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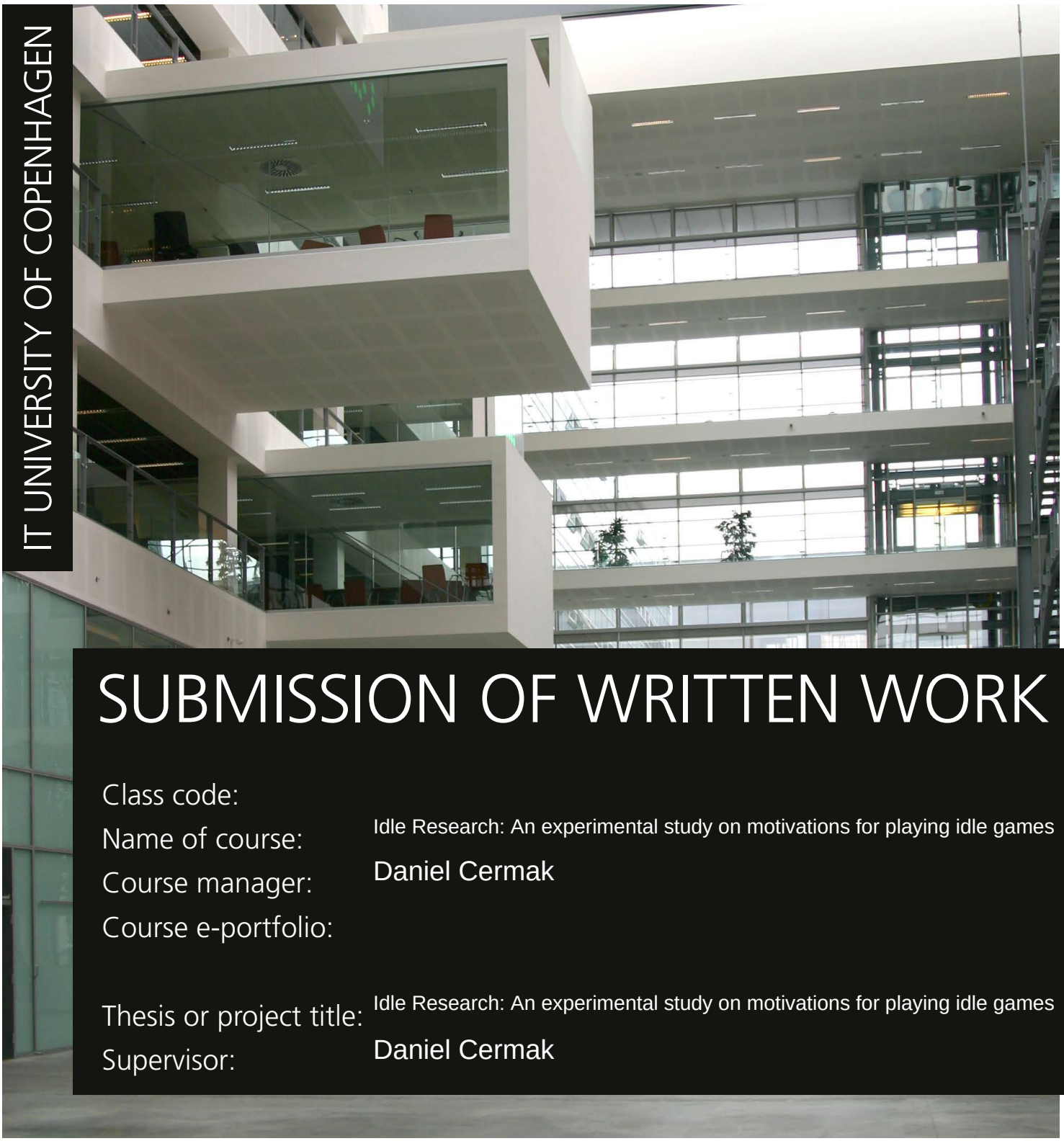

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Idle Research: An Experimental Study on Motivations for Playing Idle Games

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Abstract

Idle games are a young genre within games, focusing on big numbers and low player interaction. Some research has explored what idle games are, tracking them back to social games with microtransactions to skip waiting. Idle games differ by using waiting as a key feature rather than a punishment. This report explores what motivates people to play idle games within the framework of self-determination theory (SDT). An idle game was developed with the purpose of testing different features of the genre. Four prototypes were then distributed to playtesters; one control group and three with one feature removed each: *Clicking, end game* and *offline progress*. Afterwards a questionnaire was administered, measuring the basic needs from SDT in games: *Competence, autonomy* and *presence*. The findings show that each feature has a negative impact on motivation to play, with *offline progress* having the highest impact on motivation when removed.

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Table of Contents

Introduction

The field of games research have taken massive steps in the past decade. A focus has been the study of what motivates players to play video games. This is particularly interesting for developers and publishers, who has an interest in learning what motivates and drives their customers to spend hours in front of their gaming consoles, PCs or with their mobile phones. This has also piqued our own interest, as we often ask ourselves what motivates people to play specific genres of games, and what drives them to keep playing. In particular, the driving motivational forces behind the playing of idle games (or incremental games) has intrigued us. The main pull of most games as an entertainment medium has been the interactive element, and idle games, at the surface, seems to be a game genre with the least possible interaction from the player. One paper defines a taxonomy of idle games, and states about the genre: "*Although interactions are simple, players find these games rewarding [28, 37].*" (Alharti et al., p. 1, 2018). But what are the factors that keeps players of idle games locked to a single game for days, even months at a time? This is the question that we set out to answer in this paper.
More specifically, our research question takes the following form:

How do select features of idle games impact motivation of players?

In order to answer this question as clearly as possible, we have employed *Self-Determination Theory* (SDT) in order to gain a sense of what factors are motivating to players. Using SDT as a method of measuring motivation has seen growing popularity in games research in recent years. Notably, this research method has been used by Richard M. Ryan (one of the creators of SDT) in developing and using a survey called PENS (Player Experience of Needs Satisfaction) in order to measure the motivating factors of video games (Ryan et al., 2006; Rigby & Ryan, 2007). Ryan in particular have made a great impact in the field, doing research on a large number of video games and using SDT to identify and categorize player motivation through questionnaire data collection (Ibid; ibid). Another notable example of research in this field is an article by Peng et al., who made a game prototype, and made a 2x2 testing structure that manipulated or removed different features of the game. They then administered the testers a questionnaire with several questions from PENS in order to measure what feature had the biggest impact on player motivation (Peng et al., 2012). These methods have inspired our own research design; we developed an idle game and tested different prototypes with several testing groups, in order to pinpoint what part of idle games (if any) is the most motivational.

