A Study of Interaction in Idle Games & Perceptions on the Definition of a Game

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Abstract—An idle game, also known as an incremental game, is a genre of games defined by the primary feature of its strategy: leaving the game running by itself with minimum or zero player interaction. Interaction with the game, while often useful for progression, is optional for extended periods of gameplay. Through a comparison between academic views on the definition of a video game and the results of a survey, this paper uncovers the importance of interactivity in an academic definition and a player's perceptions on how a game can be defined.

Index Terms—Games, idle, incremental, gameplay, interaction.

I. INTRODUCTION

Idle games are a genre of video games that are primarily defined by their strategy: leaving the game running by itself for long periods of time. [1] These extended 'play sessions' often involve minimum, or even zero player interaction. They are also known as incremental, ambient or clicker games; idle games will often allow, and even reward, a player for interaction with the game. The goal is typically infinite; generate points through idling or interaction in order to purchase various upgrades which in turn generate even more points culminating in an ever increasing point total. A sub-genre of idle games sometimes named zero-player games require no interaction for progression to proceed, although inconsequential interaction may exist in some manner. Idle games were chosen as a research subject for this article as their varying and sometimes optional level of interactivity allows for a variety of experiences and insights into just how much interactivity actually affects a player's perception on what is and what isn't a game.

Through research gathered from academic sources, an examination of select examples from the idle games genre that contain varying levels of interactivity and analysis of the results of a one hundred and three person survey, this paper seeks to address the question "What level of interactivity is necessary for a game to truly be defined a game?"

II. WHAT IS A GAME? AN ACADEMIC VIEW

The definition of a game has been discussed by many academics and published articles. Each definition, while sharing similarities, also share a number of key differences. No single, all-encompassing definition on what a game is has yet been formed, though many have tried to do so. Examples include:

To play a game is to engage in activity directed towards bringing about a specific state of affairs, using only means permitted by rules, where the rules prohibit more efficient in favour of less efficient means, and where such rules are accepted just because they make possible such activity [2].

Games are created through the act of gameplay, which is contingent on player acts [3].

At its most elementary level then we can define game as an exercise of voluntary control systems in which there is an opposition between forces, confined by a procedure and rules in order to produce a disequilibrial outcome [4].

A game is a system in which players engage in artificial combat, defined by rules, that results in a quantifiable outcome [5].

An activity with rules. It is a form of play often but not always involving conflict, either with other players, with the game system itself, or with randomness/fate/luck. Most games have goals, but not all (for example, The Sims and SimCity). Most games have defined start and end points, but not all (for example, World of Warcraft and Dungeons & Dragons). Most games involve decision making on the part of the players, but not all (for example, Candy Land and Chutes and Ladders). A video game is a game (as defined above) that uses a digital video screen of some kind, in some way [6].

Through these examples, the common aspects that each definition shares can be easily identified. A game is an activity, it has a set system of rules and often, but not always, a defined goal or desirable outcome. Another aspect that is prominent in the above definitions is that of conflict or combat between players or between a player and the game system itself. The final piece of these definitions bridge the gap between game and video game where [6] states simply that "A video game is a game … that uses a digital video screen of some kind, in

some way." Putting all of these aspects together, a video game can be defined as the following:

A video game is an activity that utilizes a digital video screen in some way. It is constrained by a system of rules in which a player combats with another player, or with the game itself, often to achieve a definite desirable outcome.

This broad definition, while not all-encompassing, will be used for the purposes of this paper. It is important to note that in this definition, there is one key aspect that without, the concept of a game falls apart. It is the player. Without a player, a video game ceases to be an activity, nor can there be any conflict which in turn makes achieving the desirable outcome impossible. Without a player, a video game is simply becomes a system of rules displayed on a digital screen.

