMIFICATION

The Chemistry of an Enhancement Drug

Play

Games

Extrinsic motivation

Zone of
proximal development

Rules

Feedback

Learning

Game design

Paidia

Flow

Ludus

Relatedness

Competence

Autonomy

Intrinsic motivation

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Gamification

The Chemistry of an Enhancement Drug

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Abstract

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This master thesis is a theoretical work on the concept of gamification. Gamification is a concept that was coined in 2002 and became significantly more popular in 2010. The concept is expected by Gartner's Hype Cycle to be commonly used by companies and organizations in 2019 at the earliest.

To try and answer how gamification can be used to elicit and nurture intrinsic motivation towards non-artificial feats, this master thesis gives insights into: what gamification is; how it works; why it sometimes works and sometimes does not; where it comes from; and what are some of the advantages and pitfalls of gamification. At the end it features a suggestion on how gamification can be used to elicit and nurture extrinsic motivations toward non-artificial feats.

The basic meaning of gamification is to make non-game contexts into games by applying game design elements to the non-game contexts. It differs from traditional game design, as the games designed through gamification, are designed with a secondary objective of eliciting and nurturing intrinsic motivation towards non-artificial feats such as learning, working, and other real-life activities that may benefit from increased intrinsic motivation.

When humans are intrinsically motivated towards an activity, their performance and creativity increases in regard to the activity.

By the use of game design elements in gamifying non-game contexts, gamification is an attempt to use intrinsic motivation to increase performance and creativity of non-artificial feats.

Games are a natural way for humans to simulate, play with, and explore scenarios inside an ar-

tificial universe, a magic circle. Inside this magic circle the players can increase and decrease their perception of the challenges they face, making it easier to enter and maintain a state of flow.

Flow is also a perfect condition for learning to happen, as flow is a state without either boredom or anxiety. Boredom can result in the player's attention being divided or directed towards other things, while anxiety can overwhelm the player's attention. Both boredom and anxiety can make it difficult to concentrate, and anxiety can even impair learning. While in flow the player is completely engaged in the activity, and his or her entire attention is directed towards the activity.

By making non-game contexts into games by gamifying them, it becomes easier to enter and maintain flow as well as apply elements that connect the non-artificial activity to the three components of intrinsic motivation: relatedness, autonomy, and competence.

The process of gamifying non-game contexts follows most of the same procedures used in game design, so by looking into the fundamental procedure of game design, this master thesis features an attempt to use those fundamentals to create a guide for gamifying non-game contexts. The guide is focused on using game-design procedures to elicit and nurture intrinsic motivation towards non-artificial feats, thus it gives suggestions on how to use game design to connect game design elements to the components of intrinsic motivation.

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Chapter 1

Introduction

I am an experienced gamer (someone who plays games). I have played video games since I was a child. Games (video-, board- and other games, you name it) have always been a big passion of mine. They could mesmerize me and keep me engaged in their artificial universe for hours both as a child and as an adult (if I can ever justify calling myself that, now close to my 30's).

When I enrolled in medialogy at Aalborg University (Aalborg, Denmark), a study that was often considered as a games-study, I told myself, I would not have anything to do with games or the development of them, as it was a leisure time activity, not something I could make a living of. However, as we will explore in this master thesis later, we humans are social beings, and our relations to others is a major motivational factor, so when I met some friends, who unlike me wanted to make games (every single semester - except for the bachelor project, where we designed a platform for gamifying classroom activities), I changed my mind, and jumped right into the study of games (even started a game development company with my new friends). More on my background and experience with games can be read in appendix A *Auto Ethnography of Mikkel Lund*.

I am now enrolled in interactive digital media (also at Aalborg University), and this is my final project - my master thesis. Although gamification is not a digital media per say, it does have great relevance to digital media, and digital media have great relevance to gamification - I explain this relationship a bit more in chapter 4 *Problem Formulation: A New Prescription*.

I have decided to write about gamification, because it draws on the magic of games - the mechanisms that makes games so engaging that they can compel someone like me to dedicate so much time and energy to them. In fact, once I began looking more into the concept (which was not new to me), I realized just how much games meant to me, and that I was actually somewhat of an addict - playing games was often a habit more than something I consciously decided to do, much like smoking is (which is also an addiction I am familiar with). Researching gamification in this project, is more than just a research into the mechanisms of games, but also a diagnosis of myself - an understanding of why games affect me, like they do, hence the title "*Gamification: The Chemistry of an Enhancement Drug*". In addition to this realization, I believe that many use gamification without being aware of why it sometimes works or does not work, risking failure or worse, addiction. Gamification is to me, more than just using points, badges, progress bars and the like to engage and motivate people into doing certain things or tasks, or as Kapp (2012) puts it:

> *"to trick learners into doing something they don't really want to do"* - (Kapp, 2012, p. 42)

I want to understand gamification and the mechanisms beneath it, and from this understanding, create guidelines for how to use gamification in another way, a (hopefully) better way - as an answer to this question (the problem formulation):

How can gamification be used in a way that elicits and nurture intrinsic motivation?

Gamification (in my opinion) comes from the word game and the suffix "fy". The suffix "fy" means to "make into" or "apply attributes of" that which comes prior to "fy" (*Definition of FY*, 2018), thus to gamify, literally means to make into game or apply attributes of game.

To support this idea, here is a small list of other examples of the use of the suffix "fy" (all words are taken from www.merriam-webster.com - an online, English dictionary):

Clarify : To make something clear or understandable.

Nullify : To make something null, void or of no value.

Personify : To give characteristics (or attributes) of a person to something that is not a person.

Simplify : To make something simple.

Classify : To give class to something or arrange it in classes.

That covers just the literal meaning of gamification. What I want to find out is:

what gives meaning to this word, gamification? And why has it attracted so much attention?

This is the initial question that initiates the research done in this master thesis.

Personally I find gamification interesting, as I have myself experienced (and still to this day experience) the effect that games can have on one's motivation to do, what I sometimes may consider to be, mundane and unproductive activities - why would I spend so many hours on playing World of Warcraft, if it did not really give me anything I could use, rather than do something more "productive"?

I have experienced the addiction that games can create, but I have also experienced, how they can drive us to create, learn, and even make friends. Gamification seems to me, to be a method to utilize the power of games to motivate us to create and learn.

Gamification is a concept that borders to and includes many other concepts and topics. To get a good understanding of what gamification is, how it works, and where it comes from, I will attempt to explore some of the key concepts and topics that are relevant to understanding gamification. It is not a straight path from one topic to another, and therefore I ask you to be persevering.

My definition of gamification (which I explain later in chapter 4 *Problem Formulation: A New Prescription*), apart from the literal meaning mentioned above, is the following:

Gamification is the process of using game design elements in a non-game context to design a game or a game-like context that can elicit and nurture intrinsic motivation towards non-artificial feats.

To understand how I get to this definition, it is relevant to understand the topics: game, play and intrinsic motivation (and a few others connected to these).

Finally, I will be using my own gamified ToDo-list, which I presently call "ToDoALot". It is a game which I have been working on prior to this master thesis and still is working on. I use it daily to motivate myself to do my daily chores, as the game utilizes my daily chores as a factor in the game, thus doing my daily chores affect the game. ToDoALot will be explained more in chapter 5 *Case: A Sample of Gamification*.

Chapter 2

Gamification

Let us start with considering, where the term gamification comes from, where it is now in its development, and where it might be headed. This should justify the relevance of this master thesis - is gamification something that has come to stay like the internet? Or will it be forgotten eventually like (hopefully) fidget spinners?

The concept gamification has attracted some hype and attention since it was first coined by Nick Pelling (a game developer) (Bohyun, 2015) in 2002. However, it was first in 2010 that gamification got a "*wide-spread adoption*" (Bohyun, 2015). This can also be seen on the Google Trends for gamification (*Gamification - Google Trends*, 2017) (see figure 2.1), as it shows a significant increase in the search for gamification in 2010.

It was then in 2011 that Deterding, Dixon, Khaled, and Nacke (2011) defined gamification as being the use of game design elements in a non-game context. Hereafter, the popularity of gamification rose (not necessarily as a result hereof, but there could be a correlation).

If we look at "Gartner's Hype Cycle" from 2013 (Dale, 2014; *Gartner's 2013 Hype Cycle for Emerging Technologies Maps Out Evolving Relationship Between Humans and Machines*, 2013) (see figure 2.2), we can see that gamification is at the tip of the "Peak of Inflated Expectations", this means that it was here, the hype was at its highest. From here it was estimated to take five to ten years to reach the "Plateau of Productivity", which means that it should by that time (2018-2023) become a commonly used technology.

At this point (in 2013) it had been three years, since the popularity of the concept began its significant increase (as seen on the Google Trends figure 2.1) - three years of hype before it would begin its decline. But what does the rise and fall on the Hype Cycle mean?

2.1 Gartner's Hype Cycle

"Gartner's Hype Cycle" is a graph showing an overview of the emergence of new technologies (Linden & Fenn, 2003). Just to clarify: technology does not have to be a tangible concept such as a tool e.g. smartphones, computers etc., but is a practical application of knowledge (*Definition of TECHNOLOGY*, 2018). Gartner provides many companies with a global overview of emerging technologies and guidance about them (*Why Gartner Is Critical to Your Business*, 2018).

The Hype Cycle shows their predictions of several technologies' evolution (Linden & Fenn, 2003), and as such can be used to give an understanding of the current state of gamification.

The technologies move in different tempo and with different intensities - even if they are on top of the Hype Cycle, the hype may be of different proportions (Linden & Fenn, 2003).

The Hype Cycle is the first three phases on the chart (see figure 2.3): "Technology Trigger", "Peak of Inflated Expectations" and "Trough of Disillusionment" (Linden & Fenn, 2003).

To understand where gamification is now, where it is headed and what that means, it may help to understand the five phases that describes a technology's life cycle - remember the Hype Cycle is only the first three phases, the last two phases describe what happens when the hype is over (Linden & Fenn, 2003). Here is a brief de-

Figure 2.1: Number of searches on gamification on Google from 2004-2018. The rise starts in June 2010, reaching its highest point in February 2014 and at 80 in February 2018.

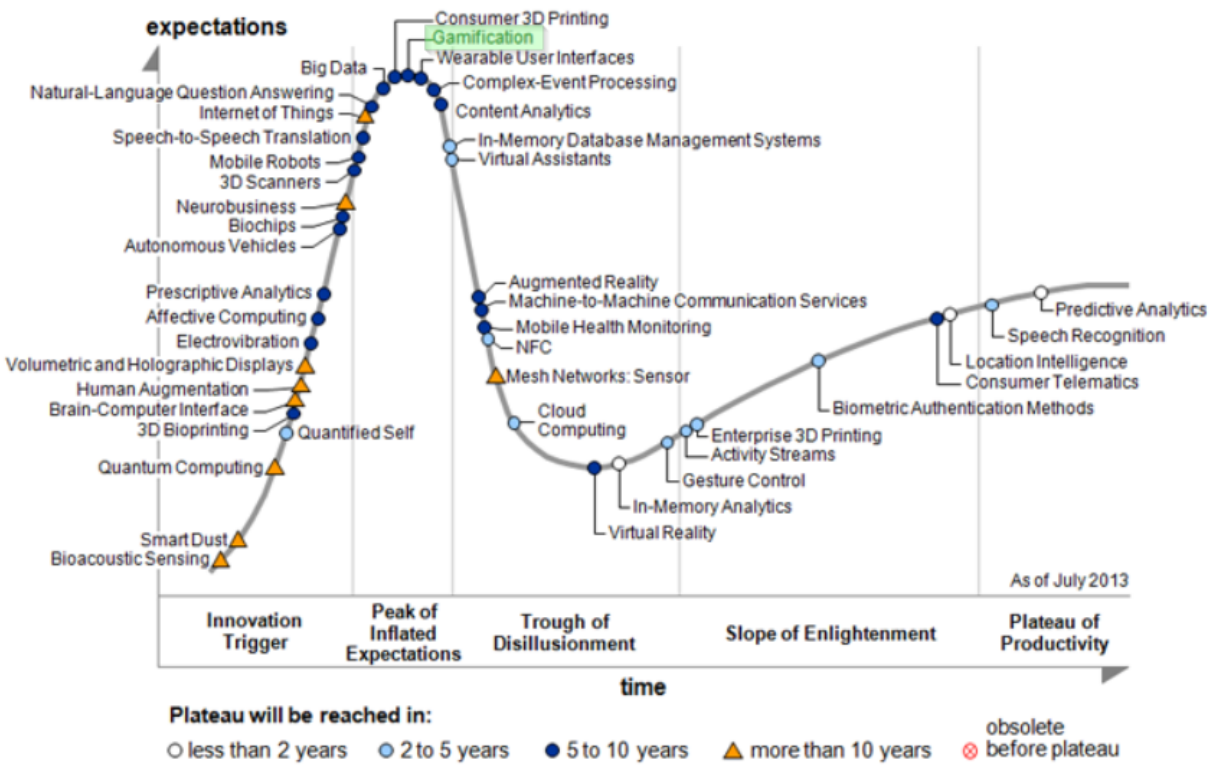


Figure 2.2: "Gartner's Hype Cycle for Emerging Technologies, 2013" shows gamification on top of "Peak of Inflated Expectations". The colors on the dots indicate how long the technology is expected to be about reaching the "Plateau of Productivity" (when will it be common use). (*Gartner's 2013 Hype Cycle for Emerging Technologies Maps Out Evolving Relationship Between Humans and Machines*, 2013)

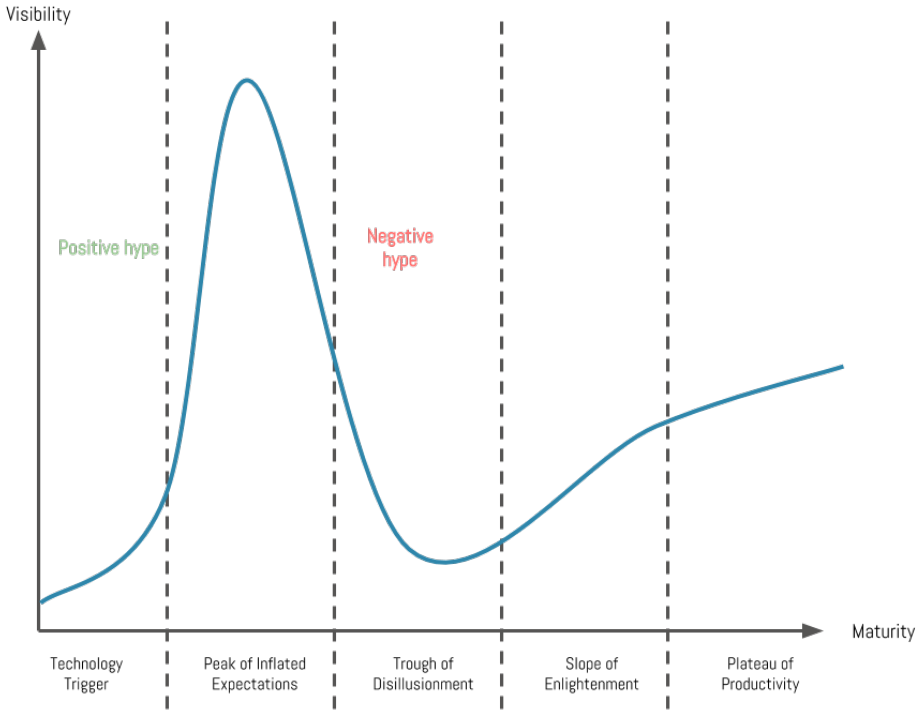


Figure 2.3: A model for "*Gartner's Hype Cycle for Emerging Technologies*" (based on Linden and Fenn (2003)), showing the five phases of the entire model, as well as the first three that make up the Hype Cycle.

scription of the phases based on Linden and Fenn (2003):

Technology Trigger is the phase in which the technology is very new, and the best evidence of its potential lies in prototypes and demonstrations.

Peak of Inflated Expectations is where the first suppliers appear, the technology is pushed to its limits, and this in return generates negative publicity, which moves the technology into the next phase.

Trough of Disillusionment is where the technology is being viewed in a more realistic light compared to the early inflated expectations and gets discredited because of this.

Slope of Enlightenment is when the technology has come through the Hype Cycle. Here focus lies on experiments and experience with the technology, which leads to a greater understanding of it.

Plateau of Productivity is when the mainstream gets ready to adopt the technology and an ecosystem evolves around it.

On the Hype Cycle of 2017 (see figure 2.4) gamification is on its way up the "Slope of Enlightenment". This means, that the hype is over for gamification, and focus should now be on experiments, experience and study of the technology to further our understanding of it.

To understand why gamification has emerged now, and not hundreds or thousands of years earlier, as it (gamification) originates (or at least borrows) from games, it may help to understand the recent development of games as well.

Digital games

Games are not something new to humans and has been known and used by our ancestors as well (McGonigal, 2011). However, with the invention of computers, the management of game mechanics and rules (explained later in section 2.3 *System, rules, and mechanics*) have become significantly easier, and as such games have become much more accessible (Salen & Zimmerman, 2004). Salen and Zimmerman (2004) gives four characteristics that digital games have as

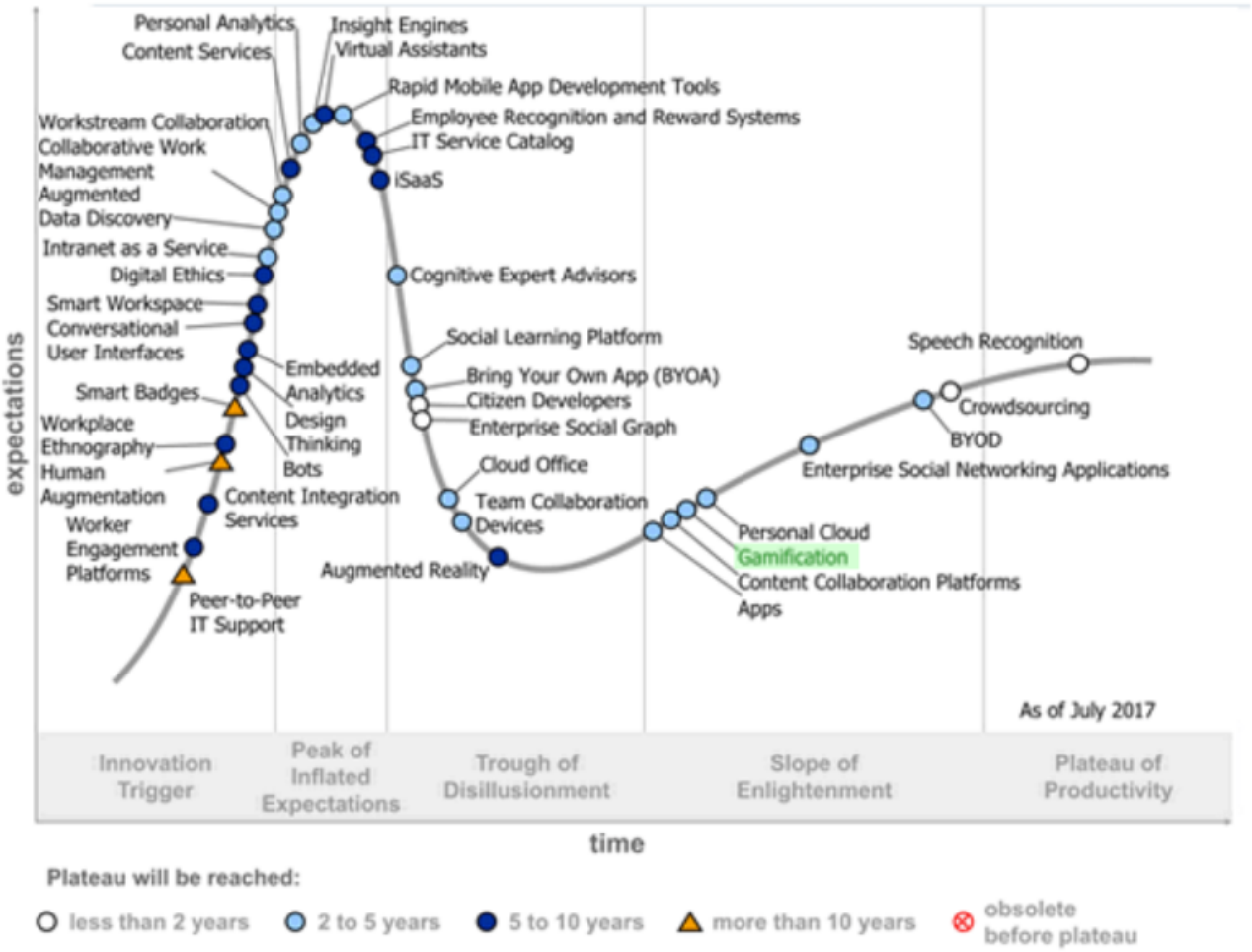


Figure 2.4: "*Gartner's Hype Cycle for the Digital Workplace, 2017*" shows gamification on the way up the "Slope of Enlightenment". The colors on the dots indicate how long the technology is expected to be about reaching the point "Plateau of Productivity" - so in 2019-2022 gamification is predicted to be a commonly used technology (*Hype Cycle for the Digital Workplace, 2017*, 2017-11-28)

an advantage over games on other medias (like board games). These are not exclusive to digital games, but are more potent in digital games and may therefore serve as clues, as to why games have become more popular; also keep in mind that the characteristics are closely related to one another (Salen & Zimmerman, 2004), thus the advantage of one characteristic may be the same advantage of another or may be connected to each other.

