EVALUATING USABILITY OF GAMES

A study of four Facebook games using heuristic evaluation

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Degree Programme in Media

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ABSTRACT

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The purpose of this thesis was to explore the topic of usability in relation to Facebook games. To set the background for my research, I looked at the definitions of the terms ”social”, ”casual” and ”hardcore”, as they are often used to categorise and describe Facebook games. I also examined the advantages and disadvantages of developing games for Facebook and provided a short history of Facebook games.

The empirical part consisted of analysis of four Facebook games in the newly-emerged Town Defense genre. The chosen method for the analysis was heuristic evaluation. For this purpose, I utilised a set of 17 heuristics, which had been selected from other heuristic sets as well as some that were created to suit the platform and situation.

The results suggest that usability was still an issue in many of the analysed games. However, the performance of the games was uneven. Interestingly, the number of usability issues found and the popularity of the game had a near-inverse correlation. The more popular games also had the most usability issues.

The findings indicate that usability is not high on the list of priorities for the developers, but issues such as wealth of content, limited scope, lack of competition and a target audience that is more familiar with gameing conventions allow these games to thrive despite this

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Key words: facebook, social games, game development, usability, heuristics

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1 INTRODUCTION

Facebook has emerged as a formidable gaming platform in the last few years. It is largely populated by so-called casual games that cater to a more mainstream audience as opposed to what has been traditionally viewed as a separate gamer segment. However, the platform is showing signs that it can also be a viable market for more niche genres that cater to a more specialised audiences.

A sign of this trend is the emerging genre of Town Defense, where players build a base and attack other players' bases in real time. It represents a break from the largely casual style of gaming on Facebook, both in terms of target audience and games. While the audience for these games is smaller in comparison, it still makes sense in business terms as this audience monetizes at a far higher rate and has higher player retention.

This thesis will explore the usability issues in Facebook games. Using heuristic evaluations, I analyse four games in the aforementioned genre: *Backyard Monsters, Edgeworld, Social Empires* and *Galaxy Life*. To limit the focus of my thesis, I focus on the process of attacking other players. To set the background for my research, I take a look at what the current Facebook gaming audience is like and briefly explore the meaning of the terms "social", "casual" and "hardcore" in the gaming space. I also analyse the reasons behind Facebook's popularity as a gaming platform, what sets it apart from traditional gaming platforms and how Facebook games have evolved to their current form. Finally, I will make the case why usability is not an issue game developers can ignore, especially on Facebook, and present heuristic evaluation as a quick and cheap way to evaluate usability in games.

2 GAMES AND GAMERS ON FACEBOOK

Platforms and the audiences they attract invariably affect what types of games succeed on them. To understand both the gamers and the games on Facebook, I must first define the terms used by the industry to talk about them. What do the terms “casual”, “hardcore” and ”social” mean in the context of games and gaming? And can they be applied to Facebook games and gamers as well?

2.1 Casual and hardcore

”Casual games” as a term is hard to describe accurately. In a nutshell they are games meant for everyone. The most common characteristics are that they are easy to learn, utilize simple controls and aspire to forgiving gameplay (International Game Developers Association 2006). They are often geared towards short play sessions and do not require a lot of commitment in order to get a pleasant game experience. There are no definite genre limitations, but the most popular genres are puzzle, card, word and arcade games. To suit everyone, the games employ family-friendly themes and rarely display overt sexuality or violence. (Paavilainen, Kultima, Kuittinen, Mäyrä, Saarenpää & Niemelä 2009).

Casual games are often platform agnostic. This means that they can be played on all gaming platforms (Casual Games Association 2012), but they flourish best on platforms that are widely accessible. This is why they’ve found most success on PCs and mobile phones, which have wider reach than dedicated gaming consoles – again fitting the ideology of “games for everyone”. The recent resurgence of casual games can be attributed to the the widespread internet access and e-commerce technology (Casual Games Association 2007), which have given rise to the browser and downloadable games markets. Social networks like Facebook can be seen as an evolution of this trend and even a successor to web game portals, which were the previously dominant model for offering casual games on the web.

Despite all these definitions, “casual games” is still a contested and vague term that has many different meanings. In the games industry and related press, the term has various

interpretations. For example, Carless (2010) tells that in the early days of the gaming industry all light-hearted and colourful games were labeled as casual purely on aesthetic or thematic basis. In more recent times, Portnow (2009) has presented that media has adopted usage of casual games to mean “non-violent games”. The term is even used demeaningly to mean low-quality games or ones that have colourful graphics coupled with shallow but addictive gameplay (Rose 2012).

