And Then You Wait: The Issue of Dead Time in Social Network Games

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ABSTRACT
Playing social network games involves a lot of waiting time; time where you can do nothing meaningful in the game and have to wait for certain things to grow, friends to send you gifts, or energy to refill. This paper addresses whether the notion of dead time as introduced by Juul (2004) can be helpful in theorizing about this waiting time in social network games. It starts with a discussion of game time in general and continues with a discussion on how time works in social network games. Then it will address the notion of dead time. It is concluded that waiting time can indeed be seen as similar to dead time and that especially Hitchens' (2006) model of time in games and Tychsen and Hitchens' (2008; 2009) appropriation of the same model for multiplayer games, is helpful in seeing how this works

Keywords
Time, dead time, waiting, asynchronity, social network games

INTRODUCTION
Playing games on social network sites like *Facebook*, *MySpace*, or *Hi5* is now a popular pastime for many people. Even though the numbers are in decline, *CityVille* (Zynga, 2010) on *Facebook* still has almost 80 million monthly active users,[1] while Zynga's (2009) earlier hit *FarmVille* was over 80 million players at its peek (Walker, 2010). Although active user is not further specified by *Facebook* a large share of these players invests a lot of time within these games. And that makes time an interesting angle upon this phenomenon.

Players expend time on playing games and this is usually supposed to be an enjoyable experience. However, as virtual world designer Richard Bartle (2004) asks: 'Is spending 40 minutes tromping across a desert without meeting a single player fun?' (p.129). Or applying this to a social network game like *FarmVille*: Is clicking on over a hundred farm plots to make them ready for a new crop fun? Both these examples refer to what Juul (2004) has called *dead time*, which he describes as time 'when you have to perform unchallenging activities for the sake of a higher goal' (p.138).

Loads of games have parts that are less interesting and players usually refer to these repetitive unchallenging activities as grinding or farming. But the time that you spend

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doing these less interesting actions, is only time spent in the game. Even in large-scale virtual worlds like *World of Warcraft* (Blizzard Entertainment, 2004) your own playing stops when you log out, although the world itself persists.[2] In several of the relatively new social network games this is slightly different as the time spent away from the game can also be useful. Or as media and games researcher Bogost (2010) posed it negatively: 'they also destroy the time we spend away from them'. For example, in *FarmVille* your crops take time to grow, but they will even grow when you are not there, or in *Monopoly Millionaires* (Electronic Arts, 2011) your houses still accumulate revenue and you gain new rolls of the dice even if you are not there. And in *Gardens of Time* (Playdom, 2010) you need to wait until your friends help you build your wonder and until you have new energy to fuel your time machine.

So in essence you are playing these games even when you are not playing, and this puts the notion of dead time in a different perspective. When your crops are growing in *FarmVille* and you have performed all the meaningful game actions, you could linger but really all you can do then is wait until your crops are ready to be harvested. It could therefore be argued that the time spent waiting could maybe be understood through the notion of dead time as the waiting for the sake of earning in-game benefits is largely unchallenging. This paper wants to explore whether we can appropriate the notion of dead time towards this relatively new time dimension in social network games and as such provide a conceptual framework that can then be used as an analytical tool.

In order to do this, I will first need to take a look at the issue of time in games in general and in social network games in particular. I will then look into the issue of dead time as theorized by Juul (2004) and address whether this conception of dead time can be applied to the waiting in social network games and how this might fit in the discussed time models. The concluding paragraph will summarize my argument, answer the main question, and give directions for further research by looking at how looking at the waiting activities in social network games might be useful in game research.

TIME IN GAMES

Several authors (among others Juul 2004; 2005; Lindley 2005; Hitchens, 2006; Zagal & Mateas, 2007; 2010) have addressed issues of time in games. In the early years of game studies several of the accounts on time and temporality originated from distinguishing games from narratives (for example Aarseth, 1997; 1999; Eskelinen, 2001; Juul 2001). Especially the temporal difference between linear textuality (e.g. novels or movies), and various other forms of nonlinear and multilinear texts (e.g. hypertext novels or games, called *ergodic* literature by Aarseth, 1997) is at the heart of the problem. In linear texts there is only one path that the reader can take and therefore a narrative enfolds the same way every time. Of course as a reader you could start reading at the last chapter or somewhere in the middle, but the overall story does not change. Ergodic literature is different as the reader is required to use 'nontrivial effort […] to traverse the text' (ibid., p.1). The ergodic text presents multiple pathways which allow the reader to actualize his or her own version of it.