We will begin this paper by presenting the field of SDT and motivational research in video games more thoroughly, as well as a taxonomy of idle games (Alharti et al., 2018) to give the reader a more detailed picture of what the term "idle games" encompass. We then go on to describe the game that was created for this study, followed by the research design itself and the different prototypes distributed to playtesters, as well as what we hypothesized each removed feature has of motivational value. We then present and analyse the results of the questionnaires. A discussion of the findings will follow, and we will end with concluding remarks on the experiment and what impact the findings from this paper could have on the future of idle games, if any.

Theoretical Framework / Research Field

In this section, we provide an overview of the literature in the field of motivational studies in video games, specifically with a focus on research that utilize SDT as their parameter of evaluation. This will include a description of SDT in general, it's contemporary use in the field of game studies, as well as a definition and taxonomy of idle games.

Self-Determination Theory

Self-Determination Theory (SDT) is a psychological theory of human motivation. The theory was initially developed by Edward L. Deci and Richard M. Ryan, from 1985 and on (Ryan & Deci, 2017). Since then, many scholars in the psychology community has elaborated on the theory, and it is still being developed by psychology scholars from all over the world (selfdeterminationtheory.org, 2018). In Ryan and Deci's own words, "*SDT posits that there are [...] basic psychological needs that must be satisfied for psychological interest, development, and wellness to be sustained.*" (Ryan & Deci, 2017, p. 10).

SDT distinguishes between three levels of motivation: *Intrinsic motivation*, which is self-determined and driven by interest, enjoyment and satisfaction; *Extrinsic motivation*, driven by external rewards and potential punishment; and *Amotivation*, being non-intentional and non-valuing in nature (Ryan & Deci, 2000b). A sub-theory within SDT is called *Cognitive Evaluation Theory* (CET) and focuses particularly on intrinsic motivation and the fundamental psychological needs that needs to be fulfilled in order to sustain or thwart it (Ibid; Ryan et al., 2006). These psychological needs include *Autonomy, Competence, and Relatedness*, though *Relatedness* is replaced with a measure called *Presence* in relation to video game research. We will here give a brief elaboration of the first three:

Autonomy is defined as how much free will and sense of volition a person has when doing a task. Autonomy is especially high when performing tasks out of one's free will and wishes. The satisfaction of autonomy can be thwarted if someone forces you to do something, or one feels controlled in their actions (Ryan et al., 2006, p. 3). It is here pointed out that playing video games is, outside of an experimental setting, almost always voluntary, meaning that player sense of autonomy will usually be high (Ibid, p. 3).

Competence is a "*need for challenge*" and a person's ability to feel accomplished at said challenge (Ibid, p. 3). Ryan et al. hypothesise that in video games, this need will be fulfilled by having *Intuitive Controls* (*IC*), as the player can easily achieve their goals in the games through the controls, as well as the game providing "*ongoing optimal challenges"* (Ibid, p. 3), meaning the game being neither too easy or too hard.

Relatedness is "*the need to feel belongingness and connectedness with others*" (Ryan & Deci, 2000b, p. 73). This need is satisfied by sharing experiences, be they successes or failures, with others in a meaningful way.

It is important to note that if the player cannot satisfy all of the needs, the other needs might be impaired as well. This is explained as being analogous with depriving a person of food, but not water; said person's well-being is still being thwarted even though other of their needs are being satisfied (Ryan & Deci, 2000b, p. 75). Additionally, Ryan & Deci note that the needs are based on "*culturally endorsed values*" (Ibid, p. 75), and therefore are highly individual.

By fulfilling the needs above, people will feel motivated to do an action or task because they find it enjoyable and personally fulfilling. In the case of video games, this would mean that a game that satisfies these psychological needs will intrinsically motivate players to keep playing. In contrast, for extrinsic motivation, the driving factor resides in external rewards, like working only to receive a salary, or studying only to get good grades. Extrinsic motivation is seldom seen in video games, as they are generally a voluntary leisure activity and hold no promise of external rewards. An exception to this would be people who work with quality assurance at development studios, who could be said to have extrinsic motivation to play, as it is their job.

Thus, SDT will be the guiding principle in our research design and the defining tool in our data analysis. In order to apply SDT to this study, we used the Intrinsic Motivation Inventory (IMI; Intrinsic Motivation Inventory, 2018) as a basis for our questionnaire, forming our questions around the framework provided by IMI. The IMI is, according to the guide, "*a multidimensional device intended to assess participants' subjective experience related to a target activity in laboratory experiments.*" (Ibid, p. 1). The guide presents a list of questions intended to make a questionnaire, scoring the SDT measures on a Likert-type scale from 1 to 7. The IMI encourages researchers to alter the questions to fit whatever subject is being investigated.

SDT in Games Research

Ryan has, amongst other scholars, applied SDT to investigate the motivations behind players of video games. There are two studies we would like to highlight from game studies that utilize SDT: *The Motivational Pull of Video Games: A Self-Determination Theory Approach* (Ryan et al., 2006) and *Need Satisfaction Supportive Game Features as Motivational Determinants: An Experimental Study of a Self-Determination Theory Guided Exergame* (Peng et al., 2012). Both studies employ SDT in order to study player motivation, though their research design is different.

In 2006, Ryan et al. published a paper with the results of four different video game motivation studies that applied SDT. In these studies, college students were recruited to play short sessions of one or more video games (Ryan et al., 2006). All participants were required to fill out both pre- and post-play questionnaires as part of the experiments. This questionnaire is called PENS (*Player Experience of Need Satisfaction*; Rigby & Ryan, 2007), the purpose of which is to measure how well each tested game satisfied each of the SDT needs, player enjoyment, wellbeing before and after gameplay, and a measure called *Presence*. *Presence* is, put shortly, the player's feeling of being immersed into the game world (Ibid; Ryan et al., 2006, p. 4). In their study, Ryan et al. expected *presence* to be fostered by the satisfaction of *autonomy* and *competence* needs (Ibid, p. 4). In addition, the questionnaire also measured the participants perception of Intuitive Controls (*IC)* (Ibid, p. 4), which was the measure of how easily players

could map an action to the corresponding control. This as well was hypothesised to have an impact on *presence* (Ibid, p. 4). All the documented studies find that "*perceived in-game autonomy and competence are associated with game enjoyment, preferences, and changes in well-being pre- to post-play*" (Ryan et al., p. 1, 2006). The games used for testing in the studies were publicly released and published by third-party studios and publishers.