III. The Role of the Player

A player is an aspect of a video game of which a majority of people would not question its necessity. Without a player, a video game becomes something akin to a movie or a book; an experience where a viewer has no choice but to passively surrender to the narrative or events depicted. The viewer has no agency nor ability to interact with the experience and therefore has no influence on the events in the video game. There are however some gaming experiences in which a player has interactivity, but no agency such as "Snakes and Ladders". In this game, the player's only action is to roll a die which determines how their pieces move. It is entirely chance based and the game allows the player no choices that they can make to change the final outcome of the game. While this type of game may typically only be popular to a younger audience, it still fits within the definition of a game given in the previous section. From this, it can be inferred that it is the interaction with the game that is more important than a player's agency when defining a game.

Another situation where the role of the player can become blurred involves the use of Artificial Intelligence within a video game. In the video game *Command and Conquer 3: Tiberium Wars* [7] it is possible to play the game's multiplayer mode against humans, computer-controlled AI opponents or a combination of both. It is also entirely possible to set the game to be played with only AI controlled players, creating an instance of the game in which a player can control the camera and view the action from wherever they like, but cannot influence the outcome of the game outside of the initial setup that preceded it. This raises the question that if a computer-controlled AI opponent can be added to a game to replace a human-controlled opponent, is it still a player? It is still under all of the restrictions set upon it by the game's system of rules and from the point of view of another player, it will act in a way that is entirely plausible for a human player to act. If the AI is programmed well enough and the fact that it is computer-controlled is adequately hidden from a player, it is entirely possible for a human player to not know whether they are playing against a human or computer-controlled opponent. Through the definitions and explanations given, it is clear that

an artificial intelligence player is still a player, and therefore, a game played without the participation or influence of a human player is still a game. How then does a completely computer-controlled instance of a video game differ from a non-game based activity such as a watching a movie or reading a book? The answer is variable results. A movie is the same every time you watch it; the same events lead to the same outcome. The above situation, provided the game is sufficiently complex, will contain a completely unique series of events leading to varying outcomes or different ways of accomplishing the same outcome [8]. There are exceptions to this rule, some movies such as *Clue* [9] had multiple endings while *Final Destination 3* [10] gave the option for DVD viewers to make decisions at key moments which could change events in the movie. Conversely, if some video games such as *The Walking Dead: Season Two* [11] were to be played by a computer controlled player, the same events and outcomes could be achieved if the same choices were made during gameplay.

The last question about a player's role in a game is that of interactivity. If player agency is not necessary for a game to be played, is interactivity necessary? In the vast majority of cases, the answer is yes. In [12], it is stated that "[…] *the essence of a game is rooted in its interactive nature, and there is no game without a player*". It has been established that players, although not necessarily human players, are necessary for a game. With the involvement of a player and then by the very definition of what a player is, it is a natural assumption interactivity must be involved. A player without interactivity is not a player but rather an observer. With this assumption in mind, a game must then include interactivity in order to fit within this paper's definition of what a game is. There are some video games that push this idea's boundaries such as *RobotWar* [13]. In this game, a player will program the actions of a virtual robot with the use of a simple scripting language. This program would control the robot's actions and reactions with the goal of becoming the only surviving robot in an arena-style battle of similarly programmed robots. Once the initial code had been created, the game can then be started and the creator of the robot becomes an observer, not a player, as his robot entered battle with the creations of other observers. While the actual game portion of the game has no interactivity, and therefore should not be classified as a game, it could be argued that the initial script creation is indeed the interactivity in the game as a whole as well as the ability to change the script after observation of the robot in order to make it better at surviving. This would fulfil the game's need for interactivity and thus, allow it to fall under the definition of a game.

A second video game that is an excellent example of pushing the boundaries of interactivity's necessity in a game is *4 Minutes and 33 Seconds of Uniqueness* [14]. This video game, created as part of the 2009 Nordic Game Jam, is described by its creator as "[…] *an exploration to what actually defines a game. You can win or fail in the game, but there is no user input or interactivity of any kind.*" [15]. The goal of this video game is simple, the player wins the game if they are the only person in the entire world playing the game for four minutes and thirty three seconds. If another player

starts the game while the player is playing, both instances of the game will quit. The only interaction is between the game systems of two players if each instance is running at the same time, but there is absolutely no interaction from either player themselves. This complete lack of interactivity should prevent this creation from being defined as a game, however comments from users of this program show that a decent proportion of people who have 'played' *4 Minutes and 33 Seconds of Uniqueness* refer to it as a game, even the users who did not enjoy the experience. There are a number of user comments that show excitement upon completion of this game or frustration at other people currently preventing them from winning [15]. This shows a clear dissonance between an academic definition of a game and the views of the general public, which will be discussed later in the paper.