Addressing this distinction between narratives and games game researcher Juul (2001) describes how time in games differs from time in narratives. In narratology, narrative time is usually split up in *story time* and *discourse time*, denoting the difference between the chronological unfolding of the events in the story world and the order in which these events are narrated (Abbott, 2008). According to Juul, the problem for the study of games within this narratological framework is that discourse time presupposes that the events

have already passed in time. If the player can act in the game, the story time has to unfold at the moment of playing to make sense. This renders it problematic to order the events differently as variations due to previous player choices can not be taken into account beforehand. These problems led Juul (2004) to divide game time into *event time*[3] (which is relatively analogous to story time) and *play time* (which implicitly seems to follow the Genette's (1980) additional reading or viewing time in narratology). Play time is the time that you expend playing the game and event time is the time that the events take in the game world. Discourse time or something similar is absent from his model.[4] In addition Juul (2004) also describes the notion of *dead time*. Within his model this is just an example of how time is experienced within the play time/event time relation, but, as will be discussed later on, this concept might be of more use.

The main problem of the above described model, as argued by Hitchens (2006) is that it remains a fairly linear approach to game time, not suited to describe nonlinearity like save games and reloads. Therefore Hitchens tried to refine Juul's model by distinguishing between four different time layers: *playing time*, *engine time*, *game world time* and *game progress time*. In essence playing time is rather similar to Juul's (2004) play time, but while Juul argues that play time is paused when the game shows a cut-scene or when it loads a new level, Hitchens incorporates this in the playing time. As such the real-world time and playing time are essentially the same, as long as there is some interaction with the game state at some point. Hitchens briefly discusses game world time, which is basically analogous to Juul's event time, but argues that 'Game world time is not a satisfactory concept for understanding all player progress through the game world' (p.47). Instead, Hitchens offers the notion of game progress time in which nonlinearity is incorporated. This time also takes into account that certain parts of the game can be saved and played again and again, marking a progression in player time, but not in the game world. The fourth time that Hitchens introduces is engine time, which refers to when the game engine is running as a result of some player interaction. In single-player games engine time will mainly mirror playing time, but in multi-player games this might be different. Like for instance in persistent virtual worlds, where players can log in and out as they choose, the game runs almost continuously with the exception of crashes or maintenance.

This added multi-player complexity was addressed in more detail in an update by Tychsen and Hitchens (2008; 2009). By empirically testing the above model on various role-playing games they identified that there needed to be three additional time layers: *server time*, *story time*, and *perceived time*. They emphasize, however, that 'not all seven layers are applicable to all forms of games' (Tychsen & Hitchens, 2008, p.6). This becomes the most apparent in their story time layer, as it is only useful in games that contain a storyline. However, both server time and perceived time might be useful, as will become clear later on. Server time indicates the time that the server is up and running. This is different from Hitchens' (2006) engine time as engine time addresses the interaction between a single player and the client software, while server time incorporates all the interaction between multiple clients (or engines) with the server. Perceived time has links to the player experience of the time that is spent on a game. As already addressed by Juul (2004), players might experience time differently. Some might consider parts of the game boring and therefore the time seems to drag out while they are playing, but others might be so engaged in the game that time seems to fly.

Another model on time and games can be found in Zagal and Mateas (2007; 2010). This model differs in its genealogy, though, as it is rooted in the games ontology project which