Immediate but narrow interactivity

A digital game can give faster feedback to the player and thereby give the player a real-time game experience. However, Salen and Zimmerman (2004) argues that the range of interactivity is limited in digital games (narrow interactivity), as e.g. the player only has the option to interact through a mouse and keyboard. I would argue that since 2004, where this was stated, the games industry has evolved much, and the interaction possibilities have evolved as well e.g. virtual reality glasses (VR; see figure 2.5), motion sensors in controllers (e.g. Wii controller; see figure 2.6), treadmills etc. were not available (or readily available) in 2004 - HTC Vive was announced in 2015 (*HTC Vive*, 2018) and the Wii Remote was announced in 2005 (*Wii Remote*, 2018).

Figure 2.5: HTC Vive: A virtual reality set with controllers and position trackers that tracks the position of the head mount and controllers to allow the player to move around the room as part of the interaction with the game *VIVE*^{TM}| *VIVE Virtual Reality System* (2018).

Figure 2.6: Nintendo Wii Remote; With accelerometer to register movement, as well as a sensor placed near the TV that allows the remote to function as a pointer (*Wii Remote*, 2018).

Information manipulation

Digital games are particularly good at managing larger amounts of data, which makes it possible to: teach the rules to the player while he or she is playing the game (unlike most board games that require the player to know the rules before being able to play the game); hide information from the player and reveal it when specific conditions are met (e.g. "fog of war" which reveals parts of a map once the player explores them, and leaves unexplored areas partly or completely invisible to the player) (Salen & Zimmerman, 2004). This (hiding of information) is also possible in games like Dungeons & Dragons, where the gamemaster may hide certain information from the player(s). A computer can act as a gamemaster who knows the rules and may manage information: non-player characters (NPCs), the game environment etc.

Automated complex systems

As mentioned earlier, the advantages for digital games, mentioned here, are closely related, and this one may be the core characteristic on which the other characteristics are based. It might also be the core reason why digital games have made such a huge impact on the popularity of games. Computers are able to automate many processes that in other medias rely on the player knowing the rules of the game, or

following certain instructions that in digital games can be handled by the computer (Salen & Zimmerman, 2004). However, this also leaves the player with little understanding of the internal mechanics of the game, which may be an issue in some cases or to some players (Salen & Zimmerman, 2004).

Networked communication

Communication between players have become easier with digital games, as players can communicate without being at the same location, and can do so almost instantly via network connections (Salen & Zimmerman, 2004). Salen and Zimmerman (2004) does again mention some limits to this advantage due to the limited input devices, however as is the case with the interaction, so has the communication capabilities evolved since 2004 with e.g. voice chat in many games, or in some cases external to the game through softwares such as Ventrilo, TeamSpeak, Discord etc.

Digital games have added many advantages to playing games, and expanded the possibilities of games. This may be the reasons for the major increase in the popularity of games. Because digital games have made games so popular, more attention has been directed towards games. This attention has made it clearer how efficiently games (especially digital games with their immediate feedback) can captivate, engage and motivate us. This "discovery" (or rediscovery, or perhaps just increased awareness) could be the source of inspiration to the creation of gamification and other game related concepts.

2.2 Gamification

The current understanding of gamification is a contested one, as there are several different definitions of what gamification is, as well as other concepts closely related to gamification (Stieglitz, Lattemann, Robra-Bissantz, Zarnekow, & Brockmann, 2017) (or the same depending on the definition). These are explored later in 3.3 *Other concepts*. Let us start with a very basic definition made by Deterding et al. (2011), as it is very simple and can in its simplicity make the foundation for many of the other definitions and concepts. Gamification is according to Deterding et al. (2011):

> *"The use of game design elements in non-game contexts"* - (Deterding et al., 2011, p. 10)

This describes a fundamental rule for gamification, but does not explain the purpose of the concept. Now, adding game design elements in a non-game context could easily be considered game design - a game is something else than a game (a non-game context) before all the necessary elements of a game is applied to it through game design. However, Deterding et al. (2011) differs between games and gamification, as gamification according to him involves a purpose that games do not otherwise have.

This purpose often seems to be to motivate people. This purpose is also stated by both Kapp (2012) and Zicherman and Cunningham (2011). The motivation is often directed towards things such as to do things such as learning, working or buying etc., but does gamification actually fulfill this purpose?

In a literature review made by Hamari, Koivisto, and Sarsa (2014), they found that gamification in most researches proved to provide positive effects on the contexts to which it was applied. Most of these contexts were educational ones. In these contexts, gamification helped motivate and engage students, but also had some pitfalls such as increased competition (may be both a pitfall and an advantage - this is discussed later in section 3.2 *Why play or game?*), task evaluation (which will be discussed later in section 3.1 *Relatedness and evaluation*) and design features. Among other contexts were mentioned companies and organizations.

Before we dive in to the distinction between gamification and other similar concepts, it may help to get an understanding of what a game is, and why anyone would use elements of game design in a non-game context (for other reasons than to make 'just' a game).

2.3 Game

To understand what a non-game context is, and what game design elements are, it is important to understand what a game is. Similar to gamification the concept of game is also a contested concept (Salen & Zimmerman, 2004). Salen and Zimmerman (2004) presents eight different definitions of game (most of them with similarities), and then they make, based on those definitions, their own definition:

> *"A game is a system in which players engage in an artificial conflict, defined by rules that results in a quantifiable outcome."* - (Salen & Zimmerman, 2004, ch. 7, p. 11)

Now that we begin to describe interactions between people, players, gamers etc. the person interacting or just acting, will be referred to as an actor. This should not be understood as an actor in a theatrical play, but as someone who acts (makes an action or interaction).

Back to the definition of game made by Salen and Zimmerman (2004). They (Salen & Zimmerman, 2004) further divide the definition into the following six elements (not to be mistaken with game design elements):

System: A collection of interrelated elements.

Players: Actors interacting with the game (system).

Artificial: Not tied with reality - exist in an artificial environment with boundaries from reality.

Conflict: This can include any sort of conflict, but is essential to games.

Rules: Make up the structure of the game by setting boundaries.

Quantifiable outcome: At the conclusion of a game an outcome can be observed or measured.

Now we have a definition that covers most concepts we could want to call a game e.g. Counter Strike, Minecraft, The Sims, Football, Chess and Hide and Seek. There might still be exceptions e.g. the game of seduction or the game of life - neither of these are artificial (in respect to various religions or beliefs), in the sense that there are no boundaries between these "games" and what we call reality.

Progress

In regard to quantifiable outcome, a game like Minecraft may lack this very component, as the early version of Minecraft did not have an end goal. A boss fight was later added to the game (*Minecraft - The End*, 2018), but before this there was no "end game", so the outcome would be whenever the player decided to stop playing, and what they had achieved in the game, which could be building different things. The game did however (even early on) have a system, rules, players, it is artificial, the conflict is to (at least in survival mode) survive the nights, when monsters would appear, mine for resources and build structures (houses, mines, railroads, traps etc.). In the "peaceful mode" of Minecraft, the "game" is more similar to what Salen and Zimmerman (2004) calls a "toy", as it does not have a conflict or a goal - it can still be used in play.

I would argue that what, Salen and Zimmerman (2004) call quantifiable outcome, can be related to what Crawford (1984) calls interaction, as the interaction leaves noticeable changes in the game that (quantifiable or not) can act as a cue of progress. In a game like The Sims, it can also be difficult to measure an outcome, as the game can continue as long as the player wishes it to, but whenever the player stops playing, it is easy to see some progress. The same goes for the other examples I have mentioned, although they have scores or end conditions - The Sims does not really have a score or an end condition, but you could argue that money, or the value of the player's home can be used as a score. However, playing with LEGO also leaves noticeable changes. This alone does not make LEGO a game, but a toy - which can be made into a game or be used as a token in a game, by adding the missing elements: system, conflict and rules

(the elements: player, artificial, and outcome are already present).

> *"..., games are seen as a collection of multiple necessary conditions. None of these conditions alone is sufficient to constitute a game and it is only in combination of them that a game emerges."* - Huotari and Hamari (2012)

A game is therefore first a game once all elements (conditions) of a game are combined.

System, rules, and mechanics

In regard to system it can help to discern between rules and mechanics, as they make up parts of the system (Salen & Zimmerman, 2004), but are in themselves important elements of games.

Rules limits the player's actions; they are explicit guidelines and can (should) not be ambiguous; they are fixed, binding and shared by all players; they are repeatable from one session of a game to another (Salen & Zimmerman, 2004).

Mechanics are what constitutes the player's behavior (Salen & Zimmerman, 2004) e.g. being able to shoot other players (in a first-person-shooter game); being able to make a character walk or jump (in a platform game); being able to build structures or buy units (in a strategy game).

To avoid misunderstandings, I find it important to add that rules may be prioritized, and as such can overrule other rules. This also means that rules can differ between players in a game depending on specific conditions, although rules are shared by all players, e.g. in the game Ludo, a player will knock another player "home" (back to their starting point), if (the following condition is met) the player lands his or her piece on a tile occupied by another player's piece, unless (here comes the prioritization of rules into effect) the other player's piece is standing on a "globe" which protects that piece from being knocked "home" (thus overruling the previous rule) or the other player has two or more pieces on that tile. These may be "house rules" I have come to know as common rules, but they still prove the point. Mechanics on the other hand in a game like Ludo, is the players' ability to roll dice and move pieces. In relation to rules and mechanics:

> *"A system is a set of things that affect one another within an environment to form a larger pattern that is different from any of the individual parts."* - (Salen & Zimmerman, 2004, ch. 5 p. 2)

Thus rules, as mentioned earlier, are parts of the system as they constitute how things will or may affect one another inside the frame of the game.

The safety of the magic circle

The frame of a game is also a very important element of games, as it marks up the border between reality and game.

The element that Crawford (1984) calls safety is hidden in the element "artificial", as the safety is tied to the fact that the game has boundaries from reality, and interactions within the artificial construct therefore has no real consequences (consequences outside the reality of the game). Salen and Zimmerman (2004) also states that:

> *"..., the frame is a concept connected to the question of the "reality" of a game, of the relationship between the artificial world of the game and the "real life" contexts that it intersects. The frame of a game creates the feeling of safety..."* - (Salen & Zimmerman, 2004, ch. 9, p. 2)

This concept (the frame), they (Salen & Zimmerman, 2004) call "the magic circle". The

magic circle is a term they (Salen & Zimmerman, 2004) get from Huizinga (1950), and is a part of what he (Huizinga, 1950) calls "play".

Voluntariness and play

It is also in the definition of play by Huizinga (1950) that we find the final element of games, marked with bold, that may be crucial in understanding why gamification may and sometimes may not work. According to Huizinga (1950) playing (or play) is:

> *"A* **voluntary** *activity or occupation executed within certain fixed limits of time and place, according to rules freely accepted but absolutely binding, having its aim in itself and accompanied by a feeling of tension, joy and the consciousness that it is "different" from "ordinary life""* - (Huizinga, 1950, p. 28)

Play is a natural concept to both animals and humans, it is irrational, unreal, voluntary and yet very serious (according to Huizinga (1950)). He (Huizinga, 1950) also views play as an underlying force from which human culture and civilization is created. However, Huizinga (1950) does not differ between different types of playing, as Caillois (1961) also states in his work "*Man, Play and Games*". Caillois (1961) credits Huizinga for his acknowledgement of the importance of play, but points out that Huizinga omits the classification of play.

Paidia and ludus

Caillois (1961) divides play into "paidia" and "ludus" (and further into four other categories: "*agôn (competition), alea (chance), mimicry (simulation), and ilinx (vertigo)*" - (Caillois, 1961, p. 10 (X))):

Paidia is turbulent, spontaneous, and relates primarily to "children's games".

Ludus is more calculated, organized, and bound by rules.

Paidia may also be closely related to the Danish term "leg": 'entertaining activity that especially children, organized or spontaneously, perform or participate in for pleasure.' (*leg — Den Danske Ordbog*, 2018); and ludus may be closely related to the Danish term "spil": 'amusing or entertaining activity performed in accordance to established rules and with different equipment and props, such as cards, tokens or dice; doing such an activity' (*spil — Den Danske Ordbog*, 2018). This is stated to support the idea that there is a difference between the spontaneous, entertaining activity of playing (paidia or leg) and the more organized, rule-governed, and also entertaining activity of playing (ludus or spil). When discussing the act of specifically using ludus I will call it gaming or playing games (in conjunction), while using paidia will be referred to just as playing.

Defining game once again

Salen and Zimmerman's definition of game seems to fit well with Caillois' use of the term ludus, as both implies the use of rules. However, they (Salen & Zimmerman, 2004) do not include the voluntary element of games - it is our intrinsic motivation (will be explained later in section 3.1 *Motivation*) that drives us to play, not an extrinsic (external) factor.

For now, we will use a slightly altered version of the definition made by Salen and Zimmerman (2004):

> *A game is a system with which players* voluntarily interact *in an artificial* and safe *conflict, defined by rules, that results in an* observable progress.

The only elements from the definition made by Salen and Zimmerman (2004) that have not yet been discussed are player and conflict.

A player must always be present to play (interact with) the game. A game however, can still be an inactive game, but if it is a closed system with no possibilities for interaction, it can not be a game.

Conflict relates well, to what McGonigal (2011) calls goal (in her definition of game), as it gives the game a purpose - a sort of end condition or a means to measure progress.

Apart from goal, McGonigal (2011) also includes rules, feedback and voluntary participation.

Feedback is necessary to tell the player how they are doing (McGonigal, 2011), and can have a huge impact on whether the game gives a pleasurable experience or not (this is covered more in section 3.1 *Feedback*). However, in the definition of game used in this master thesis, feedback is considered to be a necessary part of both interaction and observable progress - without feedback we can not observe progress nor fully interact with a system e.g. pressing a button without any other feedback than the haptic feedback of it being pushed and released, will give the actor no indication as to what is happening.

The addition to the definition that games must be a voluntary activity, as McGonigal (2011) also acknowledges, may give some issues when someone asks us to play a certain game e.g. a teacher invites a student to play Minecraft as part of a class activity. Suddenly Minecraft is no longer a game (using this definition), yet we call it a game. To address this issue, I would like to add that when we are ordered to play a game, the game may originally be a game but is now being used as a tool, much like a frying pan is a tool for cooking but may become a toy if a child uses it to make imaginary food in their imaginary kitchen - the pan was originally a tool. We can still call it a game, as it was originally designed as such, but using it as a tool, gives it a new purpose other than what it was initially designed for, and this change may also alter some of the benefits and pitfalls of the game - it might not, as a tool, be as motivating, as it might be as a game - a game is not designed as a tool, but may be used as one.

The definition (made here) does not explicitly include the aspect of entertainment (as is also the case in the definition made by Salen and Zimmerman (2004)). I consider the aspect of entertainment to be a part of the voluntary aspect, in the sense that we play the game because we want to, and it might not always be for the purpose of entertainment, but at least because it is a pleasurable experience - entertainment is often part of the reason why we play games, but a more important reason for playing games, is that it is a voluntary activity. This can correlate to the element of intrinsic motivation that R. M. Ryan and Deci (2000) calls autonomy (this is covered in section 3.1 *Intrinsic motivation*). We decide ourselves to engage in the activity of gaming for the sake of the activity, because it is pleasurable (this may be considered entertainment, but I will use the word pleasure instead) - we are intrinsically motivated to playing and gaming.

In a sense gamification is similar to hiding a pill in a cake, to try and make it easier to ingest. Gamification covers work, teaching, buying etc. in a game, which is something we voluntarily engage in (the game that is). However, I believe there is more to gamification than just tricking ourselves or others, as Kapp (2012) also suggests.

Chapter 3

The Chemistry of Gamification

How does motivation work? And what is it that give games the ability to captivate, engage, and motivate us?

Gamification utilizes game design elements in an attempt to create the right conditions to motivate us to do things outside of the artificial environment of games, with the same creativity, drive and engagement that we experience inside the artificial environment.

To me games are something I play for the activity itself, because I enjoy playing games (some games more than others). The achievements, badges, progress bars etc. is to me not the main reason, but they sure help make the game more interesting and fun if implemented and used well. However, the main reason or reasons are: to explore; create; prove and improve myself; socialize, when the game allows it; get fully immersed, forget myself and time; and have a good time with it. Even when I lose (get killed, lose a match, do something stupid), I am usually having a good time. Why is this? If games do not attribute to my life and give some sort of value, why do I easily get motivated to play games? more so than I do, when I do something that gives me real value, tangible value, such as working, exercising, studying etc.?

3.1 Motivation

According to R. M. Ryan and Deci (2000) there are different types of motivation. At the basis we have intrinsic motivation and extrinsic motivation.

Intrinsic motivation

intrinsic motivation is motivation that comes from internal values. R. M. Ryan and Deci (2000) connects it to the feeling or perception of competence, autonomy, and relatedness (these concepts are explained later in section 3.1 *Intrinsic motivation*).

Extrinsic motivation

extrinsic motivation is motivation that comes from external values such as rewards, pleasing of others etc. (R. M. Ryan & Deci, 2000).

Csikszentmihalyi (2014) differs between extrinsic and intrinsic motivation, where extrinsic motivation can be determined to be the driving force, when an actor does a task for other reasons than the task itself. When 'work is its own reward' the driving force is intrinsic motivation - again, playing and gaming are intrinsically motivated activities - we play or game primarily for the sake of the activity itself.

Similar to this definition is the definition of "telic" (Greek for goal or "an end") and "paratelic" (Greek for "alongside (para) goal (telic)") by Apter (2007): where telic is activity driven by a specific goal such as winning a game, passing an exam, or getting paid; and paratelic is activity driven by the activity itself, or by the arousal gained from it (Apter, 2007). As such telic is similar to extrinsic motivation and paratelic is similar to intrinsic motivation, at least by the definition given by Csikszentmihalyi (2014).

Our earliest experience of intrinsic motivation comes from childhood, as R. M. Ryan and Deci (2000) states that children early on have a motivation to explore and learn even when no reward

is expected (no extrinsic factors), thus connecting our intrinsic motivation to play and our early ability to learn.

They (R. M. Ryan & Deci, 2000) also talk about how intrinsic motivation improves performance and our ability to learn compared to extrinsic motivation which decreases or even obstructs our performance and ability to learn.

Intrinsic motivation

R. M. Ryan and Deci (2000) divides different types of motivation on a continuum from amotivation (the lack of motivation) to extrinsic motivation and to intrinsic motivation (see figure 3.1). There is a somewhat fluid transition from one type to another e.g. one can be more or less motivated by external values depending on, to what extent the "motivated" person have a feeling of competence, autonomy, and relatedness towards the task at hand - the border between the terms may not be very distinct but rather blurred.

R. M. Ryan and Deci (2000) do not examine the source of motivation, but rather works on the factors that may elicit and sustain intrinsic motivation. We can not, based on their (R. M. Ryan & Deci, 2000) research, determine from where motivation comes, but rather what factors influence motivation - like observing chemical reactions without understanding atoms. However, they do divide motivation into three core values that gives some structure to intrinsic motivation (R. M. Ryan & Deci, 2000):

Competence is our feeling or perception of being capable of doing the task at hand.

Autonomy is our feeling or perception of being responsible for the outcome of the task as well as the decision to deal with it in the first place.

Relatedness is in my opinion a bit more abstract than the other two values, as it is similar to (if not the exact same as) other concepts such as connectedness. Libbey (2004) discusses different terms such as: engagement, attachment, bonding, and other terms (in relation to schools), and relates these to the term "connectedness". She (Libbey, 2004) does not connect the term to relatedness, but she describes its effect on students' motivation - in this case she talks about teacher support, so students' connectedness to their teacher. Teacher support was also proved to have an impact on students' motivation in a research by A. M. Ryan and Patrick (2001). In their research A. M. Ryan and Patrick (2001) found that when students feel that their teacher is supportive and tries to understand them, they feel more motivated to study, while a teacher promoting performance goals decreases the students' motivation. This is also mentioned by R. M. Ryan and Deci (2000), as the students' perception of the teacher being supportive (they can relate to their teacher) help motivation, while lack of autonomy and relatedness (and of course competence) decreases or obstructs their intrinsic motivation. Relatedness is therefore our feeling of connection to others, our environment and aspects of the task at hand.