Another often used measuring stick for what casual games are is hardcore games, which is presented as the antonym to casual games. Hardcore games are commonly perceived to be more violent, complex, harder to learn and requiring more skill from the players (Boyer 2009, 54). Thus te division between the stereotypes of casual and hardcore games is often boiled down to the complexity and difficulty of the games. This black-and-white divide is not very useful or entirely accurate. Ventrice (2010) argues that the main differentiator between casual and hardcore games is in fact accessibility. He uses the term not in its traditional sense of making games more accessible for gamers with visual, auditory or motor-control limitations, but in the sense that games should be more accessible for people who are not very familiar with games. He argues that difficulty in hardcore games doesn’t necessarily come from difficulty or depth in gameplay, but from having difficult controls, overwhelming options, unclear goals or solutions in the game or requiring prerequisite knowledge and abstract memorization. (Ventrice 2010.)

It is this accessibility which is at the core of what casual games are. It is reflected in their distribution, gameplay and thematic choices. However, this does not stop them from having challenging gameplay, ramping up the difficulty or requiring strategic thinking from the player. As long as player is introduced to the concepts and allowed fair time to master them, the game can still be “casual” or at least ”casual-friendly”. Accessibility is also the main reason why casual games have been so popular on Facebook; it is an extremely convenient and accessible platform for all kinds of people, which in turn has created a market potential for making casual games for it.

In terms of gamers, casual can mean two things: a person who plays casual games or a gamer who plays games casually. The stereotype of a casual gamer is usually an older woman who prefers less commitment in terms of time and skill, and often does not identify herself as a gamer or even acknowledge that she plays games. Again, this is presented as the opposite of the hardcore gamer” who is stereotypically a young male,

who spends lot of time and money on games and prefers complex and/or violent game genres like first-person shooter or real-time strategy games (Boyer 2009, 2). The division between the two extreme stereotypes is again less reflective of the reality. One sign of this is the emergence of “midcore” (Warman 2012) and “hardcasual” (Boyer 2009, 115; Dickens 2007), definitions for players who represent the middle ground between casual or hardcore audiences.

However, it is the second definition of a casual gamer can provide us with a more useful viewpoint into this topic. It aligns “casual” more as a method of approaching games, a way of playing. Treating any gamer as an immutable set of habits does not capture the complexity of what, how and when people play. By changing the definition to a method instead of a rigid category or identity, the meanings become much more responsive to real-world situations. If “casual” is just a way of playing, then the “casualness” of a gamer can depend on time and place (e.g. playing casually when traveling, but more hardcore when at home) or on platform, genre or even a single game. This way of playing can transcend even the categorisation of the game being played, e.g. by playing a hardcore game casually or vice versa.

While the terms “casual” and “hardcore” are far from perfect, they offer us the best shorthand we currently have and will be used in this thesis to discuss different categories of gamers. These terms are commonly used both in the games industry and on the consumer side, and thus they are widespread and easily grasped. While this thesis recognizes the imperfection of these terms, coming up with better ones does not belong in its focus.

2.2 Social

”Social games” is a newer addition to gaming vocabulary. The term can be interpreted in two ways: they can be games that make use of social networks to provide gameplay (Björk according to Tyni, Sotamaa & Toivonen 2011) or games with mechanics that enhance social interaction (Jacobs & Sihvonen 2011). Examples of the latter type could be MMO (Massive Multiplayer Online) games like *World of Warcraft*, which allow players to communicate with each other through in-game chat, battle each other and form guilds, just to mention a few social mechanics. However, it is not very useful

categorisation in daily usage, as almost all online or multiplayer games involve some social mechanics.

The first definition is more prevalent in current media and everyday language. The term has has been criticized as most of social games offer very limited ways to interact with friends or other players and even make friends into a type of in-game commodity (Jacobs according to Jacobs & Sihvonen 2011). “Social network games” would be a more accurate description, but that would make it too long for everyday usage. Nevertheless, with the increasing popularity of social networks, the first definition is likely to be here to stay and it is the one I will be using in this thesis.

While the above definition is focused on the platform itself, social games often share the following features: asynchronous gameplay, community, no victory conditions and virtual currency (Radoff 2011). Asynchronous gameplay allows players to interact with each other without needing to play at the same time. Community comes as a natural extension of playing on social networks, and developers often try to leverage players to share the game with their friends in order to increase and retain players. No victory conditions arises from the fact that these games are often continuously updated with new content and thus have no finite end, though players may still compete with each other through tournaments or high score boards. Virtual currency forms the basis of monetisation in social games and is often employed in games on two levels: soft and hard currency. Soft currency can be earned in-game and is the more commonly used currency within the game world. The hard currency is rarer, less often earned in-game and used for premium purchases such as unique decorations or energy packs. The reason for this two-tiered model is that it allows developers to adjust the economy of the game more easily.

Currently there is a lot of overlap between casual and social games, which has lead to some confusion and mixing of terms. As casual refers to games that are defined by their characteristics and social to those defined by the platform, the two are definitely not the same. The dominance of casual games on Facebook is unquestionable, but as the market gets saturated we will be seeing more niche genres emerging. This will be is discussed in more detail in chapter 3.