Peng et al. takes a similar, yet different approach to the study of player motivation. Instead of using already published games in their studies, they developed a game inhouse with the purpose of testing different features and their effects on player enjoyment (Peng et al., 2012). In the experiment, in-game features were manipulated or removed entirely in order to test the influence of each feature on the players by giving each test group a different version of the game to play (Ibid). The features manipulated were divided into two categories: *Autonomy-Supportive Game Features* and *Competence-Supportive Game Features* (Ibid, pp. 183-184). Each category had a binary state in each of the test groups, being either "on" or "off", leading to a 2 (*autonomy-supportive* features on/off) x 2 (*competence-supportive* features on/off) testing structure (Ibid, p. 184). The article concludes that *"Need satisfaction of autonomy and need satisfaction of competence were both found to be mediators for the relationships between the game features and the motivation and engagement outcomes."* (Ibid, p. 176).

Both articles come to the conclusions that SDT is a powerful tool in the pursuit of identifying motivational factors in video games, and that further study into motivations for playing video games using SDT is needed.

Taxonomy of Idle Games

As we are investigating idle games in this study, we find it useful to provide the reader with some theory in the genre of idle games. In order to define and classify idle games, Alharti et al. has created a taxonomy of idle games for researchers investigating the field (Alharthi et al., 2018). The study seeks to identify the "*essential features of idle games*", how features cluster to produce different game types, and what the design implications of each type of idle game are (Ibid, p. 2). The resulting taxonomy reveals that idle games is a genre with a broad spectrum of different game types in it, often sharing mechanics, but employing the use of time, setup, and basic player actions in different ways. The taxonomy has the following levels:

Idle games: This highest and broadest level of the taxonomy is defined as a game that can "*progress without player interaction for some period of time*" (Ibid, p. 6). These types of game are also described as *background games* or *ambient games* (Ibid, p. 6). Some of the criteria that define an idle game are according to the taxonomy: The majority of the gameplay happening in the *background*, *waiting is playing*, the game has *temporal flexibility* (meaning that players may set the game aside and come back to it at their leisure), and that there is no *game over condition* (Ibid, p. 6).

Incremental games: This type of game is defined as a sub-category of idle games itself, but has some alternative, defining mechanics related to resources. In incremental games, the player selects resource(s) to generate, lets the resource(s) accumulate, then spends said resource(s)

to automate part or all of the resource generation process (Ibid, p. 6). Additionally, incremental games often feature an in-game economy which the player must manage in order to progress the game and accumulate even more resources. Incremental games feature several sub-genres: *Micromanagement games* (involving the player managing multiple resources), *single-resource games* (only a single resource is available to the player), *derivative games* (allows players to buy generators that generate additional resource generators) and *multi-player incremental games* (Ibid, p. 7).

Alharti et al. then proceed to place these sub-genres on an interactivity spectrum, with clickers being defined as the most interactive sub-genre, all the way to zero-player games. In the latter, the only actions required by the player is to simply start or set up the game, after which the game will proceed to play itself through an AI player (Ibid, p. 7).

Throughout this paper, we will use this taxonomy as our basic vocabulary when speaking about idle games. It also helps in defining the specific type of idle game that we have chosen to produce for this study and provides a framework for defining and arguing for specific design decisions.

Methodology and Research Design

In this section, we will provide an overview of the research design, the prototypes of the game that was made and what features were removed, and what thoughts went into the questionnaire that we gave our playtesters. We also present our hypotheses concerning what features would have an impact on SDT factors and how. Our research- and data collection design is heavily inspired by former research in the studies of video game motivation (Ryan et al., 2006; Peng et al., 2012; Rigby & Ryan, 2007).

To investigate motivation in idle games, we decided that the best way to do so would be to design one ourselves and test the different prototypes of the game in test groups, similar to the approach of Peng et al. This decision was made in order to be able to control and test a multitude of variables, making it easier to analyse what game features hold influence over which motivational factors. For testing we made 4 prototypes of the game, removing a single feature in three of the prototypes, leaving one game unaltered as the control group. For each prototype, we hypothesized what impact removing the specific feature would have on the evaluation of the game and satisfaction of the players' psychological needs.

In the study, we chose to measure *Presence* instead of *Relatedness*. *Relatedness* might be a interesting measure to explore if the game of study was multi-player, however, as the game we designed is exclusively single player, we opted to used *Presence* instead.

Playtesting & Recruitment

Our initial strategy was to recruit playtesters from the subreddit /r/incremental_games (Broken Mouse Convention, 2018), but we later decided to recruit through social media (Facebook) as

well. All testers were recruited with a message stating our wish to playtest an idle game, and to do research in the field of idle games. The message also stated the playtesting period, as well as the approximated time it would take to fill out the follow-up survey. Anyone who wished to participate could sign up via a Google survey link, where they could post their email address. Potential playtesters were informed by email that we would send them further information and a link to download the game via email, and at a later date send out links to the questionnaire. No one was informed if features were removed from the version of the game they received, and no respondents were given any compensation for their participation except for thanks. All survey answers and respondent data were anonymous.
After the recruitment process, we had 63 volunteers. The volunteers were then divided into 4 groups: One control group who would be given the control game, and three test groups, each given a different prototype of the game with a different feature removed. The playtesting period lasted for a week, and the players were asked to play as much or as little as they wished each day. After the playtesting period was done, we sent all volunteers the same questionnaire, only with a different link for each test group to be able to separate responses by prototype.

Questionnaire

In order to measure participant need satisfaction post-play, we created a questionnaire based on the *Intrinsic Motivation Inventory* (IMI; selfdeterminationtheory.org – Intrinsic Motivation Inventory (IMI), 2018), using a uniform 7-point Likert-type scale for scoring each item (See appendix 1 for full questionnaire). The answer scale was anchored at 1 (not true at all) through 4 (somewhat true) to 7 (very true). Each question was modified from the IMI list in order to measure satisfaction of the SDT need in question in relation to video games, and some questions were added from the questionnaire from *The Motivational Pull of Video Games* (Ryan et al., 2006). The questionnaire contained five subcategories of questions in order for us to easier measure satisfaction of each need. The subcategories were:

Competence: A 5-item subscale measuring participant perception of the game's difficulty level, their ability to overcome it and their feeling of accomplishment in the game. Items included: "I felt very capable and effective playing the game" and "I felt intimidated by the difficulty of the game" (reversed).

Autonomy: A 5-item subscale intended to measure the participants' feeling of freedom of choice in the game. Items included: "I did things in the game because they interested me" and "I felt that I did not have enough choices in the game" (reversed).

Presence: A 3-item subscale measuring the participants perception of their involvement and immersion in the game world. Items included: "When moving through the game world I feel as if I am actually there" and "When playing the game, I feel as if I am an important participant in the story".

Intuitive Controls: A 3-item subscale with the purpose of probing the participants feelings about the control scheme of the game. Items included: "When I wanted to do something in the game, it was easy to remember the corresponding control/button".