Amabile (1996) also recognizes competence (a sense of competence and mastery) and autonomy (a sense of control) as keys to our intrinsic motivation, thus backing up Ryan and Deci's theory of intrinsic motivation. There is however more to their understanding, as can be seen on figure 3.1.

The Motivation Continuum

On figure 3.1 we have amotivation on the left, being the complete lack of motivation - no perception of relatedness, autonomy, or competence (R. M. Ryan & Deci, 2000). On the right we have intrinsic motivation - perception of complete relatedness, autonomy, or competence (R. M. Ryan & Deci, 2000). In the middle R. M. Ryan and Deci (2000) divides extrinsic motivation into four types of regulation: "external regulation", "introjected regulation", "identified regulation", and "integrated regulation".

External regulation is completely motivated by extrinsic factors and relies on rewards and punishment - thus we are motivated by trying to avoid punishment and gaining rewards, but do not feel autonomy,

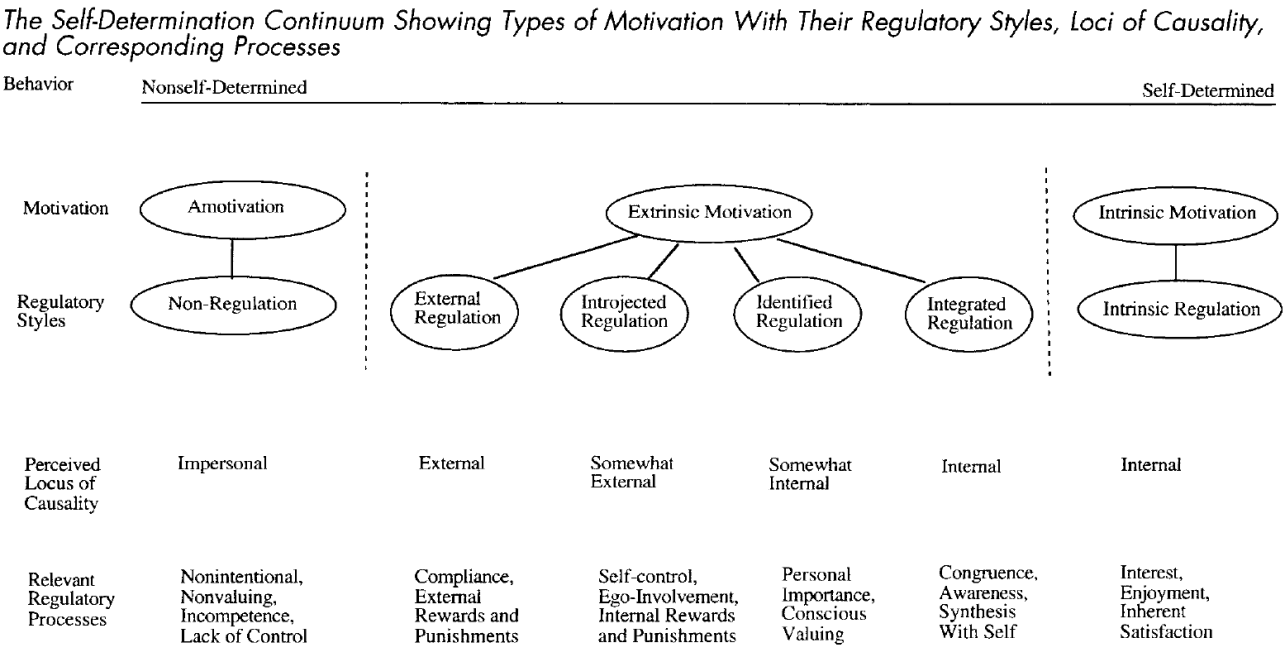


Figure 3.1: The figure shows a spectrum of different types of motivation and regulation types related to them. (R. M. Ryan & Deci, 2000, p. 72).

competence or relatedness toward the task (R. M. Ryan & Deci, 2000).

Introjected regulation happens when the regulation is more connected to intrinsic values than the external regulation, and may be driven by a need to avoid guilt or anxiety or to enhance the ego (e.g. pride) (R. M. Ryan & Deci, 2000). An example of this can be given from my personal experience with the game development company StonePlant Studios that I established together with some friends (see appendix A *Auto Ethnography of Mikkel Lund*). I did not feel competent enough to do it; I did not feel it was my responsibility or idea (I may have felt I had some influence (autonomy), but it was not much); and it relied more on my relation with my friends and my passion for games. However, the driving force was the want to be a business owner - an entrepreneur. I rarely enjoyed the work there, and the work I did was more often to not disappoint my friends and to feed my ego.

Identified regulation is when we have some identification with (or personal connection to) the task (R. M. Ryan & Deci, 2000) e.g. we understand that a cold shower in the morning is good for us, so we may do it, although the experience is not very pleasurable (at least not to some, including me).

Integrated regulation is the most autonomous of the four types of regulation, in which the task is considered to be connected to our other values and needs (R. M. Ryan & Deci, 2000) e.g. when the supervisor asks a student to read a gigantic book on a subject that may have relevance to his or her project. It is an external regulation, knowing that the subject is relevant, but the student can connect it to his or her intrinsic values.

R. M. Ryan and Deci (2000) also states that the four types of regulation are placed on their continuum depending on the degree of autonomy - how much we are in control of the regulation. They (R. M. Ryan & Deci, 2000) also state that the less autonomous the regulation is, the more alienated we feel from the task - thus we lose relatedness towards the task.

Extrinsic motivation

Although R. M. Ryan and Deci (2000) divides extrinsic motivation into four regulations, it seems that there can be a somewhat overlap between them, depending on how much value the task gives to the actor's (the one doing the task) intrinsic values.

The process of pulling extrinsic values towards intrinsic values, may be linked to what Festinger (1962) calls cognitive dissonance, which is what happens, when we try to assimilate thoughts, beliefs, or values that are somewhat alien (or extrinsic) to us - they are in dissonance to our own intrinsic thoughts, beliefs, and values. However, we will often attempt to rectify the dissonance, by aligning the extrinsic values with our own e.g. a smoker arguing that death comes for us all, to justify his or her habit, which is in dissonance with his or her knowledge of smoking being lethal (Festinger, 1962).

As earlier mentioned, the less we feel competence, autonomy, or relatedness towards a task, the less intrinsically motivated we feel to do the task. In this case, external values can help motivate us, though it seems that external values alone (without connection to the three components of intrinsic motivation) can not drive us, unless the motivation is of external regulation, so the payment is necessary to avoid punishment e.g. to get food to avoid hunger.

Csikszentmihalyi (2014) however, also points out that extrinsic rewards are necessary for civilization to exist. He (Csikszentmihalyi, 2014) refers to the parable by Aesop about the grasshopper and the ant, in which the ant works hard to gather supplies for the winter, while the grasshopper is enjoying himself by playing music, but when winter comes, the ant is well prepared, and the grasshopper suffers from his neglect of the extrinsic reward of "food during the winter".

Extrinsic rewards may obstruct our intrinsic motivation if they become a necessity, thus pulling us towards external regulation, where the motivation is driven by the reward rather than the activity. However, if the motivation is intrinsic thus driven by the activity itself, the extrinsic reward may support our intrinsic motivation.

> *"As resources accumulate in one place, they lay down the conditions that make innovation possible."* (Csikszentmihalyi, 2001, p. 10)

Csikszentmihalyi (2001) states that although a person may be intrinsically motivated to work in a certain field or with a certain subject, extrinsic rewards can not be discounted.

> *"The most synergistic use of human potential is when psychic energy gets invested in activities that are simultaneously autotelic and productive."* - (Csikszentmihalyi, 2014, p. 182)

With this, Csikszentmihalyi (2014) is saying that the optimal use of our attention, energy or resources is in activities that both arise from inner goals (or intrinsic motivation. "Auto" meaning "self" in Greek and "telic" meaning "goal" in Greek) and at the same time is productive, so that we may enjoy the work (as the grasshopper does in Aesop's parable) and reap the reward (as the ant does).

Feedback

Feedback is something both R. M. Ryan and Deci (2000) and McGonigal (2011) puts emphasis on: McGonigal (2011) uses it as one of four core elements in a game; R. M. Ryan and Deci (2000) points to the importance of positive feedback in eliciting and nurturing intrinsic motivation.

In regard to extrinsic factors: feedback, rewards and communications that supports or elicits our feelings of competence during an activity enhances our intrinsic motivation towards that activity (R. M. Ryan & Deci, 2000). Again, this seems to point towards the degree of connection between the external values and our intrinsic values (in this case competence). These extrinsic factors are also very relevant to games, as is explained later 3.2 *Why play or game?*

The problem, e.g. with a grade, is then that it is (usually) not within our control, or at least may

feel as though it is not, thus we can not determine whether we have the competence to acquire the extrinsic reward that it is. Of course, if we can get to a point where we feel confident that the grade, we want, can be achieved by us with our skills and resources, it may become a motivating extrinsic factor instead, as we now have the competence to achieve it, the autonomy to earn it (our own actions, our own reward) and the relatedness should be present from the beginning, at least to our study, supervisor, and/or our family and friends, who may give us attention once the grade is posted on Facebook.

Apter (2007) states that it is possible to switch between the states of telic (goal-oriented) and paratelic (activity-oriented). He (Apter, 2007) gives an example of walking to reach a destination (a goal), and once we realize that we have enough time, we may shift our attention from reaching the destination to enjoying the walk itself - thus switching from a telic state to paratelic state or being externally driven to being internally driven.

In regard to an exam, it may be possible to switch between extrinsic motivation and intrinsic motivation if one can change the perception of the goal or the challenge.

The example of walking given by Apter (2007) can also be connected to resources (one of Amabile's six driving factors, these are covered later in 3.1 *Amabile's six driving factors*) - at one point resources are sparse, and focus lies solely on reaching the destination, but once the resources are in abundance (enough time) the focus changes.

Amabile's six driving factors

Amabile (1998) divides the drive for creativity into six different categories which may also be able to aid in mapping the underlying mechanisms of motivation. She, however, calls them: "*How to kill creativity*", as her perspective on them, is that of what organizations and companies often fail to do, when trying to support creativity. Although the focus here is on creativity, she also links them to intrinsic motivation (Amabile, 1998).

Challenge is about creating a good balance between an actor's expertise (or competence) and the challenge of the assignment given to them (Amabile, 1998). This may take time, if someone else (other than the actor) should find and establish that balance, as it requires insight into the actor's abilities (Amabile, 1998). This also correlates very well with flow, which will be described later in 3.2 *Flow*, and competence described earlier in 3.1 *Intrinsic motivation*.

Freedom is closely linked to autonomy, in fact, Amabile (1998) states so herself. It is mainly the freedom to choose how we want to go about an assignment (Amabile, 1998). From someone else's perspective, this means that one can give an actor a goal, and leave the strategy and tactics (basically how the actors wants to accomplish the goal) up to the actor. This supports intrinsic motivation and creativity in the actor (Amabile, 1998). This could also make a good environment for the actor to enter flow, as they themselves can control the challenge level of the assignments leading the actor to accomplishing the goal.

Resources is yet again about balance (Amabile, 1998). The actor must have sufficient resources at his or her disposal (Amabile, 1998). The resources are time, money, environment, tools (Amabile, 1998), and basically anything external to the actor's own abilities. Too little resources kill creativity and the same does too many. Again, this can relate to challenge and flow. The fewer resources allotted, the higher the risk (or challenge) of reaching the goal with the resources; the more resources allotted, the lower the risk of reaching the goal with the resources.

Work-group features is about creating diversity in a team of actors and good chemistry between them (Amabile, 1998). This may be very challenging, as diversity can also lead to conflict of interests, but will unlike a homogeneous team better support creativity, as all actors (with the right chemistry) will be able to draw on each others' strengths (Amabile, 1998). This relates both to resources and relatedness: the

skills that the different actors have, can be seen as a sort of resources - the diversity in skills (abilities) create a wider range of "tools" (resources); the chemistry in the team (if good) ought to create relatedness between the actors in the team.

Supervisory encouragement is about recognizing creative work and ideas, and refrain from evaluating the quality of the ideas (Amabile, 1998) - "'A' for efforts" in a sense. Again, this relates to relatedness, in this case to the supervisor, but it also relates well to evaluation, which will be covered later in 3.1 *Relatedness and evaluation*.

Organizational support is about having an environment (organization) in which creativity is encouraged (Amabile, 1998). Now money may not be the right way to do this, as money is an extrinsic reward that may give the actor a feeling of being controlled (Amabile, 1998). This is in a sense a step up from supervisory encouragement, and moves further up to the entire organization that both the supervisor and the actor is a part of - thus again, relating to relatedness.

Although both competence, autonomy and relatedness are present in these drives, the drives that Amabile describes, help get a better understanding of the underlying mechanisms of motivation.

The Octalysis model

The Octalysis model is also a great model for illustrating some of the underlying mechanisms of motivation, which R. M. Ryan and Deci (2000) (as earlier mentioned) do not look into, as they are focused more on the factors that elicits and nurture intrinsic motivation. It may be difficult to discern between factors (eliciting and nurturing intrinsic motivation) and underlying mechanisms of motivation, but the octalysis model seems to at least map some of the mechanisms (if not all).

Chou (2016) have made the Ocatlysis model (see figure 3.2), in which he illustrates eight core drives: meaning, accomplishment, empowerment, ownership, social influence, scarcity, unpredictability, and avoidance.

These drives are based on his observations of what makes games engaging (Chou, 2016) - thus motivating us to play games. Some of these can be related to the three components of intrinsic motivation that R. M. Ryan and Deci (2000) describes (relatedness, competence, and autonomy).

Meaning (Epic meaning and calling): we feel that we have a calling or a belief e.g. contributing to Wikipedia, not for money or for writing it on our resumes, but because we believe in the governing of humanity's knowledge (Chou, 2016). Chou (2016) also relates this to "beginner's luck", as it can seem like a calling that may drive us, when e.g. we receive a very rare item from the very beginning of a game - we feel chosen, destined, called upon.

Accomplishment (Development and accomplishment): our feeling of making progress and accomplishing things. Achievements, points and badges can be used to target this drive, but it is important that they are not given, for lesser or no efforts (Chou, 2016).

Empowerment (of creativity and feedback): we are allowed to express ourselves and witness the progress of our own creations and choices (Chou, 2016). Chou (2016) explicitly connects this drive to intrinsic motivation.

Ownership (and possession): we feel ownership, attachment of responsibility over something and thus a need to protect, nurture and develop it (Chou, 2016).

Social influence (and relatedness): he (Chou, 2016) specifically relates this to relatedness, as our feeling of relatedness to friends, mentors and other social groups and entities (Chou, 2016).

Scarcity (and impatience): we want something because it is difficult to obtain; it is a challenge to get it; the feeling of something being exclusive (Chou, 2016).

Unpredictability (and curiosity): we do not know what is going to happen next (Chou,

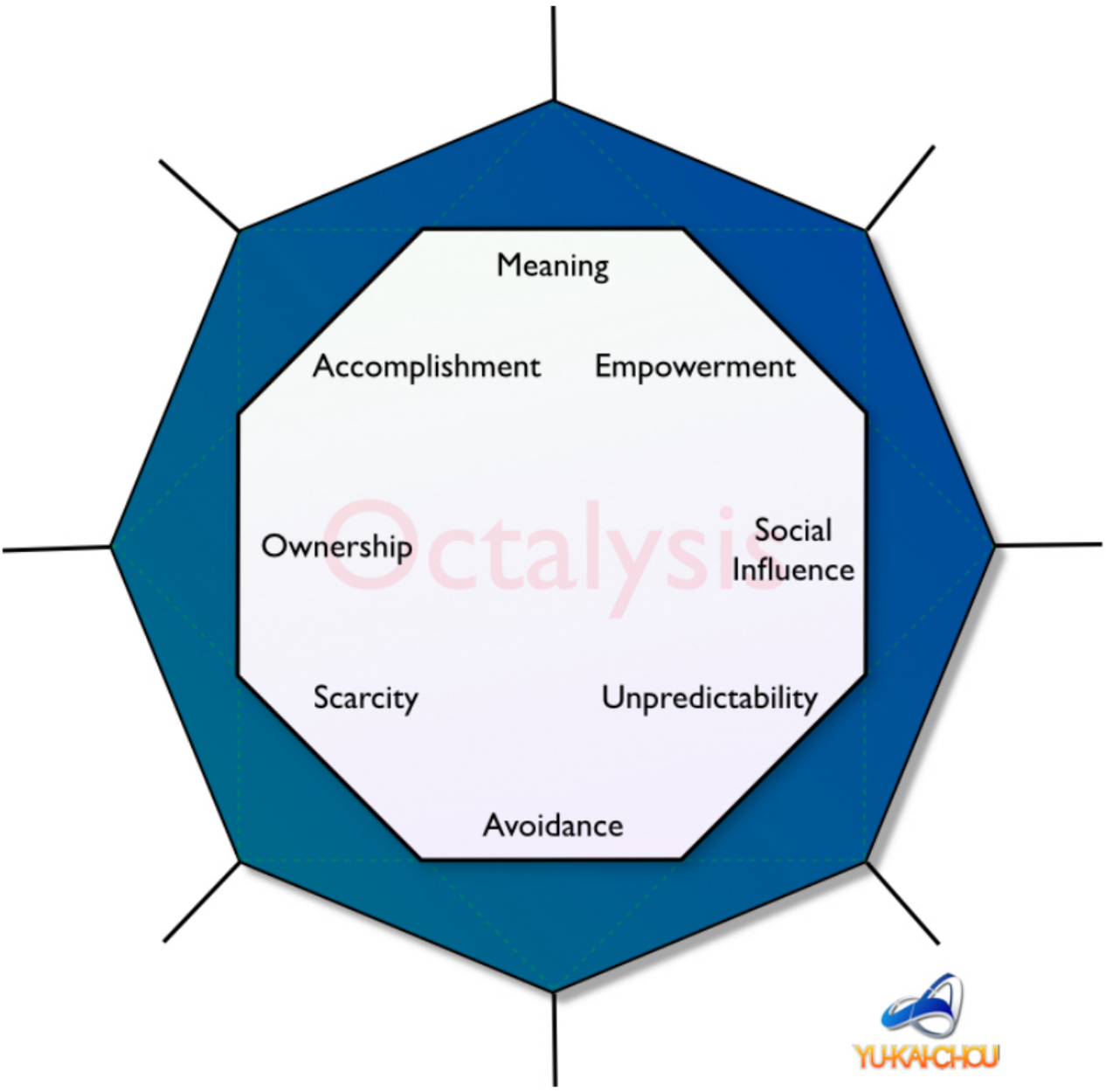


Figure 3.2: The Octalysis model shows eight core drives: meaning, empowerment, social influence, unpredictability, avoidance, scarcity, ownership, and accomplishment, derived from games' ability to engage us. (Chou, 2016, p. 2).

2016). This is what happens in alea (gambling), as we take a chance on the slot machines (Schüll, 2012). It is the same drive that drives us to watch movies or read novels, the feeling of wanting to know what is going to happen (Chou, 2016). It is the same drive found in rats in the Skinner box, in which they may or may not get a reward (food) when clicking a button - they will click the button despite them not feeling hungry (Chou, 2016).

Avoidance (Loss and avoidance): the drive to avoid certain things or loss (Chou, 2016).

If we look at these eight drives that Chou (2016) has illustrated in his Octalysis model, we can draw connections between them and other aspects, we have discussed earlier about games and motivation.

Competence is closely related to both accomplishment and scarcity: as accomplishment is our drive to prove ourselves, make progress and become better; and scarcity is the drive of achieving or acquiring something exclusive, something well deserved after much work - as Chou (2016) also points out, the rewards must not be gained for little or no effort.

Ownership is (although a different word) similar to (or entirely the same as) autonomy, as it is the drive coming from the feeling of owning something, being responsible for it, and having influence over it.

Avoidance is similar to introjected regulation, as they are both our drive to avoid certain things such as pain, disappointment, sorrow, loss etc.

Unpredictability as Chou (2016) states it, is the feeling of wanting to find the missing pieces, knowing the end of the story, but can be related both to the zone that gamblers enter when gambling, as the uncertainty (the chance) drives us to find patterns and take control over the unpredictable (Schüll, 2012); and in a story, it can relate to relatedness as our relation and social connection to the characters - we want to know what happens to them, as we connect or relate to them, we become immersed in their lives.