Through the previous exploration of a player's role in a game, we can determine three key aspects that are required: (1) Agency, while desirable, is not necessary; (2) Players are necessary for a game but do not have to be human; (3) Interactivity.

While there are exceptions, or near-exceptions for all three aspects, the majority of video games include all of the listed aspects and therefore will fit within the definition that a video game is "*…an activity that utilizes a digital video screen in some way. It is constrained by a system of rules in which a player combats with another player, or with the game itself, often to achieve a definite desirable outcome.*"

IV. IDLE GAMES

Idle games are a relatively new genre of video game; the first instance of the genre was created in the early 2000s. As their name suggests, idle games are designed to allow a player to progress while idling, when the player does not interact with the game at all. While these games typically do feature an interactive element, often allowing purchase of upgrades that speed up idle progression, the majority of an idle game's run time will be spent with no interaction from the player. The goal is typically infinite, a player can play most idle games for a few minutes or even a few years, and still be making progress. An extreme example of this would be of a player running an idle game for a month, but only interacting with it for ten minutes in total, yet they would still make progress despite the huge difference between time spent interacting and time with no interaction. Minimization or even complete removal of interactivity in idle games pushes them into a sub-genre of game sometimes known as a *Zero Player Game* (ZPG). ZPGs take the same idea of an idle game, a game that progresses without requiring input from the player, but only allows only very minor interaction (such as only being able to click a single button in *Stat Builder* [16]) or interactions that have no effect on the progression of the game such as in *Godville* [17]. Idle Games have become increasingly popular due to a number of aspects including their ease of accessibility and their fulfilment of a modern desire to multitask and use time optimally. [18] For the purposes of this paper, eight idle games were chosen as subjects of research. Four are idle games with minimal or zero interaction (ZPGs) and four require a medium to high level of interaction to effectively make progress within the game. The games chosen are listed below in Table 1.

TABLE I. IDLE GAMES CHOSEN WITH INTERACTIVITY LEVELS

Game Name	Interactivity
Godville	0
ProgressQuest	0
Clickpocalypse II	1
Stat Builder	2
AdVenture Capitalist	4
Cookie Clicker	5
Clicker Heroes	6
A Dark Room	8

The interactivity rating listed in Table 1 was calculated based on how much interaction was required to progress through the game while utilizing interactive elements of the game as they became accessible to the player. An interactivity rating of zero meant that the game would progress without any interaction at all from the player, while a rating of ten meant that the game would not progress unless the player gave the game constant interaction.

An analysis of each of the chosen idle games, comparing them to this paper's definition of a game yields the following information:

- *A video game is an activity.*
  All eight of the chosen games are activities that utilize a digital video screen. Regardless of their level of interaction, they are all voluntarily and deliberate activities. They are not something that a player can accidentally participate in.
- *…utilizes a digital video screen in some way.*
  All eight chosen games again fit this constraint.
- *It is constrained by a system of rules.*
  All eight chosen games each have their own set of internal rules that determine progression. The fact that each game follows a set of rules instead of a pre-determined series of events further differentiates them from other forms of media which will display the same series of events and outcomes every time.
- *…a player combats with another player, or with the game itself.*
  This line is where the eight chosen games begin to stray from the given definition. A player combating with the game itself implies a struggle or a challenge that the player must actively overcome. This requires strategy or thought to be put into a players actions within the context of the game. The latter four games in Table 1 each provide a player with a number of options for how to advance the game by providing options that the player can choose from. Each option has a different effect on the game and while all will be useful, some options may have a greater effect than others. The same cannot be said for the first four members of Table 1. Because no meaningful interaction is required, there is no challenge for a player to overcome; the game will progress with or without the player.