”Social gamers” is a less used term. Social gamers can be defined as players who play

on social networks or ones who play only in social environments or who are motivated by social goals in games. While these definitions are not mutually exclusive, this thesis will be using the first definition, due to its prevalence and suitability in regard to the topic of the thesis.

While casual and hardcore gamers are vague as terms, and thus hard to measure accurately, social gamers are much easier in this sense. According to a study commissioned in 2011 by PopCap Games, the average social gamer is likely to be female and over 39 years old. Despite the stereotype of being the domain of older people, social games are increasing their popularity among younger people as well. In a similar study in 2010 people over 40 represented 58% of all social gamers; now under-40-year-olds outnumber the over-40-year-olds by a small margin. (Information Solutions Group 2010, 2011a). However, it must be noted that the 2010 study excluded those under 18 years old, and the 2011 study is likely to have done the same, but the difference in data presentation makes it impossible to confirm. It is likely that actual average age numbers are even lower.

The average social gamers thus corresponds to the stereotype of a casual gamer, but due to the current overlap between social and casual games, this is not surprising. However, social gamers are not a homogenous mass; the platform does not define them as stated earlier. Defining the average and designing for that is a good strategy, but as that audience starts to become more experienced and the market more saturated, there is space for making games for more niche audiences.

In the last few years, casual games and the mainstream audience have represented the biggest business opportunity for social gaming companies, but companies targeting more hardcore gamers have sprung up. One of these companies, Kabam, commissioned a study in 2011 about the differences between what they view as the two main segments of this audience: casual and hardcore social gamers While the distinction between casual and hardcore was pointed out to be artificial in earlier chapters, the distinction in this study was defined through the genres of games played on social networks, making the division slightly more useful and concrete. In the study hardcore social gamers were defined as people playing strategy, role-playing games or other “core” segment games such as action and first-person shooter.

According to the study, the two segments showed distinctive trends, both demographically and behaviorally. Among casual social gamers, women outnumbered men (61%) and the group had a higher average age. People within this segment were more likely to be married and have smaller income as they were also more like to be homemakers, retired or unemployed. On the other hand, hardcore social gamers were more likely to be men (55%), and more likely to be working full-time or students. Other differences appeared in their gaming behaviours. As well as playing more on "core" platforms (PCs and dedicated consoles), hardcore social gamers were more likely play several games (both on social and across other platforms) at the same time and averaged longer sessions when playing social games. From a business perspective, the most interesting point is that the hardcore social gamers are more likely to spend larger amounts of money in social games. They were also more likely to find new games through advertisements outside Facebook or through online search. Interestingly, hardcore social gamers are also more like to play socially, with their friends or total strangers. (Information Solutions Group 2011b.)

Based on the findings of this study, the gender and age differences between these two groups seem to correspond to the stereotypes of casual and hardcore gamers presented earlier. While these stereotypes might not be a useful discussion point as permanent identities, the study shows that there is good business potential in catering to a non-casual audience. As a note, this study was limited to those living in the US, but as the one of the best monetizing countries, it is one of the most relevant to social gaming companies. It is not absolutely certain if the study includes those under 18 years old, so the actual average age might be lower in this case as well. Additionally, the statistics presented in this chapter are not Facebook-specific, but apply to all social gamers. However, it can be fairly assumed that as the largest social network (Social Networking Sites... 2011), the numbers are representative of its audience as well.

What repercussions do these demographics have for social gaming companies? Facebook has attracted a drastically different audience compared to what was traditionally viewed as core target audience for games, but to grow the game companies must keep enticing new players. For a long time social gaming companies have crafted their games with the casual market and casual social gamers in mind, but they aren't the only players in town. Currently one of the best opportunities is the hardcore social gamers, who can provide a smaller but well-monetizing audience.

3 FACEBOOK – THE 21ST CENTURY GAMING PLATFORM

3.1 Developing games for Facebook

Facebook is one of the most rapidly growing gaming platforms at the moment. The total number of games on the platform is estimated to be over 1200 (AppData, Games Leaderboard), and their combined revenue last year was roughly estimated to be in the range between 1.5 to 3 billion dollars (Clipperton Finance 2011). There are currently over 1000 companies who have a game on Facebook (AppData, Developer Leaderboard). The most successful one of them all, Zynga, currently has 20 games live on Facebook**,** 6 of which are in the top 10 in terms of DAU[1] (AppData, Games Leaderboard). The company also made 1.14 billion dollars in revenue in 2011 (Zynga 2012). Large entertainment companies like Disney and EA have also joined the social gaming boom by buying successful Facebook game companies, indicating its importance as a gaming platform and as a viable market.