Empowerment can also relate well to interaction, as it is our drive to make choices, create and perceiving the impact that our actions leave on the environment of the game or in the feedback we receive from the game.

Chou (2016) mostly attributes feedback to empowerment, but it may well serve all eight drives, as the feedback can target each drive, if we take feedback to be received information, whether it is as points, a progress bar, a badge, a placement on a leaderboard etc. These terms will be discussed later in section 6 *Gamify*.

Relatedness (as a component of intrinsic motivation) can be related to meaning as it is a call to us (our values and beliefs) - we feel related to the calling (the task). Social influence is related to what Caillois (1961) talks about: our drive to compete; prove ourselves; and be part of a social construct. This may also connect social influence to relatedness, as our relation to our teacher (mentor) or other social entities.

Relatedness and evaluation

In a social context, it is the attention that we are given by others that creates a connection or relatedness between us and them, and with this connection we become an interactive system (Csikszentmihalyi, 2014) - we know that our actions will be noted.

With interactive system, Csikszentmihalyi (2014) means that two or more people with relation (or relatedness) to each other, are able to interact with each other e.g. a child looks at his or her mother, once he or she confirms that the mother is looking, he or she can perform a task in front of her, and know that the action the child does, will somehow create a reaction from the mother, thus the action (the performed task) becomes an interaction with the mother, and the mother creates feedback to the child - they are as such an interactive system.

From the attention we get from others, we become aware that we may receive affirmation. This could be considered an extrinsic reward of sorts, as it is coming from others. However, as Csikszentmihalyi (2001) also states, it is not the intrinsic motivation alone that will drive innovation, but a mixture. Also, the relatedness created towards those giving us attention, should according to both R. M. Ryan and Deci (2000) and Amabile (1996) nourish our intrinsic motivation. However, it must be dependent on the

type of relatedness (or interactive system as Csikszentmihalyi (2014) calls it) created between us, as if we feel that we are being evaluated by the other party, we will lose our intrinsic motivation (or creativity) (Amabile, 1996). So, e.g. the feedback that a child gets from its mother is an extrinsic factor, but without her attention, and the knowledge that she is attentive of the child's actions, the child's intrinsic motivation might not be enough driving force to make the child act.

Whether something is creative or not, or whether it is a good or a bad performance, is, according to Csikszentmihalyi (2001), heavily dependent on the social context - it is others who judge the quality of the work performed.

Without relatedness towards others, we only have ourselves to evaluate our performance, and that does not seem to suffice. I will make the assumption that the extrinsic evaluator does not have to be a person, but if it is, it should be someone we feel relatedness towards, or it can be another kind of interactive system e.g. a game, a toy, our environment - something external to us that will give feedback to us, when we interact with the system, so that we may use the feedback to determine the outcome of our action, and from that be able to judge whether we are doing good or bad.

Some outcomes may be possible to evaluate by the actor, while other outcomes such as one of creativity, may require an external evaluator to evaluate it, as Csikszentmihalyi (2014) suggests.

As self-evaluation is important to drive intrinsic motivation and from that creativity, the prospect to reap extrinsic rewards for successful work also has influence on the growth of creativity.

Amabile (1996) states that when evaluation is perceived as coming from an internal locus, the performance may be improved, while it may decrease when the evaluation is perceived to come from an external locus - the feedback should aid in the receiver's (the person receiving the feedback) own evaluation, rather than be presented as external evaluation (or external judgement).

> *It is even possible that, under some circumstances, certain types of reward might enhance enjoyment and, hence, creativity.* - (Amabile, 1996, p. 155)

Amabile (1996), in this regard, also differs between actors in cooperation or as audience, where an audience, although somewhat a social concept, will decrease the intrinsic motivation of the actor (the one doing the task, and thus the creativity), while a colleague (actor in cooperation) will increase the intrinsic motivation (and thus creativity) towards the task. In terms of social influence, it makes a difference whether we have a connection (relatedness) towards other actors in our social environment. As previously mentioned, it holds great value in the context of evaluation, whether the evaluation comes from an internal locus (ourselves or perhaps a colleague, working on the same task) or an external locus (an audience e.g. an examiner).

In this regard John Dewey (Brinkmann, 2017) believes that relatedness is crucial for our ability to learn, and it is as role models or masters that others can help us learn. Such role models can be our teacher, supervisor, parents etc. The relatedness towards the one giving us evaluation may hold great importance here.

From Amabile's six drives it is also apparent that the feedback (or evaluation) should be given for the effort more than the result. With that said, rewards for good results may still help, which was explained in 3.1 *Extrinsic motivation*. However, evaluation focused on the outcome may affect the challenge of the assignment, which can disrupt flow and diminish intrinsic motivation while evaluation focused on the effort may give freedom (one of Amabile's six drives) to the actor, which will in turn support intrinsic motivation.

We need feedback to evaluate our actions, and when that feedback comes from other actors such as teachers, parents, an audience etc. it is not enough that we feel relatedness towards them, if the intention is to support our intrinsic motivation or creativity, the feedback given from the external source must aid us in our own self-evaluation rather than be an external evaluation

of us. It may be difficult to find a balance that allow external evaluators to support intrinsic motivation while still having to ensure that the actor makes the proper evaluation.

Let us put it into context. I am assuming that most people know what it is like to perform at an exam (the context). If the student at an exam is to be the primary evaluator, it is important for the external evaluators (the examiner and censor) to give adequate feedback that does not give a direct evaluation of the student's (the actor and primary evaluator) performance, but rather give feedback that allows the student to evaluate him- or herself properly. It probably should not be feedback such as: "you are incorrect", "you have not done your research properly on the subject", but could instead be more questions towards the same topic (is usually a good indication that something is not answered to a satisfactory level) - the external evaluators become interactive systems which give feedback rather than definitive evaluation.

There is likely much more to this balance, than what is described here, but for the sake of scope, it will suffice to state that feedback should be given that allows the actor to evaluate him- or herself, when the intention is to support the actor's intrinsic motivation. Perhaps the external evaluator may still be able to give a grade at the end, much like many games will tell the player whether they have lost or won the game - we still play the game despite knowing that this can happen.

3.2 Why play or game?

With a definition of game in place and an understanding of motivation, we still need to understand why we play games, and how games (video games especially) have become so popular that more than 44% of the online population plays games (Bohyun, 2015).

McGonigal (2011) warned us, as early as in 2011, that a "hurricane" (she calls it) is coming in regard to the popularity of playing games:

> *"The truth is: in today's society, computer and video games are fulfilling genuine human needs that the real world is currently unable to satisfy. Games are providing rewards that reality is not. They are teaching and inspiring and engaging us in ways that reality is not. They are bringing us together in ways that reality is not."* - (McGonigal, 2011, *Introduction*)

Ishibashi (1985) also points out that the industrial and digital development, have decreased the workload on the Japanese job market, leaving many Japanese workers to seek play as another means to give their lives meaning - as work is considered a virtue in the Japanese culture, and as such gives meaning to many Japanese people. One such play activities for adults may be found in games.

What makes games such a big deal to humans (and even animals, according to Huizinga (1950))?

Social value

Caillois (1961) considers games to have a social value, they are most of the time best played together with (or against) others. Games give a time and space for competition - to display skills in a social environment - linking games to relatedness.

Jane McGonigal (2011) however, mentions that unwinnable games such as Tetris (which has no defined end game) shatters the misconception of gamers (people playing games) being highly competitive, thus it is not all about competition. This does not go against the view of Caillois and Huizinga, but widens the perspective of games as being more than competition - perhaps including improvement of skills (or learning). She (McGonigal, 2011) points out that gamers enjoy the continuous play in Tetris, even though they can never truly win the game. One of the reasons for this enjoyment (or pleasure), is the high-speed (or

instant) feedback the game gives, as this helps motivate the players to move on by reminding them that the goal is still achievable (McGonigal, 2011), or in the case of Tetris that we are doing good.

In the case where competition leads to less relatedness e.g. pit players against each other, thus creating a divide between them, the competition may impair intrinsic motivation, while competition that leads to more relatedness between gamers e.g. team competition or competition against the system of the game, it may be an advantage that supports intrinsic motivation, thus creating enjoyment for the players. This may also relate to flow, in the sense that the challenge presented by the competitor should be perceived to be equal to the skill of the player. Flow is discussed later in 3.2 *Flow*.

Pleasure or entertainment

Bloom (2011) talks in a TED Talk about how perspective is crucial for our experience and enjoyment of things, although he does not tie this to games, he uses wine tasting as an example, and states that we enjoy a wine more, if it costs more and have a nicer label on it, than if it is cheap and have a less nice label on it, even if the wine in the bottle is actually the same which is unknown to the test subject. It is our perspective of more expensive wines being better that will make us perceive the wine as tasting better, when it comes from the expensive bottle (Bloom, 2011).

If something similar is the case with games, it may be possible that the gamers perspective on failing in games is that it is something that is enjoyable rather than stressful which it otherwise is in real life (McGonigal, 2011). Games can give us positive feedback when we fail, and as long as we feel that we are somewhat in control of the outcome (that the failure is not random but our doing), and that it is something we can change, we become more motivated to better ourselves (McGonigal, 2011). Koster (2013) also states that the enjoyable thing about games is the mastering of them. In that sense games are fun to play, because we can learn and improve ourselves - become better at them.

Games can even make failing an enjoyable experience (McGonigal, 2011), thus making the artificial environment not only a good place to learn because failing is of little (if any) consequences, but it can also be exhilarating to fail in games.

(Vygotsky, 1967) states that a child does not act on impulses in games, but adheres to the rules, as the rules gives greater pleasure (or satisfaction) than to just act on impulses.

Learn by playing

When we play, we create an artificial environment, in which we safely can explore the zone of proximal development (Vygotsky, 1967). Vygotsky (1980) points out that a child is always above his average age, taller etc. (above his level of development) when he plays, and this makes play an important method or tool for development.

The zone of proximal development is the stretch between current level of development and the next level of development (Vygotsky, 1980). We can consider it as what lies outside of our current area of understanding (or development).

With Dewey's understanding of learning, as being tied to relatedness (Brinkmann, 2017), it is also possible to relate the master or role model to the zone of proximal development, in the sense that the role model allows the student to get an understanding of the unknown (the knowledge and experience lying in the zone of proximal development) and thereby creating a scenario in which the student may learn from the master's experience, thus shedding some light on the unknown. However, a master or role model may not always be enough to support intrinsic motivation to learn.

With the pleasure gained in the artificial world of games, as we learn and experience our full potential, a classroom with books, blackboards and assignments fade in comparison, and the level of engagement is critically low (McGonigal, 2011). It is not entirely like this anymore, as games (or just playing in general) are becoming more widely used in schools and educational institutions, as a means to engage and motivate pupils and students to learn (McGonigal, 2011).

According to Vygotsky (1967), play is a child's wish fulfillment, thus connects play to Ryan and Deci's definition of intrinsic motivation, as it is their intrinsic values that motivates

them to play.

Dewey considers children, not to be natural listeners but rather, to be natural explorers, who explore their world and manipulates it - they are active learners not passive learners (Brinkmann, 2017). Dewey is also known for the saying: "*learning by doing*" (Brinkmann, 2017), which I believe is similar to saying: "learning by playing".

Vygotsky (1967) also connects play to the zone of proximal development, giving some credit to this idea that play can be related to "learning by doing". The connection between play and learning, however, should not be taken in the sense that actions in play are directly translated to reality (as that would be delirium, as he states) e.g. you learn to shoot robbers in a game of cops and robbers (that is not really what you learn from it), but in that morality and meaning is made from it, which is then used in reality.

Apter (2007) relates the paratelic state to that of playing or gaming, as the focus shifts to the activity itself and the fun that is derived from it. The telic state he relates to "work". He then goes on to stating that:

> *"..., the activities of the paratelic state are turned inward on themselves, cut off from the rest of life and encapsulated in their own "bubbles"."* - (Apter, 2007, ch. 3)

The paratelic state creates a bubble, frame or safety-zone-frame in which our actions have no serious consequences (Apter, 2007).

A game sets up a frame ("magic circle" or "safety-zone-frame") in which we feel intrinsically motivated to explore, experience and learn - while getting pleasure from this activity.

The idea that learning is so essential to the fun gained from playing games, also relates well to the competence component of motivation suggested by R. M. Ryan and Deci (2000).

Csikszentmihalyi (2014) points out that ethological psychologists suggest that play is a young organism's method of trying out their skills and knowledge in a nonthreatening environment, so that it may learn by trial and error. However, Csikszentmihalyi (2014) puts emphasis on play being a fun and enjoyable activity - fun is essential to play.

Vygotsky (1980) points out that the goal (apart from fun) is essential in play, as it is what makes play a fun experience. This may connect play with what Csikszentmihalyi (2014) calls flow, as having a goal is essential to obtaining flow.

Flow

Flow as defined by Csikszentmihalyi (2014) is a state of mind entered by an actor, when said actor's perceived skill level matches that of the actor's perceived challenge level (see figure 3.3) e.g. the actor is playing a game, the game presents a challenge, if the actor perceives that challenge to require the level of skill that the actor perceive him- or herself to have, the actor will enter a state of flow, when playing the game. If, on the other hand, the level of challenge is perceived to be greater than the level of skill, the actor will become anxious. If the balance is shifted (greater level of skill than level of challenge), the actor becomes bored.

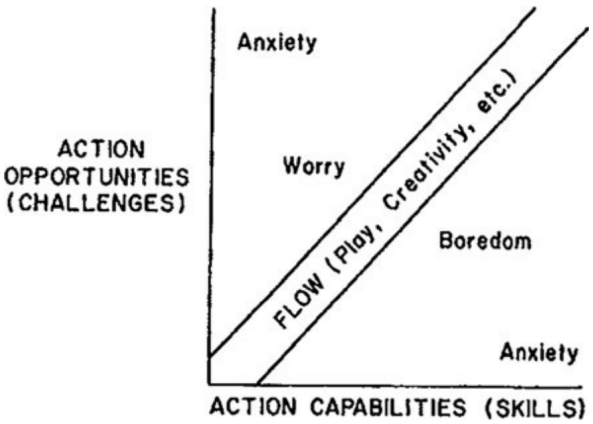


Figure 3.3: The flow-model illustrates at which point an actor experiences flow. When the perceived skill (x-axis) is equal to the perceived challenge (y-axis), the actor experience flow. If an imbalance between perceived skills and perceived challenge happens, the actor will either feel anxious or bored (Csikszentmihalyi, 2014, p. 147).

According to Apter (2007) the bigger the goal or the challenge of achieving it, the more anxious we become, while if it is too easy we become bored. Being in the paratelic state allow us to

move up and down between anxiety and boredom.

Just to clarify the graph on figure 3.3, as anxiety is present both at "high challenge / low skill" and "high skill / low challenge", which is often neglected or ignored when the model is used in other contexts. Csikszentmihalyi (2014) does not give any explanation to anxiety being experienced in the latter scenario. According to Engeser and Schiepe-Tiska (2012) the reason for this, could be that Csikszentmihaly assumes that humans need structure, and when no challenges (or opportunities for action) are present, we (humans) may experience chaos and anxiety. They (Engeser & Schiepe-Tiska, 2012) point toward a scenario in which prisoners are kept in isolation, as an example to this state.

Now back to the flow state. The conditions for flow are according to Csikszentmihalyi (2014): a clear set of goals; balance between perceived skills and perceived challenge; and clear and immediate feedback. Again, feedback is crucial, in this case to enter flow. However, feedback is not of much value if it is not received, thus bringing our attention to "awareness".

Csikszentmihalyi (2014) points to similarities between flow and religious activities such as different sorts of meditation and the rapture sought in these activities. Although there are similarities between these activities, creative activities, play and flow; flow is not strictly bound to or limited to these (Csikszentmihalyi, 2014).

> *"Perhaps the clearest sign of flow is the experience of merging action and awareness"* - (Csikszentmihalyi, 2014, p. 138)

Apter (2007) points out that a telic state is more often associated with analyzing and planning, while a paratelic state is more spontaneous and focused on the present moment and the current activity - more awareness of the present moment.

Csikszentmihalyi (2014) considers awareness of the self as having a negative affect on enjoyment and hence flow. Most often awareness of the self brings attention to our flaws and inadequacies, which can interrupt flow and enjoyment (Csikszentmihalyi, 2014). This can also be seen in some of the examples that Csikszentmihalyi (2014) mentions, where people in flow describe it as them losing awareness of themselves (the self) and their surroundings, time, problems etc. However, in the examples, there is also increased awareness to sensations (perception) related to the task (Csikszentmihalyi, 2014) - we may forget ourselves (our identity) but instead become more aware of our own presence in the present moment when in flow.

> *"whether one is in flow or not depends entirely on one's perception of what the challenges and skills are"* - (Csikszentmihalyi, 2014, p. 147)

Again, it is our perception that is the key to flow. The same is the case with pleasure as Bloom (2011) described it with the wines. Can games or play somehow aid us by influencing our perception of things?

When we enter flow, we lose our sense of time and awareness of everything around us, not related to the task at hand. All our attention (or psychic energy as Csikszentmihalyi (2014) calls it) is invested in the necessary activities to complete the task - our awareness is directed to the activity we are invested in, in the present moment.

Play, flow and learning

If we consider play as the stage or environment in which we can explore, prove and improve ourselves, we can start out with little skill, decrease and then steadily increase the level of challenge to fit our level of skill (somewhat influence our own perception), thus reaching flow more easily and keep feeling enjoyment.

According to Schwabe and Wolf (2010), learning is diminished or impaired during or after stress. Although Csikszentmihalyi (2014) uses the word anxiety (anxious), it is possible that stress and anxiety is the same or similar in this sense. In a research of the *Depression Anxiety Stress Scale* (DASS), Lovibond and Lovibond (1995) noted that:

> *"The analyses confirmed that while the DASS successfully discriminates between three negative emotional syndromes, these syndromes are still moderately highly correlated with each other, and in particular the Stress scale is more closely associated with Anxiety than with Depression"* - (Lovibond & Lovibond, 1995, p. 340)

Lovibond and Lovibond (1995) further notes that both stress and anxiety are associated with the feeling of nervousness unlike depression which is associated with low self-esteem and disbelief in one's competence. So, linking what Schwabe and Wolf (2010) found about learning to flow. By being in flow, we can create a state in which we experience enjoyment and no or little stress, depression or anxiety, thus we can in flow optimize our capability of learning.

Further, when we fail in games: we get little or no consequences - it is not a punishing experience; we do not get anxious by it; we can analyze our mistakes, learn from them, increase our skill and then increase the challenge to reach a new level of flow.

From our early beginning, we have an intrinsic motivation to explore R. M. Ryan and Deci (2000) and through this exploration possibly learn about our surroundings (our life). This exploration can become imitation of scenarios (play) that gives us meaning of and experience with the world around us e.g. conflict management by playing cops and robbers. As we become skilled at this, we can apply rules to our play, to increase the challenge, so that we may stay in flow, enjoy the activity and thereby continue to optimize our ability to learn - thus play becomes game.

We play or game because it is a pleasurable activity, and it may be helpful to our development as humans.

3.3 Other concepts

With an understanding of what a game is and why we play games, we can make more sense of the distinction that Deterding et al. (2011) makes between the concepts "Gamification", "Serious Games", "Toys", and "Playful Design" (see figure 3.4).

This distinction should allow us to draw borders between gamification and similar concepts, thus clarifying what gamification is and is not.

Deterding et al. (2011) uses two axes to discern the four concepts mentioned earlier. The X-axis shows whether the concept is whole game or play, and the Y-axis shows whether the concept is gaming or playing. Thus:

Playful design is to use parts (elements) of playing in non-play contexts.

Toy is a concept fully related to playing.

Serious games is the usage of games for other (serious) purposes than entertainment.

Gamification is then the use of parts of game in non-game contexts.

This is a great way to create a distinction between the four concepts, however, it does not clarify at exactly what point a concept crosses the Y-axis from parts to whole, or the X-axis from entertainment to playing. If one begins to design a game by putting together game design elements, yet stops mid process, will it then be gamification? And where do games fit in, as serious games are games with a purpose, but games are still whole gaming constructs, but does that mean there is a purposeful adaption to Toys as well? And can gamification or playful design not be used for learning or motivating employees? As this will give it a purpose much like that of serious games.

Kapp (2012) states that gamification is not games, as it only uses parts of games (similar to Deterding's distinction), and unlike games have no beginning or end. To this I will refer to the definition of games used in this project, which does not require a definitive end, as it is sometimes up to the player, to decide when to stop the game - both games and the tools created through gamification can have an end, but is not required to have and end.