Game Enjoyment: A 4-item subscale measuring how much participants enjoyed playing the game overall. Items included: “I enjoyed playing the game very much” and “I thought the game was boring” (reversed).

For the full questionnaire, see Appendix 1.

All questions were organised in a single section of the survey and in a randomized order. This measure was taken to ensure that participants did not guess at the true purpose behind the categories of questions. At the end of the survey, we provided the respondents with an option to leave further comments and asked their gender.

The survey was sent to all volunteers one week after the game was sent. We received 17 answers to the survey in total (14 male, 2 female, 1 non-binary).

IdleConquest

The following is a description of the game, some of the design decisions made, and each of the prototypes.
We decided to make an incremental game, as this is a common type of idle game. We decided to use the platform of mobile games, as this allows players to play whenever they feel like it. The game is themed around the player being a conqueror, taking over houses, villages, cities, countries and continents to increase their income, whilst hiring more soldiers in order to increase the speed at which they proceed. This theme was chosen because a medieval setting is not uncommon with other idle games. The main mechanics of the game involve clicking or tapping in order to conquer cities, which generate income, buying units in order to gain constant income, and hire soldiers in order to passively conquer, without clicking, at an increasing rate the more soldiers are hired.

At the beginning of the game, the player only has the option to tap, or click, the “FIGHT” button in order to start conquering houses. As soon as the first house is conquered, the player may start using their money to hire tax collectors in order to gain a steady stream of income, or hire soldiers to passively start conquering. As soon as the player has hired soldiers and tax collectors, the game will start to become more autonomous; the player will get an automatic increase in income over time, even while not playing the game. The game features offline

progression, as most idle games do. It also has a win-state when the player conquers the world, which shows a message that the game has been beaten.

Furthermore, as mentioned earlier, we developed three variations of the control game. Each of these prototypes has a feature removed from the game, described in the following (The full game can be found in appendix 2).

Image 1: Screenshot of *IdleConquest*

Clicks (appendix 3): A key feature in many idle games (save games very low on the *interactivity spectrum* (Alharti et al., 2018)); most of the interactivity comes from simply *clicking* a certain button or bar in order to make progress in the game. We hypothesized that removing this feature would have a great impact upon either the players sense of *autonomy*, *competence*, or both.

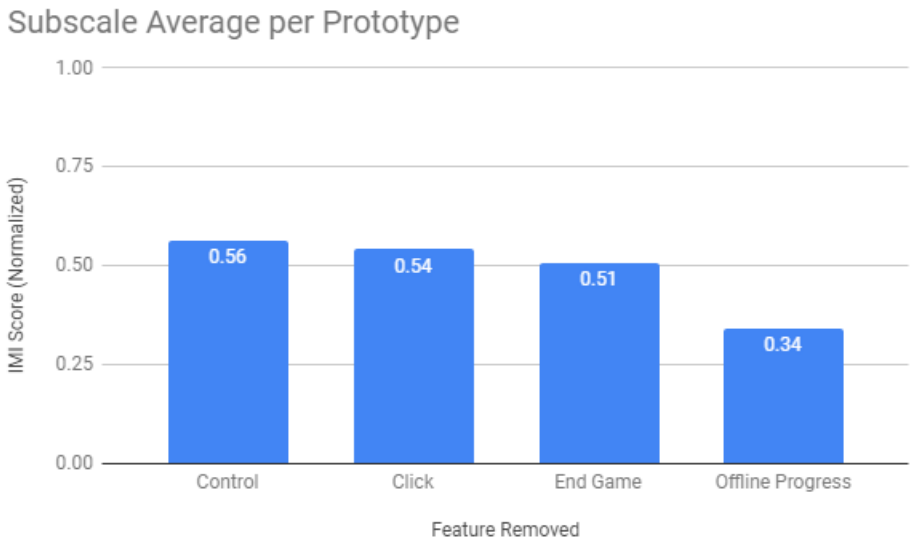
End goal (appendix 4): Idle games usually does not have a defined end; they simply keep scaling up the gameplay to match the players progress. Alharti et. al gives examples of idle games that utilize what is called *NewGame+ (NG+)*, where the player can "buy" a restart of the game when enough currency has been collected (Ibid, p. 6). The prestige level will often consist of a complete restart of the game, sometimes with a token or achievement showing that the player has bought themselves into the prestige level. The restarted game will sometimes have new features or come with rewards that the first playthrough did not have.
We hypothesise that simply denying the player access to prestige levels is not enough, however. After all, the true end goal of an idle game is often elusive in nature, as many idle games (not counting narratively driven ones) does not end, but simply go on and on with no definite end goal but to keep accumulating points or resources. We decided instead to make a version of the game that did not have an end game state, removing the message shown when the player had taken over the world. The player will now be able to keep playing afterwards, but with no clear end in sight. We hypothesized that this would have an impact on *competence* satisfaction, as having an actual finish could give the player a sense of accomplishment.

Progress while gone/idle (Appendix 5): While this element might seem weird outside the genre of idle games, we hypothesized that the progress that happens while the player is not playing the game is one of the core features of the genre. This is where the idle aspect of the genre is very prominent; the progress that happens while the game is *idle*, in the *background*, and not actively played. As this aspect is directly influenced by player choices while actively playing the game, we hypothesized that this feature will have an impact on the satisfaction of *competence*. We thought it might also influence the player's feeling of *autonomy*, as this feature gives the player more freedom to choose when and how much to play the game, while still rewarding them when they return to the game after downtime.

For the full version of the game, we hypothesized decent feedback across all needs, as we designed the game to the best of our ability, modelling it to mimic previous, successful idle games.

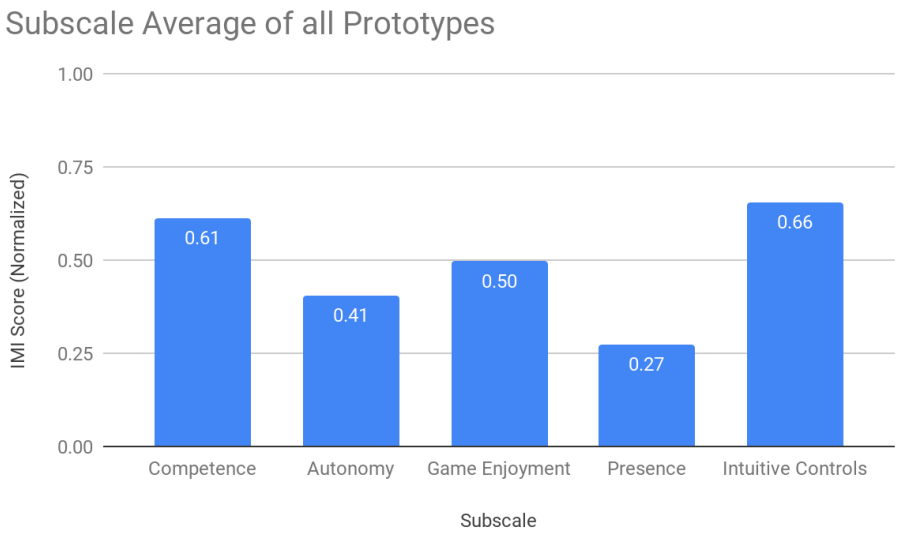
Results & Analysis

The following section will present the results from the questionnaires (See appendix 6 for data). All scores have been normalized in order to compare scores between subscales. This was done because each subscale does not have the same amount of maximum points available (e.g. *competence* has a maximum score of 35 for a single person while *presence* has a maximum score of 21). *Control* represents the control group, while the other data entries describe which feature is removed in the given game prototype.