One of the main reasons why Facebook has become a popular platform for game developers is that it has a critical mass of users. It currently has over 955 million MAU[2] (Facebook 2012b), and around 25% of these monthly users play games (Purdy 2012). This volume of users becomes even more useful when you combine it with Facebook's built-in viral channels. Each player can intentionally or unintentionally make several of their connections aware of the game and even bring them into it. Many games take advantage of this by hiding content or slowing progression, unless player invites more players to join the game (also known as "friend-gating"). Facebook's Open Graph also facilitates this virality by automatically spreading the information about the player's actions and achievements in the game to the player's Timeline and News Feed. The viral channels combined with almost no entry barriers to playing makes discovery easy on the platform.

Development costs on Facebook are lower compared to other platforms. While developing a game for a current generation console can run up to tens of millions of dollars, an average social game costs somewhere between 100,000 and 300,000 dollars.

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[1] Daily Active Users, the number of unique users who launch the app on a given day
[2] Monthly Active Users, the number of unique users who have launched the app in the last 30 days

(Reynolds 2009). Since competition and audience expectations have increased since 2009 , it is likely that the numbers for both types are likely to be higher now, but more recent sources weren't available at the time of writing. Marc Pincus, the CEO of Zynga, said that they can invest more than 10 million dollars on a potential franchise game (Shih 2012), although this figure is likely to include other costs like marketing. However, the average costs for development still remain much lower than on many other platforms. The lower costs can be explained for the large part by the technology of the platform, the lack of physical distribution, the simpler graphics and features as well as lower audience expectations.

The main technology used in Facebook games is Flash. Competing technologies, mainly HTML5 and Unity, are slowly gaining traction, but are still in the minority as 24 of the top 25 Facebook games are made with Flash (Adobe 2012). In order to make full use of the potential audience, social games need to be able to run smoothly even on low-end computers and lower bandwidths. For this reason many social games don't have 3D or high-fidelity graphics, which in turn cuts down development time and complexity. However, the costs are expected to rise as technology gets more sophisticated, allowing even low-end computers to run 3D graphics in the browser. In addition, the demands on general audiovisual quality will increase as the audience matures and competition toughens. As a recent example of this trend, one of Zynga's games, *CastleVille*, features an orchestral soundtrack, the first social game to do so (Zynga 2011).

Facebook games present an opportunity for many developers to self-publish their game. Facebook is an open platform, allowing anyone to make a game for it without need to be approved by or to pay the platform owner. This coupled with the low development costs allow companies to bypass publishers and get a larger cut of profits for themselves. Further still, the developers have better ownership over their games and its pricing compared to traditional gaming platforms. On Facebook, developers are free to set their own prices and promotional sales, publish new content and update the game whenever they want to.

Facebook also makes it very easy to stay in touch with and gather feedback from the player community. Jacobs & Sihvonen (2011) presented the development of social games as a new design process where players are involved both silently (through metrics) and directly participating (through forums and other feedback channels).

Metrics is probably one of the key design and feedback tools at the developer's disposal. In this context, metrics mean measurement and data on player behaviour and activities. They can be used to measure almost anything in the game; they can range from large ones like DAU to detailed ones like how many people sent a particular gift item to their friends. Metrics are powerful, because they are easy to gather and produce vast amounts of information. While real user feedback is also important, it can become skewed by the vocal minority and players' perception of the game. The metrics are removed from this subjective bias as it tracks actual player behaviour across all user groups. The developers still have to draw their interpretations from the mountain of data, which is a task in itself but at least they have the data.

The metrics are closely linked to A/B or split tests, where a portion of randomly selected players is presented with e.g. a new feature or altered prices, while the control group gets the normal version. The metrics from both groups are then used to determine which version proves more efficient in driving retention, virality or any other statistic that the developers wished to improve. Many social games are using A/B testing to find out what features strike a chord with their audiences, improve engagement or find the perfect balance for monetization. This allows optimization of the game to a degree that is rarely seen in offline games. There's nothing new about either metrics or A/B testing, but they have become very widespread among Facebook developers, because all of the play happens on the developer's database, allowing all the player's actions to be tracked in real time. Coupled with the ability to update the game frequently and on the fly, this makes A/B testing a powerful tool in guiding the design and development of the game.

Because the metrics and A/B-testing are so powerful at finding out what users prefer, many games are released earlier and less polished than their counterparts on other platforms. This model of releasing a game early and then quickly iterating and improving based on player feedback is possible due to the ability to monitor player behaviour and quickly update the game. This does not just reflect the period after launch, but encompasses the whole lifespan of the game with frequent updates to content and gameplay balancing. As these games are never viewed as finished, they are often said to be in "perpetual beta" (Jacobs & Sihvonen 2011). "Beta" means a phase of game development, in which the game is close to being finished but lacks the polish of the final game. As new features are added, players are used to test the feasibility and the fine-tuning of these features, the game can essentially never be fully finished as long as

new content is added. And in the case of Facebook games, adding new content is an important strategy to keep users engaged with the game.