Further, the word gamification literally means to make something else into a game, or give attributes of a game to something else. This of course in itself differs games from gamification

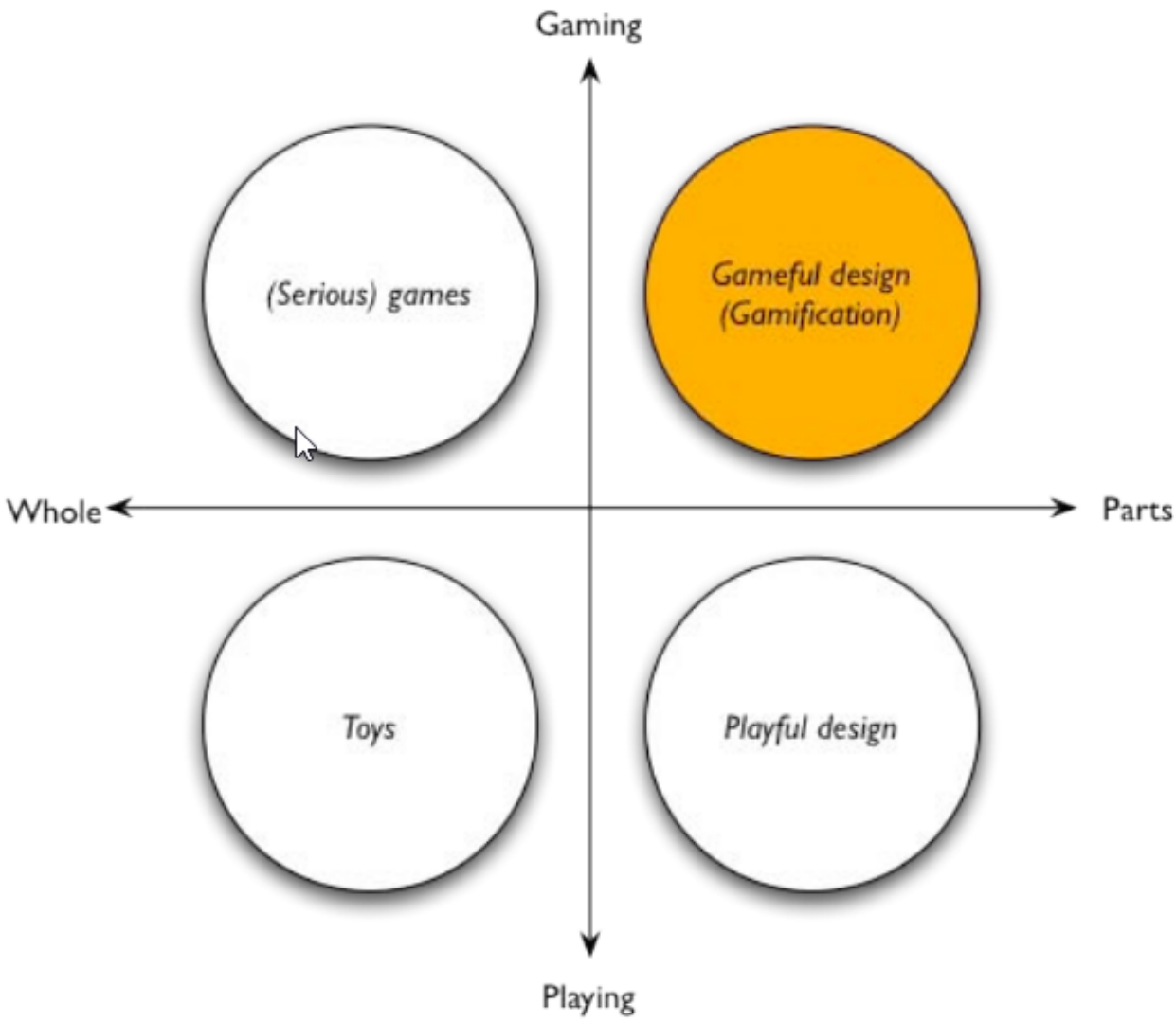


Figure 3.4: A diagram showing a distinction between gamification, Serious Games, Toys, and Playful Design from Deterding et al. (2011). The Y-axis shows how the concept relates to paidia (top) or ludus (bottom); the X-axis shows if the concept is in parts or is whole e.g. gamification uses parts (elements) of games, while Serious Games are whole games.

but not really from game design, as both gamification and game design then means to make something into games (or at least something similar to games).

Bohyun (2015) states that gamification differs from games, as gami-fy-ing something (a non-game context) means to use some of the good characteristics of games to make the non-game context fun and engaging - is engaging then similar to trying to motivate the player?

Zicherman and Cunningham (2011) considers gamification as more of an umbrella term that covers such concepts as serious games, advergaming and games-for-change. It is not necessary to know what these concepts are, to understand what gamification is, it will suffice to know, that they are a use of games for other purposes than to entertain - although they may be entertaining. They (Zicherman & Cunningham, 2011) also include (in their definition) a purpose of gamification - to engage users and solve problems:

> *"The process of game-thinking and game mechanics to engage users and solve problems."* - (Zicherman & Cunningham, 2011, p. XIV (14)).

Thus, gamification is not game design (combining game design elements to create games), but is a process similar to game design, but comes with a purpose (at least in the definition made by Zicherman and Cunningham (2011)).

Chapter 4

Problem Formulation: A New Prescription

We now know that gamification has been around for more than a decade, but began its popularity approximately eight years ago. Also, it is only a few years off from being a commonly used practice, according to the Hype Cycle.

If this is the case, we should begin to see more activities being gamified in the coming years for the sake of captivating, engaging, and motivating people to work, learn, buy, and other activities that may benefit from increased intrinsic motivation.

We started from the surface, being gamification, and dug into its ocean, to reveal what lies underneath it. Now, we will turn around and take the observations from the bottom and up towards the surface to try and make some sense of it.

Play is a natural concept to us (humans) and animals. It is a concept that allows us to explore, learn, socialize, prove, and improve ourselves in an environment where there are no real consequences to our actions.

This environment we can call "the magic circle" or "the frame of the game". Inside this magic circle, we safely explore things that are unknown to us. The magic circle allows us to enter the zone of proximal development.

If we imagine the zone of proximal development as an area outside of our current understanding (or development), as I have tried to illustrate on figure 4.1, the magic circle overlaps with the green area (the zone of proximal development), allowing us to explore the unknown, so that we may learn and become familiar with it without risking critical failure because of our lack of knowledge and experience, with what lies in the green area.

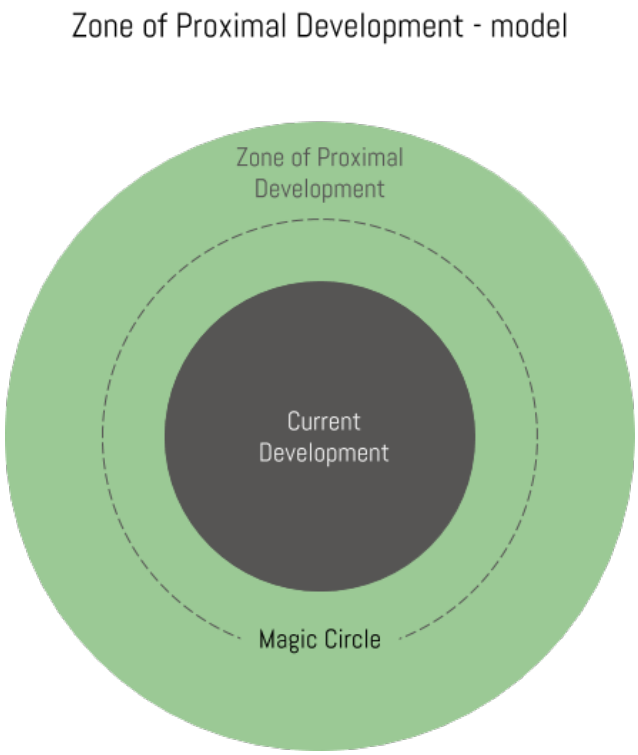


Figure 4.1: An illustration of the "zone of proximal development": The black inner circle illustrates our "current development"; the outer green circle illustrates the "zone of proximal development"; and the dashed line illustrates the "magic circle".

Inside the magic circle we are in full control, and we can as such alter the challenges that we face therein by e.g. applying rules (and additional rules if needed). This control makes the magic circle (created in play), a perfect environment to setup the right conditions for reaching flow.

Flow is a state we enter, when our perceived skills matches our perception of the challenge we face. In this state we are neither bored nor anxious, thus flow acts as a perfect condition for

learning, as our learning capabilities are not hindered due to anxiety, and our attention is 100% invested in the stimuli necessary to accomplish the challenge we phase - we are fully aware of the present moment and the task, so much that we may even forget ourselves and time. It is a pleasant state to be in: as our attention is not overwhelmed, as may be the case, when we are anxious; nor is it drifting about, as may be the case, when we are bored.

As we acquire new knowledge and skills: that, which was before within the zone of proximal development, moves in to the zone of current development - it becomes known to us. In this sense our zone of current development expands (see figure 4.2). This movement continues as we learn more. This movement can also correlate to the development of the concept of play into the concept of games (see figure 4.3): we first explore our world; then we play with our world; and as we become more familiar with it, we add rules to our play, and start gaming our world.

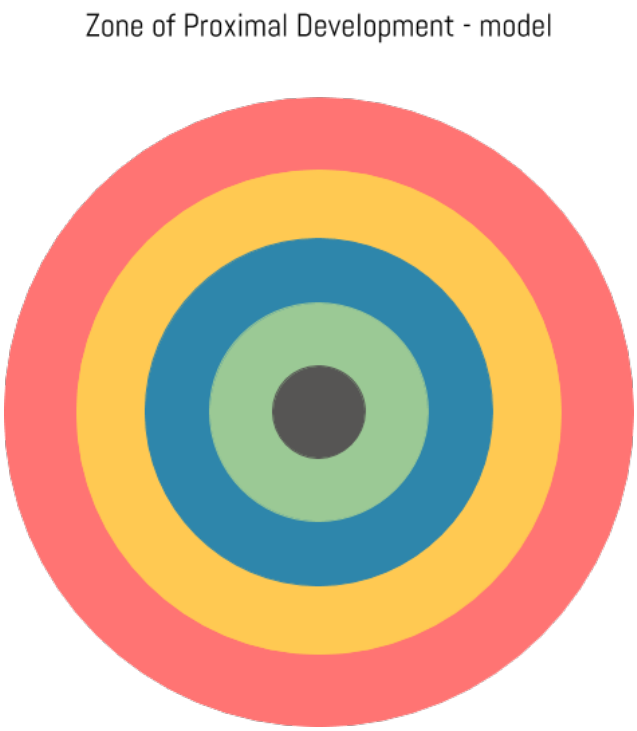


Figure 4.2: An illustration of the expanse of the zone of development (our current development: starting in the black circle; expanding to the green; the blue; the yellow; and the red as our skill and knowledge (development) increases.

As attention is crucial for flow - in flow our attention is 100% occupied by the activity - the rules applied to play, may be a good way to continue to increase the challenge and thus occupy our attention e.g. if we are too skilled (relative to the challenge of the activity), applying rules may serve as added elements to be attentive of. This is not to say that gaming is more difficult than play or exploration, nor that it is the human development, but rather that exploration may turn into play, and play may turn into game, however, we do not stop exploring or playing - the activity of play and exploration just evolves. Adding rules may just be one way of increasing the challenge to create the right condition for flow.

Just to give an example. When trying to overcome a big task - this could be writing a master thesis, arranging a big event, practicing for an important play - the tasks may seem overwhelming (the challenge is too high). This condition is not right for flow to happen, so we divide the task into smaller bits. The bits are less challenging to overcome, so flow may be entered. As this becomes familiar to us, the challenge of the bits become less challenging and the condition for flow ceases. To recreate the right condition for flow, we can apply rules or constraints to the task like less time, higher quality, more work etc.

However, just applying rules or constraints to activities, do not make the activity into play or game. Play is voluntary and it is artificial as well, the same is true for game. Both play and game are joyful activities, which we are intrinsically motivated to do. As such we enter a paratelic state, when we play and game, as we do the activities for the activities sake and less so for the goal of the activity. This differs play and game from the telic state, in which it is the goal that drives us to do the activity.

The telic state is often associated with work (as Apter (2007) does), which is often associated with being driven by external factors such as payment or a specific outcome (or goal). The external factors may motivate us, but may also impair our intrinsic motivation, which can "*kill creativity*" (as Amabile (1998) puts it) and decrease performance. However, external factors (or extrinsic motivation) is not necessarily bad, if they are linked to components of our intrinsic motivation. These components are relatedness, autonomy, and competence.

In short relatedness is our relation to others (social value) and our environment. If these are

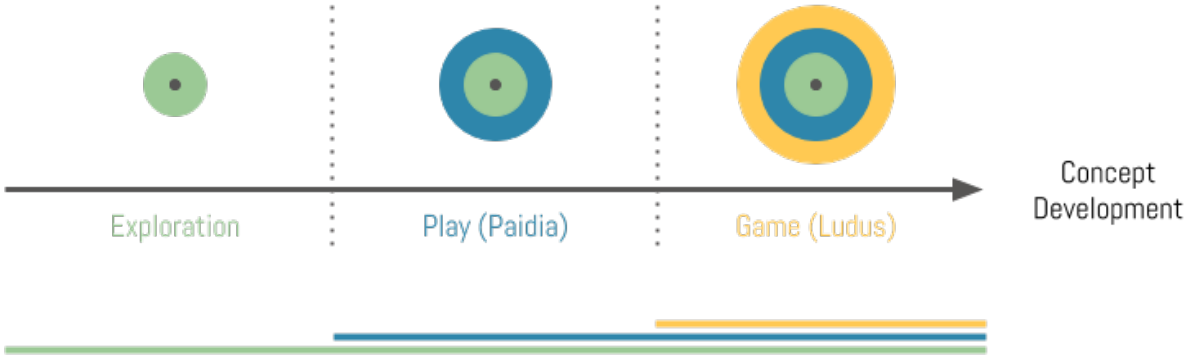


Figure 4.3: An illustration showing how the concept of play evolves (x-axis) through exploration (green. observation of the world), to play (blue. imitation of the world); and to game (yellow. simulation of the world). As our skills and knowledge (development) expands, the zone of proximal development (the circles above the graph) expands as well.

connected to who we are (our intrinsic values), they can be factors of motivation. Autonomy is our feeling of control and responsibility - we feel responsible for our actions and the outcome of them. Competence is our feeling of being capable of doing certain actions - in a sense it is our perception of our skills, as is important for reaching a state of flow.

On figure 4.4 I have tried to illustrate intrinsic motivation: the three components of it; and different factors that may connect to one or more of them. These factors are not necessarily extrinsic factors, although they are illustrated outside of the circle, but may in some cases be extrinsic. The point of the figure is to illustrate how intrinsic motivation branches out and connects to different factors, that may influence the very core of our motivation (the intrinsic motivation).

The green factors are from Amabile's six drives, and the blue are from Chou's Octalysis model.

Connected to relatedness is work-group features, organizational support, supervisory encouragement and social influence, as these are all connected to our relation to our peers (supervisor, teacher, friends, family etc.) and environment (organization, work space, school etc.).

Connected to autonomy is ownership and freedom, as these both relate to our feeling of control (freedom) and sense of responsibility (ownership).

Connected to competence is then scarcity and challenge. Challenge is again related to flow and our perception of difficulty of the task at hand. Scarcity is connected to competence in the sense that to acquire something that is scarce requires a certain level of skill and knowledge thus competence.

Then there are some factors between the components of intrinsic motivation. Between relatedness and autonomy is meaning, as it can give us a sense of purpose, connect us to the course, and make us feel chosen for the task, thus giving us a sense of responsibility towards it.

Between autonomy and competence, we find empowerment. Empowerment, in the way Chou (2016) describes it, is when we are allowed to express ourselves and witness progress of our own creations, thus giving us a sense of responsibility (autonomy) for the things we create, and through that a sense of competence as we witness the progress of it (our own improvement through our creations).

Between competence and relatedness is accomplishment, unpredictability, and resources. Accomplishment is both a direct proof of our competence, but is also affected by our relations to others, when external evaluation becomes a factor. Unpredictability is connected to relatedness, when it is our relation to something or someone to which or whom we can not predict actions of or consequences for (in this sense it may also connect to ownership of things), while in other situations it connects to our feeling of being able to gain control of the unpredictable to manage risk and reward. Resources can both be the abilities of colleagues, friends and team mates as well as our own abilities, time, money,

Figure 4.4: An illustration of intrinsic motivation: the three core components of it; and different factors from Amabile's six drives and Chou's Ocatalysis model that are related to these.

tools etc., thus connects to both competence and relatedness.

Now, avoidance is not connected to any of the components of intrinsic motivation, as it is related to external regulation and introjected regulation, as it is not a drive towards, but a drive away from, and in that sense, could be placed behind the circle of intrinsic motivation (on figure 4.4). It can be avoidance of disappointment of our peers; avoidance of being imprisoned, being stripped from freedom, control, and responsibility; or it can be avoidance of failure and feeling incompetent.

With the digital age, and play and game's adaption to it, the intrinsic motivation that drives us to play and game, and factors that influence it, have become clearer, thus possibly giving inspiration to try and use some of these factors (game design elements) to support intrinsic motivation. This is where gamification comes from - an attempt to create a bridge between a telic state and a paratelic state, to support creativity and performance by making non-game contexts into game-like contexts (or simply games).

4.1 Defining gamification once again

As gamification is a heavily contested term and there are many great and well thought through definitions of it (from Deterding et al. (2011), Zicherman and Cunningham (2011), Stieglitz et al. (2017) and others), a (perhaps) new definition is made once again - for the sake of understanding the scope of this study:

> *Gamification is the process of using game design elements in a non-game context to design a game or a game-like context that can elicit and nurture intrinsic motivation towards non-artificial feats.*

This makes gamification a process similar to game design, but can be applied without making a whole game (although it can also make a whole game), and is done for the purpose (other than entertainment) of eliciting and nurturing intrinsic motivation towards non-artificial feats. Thus, designing a game or game-like context that helps motivate us intrinsically towards doing feats such as learning or working that have value outside of the artificial construct - the magic circle that games create. It is therefore not enough to just use points, badges and achievements (or other game design elements) as extrinsic factors to motivate us, we must, in gamification, design a game (or game-like context) that we voluntarily wish to engage in, and which will give us some sort of pleasure while doing it. In a sense, gamification (by this definition and others) attempts to create a magic circle outside of the artificial construct of games and into real life (expanding the magic circle into a new zone of proximal development that is real life) - making real life as engaging, motivating and pleasurable as games are, while having an impact on real life. We could say that gamification creates tools for motivation rather than games for entertainment.

> *"..., it is not too much to claim that one of the central issues of psychology is learning how to combine intrinsic rewards with activities that are useful in the long run. To achieve this aim, however, we must first understand the dynamics of intrinsic motivation."* - (Csikszentmihalyi, 2014, p. 182)

I am not a student of psychology but a student of interactive digital media (InDiMedia), and in this field gamification has emerged as something that can be used in InDiMedias as well as grow from it, in a symbiotic relationship - the InDiMedias make gamification easier to implement and use, and gamification makes InDiMedias easier to use and more useful. For this reason, this master thesis borders between these two fields in a quest to understand gamification and attempt to find a way to use gamification as the bridge required between intrinsic motivation and activities that are useful (productive) such as work and learning.

With this in mind, gamification should be considered a bridge between the extrinsic factors and the intrinsic factors that will allow us (as mentioned before) to work hard but with more creativity, performance and enjoyment.

Gamification may be the method (process) in which we transform "work" into "play" (or game) to make the process of "work" an enjoyable experience that holds its own reward, thus diminishing or entirely removing the extrinsic rewards of the work as a factor for our motivation. If this is possible, gamification can (but should not make extrinsic rewards redundant, but) make "work" be driven primarily by intrinsic motivation, and thereby increase our enjoyment, performance and creativity in the process.

> *'Find something you love to do and you'll never have to work a day in your life.'*

The saying is apparently not attributed to Confucius, as seems to be a popular assumption (Garson, 2018), but is nonetheless very true in this regard. If intrinsic motivation comes from enjoyment of the work itself, then being driven primarily by intrinsic motivation is more similar to playing than working (in the sense that work is something we do solely to make a living).