Graph 1: Averaged subscale scores of each prototype

Graph 1 visualizes the average scores of each prototype across all questions and SDT needs. The control group had the highest score with a score of .56, while the prototype lacking offline progression has the lowest score with an average of .34. While we did expect the *Control* game to score the highest, *Click* and *End Game* scored very similarly with .54 for *Click* and .51 for *End Game*. In the case of *End Game*, this might suggest that this feature does not have much impact on the overall enjoyment or perception of the gameplay, since it is only visible at the end of the game. As a result, some players may not even have arrived at the point of getting the end game message. For the *Click* prototype, removing this feature might have had a low impact on player satisfaction because the game was still very playable, and even fit under a different idle game genre according to the taxonomy (Alharti et al., 2018).
Finally, of note is *Offline Progress* having the lowest score of all the prototypes. We expected this feature to have a big impact on player satisfaction, as gaining progress while offline is essential for idle games.

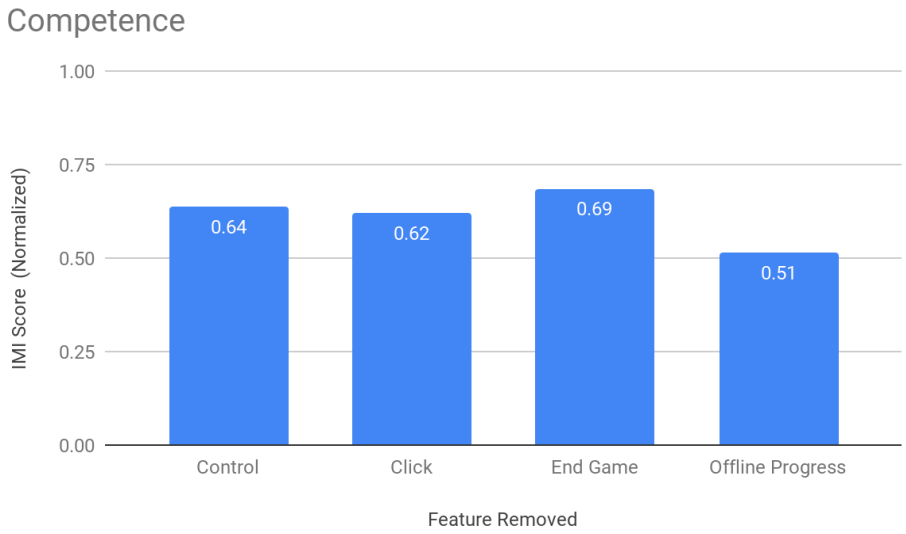


Graph 2: Scores of subscales (normalized), averaged across all prototypes

Graph 2 shows the average score of each questionnaire subsection across all prototypes. *Competence* and *Intuitive Controls* scored highest of the all subscales with scores of .61 and .66, while *Game Enjoyment* and *Autonomy* both got middling-to-low scores of .50 and .41. *Presence* received the lowest score by a wide margin, scoring only 0.27.

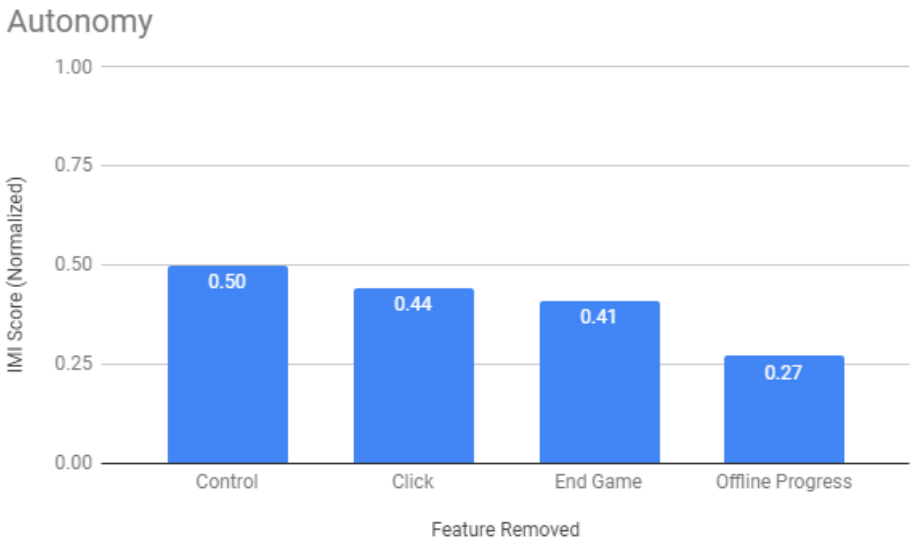
Regarding *Presence*, we expected from the beginning that this would be the lowest scoring measure, as idle games are generally not directly engaging and immersive when compared to other genres of games. However, one player commented at the end of the questionnaire: *"The thing that kept me [playing] with cookie clickers etc, was more of a story"*, meaning that for him, a higher *presence* is what is vital for his motivation to play. *IdleConquest* does not have an in-depth story with characters and a plot, but more of an overall theme and progression timeline. This means the player would need to be creative and imagine a story of their own from what little is given. As we only received one such answer, it is possible that it is just a minority opinion, or it might mean that a subsection of idle game players does value and play for immersion and *presence* in idle games.

It seems people had a good understanding of the controls of all game iterations, as *Intuitive Controls* has the highest score of all measures; an average of .66. However, some players expressed that they weren't quite sure what each button did, and some buttons were a bit too small.