Facebook games are a profitable business as stated at the start of this chapter. Due to the free and accessible nature of the platform, many games are also free, so how do the developers make their money? Currently the dominant monetization model is free-to-play (F2P), which allows players to play the game for free as long as they want but offers faster progression, exclusive items or other benefits for real money. F2P is different from “freemium”, which offers only a portion of the game for free and players must pay to access the full experience. However, the line between the two is blurry, and the two terms are often used interchangeably in the industry.

The benefit of the F2P model is that it removes all barriers of entry, making it quick and easy to get into the game. Most players will never pay anything, but the F2P model often works even if just a small percentage of players convert into paying customers. In fact, F2P games are based on the assumption that a lionshare of the income will come from a tiny fraction of players. These players are often called “whales”, a term borrowed from casino industry denoting high-spending customers. Because the F2P model also raises or completely removes any limit to how much money can be spent, these players can sink much higher sums of money in the game compared to fixed-price model. The ethics of this new monetization model are still subject to a lot of debate, because the F2P model has an effect on the design of the game. For example, if the game includes a competitive element, the balance of purchasable items must be carefully considered, so that the paying players don’t get an unfair advantage over others.

Developing games for Facebook has its downsides as well. The virality of the platform isn’t as strong as it used to be. In 2009 Facebook was forced to clamp down the viral channels due to the “feed spamming” that annoyed non-gaming users (Clipperton Finance 2011). Decreasing virality means that game developers must rely increasingly on Facebook ads and cross-promotion, where developers entice players from one game to try out another one. This raises the user acquisition costs as advertising outside Facebook isn’t very fruitful, particularly in the case of casual social gamers. Rising user acquisition costs also meant that companies are wary of releasing unpolished products in fear of scaring off these costly customers, which again raises the development quality

bar, the development time and thus overall costs (Duryee 2011).

As well as competing with other social games for attention and ad spaces, the game companies must compete against the platform itself, which provides players with many non-gaming distractions. The design of the game must adapt to this distractive environment. The play styles of social network gaming have evolved to accommodate the players' differing needs and potentially short and disrupted gaming sessions (IHS 2012). This is another reason why casual games have done so well on the platform; highly immersive and demanding games find it harder to succeed in an environment that already places so many demands on the players' attention.

Another effect on development is the subject of cloning. Because of the simple technology, features and whole game ideas can be copied quickly and cheaply. This is no longer such an issue as in the early days of Facebook, when graphics and gameplay standards were lower. However, the fear of cloning remains and can push back development and avoid publishing details of upcoming games in order to be the first in the market with their ideas. A recent example of this was Spry Fox accusing publisher 6waves (formerly known as 6waves LOLAPPS) of copying their game *Triple Town* (Edery 2012). The industry leader, Zynga, has also been accused of cloning multiple times (Brown 2012).

Monetizing games on Facebook isn't a straightforward business. Applying the F2P model requires more effort from developers than the traditional "ship-and-forget" model. Most developers are forced to adopt this model, because of its appeal to casual audience and its potential to monetize well as mentioned earlier. It works well in enticing a great number of players, but retaining them and transforming even some of these players into paying players is a challenge that all Facebook game developers face. Because players haven't invested any money or effort into getting in the game, they are inherently less committed to it (Ricchetti 2012). They have no qualms about walking away from the game, if it does not strike their fancy. Once a player has been sucked into spending some time (and perhaps money), leaving the game is harder because of that commitment. Still, even that commitment can be soured by a bad experience or even by the player running out of content. Instead of enticing players to make a one-time purchase similar to traditional gaming platforms, the F2P model demands that developers must build and constantly maintain a relationship with the player in order to

keep them engaged and happy.

After the developer manages to convert a user into a paying customer, Facebook comes in and takes a 30% cut. This cut goes from all sales made with Facebook Credits, the unified virtual currency of the platform, which was made compulsory in 2011 (Liu 2011). The idea of Credits was sold to developers on the premise that they would lower the barriers for users to purchase in-game items and also provide a safe and reliable payment option. However, there are signs that Credits aren't converting paying users as well as developers hoped (Cutler 2012a), making the deal disadvantageous for developers at the moment. Facebook is currently moving away from the unified virtual currency, as many games already implement their own currencies, and allowing games to show prices in local currencies, which makes the pricing more granular and consistent across different areas (Fuloria 2012). However, the 30% cut from all sales remains unchanged.

In addition to all these costs, maintenance is another one that developers will have to bear. The hosting, updating and general maintenance of a game makes for a hefty post-launch bill. With potential traffic of tens of millions of users, running the servers is no small feat. The development team also cannot be allowed to rest after the launch of the game; they are needed to constantly tweak the game and add new content, again adding to the post-launch costs. Because of these running costs, older or unsuccessful social games are often shut down or at least no longer supported to a similar standard.