- *...to achieve a definite desirable outcome.*
  Idle games typically do not have a defined end goal, they do however have a desirable outcome, the continuous and ever-increasing accumulation of points, or the game's equivalent of points.

From the above comparison, all eight of the chosen games fit within four of the five criteria to be classified as a game, however, only the four games with a higher level of interaction fulfilled the fifth criterion. The key point from this analysis is that by this paper's definition of what defines a game, meaningful interaction is important. Interaction can be present in a game-like activity, but without a tangible response to a players actions, a response that has an active effect on the game from that point onwards, the activity cannot be called a game. Meaningless interaction does not constitute a challenge for the player in any way.

It is possible to conclude then that based on the information gathered, the definition of a video game that was extrapolated from other academic definitions and the comparison of the eight chosen games that idle games can be classified as games, but only if they include player interaction with the game and that the interaction is meaningful and will affect the gameplay. Without this meaningful interaction, it simply becomes a game-like activity that, while sharing a lot of features with a video game, cannot be classified as a video game under an academic definition.

V. What is a Game? A Player's View

The second half of this paper focuses on the results of a public survey of 103 people. The target sample of this survey was as wide as possible; all ages, all genders and varying levels of video gaming experience. It was distributed via the internet and the respondents were from many different countries. The survey asked each respondent to choose two games from a list of eight idle games, one from a list of mid to high interaction idle games and one from a list of low to zero interaction idle games. The respondents did not know which list their chosen idle game was from, nor that the games were separated based on interactivity. They were then asked to play each of their two chosen games for five minutes and then answer a number of questions based on their experiences playing the game. Survey respondents asked to give their chosen idle games a rating between one and ten for graphics, interactivity, enjoyment and overall rating and also asked if they would consider it a game or not.

Analysing the responses to the medium to high interactivity games, there are a number of mixed results. The majority of respondents gave ratings of seven and above to interactivity, enjoyment and overall rating, and six and above for graphics when rating these four games. The lower ratings in graphics can be traced to *A Dark Room* which is completely text based. The average rating of interactivity was 5.9, which is similar to the average of the ratings shown in Table 1, which is 5.75. When asked if the respondents considered the game they played a game, 85% responded 'Yes'.

Following the rating, respondents were asked some open ended questions about why they felt that the game was or was not a game. There were a lot of shared aspects in the responses given that can help identify the reasons that 85% of players agreed that these were in fact, games. Aspects mentioned in multiple responses include; allowed user input and provided feedback to those responses, Offered choices to the player and that it was designed to entertain the player. The most common reason given however that was the game was interactive. A large number of responses mentioned this in particular as being the key point that defined a game. Of the remaining 15% who did not classify these as games, a number of reasons were also given for these not being games, but the most common reason was a lack of interactivity. It is also worth noting that 82% of respondents who said that these were not games also gave their chosen game an interactivity rating of four or less. Ratings for graphics, enjoyment and overall rating for this sub-group were not as low as the interactivity rating in over half of the responses. This clearly shows a correlation between a player's perception on whether a game is a game and the level of interactivity they felt it contained.
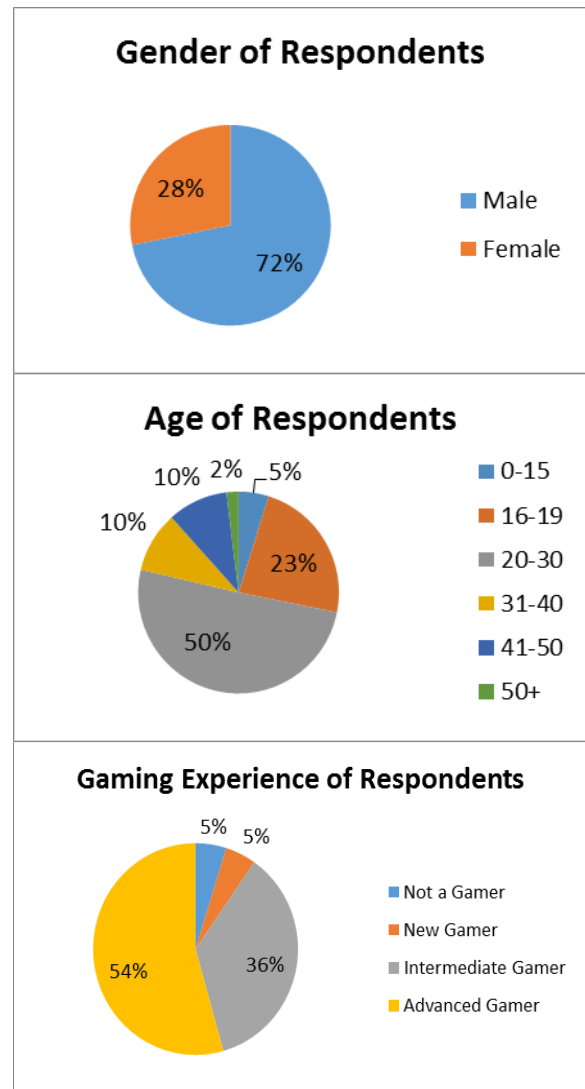