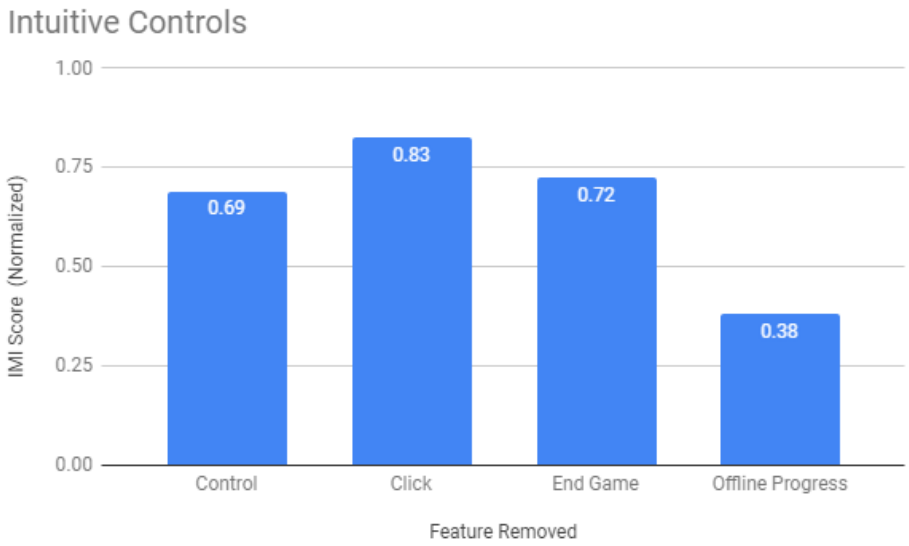
Graph 3: Perceived competence for each prototype

Graph 3 shows perceived *competence* fulfilment scores for each prototype. These scores are very similar, with *Offline Progress* being the only prototype with a significantly lower score. While all the other prototypes scored in the sixties, *Offline Progress* only scored .51. This could indicate that the two other features removed, *Click* and *End Game*, has a lower impact on perception of *competence* than originally hypothesised. We were particularly surprised at the low impact *End Game* had on the score, as we hypothesised removing this aspect of the game would make the game repetitive and not particularly satisfying. However, this graph also indicates that *Offline Progress* is the most impactful feature regarding perceived *competence* in idle games, and the one that players feel the absence of the most. This might be due to a lack of additional resources when they return to the game that impacts the perception of *competence*, as removing this feature skews the rate at which the game progresses, and thus changes the challenge of the game.



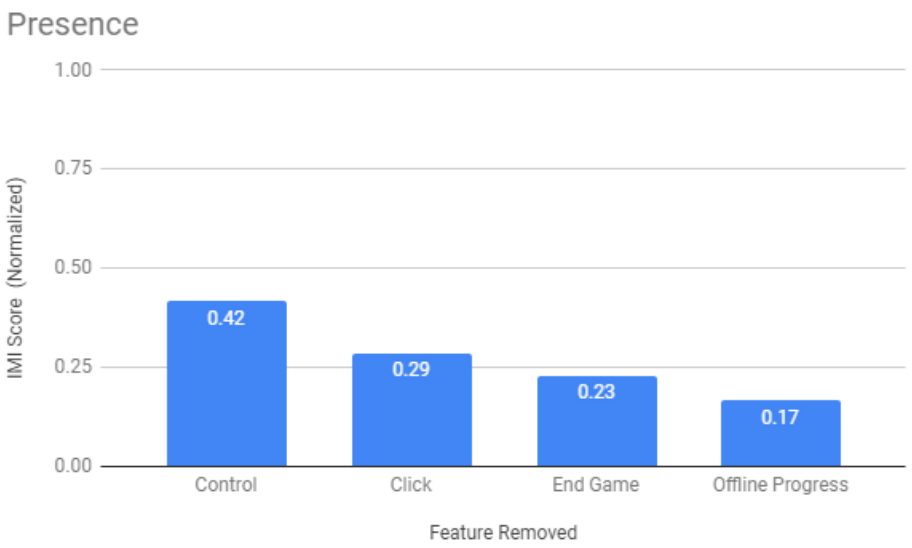
Graph 4: Perceived autonomy for each prototype

Graph 4 shows respondents' score of perceived *autonomy*. *Control* scored highest in this category with .50, while *Click* and *End Game* each declined markedly into the lower forties. As with competence, *Offline Progress* is the lowest scoring category, however much lower than the others this time, scoring only .27. This was initially surprising, as the *Offline Progress* iteration does not directly manipulate *ingame* features or freedom per se, like is the case with both *Click* and *End Game*. However, while there is no choice taken away in the active gameplay, the choice to play while not playing is taken away, which is an essential part of idle games, as earlier noted. The fact that the game becomes an activity to which the player has to pay attention constantly in order to progress subverts the expectation that an idle game can take care of itself for long periods of time. Additionally, it takes away player freedom to only check on the game during spells of boredom; the game simply becomes an instance of what Alharti et al. calls "*playbour"* (Alharti et al., p. 8, 2018), as it keeps calling attention to itself to be played. The lower scores in *autonomy* than in *competence* might suggest that we did not implement enough features in general or give the players enough choice in their ways to play the game. However, the significantly lower score in *Offline Progress* is still indicative that removal of this feature in particular had a large impact on the perception of *autonomy* in the game, and that the choice of when and how much to play the game in order to progress is key to idle games.



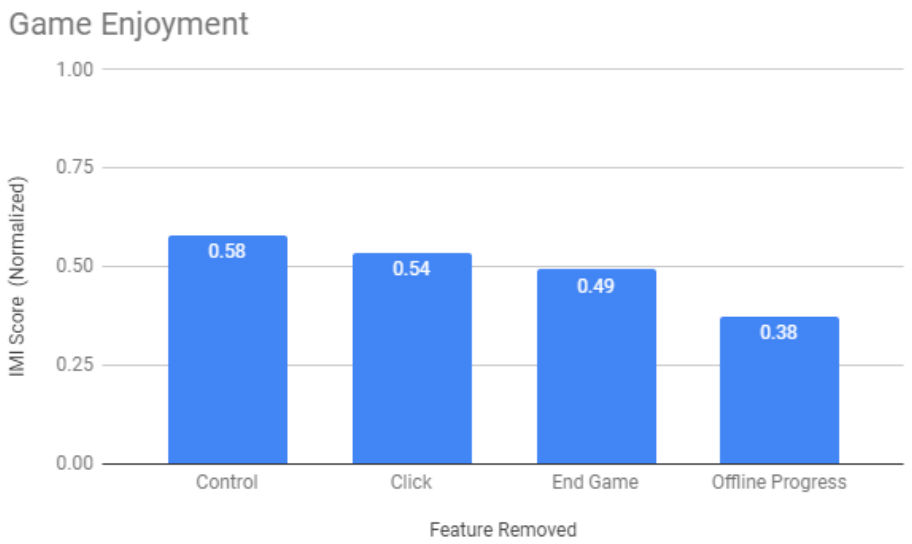
Graph 5: *Intuitive Controls* for each prototype

Graph 5 shows how players scored *Intuitive Controls* across each prototype. *Click* scored the highest with a score of .83, which could potentially be because there is one less button to think about. It stands to reason for *Control* and *End Game* to have roughly equal scores, .69 and .72, as there are no changes to the controls in these iterations. However, looking at *Offline Progress*, it is once again significantly lower than others with a score of only .38. While there is no actual manipulation of the control scheme in this prototype, the low score could reflect that players feel so frustrated by the lack of this feature that even the controls feel wrong. This once again emphasises the importance of this feature for the genre, as it seems to influence even player perception of the controls.