aims at 'creating a framework for describing, analyzing and studying games, by defining a hierarchy of concepts abstracted from an analysis of many specific games' (Zagal et al., 2005, p.1). As such it has more links to other frameworks, categorizations and typologies, like Aarseth et al. (2003), Björk et al. (2004) or Elverdam and Aarseth (2007). Zagal and Mateas (2007; 2010) describe four temporal frames: *real-world time*, *game world time*, *fictive time* and *coordination time*. The real-world temporal frame incorporates all the events in the physical world and is as such more inclusive than Juul's (2004) play time or Hitchens' (2006) playing time. It addresses *all* events whether you are playing or not. Events that are represented in the game world make up the game world temporal frame. This frame seems to be rather similar - or at least harbors some overlap - to their fictive time frame, but the main difference is that game world time refers to *all* events in the game world, while fictive time only refers to '[r]epresentational elements [that] strengthen the fictive frame' (Zagal & Mateas, 2010, p.851). So game world time also includes gameplay actions, while fictive time is the mere application of socio-cultural labels and use of narrative frames. Their last temporal frame is coordination time, which is 'established by the set of events that coordinate the actions of multiple players (human or artificial intelligence[AI]) and possibly in-game agents'(ibid., p.850). This is every event that is determined by the rules or mechanics of the game, like turn taking or rounds.

As can be abstracted from the above, there is a lot of overlap in the subsequent models and all can be useful for describing and analyzing games. The main differences between the models can be found within their focus on the player and the game. Juul's (2004; 2005) model contrasts the player with the events in the game and only looks at the chronological progression of play time when the player is actually able to interact with the game. Hitchens (2006) takes a more inclusive approach and incorporates both non-game events (e.g. cut-scenes or loading time) as well as nonlinear progression (e.g. reloads of save games). In addition he also looks at the engine time, which might operate without the player. In Tychsen and Hitchens' (2008; 2009) update of the model, they enabled the model to accommodate multiple players. Zagal and Mateas (2007; 2010) are more concerned with the game as experienced by the player and as such do not include an engine time. Their coordination time takes over some of the properties of engine time as it addresses the game and its mechanics influencing the gameplay. They do, however, incorporate non-playing time in their real-world temporal frame. Both this incorporation of non-playing time and some kind of engine time and/or server time are very relevant in describing the temporality in social network games as will be explicated in the next section.

TIME IN SOCIAL NETWORK GAMES

Social network games offer an interesting case study in relation to time. Not alone because so many people 'waste' time on them,[5] but also because they use time in interesting new ways. Usually social network games are classified as (very) casual games (Rao, 2008, Chen 2009) and are contrasted with hardcore games, a hypothetical distinction very common in the games industry (Bateman & Boon, 2006). Time is already inherent in this distinction, because the stereotypical casual gamer is unwilling to invest a lot of time in a game, while stereotypical hardcore players desire to play for many consecutive hours (Juul, 2010a). Taken from this stereotypical viewpoint it is quite odd that the social network game players are investing so much time if social network games are casual games.

The explanation, according to Juul (2010a), lies in flexibility rather than in time investment per se. Hardcore games are usually *inflexible* in their 'demands' and require a

large amount of player investment. Hardcore players therefore have to adapt their playing time to the game. Casual games on the contrary are usually rather flexible and can be played in short time spans as the casual game player is usually more constrained – and therefore less flexible – in terms of available time. This also explains why casual games can be played in hardcore ways. The game affords the flexibility to play excessively. According to Juul's research a lot of previous hardcore gamers that experienced life-changing events like a marriage or a full-time job were likely to play casual games in hardcore ways as they both provide the flexibility to play them in long strides, while they can also be left alone at basically any moment without dire consequences.

The case for social network games is still a bit different though. Social network games are usually asynchronous multi-player experiences, which means that all players do not have to be online in the game at the same time. Bogost (2004) describes four characteristics of asynchronous multi-play: 1) it supports multiple players playing in sequence, not in tandem, 2) it requires some kind of persistent state which mutually affects and can be affected by all players, 3) in asynchronous play the breaks between players are the organizing principle, and 4) it does not need to be the defining characteristic of a game.

The most important of these characteristics, at least for social network games, seems to be the persistence of the game state. There are loads of social network games that work like what Egenfeldt-Nielsen et al. (2008) call process-oriented games where you continuously develop something in a kind of 'from rags to riches' fashion. For instance, a farm (*FarmVille*), a city (*CityVille*), a fair (*Ravenwood Fair*, Lolapps, 2010) or a Monopoly imperium (*Monopoly Millionaires*). Paramount in these kinds of games is that your progress over time is saved, or in other words persists. Another form of persistence can be found in the keeping of scores after playing a short game like *Robot Unicorn Attack* (Adult Swim, 2010) or *Bejeweled Blitz* (PopCap Games, 2010) that is then automatically compared to scores of your friends.