While the developers are fairly free to do as they please on Facebook, they are still dependent on the platform owner. Facebook is constantly changing, so developers need to stay sharp and devote part of their energy to keeping up with the new and upcoming trends and features. However, with the introduction of Facebook Credits, Facebook itself has it in their interest to have successful and diverse games on their platform, which is why they do provide support for developers. They currently have more than 40 staff dedicated to managing the games, and they want to encourage and support the development of high-quality games (Gaudiosi 2012).

Another vulnerability is that some day Facebook might not be the biggest social network or the desktop the most popular way to access it, which makes developers who rely purely on Facebook vulnerable. The trend is already pointing to social gaming

revenue from outside of Facebook eclipsing that from Facebook's social games in 2014 (Beyond Facebook... 2011). Similarly, Kabam, a social game developer with games on many platforms, reported that most of their new users arrive from outside Facebook (Takahashi 2012), further destabilising the idea that Facebook will be the best or the only place for social games in the future.

The move away from desktop can also provide a difficult step for many developers. Already around 40% of Facebook users access it from their mobile (Perez 2011). The same trend is visible in the rest of the gaming industry. According to the Entertainment Software Association (2011), 55% of gamers play games on mobile or handheld devices. So the trend is moving towards mobile both from gaming and Facebook's perspective. Facebook will likely become part of a converging multi-platform landscape, where players can access the same experience or different facets of the same experience on almost any platform (IHS 2012). However, it is still a difficult position for developers as well as Facebook, because leveraging the mobile version is much more challenging than the desktop version. Currently the Facebook mobile app does not have any advertising, so user acquisition options are minimal. Game developers would also have to start thinking multiplatform, as the mobile app is no help for them if they do not have their game available for the same device. Additionally, the developers will face heavy competition from native mobile apps.

3.2 Evolution of Facebook games

Facebook wasn't originally designed to be a games platform. When Facebook launched its Platform in 2007 (Facebook 2012a), allowing third-party developers to develop their own applications on top of Facebook, they weren't expecting games to become so popular. Mark Zuckerberg himself was surprised by the popularity of games (Smith 2009). Since 2007, the games on the platform have evolved considerably, and this sub-chapter takes a closer look at the past, present and the future of social games.

The first generation games came around quickly after Facebook Platform launched in 2007. Giordano Contestabile from PopCap Games said that the first generation games could be barely defined as games. They were more like "applications" built by web developers, who had little or no experience of game design (Contestabile 2012). There

was little knowledge on what worked and how to take advantage of the platform, which resulted in low-quality games by today's standards (Salanga III 2010). The games featured very little interactivity and were mainly comprised of simple static images and text. Examples of first-generation games would be *(Lil) Green Patch* and *Superpoke*, which were very simplistic and graphically static applications revolving mostly around sending different kinds of gifts or items to friends.

The second generation brought with it increased complexity and graphical quality. Games started to introduce customizable avatars and persistent, isometric worlds. Farming and time management games became popular as genres as well as competitive social/casual game types like brain training (Dredge 2012). Many female-friendly themes emerged such as pets, nursing, farming and restaurant or shop management. The most famous example of a second generation game is *Farmville*, which still has 18.7 million monthly players (AppData, Farmville). This generation was hit by Facebook's decision to cut down on the viral channels in 2009 and 2010. This also affected the "stickiness"[3] of games, which dropped from their average of 25-28% to 20% for the top performing games (Clipperton Finance 2011).

Currently Facebook games can be reckoned to be in their third generation (Dredge 2012). What sets them apart from second generation games is the increasing complexity in features and variety in genres. If the second generation was defined by farming and time management games, the third generation is seeing increasing influence from role-playing and adventure games. Many games also include more competitive elements, pitting friends against each other and allowing them to attack each other or hinder their gameplay in some ways. This is a departure from the very casual-friendly type of gameplay, which focused more on helping friends and co-operating with them for greater rewards.

In addition to incorporation of more competitive and complex mechanics, the rise of hardcore and midcore games is also a notable feature of this generation of Facebook games. It's a bold move on a platform so defined and known for its casual games, but it makes sense in the crowded market with rising user acquisition costs, which in turn drives developers to focus more on monetizing and retaining their existing players. A

[3] A metric for measuring user engagement, derived from dividing DAU (daily active users) with MAU (monthly active users)

manifestation of this need for better retention is the rise in exploration of game mechanics and genres that require greater player commitment or skill. This has been typified by an increase in the number and quality of strategy, action and traditional/casino games (IHS 2012). Targeting more hardcore gamers is also appealing for developers, because these players are proven to spend money on games and are known to be interested in games. Also the existing casual audiences will also look for more complex, engaging play as they seek novelty and grow more comfortable with gaming and its conventions. A good example of this trend is the genre of Town Defense, which will be explored more in-depth in the next chapter.