4.2 Problem formulation

As carefully designed games can captivate us, engage us and motivate us to work hard on achieving things of artificial value, using game design elements in other contexts can potentially help engage and motivate us to work hard on achieving things of real value. However, just giving us artificial values (e.g. points and achievement badges) may not be sufficient, as it may act as extrinsic motivation, thus impairing our intrinsic motivation, especially if we feel pushed or forced to do the work. The intrinsic motivation must be bigger than the extrinsic motivation if we are to increase creativity and performance - but a good balance between the two types of motivation is recommended.

Although Amabile's focus is on the effect of intrinsic motivation on creativity, the same effect goes for performance in general.

> *I suggest that the undermining of creativity under external constraint is mediated not only by cognitive processes (task judgments, self-judgments, and attention), but also by affective processes (feelings of displeasure with a task approached as "work"). Likewise, the conducive effect of intrinsic motivation on creativity may be mediated by feelings of pleasure in a task approached as "play".* - (Amabile, 1996, p. 155)

Basically, Amabile (1996) is saying that "work" should be more enjoyable like play, if we are to support creativity (and thus performance as well).

Gamification is a means to use game design elements to make "work" into "play" (or "game"): allowing us to change our telic state to a paratelic state; regulate challenge to our perceived skill level to enter flow; enhance and support our intrinsic motivation towards non-artificial (productive) feats such as work or learning; and do so with higher creativity and better performance.

Gamification is not entirely the same as game design, as, in gamification, game design elements are being added to a non-game context (as is the case in game design, but) for a specific purpose, other than just motivation, which is usually to help motivate us, thus the non-game context does not become a game but a tool similar to a game - when we gamify (apply gamification to) it.

However, gamification has its pitfalls, as extrinsic rewards are often used in games (and thus in gamification), which, as discussed earlier, may impair intrinsic motivation (Hamari et al., 2014). As it has also been discussed, extrinsic rewards are not to be discounted, and may be implemented in such a way that creates balance between extrinsic and intrinsic values, thus extrinsic

rewards may instead act as a catalyst for intrinsic motivation rather than impair it.

Apart from my own interest in gamification (see appendix A *Auto Ethnography of Mikkel Lund*) being primarily based on the correlation between playing games, motivation and productivity, this also seems like a really good time (based on the current trends (*Gamification - Google Trends*, 2017) and the Hype Cycle (*Hype Cycle for the Digital Workplace, 2017*, 2017-11-28)) to analyze gamification: understand the uses and applications of it; understand the core mechanisms of it; and make an attempt at describing it in a way that can help support the potential of it, as well as avoid misuse of it.

> *"Anyone who is technically proficient can solve a problem that is already formulated: but it takes true originality to formulate a problem in the first place"* - reference to Einstein and Infeld (1938) (Csikszentmihalyi, 2001, p. 14)

And with this said, I state the following question that must be answered, or problem to which a solution must be found:

Problem formulation:

How can gamification be used in a way that elicits and nurture intrinsic motivation?

Chapter 5

Case: A Sample of Gamification

Before the beginning of this master thesis, I have been designing and using a game with the purpose of motivating me to do the tasks on my ToDo list.

This game has already gone through many versions (see figure 5.1, 5.2, and 5.3 respectively), especially during the course of this project, and is far from finished (if it will ever truly be).

The game will serve as an example of what gamification is. To answer the problem formulation, a guide, based on the theories covered in this report, will be made on how to gamify (use gamification) to elicit and nurture intrinsic motivation. ToDoALot will be the primary example to which they guide will be applied.

5.1 Case: ToDoALot

The essence of the game is a strategy game in which the player (the actor doing the tasks), must buy soldiers of different types and move them around on a grid to defend against demonic units and eventually defeat the Demon Lord. The Demon Lord generates points (power) on each turn which he (also done by the player, because it is currently a single player game) uses to summon demons. The demons are then sent off to destroy the human castle.

To defend the humans and ultimately beat the Demon Lord, the player can: buy units; upgrade units; buy farms to generate income; buy roads to connect buildings and expanding his or her territory; buy towers to shoot demons with AoE (Area of Effect) damage; buy arrows for archers; and upgrade walls.

To generate income the player must complete tasks on his or her ToDo list, each completed task then generates gold times the amount of farms owned (and connected to a road) - in figure 5.3 the player generated five gold per task completed. Apart from tasks on the player's ToDo list, he or she also has a habit tracker (the three vertical bars on top of the field) which tracks three habits at a time. Each bar has 21 fields which divides into three areas. One bar could be "run once a week" and be assigned to soldiers, if the player then succeeds in running that week, he or she moves the marker seven steps on the bar (one for each day in the week, if it was a daily task/habit it would move one step each time), thus the 21 steps corresponds to 21 days (three weeks). Depending on which area (or week) the marker is in, the unit (in this case the soldier) gets certain new abilities e.g. more movement points or a new ability.

To motivate the player, both the Demon Lord and the habit tracker is associated with a reward. If the Demon Lord is slain (a certain amount of times decided by the player) the reward may be gained. Likewise, if all three bars of the habit tracker reach step 21, a reward is gained, and the habit tracker is reset.

The game was first made as a paper prototype with the use of post-its, then made in a Google Draw document, as is currently the case, thus all elements are simply pictures and text that must be moved around manually.

The game (or tool) is, as mentioned before, not really finished. It is playable if one knows the rules and has access to the files. Although it has helped me get motivated at times, I have also experienced periods in which it did not matter to

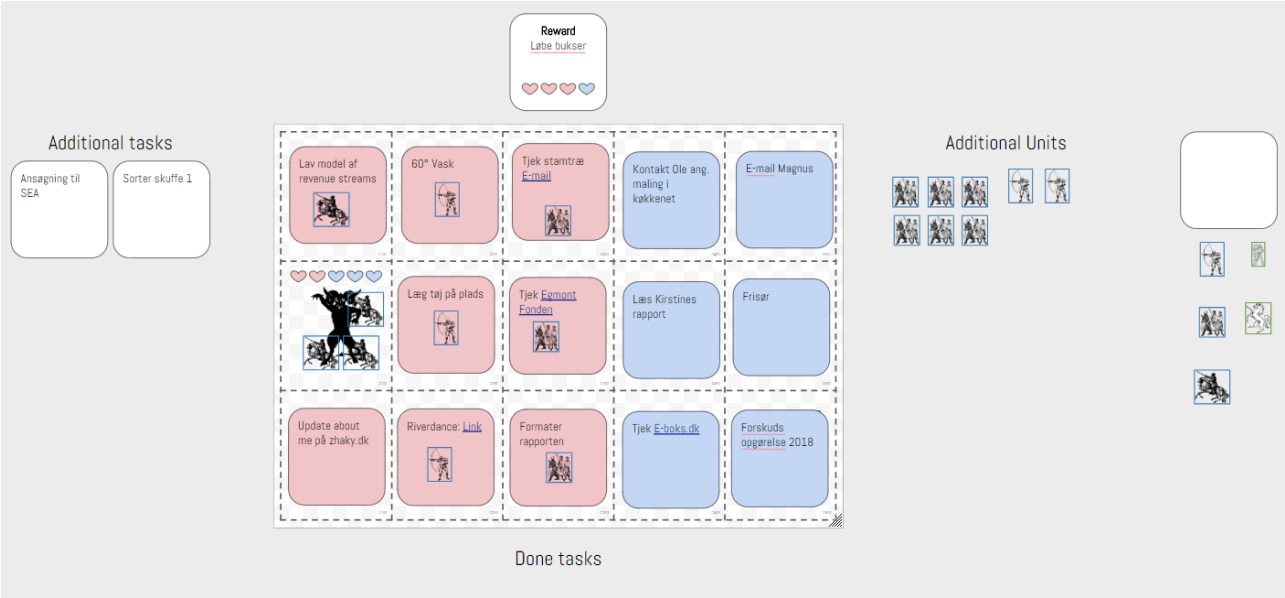


Figure 5.1: Early version called ToDo Battlefield. There were three types of units: archers, soldiers and knights. Enemy units were simply tasks, and the player's units would have to occupy each of the enemy tasks in order to be able to complete them. The enemy tasks had to be completed (removed) in order to attack the Demon Lord. Player units were also created by doing tasks.

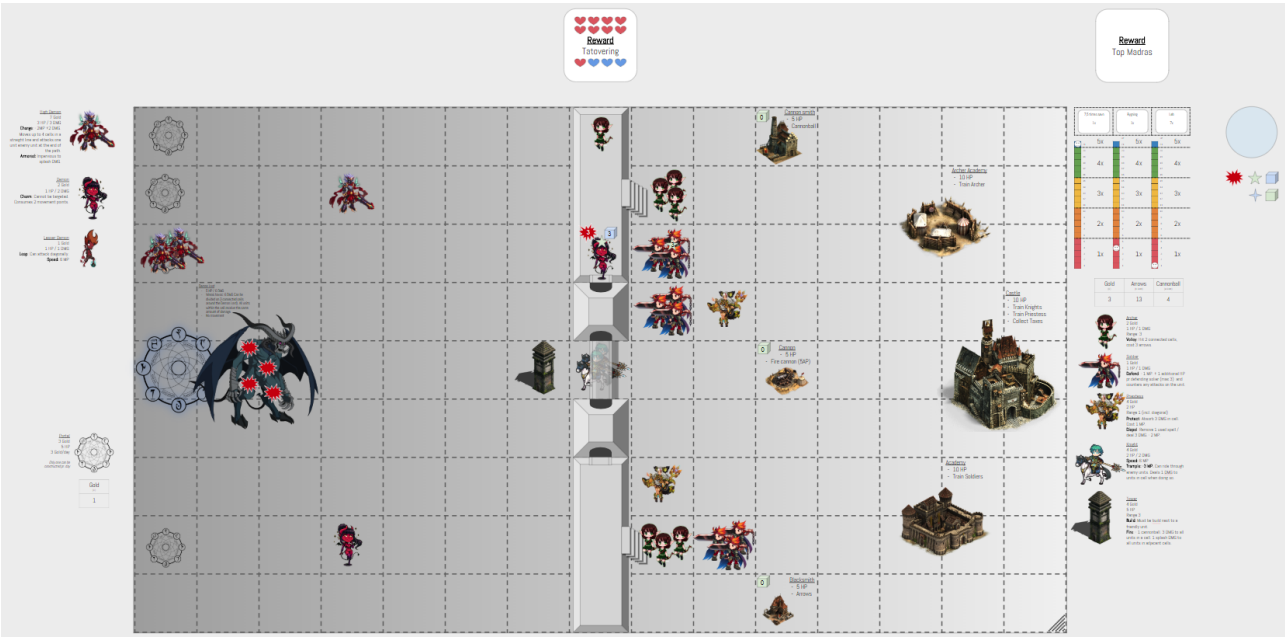


Figure 5.2: The next big upgrade was called ToDoALot. The fields was much bigger allowing for more strategic plays; a wall divided the map; archers could stand on the walls; towers could be build which could do damage on more cells at once (often referred to as AoE (Area of Effect) damage); the demons got new types of units; abilities were introduced to the units; a cannon was the only thing the player could use to attack the Demon Lord, thus it had to be defended, and points had to be spend on projectiles for it; a habit tracker was introduced which could increase the earning of points the more it increased.

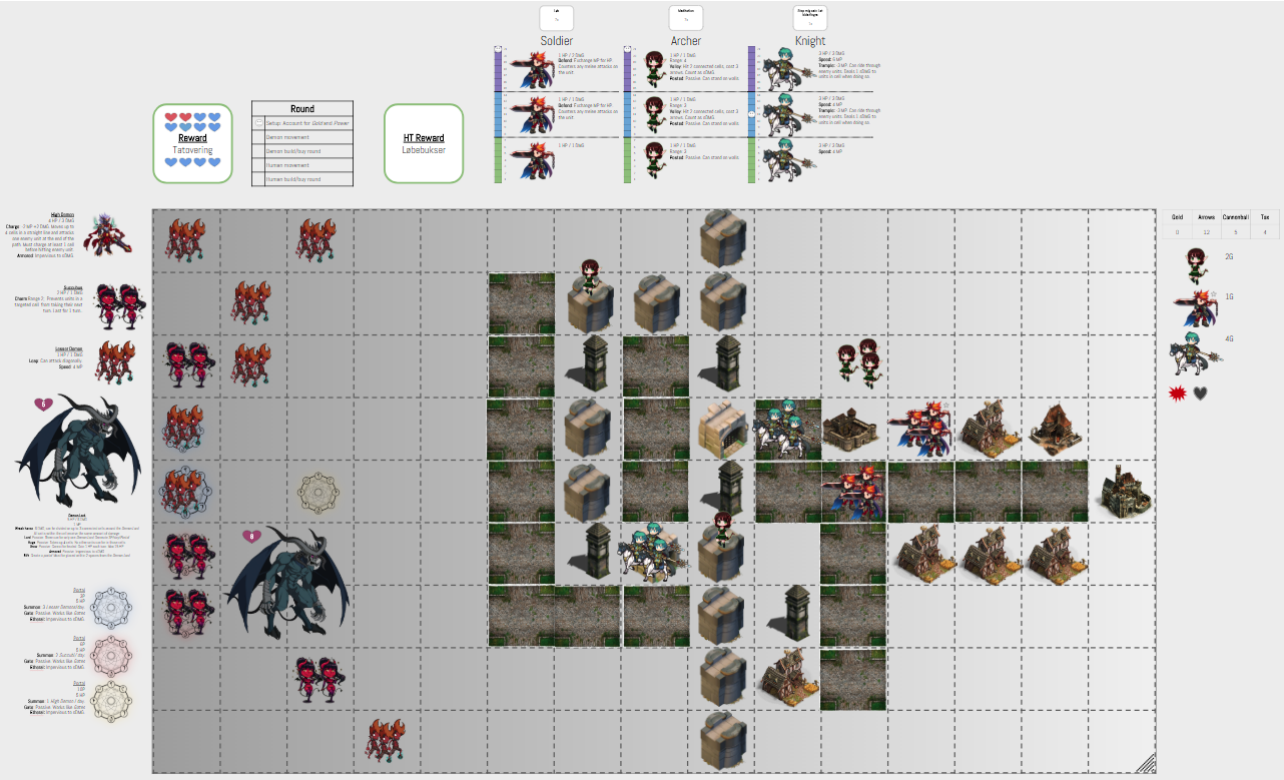


Figure 5.3: The latest version of ToDoALot: fewer units; units can be upgraded with the habit tracker; walls are now buildable and can be upgraded; the canon is removed and the Demon Lord can walk the field and must be attacked by player units; farms must be built to generate income; roads must be built to make certain buildings buildable and functional.

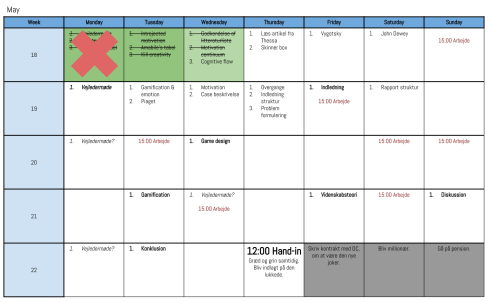
me.

5.2 Upgrading to the digital age

At the beginning of the course of this project, the game was played every day, however at the start of May (the final month before the hand-in), the game was "paused". It was not because it had lost its effect on my intrinsic motivation, but rather because it takes much time to update: allocate points, move units, buy units and buildings etc.

Instead I kept to just updating my ToDo list and saving it, so that I can later use it for the game - the work is still done after all, and the points are earned. In that sense I have not stopped playing the game, as I am still collecting points (saving them), but I am not using the points yet, as that requires more time.

Further, I created a calendar (also using Google Draw) in which I would write mile stones (see figure 5.4). I added one rule, being that a day could have a maximum of three milestones, and then it would serve me as an easier, minor, gamified tool to give me feedback and keep me on track. More about the tool can be found in appendix B.3 *Plan of May*.


May

Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
18	1. ~~Hjelpermarke~~ 2. ~~Hjelpermarke~~ 3. ~~Hjelpermarke~~	1. ~~Intrapersonal motivation~~ 2. ~~Amotivation noted~~ 3. ~~Kid-anonymity~~	1. ~~Gradientdesign of intrapersonal~~ 2. ~~Motivation continuum~~ 3. Cognitive flow	1. Læs artikel fra Thousa 2. Skinner box	1. Vygotsky	1. John Dewey	15 00 Arbejde
19	1. **Hjelpermarke**	1. Gamification & emotion 2. Piaget	1. Motivation 2. Case beskrivelse	1. Overgange 2. Indledning struktur 3. Problem formulering	1. **Indledning** 15 00 Arbejde	1. Rapport struktur	
20	1. Hjelpermarke?	15 00 Arbejde	1. **Game design**			15 00 Arbejde	15 00 Arbejde
21		1. **Gamification**	1. Hjelpermarke? 15 00 Arbejde		1. **Videnskabsteori**	15 00 Arbejde	1. **Diskussion**
22	1. Hjelpermarke?	1. **Konklusion**		12:00 Hand-in Grand og gim samtidig. Bliv indlagt på den lukkede.	Skriv kontrakt med DIC om at være den nye joker	Bliv indlagt	Stå på pension

Figure 5.4: The Plan of May calendar as it looked on the 1st of May 2018 (one month before the hand-in deadline of this master thesis). The red cross indicates that the day is in the past. The green color (three shades of green) indicate how many of the milestones of that day is currently reached. A bigger picture can be found in appendix B.3 *Plan of May*.

To make ToDoALot work in circumstances

with higher pressure (less time to play the game), the game could benefit much from being digitalized. This could be done using HTML5 - programming it as a webapplication. The webapplication could: keep track of turns, points, damage counters, unit upgrades, the habit tracker etc.; it could also govern the rules of the game; show the player where he or she can move units to; utilize graphical user interfaces (GUI) to make it easier for the player to upgrade walls, buy and place units and buildings, illustrate possible movements, attacks (in case of ranged attacks from archers or towers), and whether buildings are connected by roads or not.

Such an improvement would require much less time of the player, require less knowledge of the rules and mechanics of the game, and even allow for more frequent and immediate feedback which can aid in supporting intrinsic motivation.

There are possibly more things that could be upgraded, especially when the current version of the game is subjected to the mechanics of gamification that are covered in this report e.g. relatedness as there is currently no social relation included.

Chapter 6

Gamify

How can we gamify something so that it elicits and nurtures intrinsic motivation? With the definition made earlier of gamification:

> *Gamification is the process of using game design elements in a non-game context to design a game or a game-like context that can elicit and nurture intrinsic motivation towards non-artificial feats.*

There are many ways to use gamification - designing and developing a game such as ToDoALot is just one way of doing it, as it does not have to be an entire game, but just use game design elements.

What are game design elements? And how can they be used to gamify non-game contexts into game or game-like contexts that support intrinsic motivation towards feats that are non-artificial?

6.1 Game design and gamification

To answer this, I will describe some of the basic concepts of game design. To do this, I will primarily use "*The Art of Game Design: A Book of Lenses*" by Schell (2015), as he covers game design very broadly including both digital games, board games, and other games. In the book he (Schell, 2015) creates a list of "lenses", as he calls them, which are different aspects to consider in game design (not necessarily game design elements). I will not go through all of them, as there are more than 100 lenses, but instead attempt to cover the basics of game design that I find important in understanding the application of game design elements when gamifying.

I will also include game design elements found in a literature review by Nah, Zeng, Telaprolu, Ayyappa, and Eschenbrenner (2014). In the review they (Nah et al., 2014) studied the use of "game design elements" used to gamify educational contexts (the same elements can be used in designing games for other contexts than educational ones).

Nah et al. (2014) collected and arranged all the design elements that they found used in gamification. The design elements that were used were: experience points, levels, leaderboards, challenges, badges, progress bars, points, immediate feedback, peer interaction, collaboration, choice of difficulty level, prizes, in-game rewards, onboarding, replay, unlockable content, customization, achievements, storytelling, feedback, stages, storyline, visual elements, goals, frequent feedback, scoreboard, peer motivation, character upgrades, and avatars.

Some of these elements are similar to each other (or the same, depending on the use and definition). However, I will not go into details with all of them, as Nah et al. (2014) found eight game design elements that were more frequently used than the others and covers most (if not all) of the elements previously mentioned. These elements were:

Points may serve as both indication of progress (e.g. experience points or scores) as well as currencies that can be spend on both in-game or external items (Nah et al., 2014).

Levels/stages are systems used to indicate player progress. Lower levels may present easier challenges compared to higher levels or stages (Nah et al., 2014).

Badges are marks of accomplishment or achievement, and are given to the player as evidence of their accomplishments (Nah et al., 2014).

Leaderboards are ranked lists of scores, comparing the players' scores and illustrating how well they are doing (ranked) compared to each other. This element strongly supports competition. To avoid demotivation, it is suggested that only the top five or ten players are listed (Nah et al., 2014).