The multi-player part of social network games is rather complex. The two above mentioned different forms of persistence more or less follow Rossi's (2009) distinction between what he has termed *truly social games* and *skill/knowledge games*.[6] In the former you need your friends to advance in the game (i.e. to develop your city, farm etc), while in the latter you basically only compare your skill or knowledge (usually in the form of a score) with your friends. These forms cross over, however, as for instance in *CityVille* you can see the levels of your so-called neighbors and also which reputation level they have attained.[7] Or in *Gardens of Time* you are building a garden, but in the mean time compete on high-scores in the subsequent challenges.

More could be said about the above mentioned temporalities, but there is one temporal issue in social network games that I want to highlight here as it questions game time in a more fundamental manner. The persistence of the social network games not only ensures that your game progress is saved and that your game state is available at any hour of the day. It also extends playing time to the time during your absence. Basically all the 'truly social games' have some real-world time components that operate with or without your presence. If you plant crops in *FarmVille* or *CityVille* they continue to grow while you are away or if you cook a dish in *Café World* (Zynga, 2009) it will continue to cook whether you are there or not. And games that work with an energy supply like *Ravenwood Fair*, *CityVille*, or *Monopoly Millionaires*, continue to replenish your energy, and when you need some assistance from your neighbors to complete a quest or a

building, you need to wait for them to send you the materials. This gives rise to two possible problems for the players: 1) Once you have done everything within the game or expended all your energy points you are "done" for that moment, basically halting gameplay, and 2) when you do not return soon enough your crops may wither or you might miss additional energy as it only replenishes until a maximum amount.

Looking at social network games from this perspective especially the second one does not really make them seem like very flexible (casual) games as they basically force you to come back in order not to miss out on certain opportunities.[8] This is also one of the main criticisms of Bogost (2010): it destroys time as it not only takes the time that is used playing the game, but also the time spent away from them. However, these games are still highly flexible as the persistence of the world ensures that the game is rather forgiving towards the failure to come back. You will just miss out on *additional* opportunities and although you might lose some crops or energy most of this can be remedied by spending a bit of real-world money. Your buildings and animals in *FarmVille* are always there. And to stick with *FarmVille* for the moment, it provides additional flexibility in the different grow times of crops. Some take only two or four hours, but others need for instance one, two or even four days to grow. This allows you to plan your playing time in advance.

THE NOTION OF 'DEAD TIME'

As mentioned before, Juul (2004) uses the notion of *dead time* for unchallenging game play which has to be 'endured' in order to advance in the game. His main example are many of the more mundane tasks in massively multiplayer online games (MMOGs),[9] like traveling to certain areas, the waiting for monsters to re-spawn or the repetitive task of crafting or gathering. In the introduction I hinted that we might appropriate this concept of dead time towards the time issue in social network games. The problem is that the Juul's description of the notion of dead time is rather short and only related to enjoyment of the game versus boredom. Some players do not necessarily see these unchallenging activities as boring or less fun. Rettberg (2008) remarks in a footnote on a guild member that spent a lot of time fishing in *World of Warcraft*: '[she] says that she does so not for the monetary reward in the game, but because she finds it meditative and relaxing after a hard day of work' (p.36). So the unchallenging activities that fall under dead time do not necessarily have to be experienced negatively by the players.

Let me describe a typical play session for *FarmVille* leaving out all the extra buildings, crafting and animals etc. First we need to harvest all our crops that have now grown. You click every single farm plot of your farm to do so,[10] so if you have a ten by ten farm you have to click one hundred farm plots to harvest your crops. When they have been harvested you again click on these hundred farm plots to plow them and make them ready for a new crop. And to plant new crops you click them again. Clicking three hundred times does not seem to be very challenging, and the time spent doing it would therefore fit Juul's description of dead time perfectly. The clicking of the plots is not the only time involved, however. When you click a farm plot your avatar in *FarmVille* has to walk to the designated farm plot, start harvesting, plowing or seeding, and then walk over to the next farm plot. This takes additional time as you can click on the farm plots much faster than your avatar moves. So you can cue a number of actions, but at some point you can only wait until the avatar has moved to another plot in order to work that plot again. A rough timing of the plowing of forty plots was around one minute. However, when you go into another window or tab in your browser (possibly with another *Facebook* game

perhaps), this time is almost doubled: The same cued forty plots now took around two minutes to complete.[11]