4 TOWN DEFENSE – AN EMERGING GENRE

Town Defense is one of the newest game genres to appear on Facebook. This genre is part of a larger "Strategy & Combat" genre - a term used on popular metrics website AppData (Strategy & Combat) - but I've coined the term "Town Defense" for the purposes of this thesis, because the larger genre is too vague and includes a variety of games whose only unifying elements are that of combat and strategy as the name suggests. Town Defense is a selection of games that are similar enough to allow comparison between them.

The Town Defense games revolve around the concept of building one's own base and defending it against attacks by other players. A unifying element in the games in the genre is that the attacks happen against the actual town and its defensive structures. Another defining feature is that the attacker can see the attack unfold in real time. For these reasons, many of the pioneering games in the Strategy & Combat are not included in the Town Defense genre. For example, in *Dragons of Atlantis* the combat has no graphical representation at all, and the outcome is determined by the number and the strength of units. Another common feature in Town Defense games is that offense and defense are usually handled by separate units: troops or other mobile units are used for attacking and stationary buildings for defending. In some games the player is able to save or allocate part of their attacking force to defend their own town via bunker-like structures.

The Town Defense genre borrows many elements from real time strategy (RTS) games such as building a base, placing and controlling troops and using them to attack the enemy base. The main difference to a typical RTS game is the slower pace and lack of completely synchronous gameplay. Currently there is only one game, *Battle Pirates,* in the genre that features real-time battles between players, but there is still very little chance of both the attacker and defender being online at the same time. From online games the genre borrows the aspect of guilds or alliances, allowing players to form groups for mutual protection, co-ordinated attacking, resource sharing and other benefits. Also, they often involve more direct interaction with strangers than with friends - the opposite of many casual games where players usually interact only with their friends. A few games are also influenced by role-playing games (RPGs),

implementing features like technology trees or special hero units that can be upgraded as the player grows stronger.

In the base-building part of the games, most games use the same four basic building categories: resource buildings, which produce resources for expanding and upgrading the base; storages, which set the maximum limit of how much of each resource the player can hold; defensive buildings, which can range from turrets and bunkers to traps and walls; and a central building, which guards a large part of player's resources and its destruction is usually the main goal of the attacker - partly due to the resources, but partly due to the psychological satisfaction.

The majority of gameplay revolves around player-vs-player (PvP) combat, but many games also include computer-controlled enemies to provide targets for players who do not wish to battle against other players. Many games encourage the players to battle by making it much faster to gain resources by attacking than by peaceful means. These resources can then be used to build new and improve existing buildings, which in turn allow player to build a larger and better army, which allows them to take on bigger and more well-defended towns. This cycle of attacking and town improvement forms the core of the interaction loop in Town Defense games.

A general focus of these games is to place emphasis on skill and strategy. The decisions players make - how the players place buildings in their base and what troops they send into battles - are not just cosmetic, but affect the gameplay and their chances of success. Another emphasis is on competition. In addition to leaderboards and tournaments, the games in this genre feature more hardcore elements like destruction and a very real chance of losing; most often not permanently but still often with losses and repercussions to the losing side. In many games, the resources that the player wins in a battle against another player are deducted from the loser. To compound the sense of loss, the owner of the base will often see their destroyed base when they return to the game.

With a gameplay that puts more emphasis on competition and destruction, it's no wonder that the target audience for these games is hardcore gamers. The difference in audience segments show well in their player demographics. Kixeye boasts a 96% male audience for its most successful game, *Backyard Monsters* (Preece & Scott 2011), while

Kabam stated that 72% of their audience is male and 55% are under 40 years old (Thomsen 2011).

While both companies' games are fairly small in terms of users - Kabam's most popular game has under 150,000 DAU and Kixeye's under 500,000 DAU (AppData, Kabam; AppData, Kixeye), that doesn't mean smaller revenue. The male-heavy audience and deeper, more competitive gameplay translate into bigger profits. According to studies, male social gamers are more likely to purchase and spend larger amounts (Infosolutions Group 2011a, 2011b). The revenue from hardcore social game companies reflects these results. According to Cutler (2012b), Kixeye is expecting to make $100 million in revenue in 2012. They have also stated that they make around 80 cents per day per user, while an average social game can expect to make only four. And there is still room to grow. Kixeye's CEO, Will Harbin, estimates that the market for hardcore social games is only 8% saturated. (Cutler, 2012b).

The reason I've selected this particular genre as the focus of my thesis is that it represents the next step in the evolution of Facebook games, an opening for more hardcore style of play on the platform. The genre's focus on strategy makes it interesting to study from the point of usability as, unlike in the casual Facebook games, players have a real chance to lose, making their choices more meaningful. It's also a lucrative segment of Facebook games, as pointed out in this chapter, which is likely to attract more competition in the future.