Fig. 1. Survey sample's gender, age and gaming experience

TABLE II. SURVEY'S IDLE GAME LISTS

Low to Zero Interactivity	Medium to High Interactivity
Godville	AdVenture Capitalist
ProgressQuest	Cookie Clicker
Clickpocalypse II	Clicker Heroes
Stat Builder	A Dark Room

Analysis of the second half of the survey results provides more information to build a conclusion with. Of the remaining four games, three required absolutely no interaction to progress (*Godville* and *Clickpocalypse II* [19] do have optional interaction) and the remaining game requires only a single, repeated type of interaction; clicking on a button. Over 60% of respondents gave a rating of five or less in every area for these four games, with more than 25% of all responses in each area giving a rating of one. The average rating for interactivity was a mere 3.2, which is higher than the average of the interactivity ratings in Table 1 of 0.75. It is however, 2.7 points lower than the rating for the medium to high interactivity games. Results for whether respondents would define these games as games were more mixed than the other four games, 49.5% of respondents said these were games and 50.5% of respondents said that they were not.
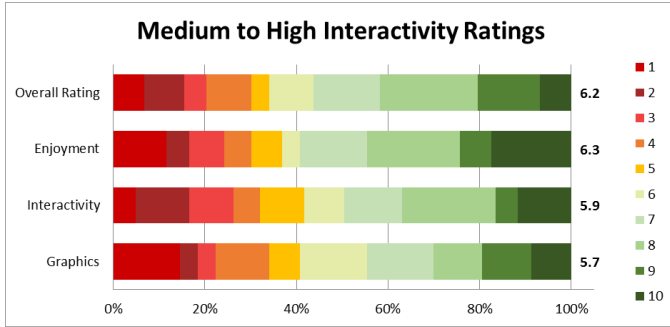

Fig. 2. Medium to high interactivity games survey results – Ratings

The group of respondents that did choose to define these as games gave varying responses when asked why. Common elements in their responses include; it is entertainment, takes user input, it is a parody of other games and it is a game because it is labelled as a game. A few respondents said that they were "*The absolute bare minimum for a game*". Of all the reasons given, the most common reason was, as before, interaction. While many noted that the interaction present was minimal at best, it was often enough for them to define their experience as having played a game. The other 50.5% of respondents who did not classify these as games agreed on a lot more as to why they felt that these aren't games. Common aspects included: No user input, the player was just watching, the game was pointless or boring and that the game required no thought at all. A few respondents were confused by the game's lack of interaction and felt like they were missing something while others did not want to play these games for the required five minutes and closed the game early. As has been discussed before, interaction, or lack thereof, plays an important role in defining a game. The most common aspect mentioned by this sub-group was the minimal, or non-existence, of interaction.