Looking at the above from Hitchens' (2006) playing time perspective it is all part of the game as the time between the moment that you enter your farm until you decide to leave it can all be incorporated in his playing time. But apart from the waiting in the game, there is more waiting involved in social network games. Consider that in the above mentioned playing session we want to plant cranberries, which need ten hours to grow. After completing all other possible actions in *FarmVille*, there will probably be a lot of time left where there are no other things to do but wait for the cranberries to grow. That time will be spent outside on something else; maybe another game, maybe some real-life obligations, or something completely different.

So waiting is very much a part of social network games. But can we consider this waiting time a form of dead time? And if so, what would be the benefits of doing so? Waiting is definitely unchallenging from a gamer's perspective. You can watch what happens on the screen, without interaction, which could be seen as analogous to a specific form of an ambience act as described by Galloway (2006), or the triggering of an, albeit long and unskippable,[12] cut-scene. But you can also leave the game, surf to another website or even close the browser and your crops will still be growing or your energy in *CityVille* will still be replenished, or the income from 'games' at your *Ravenwood Fair* will continue. In terms of Tychsen & Hitchens' (2008;2009) time model, the playing time is paused, but the engine time/server time and the game progression time will continue to advance. As such there is still an agent working on your game, basically performing the unchallenging activities for you.

This is also reflected in Zagal and Mateas' (2007; 2010) model by the game world time (the growing of the crops) and the fictive time (the sociocultural idea that it takes time to grow crops) that determine that the game state changes while the player is away. In this model the real-world time just continues and is not paused as such, making it more coherent with the notion of dead time. But it can be questioned how the player is incorporated in this latter model when the real-world time holds *all* events (gaming and non-gaming). Therefore I am more inclined to extend Tychsen & Hitchens (2008) playing time to incorporate the waiting. From the perspective of the game it *is* still part of the playing time as you have performed the actions in the game and thereby triggered the waiting time associated with it. In order to progress in the game you will *have* to wait and come back when the actions are finished and therefore it can be considered as dead time.

Overall I think that Tychsen and Hitchens' (2008;2009) time layers support a way to accommodate the notion of dead time within it. It accounts for both the halting of player time as well as the persistence of the engine/server times during the player's absence. Yet it is sufficiently flexible to also account for waiting times when the player *is* present. In addition it is able to incorporate both the objective time spent on the waiting within their playing time layer, but also the more subjective experience of this time within their perceived time layer. Because ultimately it is the player that decides whether something really is unchallenging or not and whether it is worth the fuzz. And as mentioned in the beginning, dead time does not necessarily have to be about a negative game experience. There is also a difference between players that are eager to progress in the game and that will bend towards what the game demands (basically performing hardcore playing behavior) and those that just take a break from their regular work, plant some crops to be harvested when they come home and then forget about them until after work (which

would be a more casual playing style). The first group will probably experience the 'down-time' as far more problematic than the latter.

CONCLUSION

This paper started out to see whether the notion of dead time as mentioned by Juul (2004; 2005) could be appropriated towards the waiting in social network games which is apparent in a lot of these games. In order to answer this we started with addressing the previous literature on time in games. There it became apparent that there have been multiple attempts to study time in games. Then we looked at time in social network games. Here we saw interesting links between the asynchronous and multiplayer characteristics of those games and time. But the main part of playing social network games is the waiting in between game sessions where the game offers rewards for frequent revisits, but does not offer a continuous game experience. The notion of dead time was then discussed and how this could be appropriated to incorporate this waiting time.