Graph 6: *Presence* for each prototype

As mentioned earlier, player perception of *presence* is very low for the overall game across all prototypes, the highest score being *Control* with an 0.42 average, while all other prototypes are scored significantly lower. Again, *Offline Progress* is the lowest scored iteration at 0.17. While removing *Offline Progress* should not directly influence immersion into the game world, it could be argued that players lose the illusion of their army having free will and agency when *Offline Progress* is removed. This could potentially subtract from player perception of *presence* in the game world, although in an indirect way, as this is highly dependent on how much players are immersed in the game.
The same argument might be raised about both the *Click* and *End Game* iterations: Clicking the “Fight!” button might represent the player personally taking part in the battle as a general or officer, adding to player satisfaction of *presence*. Removing the win-screen also has a significant effect on presence. This could be because the player gets stronger feelings when getting a message that the game is completed, and that the game communicating that the win condition has been met adds to the immersion.



Graph 7: *Game Enjoyment* for each prototype

Finally, we see the overall scores for game enjoyment for each iteration in graph 7. Following the trend of the other graphs, *Control* scored the highest, with *Click* and *End Game* being a bit lower. Scored lowest was the *Offline Progress* prototype with a score of .38, once again confirming the importance of this feature to the testers.

The overall data shows that each feature has an impact on basic need satisfaction. Removing *Offline Progress* has the highest impact on motivation to play, while removing *Clicks* and *End Game* has less, but still significant, impact.

Discussion

In this section, we will discuss the findings of the analysis in greater detail, as well as compare the findings with earlier studies in the field. Included will be a discussion on the implications of game features removed, as this has a large impact on the nature of the game, down to a discussion of whether or not a feature removed can change the genre of the game. We will also address the size and validity of this study and suggest future works and new directions for similar studies.

Immersion in Idle Games

One of the measures that we wish to address first is *presence*. This factor was added to the project in order to compare it to the studies of Ryan et. al, as the article emphasize *presence* as being a key motivational factor for video games (Ryan et. al, 2006). However, we hypothesized that this would not necessarily be true in the case of an idle game, as this factor is more commonly seen in other genres. Though there are indeed narratively driven idle games on the market, our prototype is not, and thus we hypothesized that the players would not value presence to a great degree. We conclude that this was indeed the case, as it was reflected in the low scores the game received across the board on the presence measure. What we cannot tell by the findings, however, is whether or not presence had a noticeable impact on overall game enjoyment, as the presence score was low in all prototypes. The only hint we have to this is formerly quoted player statement in the questionnaire, that he or she often played idle games for the narrative. This could be investigated in future research by incorporating more story-elements into the game, such as pop-ups telling the story of the battle the player had just fought or adding NPC rivals and advisors to the game that would taunt or guide the player along. Alternatively, an analysis of already established idle games could be fruitful.

Key Findings and Future Features

As the findings show, *Offline Progress* is the most essential feature of the three removed. There is a very definite relation between low *autonomy* and *competence* measures of the game, and the game's low score on game enjoyment. Upon further reflection, the reasons for this seems multifaceted. As per the definition of idle games: "*[T]he majority of the play happens in the background"* (Alharthi et Al., p. , 2018), meaning that without offline progress, the game cannot

even be defined as an idle game. Alharti et al. address this aspect of idle games and recognize it as the defining feature of the genre, pointing out the fact that idle games are meant to be in the *background* as a critique of "playbour*, or work-like* practices that emerge around gameplay" (Alharti et al., 2018, p. 8; emphasis in original). If people expect to play an idle game, it would seem that they also expect to progress while not in the game, simply because it is a defining mechanic of the genre, and by removing this mechanic, the game turns into playbour. This might have even created bias in the data: The *Intuitive Controls* subscale also scored significantly lower for this prototype, even though the controls were not manipulated in any way. We expected that these would be roughly the same across all prototypes since the controls were not manipulated to a high degree, but it seems that removing offline progress has such a big effect on the experience of the player that it even affects the intuitiveness of the controls.

From the findings we can discuss whether clicking is even a core mechanic of idle games, since it did not have as significant an impact on need satisfaction or game enjoyment as first hypothesised. However, some idle games are categorized as "clicker games" (Alharthi et al., 2018). Seeing the small impact clicking had on the SDT scores, we cannot categorize our game as a clicker, but rather as an incremental game, or even a single resource game (Alharti et. al, pp. 6-7, 2018). One reason for this could be that clicking does not have much value later in the game because there are no upgrades. As such, the interaction shifts from clicking at the early stages of the game, to choosing units to buy at the later stages.
As for *End Game*, this does not seem to have had a noticeable effect on overall player motivation. Since getting to the end game screen only provides a message saying that the player won and has no further impact on gameplay, it can be perceived as an artificial goal. It is also the highest rated prototype in the competence subscale, which could imply that people would rather like to set their own goals when playing idle games without having the end game screen to break immersion.

In future research, it would be beneficial to add more *autonomy* factors to the gameplay, like different upgrades or generators to purchase. One could argue that this would possibly also influence satisfaction of *competence*, since these features would add more challenge to the game. *IdleConquest* has relatively few features compared to other idle games; for example, other idle games have upgrades, which would increase *autonomy* (more choices) while possibly decreasing competence satisfaction, as the player would have to do more calculations to figure out which upgrade is the most efficient. Alternatively, higher autonomy and added challenge might lead to more competence satisfaction in players, as a greater challenge presented at the right time would keep the player invested in the game. The difference in scores might suggest that perceived competence would have been even higher in *IdleConquest* if perceived autonomy had been higher as well. Higher autonomy might be achieved in future research by giving the players even more choices in the game. This could include upgrades to units or the conquered cities, more choices in what cities to conquer and when, maybe even strategic choices in the battles, though this would edge on changing the game from an idle game to a strategy game. This begs the question; does too much choice change the genre of the game?