Prizes/rewards should rather be multiple small rewards given often rather than one big reward given rarely. The rewards should also be evenly distributed over time (Nah et al., 2014) much like a payout schedule used in slot machines (Schüll, 2012). Rewards can be something like character upgrades (requires a character/avatar) given to the player (Nah et al., 2014).

Progress bars are bars that track the progress of the player, thus serving as an indication of how close to the goal the player is (Nah et al., 2014).

Storyline is a story that the player may follow. This may also help connect the learning elements of the gamified context to real life (Nah et al., 2014). It may also relate to unpredictability mentioned in the Octalysis model, as the player may identify with characters of the story (relatedness), and wish to uncover what happens to them later in the story (unpredictability).

Feedback both as frequent and immediate is important for motivation and reaching the flow state (Nah et al., 2014).

Before I go into more details with how to apply and use these elements, I will cover the fundamentals of game design. Game design is primarily what we do, when we gamify. The main difference is that we have a goal outside of the game (the magic circle).

As I cover different aspects of game design, I will link these to gamification, and use ToDoALot as an example of how it can be implemented. Note that not all aspects are covered in ToDoALot, instead I will give examples of how they could be implemented in ToDoALot, and what difference this could have.

The fundamentals

To cover the fundamental aspects of game design, Schell (2015) uses a model, he calls "The Elemental Tetrad" (see figure 6.1), which shows the four basic elements of a game: aesthetics, story, technology, and mechanics. The elements are all connected (as seen on the figure), and should as such be considered in connection with each other e.g. the aesthetics should complement the story and vice versa.

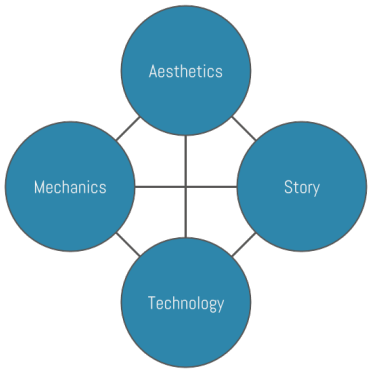


Figure 6.1: The Elemental Tetrad (remake): shows the four basic elements of a game: aesthetics, story, technology, and mechanics (Schell, 2015, p. 51).

Aesthetics is essentially how the player perceives the game: look, feel, sound etc.

Story is the sequence in which the game unfolds. Unlike most books and films, the story does not have to be linear, in the sense that each event falls in a predetermined order, but can e.g. be determined by the player.

Technology can be considered as the platform (or media) on which the game operates e.g. if it is a board game it probably has a board, some tokens, maybe cards, a die etc. which before game mechanics determines what is possible within the game e.g. in the board game you can not draw cards, if cards are not part of the game.

Mechanics. Although this has been covered earlier in section 2.3 *System, rules and mechanics*, here it includes rules as well (rules are mechanics according to Schell (2015)). So, it is what creates the boundaries of the game, and determines what the player can do within the game.

In regard to ToDoALot, the technology is a Google Draw file, which limits the functionality compared to e.g. a webapplication or a digital game running on a game engine (e.g. Unity3D, Unreal, Cry Engine etc.). Google Draw allows images, tables, text and some geometric figures to be placed, scaled, rotated, aligned, moved etc. In comparison to a board game, it allows for almost endless amounts of tokens, as each element can be copied as many times as needed and deleted again (only limited by the computers capacity, as too many elements will slow down the Google Drawing). In comparison to most other digital games like those found on consoles, mobile phones and PCs, the game can not manage rules, calculations, AIs or any other automation of mechanics.

The mechanics of ToDoALot are all the rules written down in a separate file. These rules determine what the player can do (apart from cheating, as the player can basically ignore the rules as he or she sees fit). The player (when following the rules) can move units and place buildings; buy, upgrade, and build buildings and units; and attack opponent units. The player also controls the opponent in the current version, and therefore can buy and move units for the opponent.

The story is very simple: the humans are defending their castle against a Demon Lord who spawns his minions through portals that he creates. The demons are trying to break through the humans' defenses and demolish the humans' castle.

For aesthetics, there is a lot that can be improved, as the only feel the player gets is from the haptic feedback of the mouse and keyboard of the computer he or she is using to play the game, the rest is visual feedback, which is just images, tables, text, figures and colors. The images are taken from various places, using Google's extended search tools, so would also need to be replaced, if the game is to be shared with others.

When designing a game, it is (almost) impossible not to have these four elements covered, whether the designer is aware of them or not (some may argue that games like Tetris, Tic Tac Toe and others do not have the story element, but I will not go into that debate here). So, for gamification it may help to be aware of these elements and especially that they should be connected e.g. in ToDoALot the pictures feature demons and humans, which connects to the story; the mechanics allow for turn-based attacks, which again connects with the story of a battle, and also to the technology (Google Draw) which would make a real-time strategy game difficult (if not impossible) to manage, as the player must move all units on the "board" (the digital grid made with a table).

There is not a specific order in which these elements should be taken into consideration. Sometimes the technology may be determined before story, mechanics, and aesthetics are set. Other times it may be that the mechanics are determined first. Keep this in mind when gamifying that all four elements should be considered, and not necessarily in the order that I present them in here. I present them in an order that reflects how ToDoALot was designed.

Goal and skills

With the fundamentals covered, we can begin to look into gamifying non-game contexts. As the goal of gamification is to elicit and nurture intrinsic motivation towards non-artificial feats, I recommend that we start by determining what our non-game context is and which non-artificial feat we wish to elicit intrinsic motivation towards.

In regard to intrinsic motivation, the components of intrinsic motivation, as well as avoidance, will be covered at the end. These should be considered through most of the processes, but

is used in this guide as a means to evaluate the game created - does the game actually connect the game design elements with intrinsic motivation.

To design a good game or gamify a non-game context, it is important to know the goal of the game, and also why the goal is important to the player (Schell, 2015).

We can consider it this ways: we have a goal in real life - a "non-artificial goal" (NAG); and we have an "artificial goal" (AG); to complete the NAG, we must possess certain non-artificial skills; to complete the AG, we must likewise possess certain artificial skills (see figure 6.2).

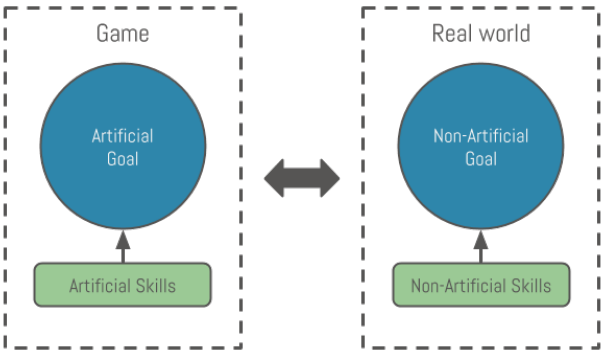


Figure 6.2: Illustration of the artificial and non-artificial goals and skills.

If we can connect these two goals (AG and NAG) and/or skills, so that accomplishing one goal leads to accomplishing the other, we can use the artificial construct of the game (the magic circle) to drive intrinsic motivation, towards accomplishing the AG, which should also (if the NAG and AG are connected properly) lead to accomplishing the NAG.

In ToDoALot the NAG is very simple to find. The game is designed to elicit intrinsic motivation towards doing chores on a ToDo list (that is the NAG). What I really want is for the game to motivate the player towards doing as many tasks as possible. The NAG is therefore: "to do a lot of chores", and this also determines the non-artificial feat (skill), which in this case ought to be productivity or discipline, if we want "to do a lot" (get it? It is the name of the game, also it sounds a bit like Camelot, which is also a castle).

Schell (2015) links "games" to "problem solving": the solution becomes the goal; we determine what methods and resources we have to solve the problem - we set up the rules; we set up an artificial construct of reality in our mind, in which we can analyze the problem and possible solutions - we visualize the problem and its possible solutions; if we care about the problem, it engages us in trying to find a solution - intrinsic motivation; as we engage in the problem we forget about the real world and our attention is directed towards the problem (or solving it) - we enter flow; eventually we win or lose the game - I mean we find a solution or we do not.

In my definition of game, goal is not mentioned as an important factor, but conflict is. The conflict is the problem (Schell (2015) is talking about) that needs solving, and thus it connects to the goal of the game. Keep in mind that in both play and game (and therefore in gamification as well) it is the activity that is in focus - it is a paratelic state - but even in a paratelic state there is a goal.

Schell (2015) goes on to stating that the magic circle is our internal problem-solving system. This fits well, with what I have stated earlier: that gamification is a way to create the magic circle inside real-life.

So, when gamifying, it makes sense to look for the problem that the non-artificial feat solves, and try and merge that in some way with the goal of the game (the AG).

A goal must also be concrete, so that the player can understand it, achievable, and rewarding (Schell, 2015).

In ToDoALot the goal is to defeat the Demon Lord. The main reason this is important, is because of the reward that is rewarded to the player, once he or she defeats the Demon Lord. By not doing so, the player risks defeat which will just prolong the process of acquiring the reward. The reward is chosen by the player, so it should from the beginning be something that the player has intrinsic motivation towards receiving. The non-artificial "problem" that should be solved is, however, to do as many chores as possible. This does not relate to the AG. The way ToDoALot connects the AG to the NAG, is by connecting it to the "skill" required to reach the NAG. The non-artificial skill is productivity or discipline - how many tasks can the player push him- or herself to complete in as short an amount of time as possible? Each task finished gives gold in the game, which is an essential resource for winning

the game and reaching the AG.

The AG is both achievable and rewarding (the player chooses the reward), but in terms of understanding the AG, only the rules of the game explicitly states what it is. If the game is digitalized, the goal may have to be stated explicitly to the player, or it could be designed in a clever way that implicitly guides the player towards the goal. In most Zelda games the levels are locked e.g. a road is blocked off by something, and to move on towards the goal, the player must find a way to unblock the road - the game gives the player a controlled amount of freedom, as he or she may roam around in the level they are currently in, but in reality, has to do certain things to move on, and is in this way guided towards the goal of the game.

Freedom is important in games, but does not have to mean that the game should be open-world (the player can go wherever and do whatever he or she wants), but can present the player with a select set of choices (Schell, 2015). This ensures that the game designer have some control over the player's behaviors, but also that the player has some freedom.

In ToDoALot there is not much else to do, than to defend against the demons, which could eventually lead the player to attempt an attack on the Demon Lord, which (if the player does not know the AG and the rules of the game) will reveal the AG to the player, as the Demon Lord will eventually be defeated and the game be won.

The next step is to consider the skills required of the player. Is the point of the gamification to hone a particular set of skills? Then the game should be designed towards using those skills in some way. If the point of the gamification is to accomplish a certain NAG, then the game should be designed so that finishing the steps in the game leads to accomplishing the NAG.

In regard to ToDoALot, the non-artificial skills required vary from each chore, but having discipline and being productive should at least push the player to accomplish the NAG, thus ToDoALot attempts to connect those skills with the AG.

Story and theme

When the NAG, AG and skills required are identified, it makes sense to find a story and theme for the game.

A theme is what ties a game together (Schell, 2015). Schell (2015) recommends letting the theme emerge, as the game is being designed. Once a theme is set, stick to it, and let the theme determine what goes into the game and what does not.

An example of this could be, if the NAG is to clean a house, it would make sense to choose a theme that supports activities required in doing so - something that can relate to vacuuming and cleaning the floor. The theme could be an alien invasion: each room must be secured by the "special alien defense force". The story could be that aliens have invaded Earth, and the house is one of the last remaining human strongholds. The special alien defense force patrols each room for any alien activity (vacuum the floor), and then sets up defense mechanisms (washing the floor). This of course might just be play, but we could of course add some rules to make it a bit more challenging and perhaps fun depending on the player's skill level in "defending against aliens" (cleaning a house) - making it into a game. A rule could be that we must finish each room in a specific amount of time, as the aliens would otherwise have time to break through our defenses, or it could be that we must stay clear of any areas already covered as we would otherwise set off our own defense system (and leave dirt on already cleaned areas).

Schell (2015) points out, in an example about creating a pirate experience in a game, it was not enough to conclude that the theme was "pirates", as it had to be more concrete. Eventually the theme in his example ended up being "the fantasy of being a pirate". This new theme could set some guidelines as to what should be included and what should not be included.

Nah et al. (2014) also lists "storyline" as one of the eight game design elements they found in their review. As stated earlier, a story can be created by the player or be predetermined to varying degrees. A story may also help create relatedness and uncertainty in the game, which can help motivate the player.

When deciding on a theme and a story, it is

also very important to include the player and his or her values and interests in the consideration.

The game should be designed towards the player, and when there a more players with different values, designing a good experience for them all becomes tricky (Schell, 2015). However, it is possible to include all players and design a good experience for them all, as is also the case in an example given by Schell (2015). The game, used in the example, was for an entire family to play, and featured a ship that needed to be sailed, cannons that needed to be manned, possibly also sails that needed to be hoisted etc. What happened in the example, was that the game had a wide range of roles, enough so that each member of the family could find a role to fit in e.g. the mother of the family being expected to be a non-experienced gamer, found her role as the captain, steering the ship, so that the rest of the family could have a good time (Schell, 2015).

so be considerate of the player when choosing a theme (Schell, 2015) or a story, as players may have different preferences - not all players are into shooting bad guys.

Time and space

With the story and theme set, we can begin to consider the time and space of the game.

When designing a game, it is important to consider the time and space that the game works in. Is it a two-dimensional like e.g. Ludo is, as there is no up and down but just the length and width of the board, or is it three-dimensional like e.g. Counter Strike where it is also possible to move up and down as well as jump? Even if the game is a quiz, consider the mind of the player and the question giver as spaces in the game (Schell, 2015).

In regard to time, is it real time where a player can interact whenever or is it turn-based so that the play can only interact on their turn? When will the game start? And when will it end? Do you need something to count or measure time (Schell, 2015)?

In ToDoALot the space is mostly a two-dimensional one, with the only exception of archers being able to stand on top of walls, as the only unit that can be placed inside a field with a wall. The choice of making it two-dimensional is also a constraint set by the choice of technology, as Google Draw does not feature more dimensions apart from being able to place picture on top or behind each other.

The time is also affected by the choice of technology: the game is turn-based, meaning that time progresses in turns, as having the game run in real time would put a strain on the player, as it is the player that must move each unit, and in real time all units could move simultaneously. However, both the time and space fits well with the theme of the game, being a battle between humans and demons, as they may move across the field, block paths, and take cover, which can also happen on a battlefield.

If cleaning the house is the game, then the time may be real-time and the space may be the entire house.

Digital games may give huge advantages to time and space, as the computer can simulate both real time and three-dimensional spaces, without putting any strain on the player, as the computer makes all the necessary calculations.

Rules and mechanics

Now we know the goal of the game, we know the theme and story of the game, and we know how time and space works in the game, so we can begin to setup rules and mechanics defining the system and frame of the game.

As the rules and mechanics of the game are what creates challenge - what you must, must not, can, and can not do inside the game. It is important to design rules and mechanics that fit the player's skill level. Additionally, the game can be designed to gradually increase the challenge of the game e.g. through levels and stages (mentioned by Nah et al. (2014)). The balance between challenge and skill is also what creates flow and keeps the player from being either anxious or bored, but rather fully immersed in the activity of the game.

To cover the basics of rules and mechanics as they can be quite expansive depending on the game, I will cover some different concepts, mentioned by Schell (2015), and include some of the game design elements mentioned in the literature review by Nah et al. (2014).

Actions

First off let us consider what sorts of actions the player should be able to do in the game. In ToDoALot the player should be able to: move units, build buildings, buy and upgrade units and buildings, and attack enemies in order to accomplish the goal.

How will the player be able to do these actions? And what restrictions are necessary to constraint the actions to what is possible in the game? The rules governing actions and mechanics should give the player some freedom while also adding some challenge to the game e.g. you can only have three units placed in the same cell in ToDoALot, this puts a constraint on the player and requires the player to be considerate, of where he or she moves his or her units, adding a slight challenge to the game. The constraint can e.g. mean that only certain units can reach a specific cell in the next turn, if they are able to be placed within movement range of that cell, while others can not get close enough.

State

Another concept to consider is state. Can objects in the game be in different states changing the rules that apply to them. In ToDoALot the soldier unit can use an ability called "Defend" which increases the soldier's health and enables it to counter attack enemy attacks. This is a different state the unit is in, as it would normally not give damage to units that attack it, but only if the soldier attacks other units. The state makes the soldier a less preferable target to attack, as it makes it tougher to kill (destroy) and also costs damage to the attacking unit. This makes the soldier useful as a moving, defensive blockade.

Objects and attributes

Both with actions and states it is important to consider the objects of the game: what can the player interact with? How can the player interact with the objects? And what attributes does the objects have?

In ToDoALot there are different types of units and buildings, and they all have different attributes and even abilities. A wall can be placed, and can not be passed through once placed. The wall also has a high amount of hit points (HP), making it a tough object to destroy. Apart from that it can be upgraded to be even more difficult to destroy. A unit such as the lesser demon can move further than most units, is cheap, give little damage, can take little damage, but is also able to attack diagonally, giving it added strength if it can surround opponent units or buildings - the attributes of the unit have great importance to its role in the game. However, surrounding opponent units is difficult, as it must all be done in turns, meaning the opponent may realize the intention and withdraw his or her unit (if it is possible) from the oncoming attack.

Modes

This leads to the concept of modes. Modes are similar to states, but are on a more global scale of the game. In ToDoALot the turns are not just shifting between two opponents, but goes through different stages with different modes. In one stage the game is in "movement and attack" mode, and in the next it is in "buy and build" mode. This means that the player can not move and attack units that he or she has just bought in their turn, as the units are bought after the "movement and attack" mode was disabled again, so movement and attack is no longer an option to the player until his or her next turn.

Chance and unpredictability

According to Schell (2015), surprise is a crucial element to creating entertainment. Surprise can be made in different ways, and can be both good or bad, but adding chance to the game, is one way to do it. Chance should, however, be well designed, as too much chance may take the feeling of control away from the player, while just enough chance can prompt the player to try and assess the probabilities and attempt to optimize his or her chances. The chance also gives an element of surprise.

Schell (2015) gives an example, where participants were sprayed in the mouth with either water or sugar-water. The participants that were sprayed randomly with both sprays found it to be a more pleasurable experience. This also connects to what Schüll (2012) describes, as one of the driving factors for gamblers, being that the

outcome of each pull on the lever is randomized - the outcome is a surprise.

When implementing chance, the designer should consider the expected value of the probabilities, thus what the average outcome will be (Schell, 2015).

However, surprise can of course also be created simply by hiding information from the player e.g. by utilizing "fog of war" which covers the player's environment in "fog" that limits or prevents the player from seeing what is in the "fog". Such a mechanic is however easier to implement in digital games, as the computer can act as an enforcer.

Enforcer

An enforcer is someone e.g. a gamemaster, or something e.g. a computer that enforces and governs the rules of the game. The enforcer can hide information from the player; act on behalf of opponents; change the environment and rules of the game if necessary; and also limit or prevent cheating.

Cheatability

Cheating is when a player breaks the rules of the game, to increase his or her chances of winning the game. Even if cheating is not actually present, the very notion of it being possible, can affect the entertainment value of the game Schell (2015).

In gamified contexts cheating takes on a slightly different impact, as gamified contexts have consequences in real-life.

In ToDoALot there are no enforcers, as the player controls everything including the opponent. However, if the player decides to cheat in ToDoALot, he or she may win the game with little or no effort, but this destroys the entire purpose of the game, as the game will lose its ability to motivate the player to do chores - cheating in ToDoALot breaks the connection between the AG and the NAG. "When you cheat, it is only yourself that you are cheating", I have heard many teachers of mine say, and it is very true in ToDoALot, as the intention of playing the game, is to motivate to do chores, and cheating disables this benefit of the game.

Implementing ToDoALot as a webapplication could significantly impact the possibility of cheating, as it can be programmed to enforce the rules, act as the opponent, and even allow other players to act as the opponents.

Feedback

Feedback is the final part I will cover of rules and mechanics. Feedback is crucial when trying to motivate the player, and is connected both with technology and aesthetics. The technology may determine how the feedback can be given e.g. on a screen, a card, a token etc. The aesthetics may influence how the feedback is perceived e.g. sound, a colorful display, vibrations etc. However, the rules and mechanics should determine what is given as feedback, when, how, and to whom.

First off, feedback can help give the player a sense of progress, which is important for the player to feel competent in the game and thus allowing the player to enter and stay in flow.

Progress can be shown through changes in the environment that the player interacts with; with progress bars that expands as the player progresses; points that accumulate as the player earns them; badges that prove the player have achieved certain things; leaderboards that illustrate to the player how he or she is doing in comparison to other players.