As such the above must be seen as a conceptual framework for looking at how social network games operate and how game designers appropriate waiting – something that is usually seen as bad or cumbersome – as a core ingredient in their games. Even though this might be deemed 'evil' as some designers claim (Caldwell, 2011) or that they 'waste' the time outside of playing (Bogost, 2010), millions of players have found it enjoyable enough to keep playing them for months on end. Whether this is because they 'endure' the waiting and engage in the juiciness of the games (Juul, 2010a) or they just do not care about the waiting, can not be derived from the theoretical angle that I have used in this paper. A further grounding in empirical data on how players experience these long strides of waiting would greatly benefit the analysis. As I hinted at in the last part, this experience is also not singular as some players will consider every tedious task as unchallenging, while others just enjoy playing the game or use a simple task to forget their real-life stresses for a moment. In addition, the player experience of these unchallenging tasks might differ per playing session.

The literature on social network games is still scarce as these games are still young. Therefore game studies would benefit from in-depth analyses on time and the experience of time in social network games and thorough comparisons between these social network games and other forms of games. How do players appropriate these games and why do they play them? Especially the asynchronity of social network games is interesting as it challenges the specific foundations of multiplayer games. It also challenges the relationship between not playing at the same time as your friends, but still interact in a social way with them. Also a more thorough discussion on the experience of playing these games, without the specific focus on the dead time expended on them applied in this paper, could provide valuable insights for game studies.

ENDNOTES

1 The data of April 20 indicated that *CityVille* had around 89 million players at that time, with *FarmVille* at 48 million players. Although the website that I used as source (http://www.facebook.com/apps/directory.php#!/apps/directory.php?app_type=0&category=400) is no longer accessible, according to the numbers of August 6 from *AppData*, *CityVille* now has 77 million monthly active users, while *FarmVille* is down to 33 million players (http://www.appdata.com/leaderboard/apps?show_na=1).

2 Exceptions do exist. One example that could be mentioned here would be the Auction House in *World of Warcraft*, where your auctioned goods are available for sale during a fixed time period, whether you are playing the game or not at that time.

3 In a later version of this model (see Juul, 2005, p.141-162) Juul calls this fictional time, as he deems it a more descriptive term (ibid., p.208). This is probably due to the fact that Juul reserves event time to games with a story world. Therefore, according to him, a game like *Tetris* (Pazhitnov, 1985) only has play time as it lacks a fictional world. As I disagree with him on this point, however, I deem event time the more useful term.

4 It must be noted here that in a later version of his model Juul (2005) notes that play time *is* rather similar to discourse time, although he notes five crucial differences. However, discourse time in narratology is really about the ordering of events and in games, as Juul notes justly, this must be chronological in most cases as the player is the one setting the events in motion. Lindley (2005), however, *does* distinguish a discourse time level for games in a rather unproblematic sense, but he does not distinguish how this should work.

5 That seems to be the general view among critics at least, see for instance Bogost, 2010; Liszkiewicz, 2010 or Caldwell, 2011.

6 In my opinion the names that Rossi (2009) chose for these two strands of social network games are not particularly helpful, especially his rather residuary description of truly social games as 'those [games] that seem to be pointless if played alone' (ibid., p.3). However, the distinction highlights an interesting difference between games based upon scores of mastery (in skill/knowledge games) and scores of dedication or time investment (truly social games).

7 Your level in *CityVille* is measured by how many experience points you have accumulated, while your charity level is measured by the amount of hearts that you have collected. Experience can be gained in your own city, but hearts can only be accumulated by helping the cities of your neighbors, giving some indication of your 'being a good neighbor'.

8 Actually several of the games provide increasing rewards when you come back at least once every day for a number of days in a row, making the missing of a day even more like a 'missed opportunity'.

9 I must note here that I reserve the term MMOG here for the large-scale graphical virtual worlds like *World of Warcraft*, even though social network games can also be called massively multiplayer online games.

10 Of course, later on in the game you are able to buy machines that speed up the work by allowing you to harvest, plow, or seed four plots at a time, or even combine these tasks in one machine. However, those use fuel and you will not always have enough fuel to completely eliminate the tedious clicking unless you decide to spend real-world money on in-game goods.

11 As Juul (2010b) shows, people have found ways to reduce the waiting time by clever use of game mechanics. By putting decorations around the avatar, it is basically stuck and

therefore the walking time is reduced to zero. It still takes the harvesting/plowing or seeding time, but this already speeds up the process by a fair margin.