Separation of Autonomy and Competence

This leads us to reflect on whether it is even possible to separate the concepts of competence and autonomy in idle games. In other games, there are usually specific skills included in the game, such as aiming in shooters or precision movement in platformers. However, it is hard to identify such a skill in idle games. When you boil it down, an idle game consists of numbers. If the player is good at math, he is probably good at idle games. But what happens if you are able to calculate everything? Would that then take away choices, and thus perceived *autonomy*, or add it? It can be hard to separate *competence* and *autonomy* in idle games and is something that could be investigated with further research.
A possible competence feature to test in a later iteration could be flash events; small gameplay sessions occurring randomly or at a specific time in the game. The player must perform a certain action in order to gain a bonus, like clicking or tapping a set number of times within a specific time limit (Alharti et. al, p. 9, 2018). In the case of *IdleConquest*, this could be battles that the player would have to take charge over by clicking the "Fight!" button a set number of times in order to win the battle, with a result of extra rewards if they succeeded. However, this would draw active attention to the game itself, and maybe decrease player perception of *autonomy*, as the game now requires their full attention, be it only for a few seconds.

Data Validity

While the data shows some of the trends outlined, it may not be quite representative. While we originally sent each prototype to around 15 people (63 total), only a total of 17 people responded to the questionnaire. The subreddit polled has 48,380 subscribers, and the most downloaded idle game *Idle Heroes* has over 10 million downloads on the Google Play store[1]. To be able to reliably say more about idle games, we would need a larger sample size.
Furthermore, it is hard to say what exactly motivates people to play idle games. Here lies one of the limitations of a quantitative study, meaning we can only say something about what we're asking. To be able to gain in-depth insight in players' own perception of motivation, a qualitative approach would be suitable. This would not only allow us to be more flexible but would also achieve triangulation in our data collection. This leads to the question of how to quantify gameplay motivation, if even possible. Both Ryan et al. (2006) and Peng et al. (2012) used questionnaires to measure this within the SDT framework. While we don't claim to have a definite answer to this, the approach has been useful for us. We may not have gotten the details and nuances that a qualitative approach would have given, however we have gotten a larger sample size, which makes up for it.

A general note on the scores of perceived *autonomy* is that it is to be expected to see lower scores in an experimental setting, than if a game was played exclusively of one's own volition. This stems from the fact that you do not necessarily participate in the game for your own satisfaction, but rather as part of an experiment, thus having less personal motivation to play. This is hinted at by Ryan et al.: "*Because participation in games* outside experimental settings *is nearly always voluntary (Bartle, 2004), player autonomy for play would typically be high.*"

[1] As of 14th of december, 2018

(Ryan et al., p. 3, 2006; emphasis added). This means that the opposite would also be true; that a game played as part of an experiment might not be voluntary, and thus have an influence on *autonomy* perception. While this being a research project has most likely influenced the data, everything has been as voluntary as possible. We did not ask people to play a certain amount of time, and we did not place them in a lab-setting. People were encouraged to play as much or as little as they wanted and were even told that it was okay to not play at all. There will however most likely be the pressure of having to play the game once you signed up, but this is unavoidable with this type of experiments.
It is also important to note that the *Offline Progress* prototype had the lowest number of respondents across all the prototypes; only two testers from this group answered the questionnaire. We theorize that this might have something to do with the game subverting expectations so much that testers were jarred by the game and ended up simply discarding the game as not being worth their time, though there is no clear evidence of this.

The features removed from the different prototypes are clicking, an end game goal and offline progress. While these are not all of the features of idle games, we felt that these were vital to the genre and decided to test them. Ideally, we would like to test all the features of idle games, however our sample size was already small enough as it was for each prototype, and we did not wish to fragmentize it further.
On the other side of the argument, there are more features usually connected with idle games than in our game, e.g. upgrades, flash events and NewGame+. This was not within the scope of this project, but testing more features is something to explore in future research. Finally, the scope of the project has most likely impacted the overall design of the game. A team of two and a few weeks to develop a game means that the game hasn't gone through as rigorous a design phase or playtest that we might have wished. Having more time and resources would most likely result in more solid data, as well as more detailed information about what features impacted the game.

Conclusion

In this study, we set out to investigate what features players found to be motivational about idle games. To test this, we designed and implemented a small idle game and made three manipulated prototypes of it with a different key features taken out in each, then tested all four prototypes with four independent groups of testers. We used SDT and CET to make a questionnaire in order to quantify the different prototypes' need satisfaction for the players, then compared the results. Analysing these findings, we conclude that all the features taken out had an impact on perceived *autonomy*, *competence* and *presence*, all of which seemed connected to overall game enjoyment, with *Offline Progress* having the highest impact when removed from the game. This leads us to conclude that *Offline Progress* might be the most important motivational factor of idle games out of the three features removed. This finding might be used for the improvement of idle game design in the future, as well as give insight into the motivations of the player base.
However, because of limiting factors like the project's small dev team, a small pool of testers and the even smaller number of replies to the questionnaire, we advise that this study be

replicated with a larger sample size of testers and larger dev team in the future to confirm the findings. We also recommend that other features than what we implemented in this experiment are tested as well, as this study is far from all-encompassing of all features of idle games.

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Appendix

Appendix 1 - Questionnaire

The (R) means the question is reverse-scored

Competence questions:

I felt very capable and effective

The game kept me on my toes but did not overwhelm me.

I felt intimidated by the difficulty of the game (R)

I was not very good at the game

The game was too easy

Autonomy questions:

I did things in the game because they interested me

I felt controlled and pressured to be a certain way (R)

I felt that I had the freedom to play the game my way

I felt that there were many different ways to play the game

I felt that I did not have enough choices in the game (R)

Game enjoyment:

I enjoyed playing the game very much

I thought the game was boring (R)

While I was playing the game, I was thinking about how much I enjoyed playing

The game did not hold my attention at all

Presence:

I felt immersed in the gameworld

When present the game world I feel as if I am actually there

When playing the game I feel as if I am an important participant in the story

Intuitive Controls:

When I wanted to do something in the game, it was easy to remember the corresponding control/button

The controls of the game made sense to me

I found it hard to figure out the right controls while playing (R)

Appendix 2 - Prototype: Control game

See zip file - “IdleConquest - Control.apk”

Appendix 3 - Prototype: Click removed

See zip file - “IdleConquest - Click.apk”

Appendix 4 - Prototype: End game removed

See zip file - “IdleConquest - End Game.apk”

Appendix 5 - Prototype: Offline progress removed

See zip file - “IdleConquest - Offline Progress.apk”

Appendix 6 - Questionnaire data

See zip file - “Complete Data.pdf” (Zoom recommended) or “Complete Data.xlsx”