Schell (2015) states that value should be considered especially in terms of points and other in-game values. If they are not considered in terms of what value they hold to the player, the player may very well ignore them. One way to deal with this, is to connect the value to the goal (or the drive beneath the goal).

Further, as have been mentioned before in 3.1 *Feedback*, feedback should allow the player to evaluate him- or herself, and not be given as an external evaluation. If the game states that the player has lost, the message should connect to the player's actions and make him or her feel that it is his or her actions that lead to it - the player must feel responsible for the evaluation made from the feedback.

Feedback can improve intrinsic motivation, when it is positive, frequent, and immediate, but should not e.g. in case of prizes and rewards be given for too little effort, as this may backfire and

instead demotivate the player.

Technology

In terms of feedback and technology, digitalization of games can have a huge advantage, as has been previously mentioned in 2.1 *Digital Games*. Computers can make it easier to give frequent and immediate feedback in games, however, the computer is just one technology that can be used for designing games.

Before ToDoALot was implemented in Google Draw, it was made by using post-its that were placed on a wall in a five-by-three grid (the grid was much smaller in the first version, similar to the one that can be seen on figure 5.1). The rules were also much simpler, and there were fewer units on the board. As the game required more and more post-its as well as physically moving tiny paper pieces (the units) around on the board, the game was digitalized to save paper and time.

The upgrade also made it easier to use a bigger board and more units without increasing the workload much, so the game was updated with more features.

Although the digital medias present many great opportunities for games, and I do recommend using it when possible, technology of the game should be taken into consideration e.g. cleaning the house might not really need to be digitalized, although an application on a mobile phone, utilizing augmented reality, could add a little more to the game, like a timer, a list of mission objectives, or little green men running around in the house.

Consider the time, space, rules and mechanics, and what kind of technology would best support the game.

Aesthetics

Knowing the theme, story, mechanics, and technology of the game may give some inspiration as to how the game should and could be presented to the player. Consider what the board should look like to fit the theme and story? How should the tokens of the game feel? What kind of sounds should there be? Should there be music?

ToDoALot mostly features "look" with the images presented of the different units and buildings. These all share the same theme of a medieval fantasy battle. However, considering the upgrade to a webapplication, it could benefit from sounds, music, and even animations as well. Loud rumbling when buildings are hit; screams when units are killed; and dramatic background music, perhaps changing to music depending on whether the player is close to losing or winning.

Gamifying cleaning the house might not require much effort into aesthetics, but in that case, consider whether, a map of the house could be drawn, place some tokens to indicate a possible alien threat in different sectors of the house.

Motivation

Motivation may be the last part to be included here, but should be considered during the entire design process.

Relatedness

To use relatedness to motivate the player, competition or cooperation with other players can be used, this in particular affects how the rules and mechanics, as they should be designed with multiplayer capabilities in mind. Further, a story and universe with characters that the player can relate to, can also help greatly in using relatedness as a motivational factor.

So, for game design elements, consider using story, leaderboards, and mechanics that allow or require multiple players to compete, cooperate or just interact with each other in the game.

In ToDoALot this is not yet a feature, but could be implemented by allowing other players to act on behalf of the opponent or perhaps allow for trading resources among players. The idea of one player being so good at doing his or her chores that he or she can share their wealth with others could be one way to motivate players. Schell (2015) also points out that the possibility of helping others can often be a great motivational factor for player.

Even cleaning the house as a game can benefit from relatedness, if e.g. more players play the game, one can have the role of clearing (vacuuming) the sectors (rooms) of the house, while the other player is in charge of setting up defenses (washing the floor). Both players must

work together and update each other on the situation, thus creating relatedness between them as a team. It could also be that one player are the aliens, spotting gaps in the humans' defenses (pointing out dirt on the floor).

Autonomy

Autonomy may be simple to find suggestions for, but may be more difficult implementing. The simple suggestion is: make sure the player has freedom to make choices, and that there are not too much chance involved, so that the player may feel that their chance of winning is out of their control. However, ensuring freedom to the player may be as simple as giving them the choice to move, pick colors or other things, and the choices can even be presented by the game, thus allowing the designer to choose what is possible, and what is not.

Chance should be something the player can have an impact on e.g. spend some resources on upgrading your armor, to decrease the chance of it breaking during battles. Stock up on health potions in case you are unlucky in battle, and need to heal your character - the player can manage the risks of the game at a cost. This allows for surprises, but also gives the player some control (autonomy).

Further, the player can be given possessions that he or she will feel responsible for, and even might get some relatedness towards e.g. an avatar which was mentioned by Nah et al. (2014) but not included in their eight game design elements.

ToDoALot neither features chance nor hidden information at the time, but was upgraded after being digitalized, with more rules, new units with more abilities etc. for the purpose of giving the player more options and hence choices. This allows for more ways (than previously available) that the player can play the game, giving him or her more control of the game.

In regard to chance, ToDoALot could have the units attack with an interval of damage, so that e.g. a knight could hit and give damage between two and four, thus keeping the expected value of damage, but allowing for surprises.

Competence

Games are not all about competition or skills, but it is a major factor, and games offer many ways of using competence as a motivational factor.

As previously mentioned: feedback is very important here (as well as in other cases), as it is needed to give the player, an idea of how he or she is doing. Whether it is the environment of the game that changes, showing the player their progress, or it is messages, points, badges, leaderboards, levels, story progression, progress bars etc. all gives the player a feeling of competence - when doing good of course.

In ToDoALot enemy units are removed from the game when defeated showing the player that he or she is making progress in defeating the demon army; more human units and buildings are placed on the map (if the player chooses to do so), also giving indication that the player is progressing. Further, each time the Demon Lord is defeated, one of his hearts (that are normally red) are turned blue, to indicate that he has been defeated. The more times he is defeated, the more blue hearts and less red hearts are shown. When the last red heart turns blue, the reward is gained, thus the hearts shows the players progress towards reaching the goal of the game.

Levels and stages may also be used, not only to indicate progress, but also to increase the challenge, allowing the player to continuously stay in flow.

Avoidance

The final motivational factor, which is not an intrinsic one, in fact, when motivated to avoid something compared to being intrinsically motivated to obtain something, two different parts of the human brain is activated (Schell, 2015), indicating that it is two very different types of motivation. However, just as extrinsic motivation, avoidance should not be completely disregarded but used with caution.

Schell (2015) mentions the use of punishment as a motivational factor in games. This links to "avoidance", "external" and "introjected motivation". As mentioned before, and as Schell (2015) also points out, such factors are useful in combination with "intrinsic motivation". Schell (2015) also gives examples where games push (motivate)

the player to come back to the game, in order to not lose valuable points or items. He goes on to stating, how in some cases the player even has to "divorce" the game, as it has become more of a "have to do" than a "want to do" activity.

Without going into different types of punishment, I suggest using such factors sparingly, and rather let the theme determine the punishment e.g. if the player in ToDoALot does not play well, the game will punish the player indirectly, but giving the opponent time to grow a bigger army, which prolongs the game, and in worst case results in the player being defeated by the demon army. In this case the punishment is directly linked to the players own choices (and autonomy), and is not an external source deciding that the player should be punished for making bad choices.

6.2 Gamification protocol

When we have a context that could benefit from increased performance and creativity, we can use the following gamification protocol.

The protocol is a shorter version of the steps explained above in 6.1 *Game design and gamification*.

The protocol gives a step-by-step guide of what to consider when gamifying a non-game context, in order to use game design to connect game design elements to components of intrinsic motivation. By taking all steps into consideration in accordance to the protocol, the gamifyer (the one gamifying) should be able to, with the game, elicit and nurture the intrinsic motivation of the player, towards doing non-artificial feats such as working, learning, and other activities with consequences outside of the magic circle of the game.

It should be noted, since motivation is the final step, that it will make sense to use the protocol in iterations, as Schell (2015) also suggests in the process of designing games - create the first concept of the game, evaluate it and start over. During the evaluation, consider if each step properly connects the game design elements to the components of intrinsic motivation.

The protocol is featured on the next page.

Gamification Protocol

Goal and skills

Consider the non-artificial goal (NAG) and skills required to accomplish it. Connect this to the artificial goal (AG) and/or the skills required to accomplish this. The AG should be understandable, achievable and rewarding.

Story and theme

Choose a story and a theme that will engage the player and support the connection between NAG, AG and the skills required to accomplish these.

Time and space

Choose a time and space that supports and connects well with the story and theme, technology, and mechanics.

Rules and mechanics

Consider what **actions** the player or **players** should be able to do? Should objects in the game be able to be in different **states**? what **objects** are required? What **attributes** should the objects have? Should the game have different **modes**? Should the game have elements that are **random** and/or **unpredictable**? If randomness is implemented, what are the **expected values** of the chances? Will the game benefit from or require an **enforcer**? Should some information be hidden from the player? Are their entities or mechanisms that must be controlled by the game or an enforcer? Can the players **cheat**? How? What consequences could this have? What sort of **feedback** should the game use? How should it be presented? How frequent should it be presented? Does it evaluate the player or allow the player to evaluate him- or herself?

Technology

Consider what technologies are needed to support the mechanics, space, time, feedback etc.

Aesthetics

Consider how the game should be perceived to best support the theme and story of the game.

Motivation

Consider if the game gives the player a feeling of: **relatedness** to other players, characters in the game, or perhaps belongings in the game; **autonomy**, ownership, responsibility of actions and objects in the game; **competence** from being challenged adequately and progressing in the game; **avoidance** towards failure or other sources of displeasure in the game, but not to the extent where the player will have to "divorce" the game.

The protocol is based on the process used to design the game ToDoALot, but with additional steps, as ToDoALot was designed previous to the creation of this report. As such, there are some parts of the protocol that have not been applied to ToDoALot, even if ToDoALot features some of the parts covered in the steps.

It has also been mentioned earlier in this report that the steps may not necessarily be advantageous to take in the shown order, as this can vary from game to game. However, when gamifying it is crucial to understand what non-artificial feats the game is designed to elicit and nurture intrinsic motivation towards, as such it makes sense to start with the goal of the game and connect it to the goal of the non-artificial context.

Had technology been considered earlier in the process of designing ToDoALot, the game could very well have been much different than it currently is e.g. the advantage that digital games have in managing multiplayer functionality, could mean that the game would have been designed as a multiplayer game instead.

As gamifying, like game design, may benefit from being iterated, the order becomes less critical, as each iteration may utilize the protocol in different orders. The protocol does not feature any numbers or arrows either, indicating which order it should be used, so even though there is the risk of the gamifyer consequently using the protocol in the order it is listed, the protocol itself does not suggest any particular order, except for the reading convention used (left to right, top to bottom).

To further diminish the possibility of the order, in which the protocol is used, to create confusion, the protocol could be cut out and used like a deck of cards - shuffle the deck and take whatever step comes first. This can also be done with the "lenses" featured in "*The Art of Game Design: A Book of Lenses* by Schell (2015), but even his lenses have numbers. However, even using the steps as cards features some risks, as a deck of card gives no indication of each card having to be turned or used. Avoiding the risk of the protocol being used in a specific order, seems difficult to escape, compared to the probability of it happening and the consequences it could have.

The protocol only touches the "tip of the iceberg" in regard to game design. The reason for this, is that the protocol should be easy to use, and be useful in gamifying many different types of contexts. Going deeper into game design and game design elements e.g. the list found by Nah et al. (2014) in their literature review (not just the eight they present), could mean that the protocol will feature too much redundant information in different contexts.

To give an example of this, the protocol does not mention any suggestion of using a replay feature, as it may not be a useful game design element in many contexts (like cleaning the house).

The protocol should be useful in gamifying all types of contexts, and if a replay feature makes sense in that context, it is up to the gamifyer to understand enough about game design, to be able to recognize this, while the protocol works as a check list of basic aspects to consider when gamifying - the protocol helps the gamifyer in covering the basic aspects of gamification to ensure that the game can elicit and nurture intrinsic motivation.

The protocol does not either go into details with how intrinsic motivation can be used while avoiding making the player addicted. As Schell (2015) also points out, it is unfair to ask the game designer (or in this case the gamifyer) to avoid making the player addicted, by making the game less attractive or engaging. The gamifyer should design a game that is engaging, attractive, and elicit intrinsic components. This can lead to addiction in some players but not all (Schell, 2015). It is in many cases the extrinsic rewards of games that may lead some players to become addicted (Schell, 2015). Even though the same rewards are given to all players, it is not all players that become addicted. The protocol suggests consideration of the use of extrinsic rewards, but that may not even be enough to completely avoid addiction. The problem of addiction may lie elsewhere, and not be a factor that a game designer or gamifyer can control.

Again, the protocol is designed to work as a check list that can be used in gamifying all contexts that could benefit from increased intrinsic motivation.

Chapter 7

Conclusion

How can gamification be used in a way that elicits and nurture intrinsic motivation?

The gamification protocol mentioned in 6.2 *Gamification protocol* is an attempt to answer this question.

It covers some of the basic elements of game design, and gives examples to how game design elements can be used to elicit the components of intrinsic motivation - relatedness, autonomy, and competence - as well as how external factors can be connected to these to nurture intrinsic motivation.

Further, the protocol includes avoidance, which can not entirely be avoided when failure is a possibility in games. However, the protocol gives suggestions to how avoidance can be balanced to prevent 'death of intrinsic motivation' and disengagement of the game.

The protocol does answer the final problem formulation, as a possible way to use gamification to elicit and nurture intrinsic motivation. But, whether the protocol can be used to gamify all contexts that could benefit from increased intrinsic motivation, and gives adequate advice on how to elicit and nurture intrinsic motivation, still remains to be tested and proven.

Further, the protocol does not cover to what extent extrinsic and intrinsic motivation should be connected and balanced, and what effect this could have on the player.

As games can create addiction in players, can gamification (utilizing game design elements) designed to elicit and nuture intrinsic motivation, done using the protocol featured in this report (6.2 Gamification protocol), also risk creating addiction in players? And what would be the consequences of addiction towards doing non-artificial feats be?

Chapter 8

References

Amabile, T. M. (1996). *Creativity in context: Update to the social psychology of creativity*. Hachette UK.

Amabile, T. M. (1998). *How to kill creativity* (Vol. 87). Harvard Business School Publishing Boston, MA.

Apter, M. J. (2007). *Reversal theory: The dynamics of motivation, emotion, and personality*. Oneworld Oxford.

Bloom, P. (2011). *Transcript of "the origins of pleasure"*. Retrieved 2018-04-02, from `https://www.ted.com/talks/paul_bloom_the_origins_of_pleasure/transcript`

Bohyun, K. (2015). The popularity of gamification in the mobile and social era. , *51*(2), 5.

Brinkmann, S. (2017). John dewey. In *Klassisk og moderne p\a edagogisk teori* (pp. 725–728). Hans Reitzel.

Caillois, R. (1961). *Man, play, and games*. University of Illinois Press.

Chou, Y.-K. (2016). *Actionable gamification: Beyond points, badges, and leaderboards* (Vol. 7). Leanpub.

Crawford, C. (1984). The art of computer game design.

Csikszentmihalyi, M. (2001). A systems perspective on creativity. , 11–26.

Csikszentmihalyi, M. (2014). Toward a psychology of optimal experience. In *Flow and the foundations of positive psychology* (pp. 209–226). Springer.

Dale, S. (2014). Gamification: Making work fun, or making fun of work? , *31*(2), 82–90.

Definition of FY. (2018). Retrieved 2018-05-15, from `https://www.merriam-webster.com/dictionary/FY`

Definition of TECHNOLOGY. (2018). Retrieved 2018-05-17, from `https://www.merriam-webster.com/dictionary/technology`

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: defining gamification. In *Proceedings of the 15th international academic MindTrek conference: Envisioning future media environments* (pp. 9–15). ACM.

Engeser, S., & Schiepe-Tiska, A. (2012). Historical lines and an overview of current research on flow. In *Advances in flow research* (pp. 1–22). Springer.

Festinger, L. (1962). *A theory of cognitive dissonance* (Vol. 2). Stanford university press.

Gamification - google trends. (2017). Retrieved 2017-11-28, from `https://trends.google.com/trends/explore?date=all&q=gamification`

Garson. (2018). *Choose a job you love, and you will never have to work a day in your life | quote investigator.* Retrieved 2018-05-04, from `https://quoteinvestigator.com/2014/09/02/job-love/`

Gartner's 2013 hype cycle for emerging technologies maps out evolving relationship between humans and machines. (2013). Retrieved 2018-02-23, from `https://www.gartner.com/newsroom/id/2575515`

Hamari, J., Koivisto, J., & Sarsa, H. (2014). Does gamification work?–a literature review of empirical studies on gamification. In *System sciences (HICSS), 2014 47th hawaii international conference on* (pp. 3025–3034). IEEE.

Hari, J. (2015). The likely cause of addiction has been discovered, and it is not what you think.

Htc vive. (2018). Retrieved 2018-05-08, from https://en.wikipedia.org/w/index.php?title=HTC_Vive&oldid=839576997 (Page Version ID: 839576997)

Huizinga, J. (1950). *Homo ludens: A study of the play element in culture*. Boston: Beacon Press.

Huotari, K., & Hamari, J. (2012). Defining gamification: a service marketing perspective. In *Proceeding of the 16th international academic MindTrek conference* (pp. 17–22). ACM.

Hype cycle for the digital workplace, 2017. (2017-11-28). Retrieved 2017-11-28, from https://www.gartner.com/newsroom/id/3785664

Ishibashi, T. (1985). MAN,'PLAY', AND GAMES. , *14*(1), 1–2. Retrieved from https://www.jstage.jst.go.jp/article/jhe1972/14/1/14_1_1/_pdf/-char/en

Kapp, K. M. (2012). *The gamification of learning and instruction: game-based methods and strategies for training and education*. John Wiley & Sons.

Koster, R. (2013). *Theory of fun for game design*. " O'Reilly Media, Inc.".

leg — den danske ordbog. (2018). Retrieved 2018-03-15, from http://ordnet.dk/ddo/ordbog?query=leg&tab=for

Libbey, H. P. (2004). Measuring student relationships to school: Attachment, bonding, connectedness, and engagement. , *74*(7), 274–283.

Linden, A., & Fenn, J. (2003). Understanding gartner's hype cycles.

Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the depression anxiety stress scales (dass) with the beck depression and anxiety inventories. *Behaviour research and therapy*, *33*(3), 335–343.

McGonigal, J. (2011). *Reality is broken: Why games make us better and how they can change the world*. Penguin.

Minecraft - the end. (2018). Retrieved 2018-03-15, from https://minecraft.gamepedia.com/The_End

Nah, F. F.-H., Zeng, Q., Telaprolu, V. R., Ayyappa, A. P., & Eschenbrenner, B. (2014). Gamification of education: a review of literature. In *International conference on hci in business* (pp. 401–409). Springer.

NES - video game industry - wikiwand. (2018). Retrieved 2018-04-04, from http://www.wikiwand.com/en/Video_game_industry

Ryan, A. M., & Patrick, H. (2001). The classroom social environment and changes in adolescents' motivation and engagement during middle school. , *38*(2), 437–460.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. , *55*(1), 68.

Salen, K., & Zimmerman, E. (2004). *Rules of play: Game design fundamentals*. MIT Press.

Schell, J. (2015). *The art of game design - a book of lenses* (2nd ed.). CRC Press. Retrieved from http://www.amazon.com/The-Art-Game-Design-Edition/dp/1466598646/ref=dp_ob_title_bk

Schwabe, L., & Wolf, O. T. (2010). Learning under stress impairs memory formation. , *93*(2), 183–188.

Schüll, N. D. (2012). *Addiction by design: Machine gambling in las vegas*. Princeton University Press.

spil — den danske ordbog. (2018). Retrieved 2018-03-15, from http://ordnet.dk/ddo/ordbog?query=spil

Stieglitz, S., Lattemann, C., Robra-Bissantz, S., Zarnekow, R., & Brockmann, T. (2017). *Gamification: Using game elements in serious contexts*. Springer.

VIVE™| VIVE virtual reality system. (2018). Retrieved 2018-04-04, from https://www.vive.com/

us/product/vive-virtual-reality-system/
Vygotsky, L. S. (1967). Play and its role in the mental development of the child. , *5*(3), 6–18.
Vygotsky, L. S. (1980). *Mind in society: The development of higher psychological processes*. Harvard university press.
Why gartner is critical to your business. (2018). Retrieved 2018-03-09, from https://www.gartner.com/technology/why_gartner.jsp
Wii remote. (2018). Retrieved 2018-04-04, from http://nintendo.wikia.com/wiki/Wii_Remote
Zicherman, G., & Cunningham, C. (2011). Gamification by design.