12 This is not entirely true as in most cases you can spend some real-world money that will allow you to complete things with one click, thereby skipping the waiting time.

BIBLIOGRAPHY

Aarseth, E.J., Cybertext: Perspectives on Ergodic Literature. The John Hopkins University Press, Baltimore MD, 1997.

Aarseth, E.J., "Aporia and Epiphany in Doom and the Speaking Clock: The temporality of Ergodic Art," in Ryan, M.-L. (Ed.). Cyberspace Textuality: Computer Technology and Literary Theory. Indiana University Press. Bloomington IN, 1999.

Aarseth, E.J., Smedstad, S.M. & Sunnanå, L., "A Multi-Dimensional Typology of Games," in: Copier, M. & Raessens, J. (eds.). Level Up: Digital Games Research Conference. Universiteit Utrecht, Utrecht NL, 2003,pp.48-67.

Abbott, H.P., The Cambridge Introduction to Narrative (Second Edition). Cambridge University Press, Cambridge, UK, 2008.

Adult Swim (2010) Robot Unicorn Attack [PC Computer, Facebook].

Bartle, R.A., Designing Virtual Worlds. New Riders Publishing, Berkely CA, 2004.

Bateman, C. & Boon, R., 21st Century Game Design. Charles River Media, Hingham MA, 2006.

Björk, S., Lundgren, S. & Holopainen, J., "Game Design Patterns," in: Copier, M. & Raessens, J. (eds.). Level Up: Digital Games Research Conference. Universiteit Utrecht, Utrecht NL, 2003, pp.180-193.

Blizzard Entertainment (2004) World of Warcraft [PC Computer, Online Game]

Bogost, I., "Asynchronous Multiplay: Futures for Casual Multiplayer Experience," paper presented Other Player's Conference (Copenhagen DNK, December 2004). Available at: http://www.bogost.com/downloads/I.%20Bogost%20-%20Asynchronous%20Multiplay.pdf (accessed Apr. 2011).

Bogost, I. (2010, July 21) "Cow Clicker: The Making of Obsession" [blog]. Available at: http://www.bogost.com/blog/cow_clicker_1.shtml (accessed Apr. 2011).

Caldwell, B. (2011, February 15) "Jonathan Blow Interview: Do You Believe Social Games Are Evil? Yes. Absolutely" [interview]. *PcGamer*. Available at: http://www.pcgamer.com/2011/02/15/jonathan-blow-interview-social-game-designers-goal-is-to-degrade-the-players-quality-of-life (accessed Apr. 2011).

Chen, S. (2009, April 29) "The Social Network Game Boom" [blog]. Gamasutra. Available at: http://www.gamasutra.com/view/feature/4009/the_social_network__game_boom.php (accessed Apr. 2011).

Egenfeldt-Nielsen, S., Smith, J.H. & Tosca, S.P., Understanding Video Games: The Essential Introduction. Routledge, New York NY, 2008.

Electronic Arts (2011) Monopoly Millionaires [PC Computer, Facebook].

Eskelinen, M., "The Gaming Situation," in Game Studies vol.1, no.1 (2001). Available at: http://www.gamestudies.org/0101/eskelinen/ (accessed Apr. 2011).

Galloway, A.R., Gaming: Essays on Algorithmic Culture. University of Minnesota Press, Minneapolis MN, 2006.

Genette, G., Narrative Discourse: An Essay in Method (trans. Lewin, J.E.). Cornell University Press, Ithaca NY, 1980.

Juul, J., "Games Telling Stories? A Brief Note on Games and Narrative," in Game Studies vol 1., no 1 (2001). Available at: http://www.gamestudies.org/0101/juul-gts/ (accessed Apr. 2011).