As shown in Figure 3, more than 80% of interactivity ratings for these games were five or less, with almost half of those respondents only giving a rating of one, the lowest option on the scale.

From the analysis of the survey results, it is clear that, while other aspects can play an important part in defining a video game, interaction is the key aspect for a player. Approximately half of the players surveyed still considered a game with minimal interaction to be a game, however the other half did not. The difference was a lot clearer when the games examined had clear levels of interaction that allowed players to do a variety of things, where a majority of players did consider these to be games. Other aspects, such as player input and feedback from that input, entertainment value and player agency are all important to defining a game, but interactivity overshadows all of them as the most important aspect of a game. From the results, we can extrapolate that idle games will generally be defined as games by players themselves, however, an idle game with very little or no interactivity is a lot more likely to not be classified as a game.
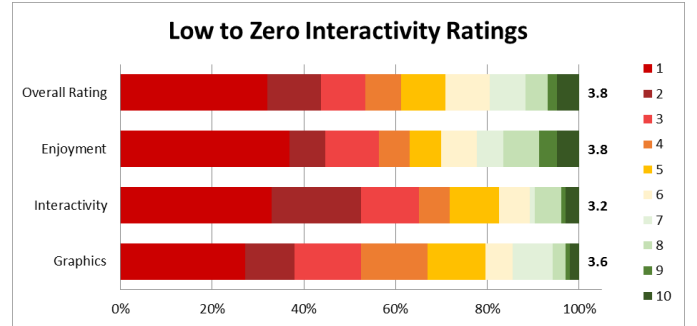

Fig.3. Low to zero interactivity games survey results - Ratings

VI. CONCLUSION

In Section II, a video game was defined as:

A video game is an activity that utilizes a digital video screen in some way. It is constrained by a system of rules in which a player combats with another player, or with the game itself, often to achieve a definite desirable outcome.

In Section III, this definition was dissected further to determine exactly what is necessary for a video game to fall under this definition. It was determined that two factors are key, players (although not necessarily human) and interactivity. Without one or both of these aspects, a video game compared to this definition simply cannot be called a game.

Eight specifically-chosen idle games were compared to this academic definition and it was found that interaction was the deciding factor for the eight chosen games. Four of these games did not contain a sufficient level of meaningful interaction. While they contained a small amount of interaction, this interaction had no effect at all on the progression of the game and thus could not fit under the given definition of a game, specifically with reference to the following section; "*a player combats with another player, or with the game itself.*"

The eight chosen idle games were the subject of a survey of 103 people who each played two for five minutes. They were

then asked to rate a number of aspects and asked if they believed the games played to be classified as a game and why. The results clearly showed a correlation between a game's level of interaction and whether it was classified as a game or not. Games with a medium or high level of interaction were more likely to classify as a game than games that did not have interaction at a meaningful level. While other aspects did affect a player's classification, none were more commonly referenced than interaction.

Through this close analysis of idle games, it can be determined that through an academic lens, idle games can be defined as games as long as they contain meaningful player interaction. An idle game that plays itself completely, where a players presence and input does not affect the events shown on screen, cannot be academically classified as a game. Through the lens of a player however, the line becomes more blurred. While higher levels of meaningful interaction in a game will more often than not make a player classify a game as a game, any interaction at all contained in a game can have an effect on a player's definition of a game. Approximately half of the players surveyed still considered a game with no meaningful interaction to be a game. While academically, these cannot be defined as games, in the player's point of view it becomes a matter of opinion as to the necessity of meaningful interaction within a video game.

The question asked at the beginning of this paper, "What level of interactivity is necessary for a game to truly be defined a game?" can be answered two ways. Academically, a game must possess a level of player interactivity that allows the player to have a tangible effect on the progression of the game. Without this, it cannot be defined as a game, merely a game-like activity. A player-focused response gives a slightly different answer; a game must possess interactivity to be defined as a game. Whether the interactions have to be meaningful and have a tangible effect on the game is a matter of opinion that differs between players.

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