Juul, J., “An Introduction to Game Time,” in: Wardrip-Fruin, N. & Harrigan, P. (eds.). First Person: New Media as Story, Performance and Game. The MIT Press, Cambridge MA, 2004, pp.131-142.
Juul, J., Half-Real: Video Games between Real Rules and Fictional Worlds. The MIT Press, Cambridge MA, 2005.
Juul, J., A Casual Revolution: Reinventing Video Games and Their Players. The MIT Press, Cambridge MA, 2010a.
Juul, J. (2010b, August 31) “The Video Games of Video Games: Prejudices Against Social Games Verbatim Copies of Prejudice Against Vide Games” [blog]. The Ludologist. Available at: http://www.jesperjuul.net/ludologist/the-video-games-of-video-games (accessed Apr 2011)
Hitchens, M., “Time and Computer Games Or ‘No that’s not what happened’,” in Wong, K.K.W., Fung, L.C.C., Cole, P. & Pisan, Y. (eds.) IE 2006: Proceedings of Third Australasian Conference on Interactive Entertainment. Murdock University, Perth AUS, 2006.
Lindley, C.A., “The Semiotics of Time Structure in Ludic Space As a Foundation for Analysis and Design”, in Game Studies vol. 5, no.1 (2005). Available at: http://www.gamestudies.org/0501/lindley/ (accessed Apr. 2011).
Liszkiewicz, A.J.P. (2010, March 9) “Cultivated Play: Farmville” [blog] Media Commons. Available at: http://mediacommons.futureofthebook.org/content/cultivated-play-farmville (accessed Apr. 2011).
Lolapps (2010) Ravenwood Fair [PC Computer, Facebook].
Playdom (2010) *Gardens of Time* [PC Computer, Facebook].
PopCap Games (2010) Bejeweled Blitz [PC Computer, Facebook].
Rao, V., “Facebook Applications and Playful Mood: The Construction of Facebook as a ‘third place’,” in: Lugmayr, A., Mäyrä, F., Franssila, H. & Lietsala, K. (eds.). Proceedings of the 12th International Conference on Entertainment and Media in the Ubiquitous Era. ACM, New York NY, 2008, pp.8-12.
Rettberg, S., “Corporate Ideology in World of Warcraft,” in Corneliussen, H.G. & Rettberg, J.W. (eds.) Digital Culture, Play, and Identity: A World of Warcraft Reader. The MIT Press, Cambridge MA, 2008, pp.19-38.
Rossi, L., “Playing Your Network: Gaming in Social Network Sites,” in Breaking New Grounds, Proceedings of DiGRA 2009 Conference (London UK, August/September 2009). Available at: http://www.digra.org/dl/db/09287.20599.pdf (accessed Apr. 2011).
Tychsen, A. & Hitchens, M., “Interesting Times: Modelling Time in Multi-Player and Massively Multi-Player Role Playing Games,” in Leonardo Electronic Almanac vol. 16, no. 2-3. Available at: http://www.leonardo.info/LEA/PerthDAC/JTychsen_Hitchens_LEA160203.pdf (accessed Apr. 2011).
Tychsen, A. & Hitchens, M., “Game Time: Modeling and Analyzing Time in Multiplayer and Massively Multiplayer Games,” in Games and Culture vol. 4, no.2 (2009), pp.170-201.
Walker, T. (2010, February, 22). “Welcome to FarmVille: Population 80 million” [news] *The Independent*. Available at: http://www.independent.co.uk/life-style/gadgets-and-tech/features/welcome-to-farmville-population-80-million-1906260.html.
Zagal, J.P., Mateas, M., Fernandez-Vara, C., Hochalter, B. & Lichti, N., “Towards an Ontological Language for Game Analysis,” in Changing Views, Proceedings of DiGRA 2005 Conference (Vancouver CAN, Jun 2005) Available at: http://www.digra.org/dl/db/06276.09313.pdf (accessed Apr. 2011).

Zagal, J.P. & Mateas, M., “Temporal Frames: A Unifying Framework for the Analysis of Game Temporality”, in Situated Play, Proceedings of DiGRA 2007 Conference (Tokyo JPN, Sep 2007). Available at http://www.digra.org/dl/db/07312.25239.pdf (accessed Apr. 2011).

Zagal, J.P. & Mateas, M., “Time in Video Games: A Survey and Analysis,” in Simulation & Gaming vol.41, no.6 (2010), pp.844-868.

Zynga (2009) *FarmVille* [PC Computer, Facebook].

Zynga (2009) *Café World* [PC Computer, Facebook].

Zynga (2010) *CityVille* [PC Computer, Facebook].