5 USABILITY AND ITS IMPORTANCE TO GAMES

5.1 Usability in games

Usability is a measure of how easy an interface is to use. The ISO 9421-11 measures usability based on three independent qualities: efficiency, effectiveness and satisfaction (ISO 9241-11). This definition is not very useful from the viewpoint of this thesis, as Federoff pointed out, considerations of efficiency and effectiveness are secondary - or even completely inapplicable - when it comes to video games (Federoff 2002). The ISO standard and other software usability guidelines fail to be relevant to games, because games have a very different goal compared to them. Game are meant to entertain. This goal can be achieved in many ways. Games can be frustrating, confusing or punishing, and yet still be fun. It is when the these issues appear unintended, outside the design of the game, that players are often put off.

What does usability mean for games then? In the context of games, Pinelle has defined usability as the degree to which a player is able to learn, control and understand a game (Pinelle, Wong & Tasch 2008). This definition frames usability as a very important part of a successful game. A game that doesn't provide a suitable tutorial or instructions, controls badly or leaves players confused of what they're even supposed to do is unlikely to do very well in the mainstream games market.

Usability has been an integral part of software development for decades, but games industry has awoken to the issue only in the last few years. In his Gamasutra article, Laitinen laid out three reasons why game developers cannot afford to ignore usability in today's market. First, gaming is a voluntary activity. If the usability problems make the game not fun, the player can always quit the game and not suffer any repercussions for it. The second reason is the increasing supply of games available to consumers. Competition is tough, and many games have to compete not only on their platforms but also within their own genres. Third, the increasing popularity of gaming and the influx of newcomers to gaming are another signal to pay more attention to usability. These newcomers can't be expected to know the conventions that the experienced gamers already have ingrained in their minds, so the games must more understandable and intuitive to the layman. (Laitinen 2005.)

Laitinen's reasonings apply especially well to Facebook games. The games already exist on a platform where the users have a multitude of other activities competing for their time e.g. browsing the News Feed or chatting with friends. The competition among games is also very tough. Just in the genre of city building, there are over 50 games in that category (AppData, Category: City). Good game ideas and features can be quickly copied as mentioned in chapter 3.1., but crafting a good user experience is harder to do. Often it's not the game that is first in the market, but the one that has the best execution, that ends up capturing the largest share of users. A good example of this in the traditional gaming side is *World of Warcraft*, which after 10 years of its original launch is still the leading MMORPG in the world (Activision Blizzard 2012). On Facebook, the best example is Zynga's *Farmville*, which was preceded by a very similar game called *Farm Town*, made by Slashkey. Tending to the needs of inexperienced gamers is also very important for social game companies, as 17% of Facebook gamers are completely new to gaming (Infosolutions Group 2011a). Last but not least, the prevalence of the F2P model makes usability extremely important, as the players have no pre-investment in the game before trying it and thus have little reason to try to keep playing a game with bad usability. This makes usability important for the business of social game companies as players who do not play also cannot pay.

If usability is so important to games, how can developers improve it? How do we measure usability? In the next sub-chapter I'm going to explore heuristics as an option for evaluating games.

5.2 Heuristics as a usability evaluation tool

In the field of software engineering and usability, heuristics are defined as a set of usability principles. Nielsen and Mack have also likened them to shortcuts to finding usability problems (Nielsen & Mack in Pinelle, Wong & Tasch 2008). These principles are applied through heuristic evaluation, where a small set of evaluators examine the user interface (UI) of the product and judge its compliance against the selected list of heuristics. Different heuristic lists usually vary in length from 10 to over 40 items, depending on how detailed the heuristics are.

Heuristics are a popular usability inspection method because of its relative cheapness and quickness compared to user testing (Nielsen & Molich, 1990). Nielsen (1990) noted that since the evaluators are not *using* the system as such (to perform a real task), it is possible to perform heuristic evaluation of user interfaces that exist on paper only and have not yet been implemented. This makes heuristic evaluation suited for use in the early stages of product development.

One of the most commonly used heuristic lists is Ten Usability Heuristics by Nielsen (1994). Nielsen also pioneered the severity rating system, which used to assign each usability issue a value from 0-5 to to denote the importance of the found usability problem and thus better evaluate the need for further refinement of the usability of the product. (Nielsen 2012a).

According to Nielsen, a good number of evaluators for a heuristic evaluation is three to five. One evaluator can find about 35% of the problems by themselves, but as different individuals find different problems, the combined results of several evaluators produces a comprehensive list of usability problems (Nielsen 2012b). Nielsen (1993) also discovered that double experts, who are experts both in usability and the system in question, find more usability problems than regular evaluators. This makes them better for an efficient heuristics evaluation, but on the downside they are not as easy to come by.

Despite the benefits, heuristics cannot replace traditional user testing. However, research in the field points to that heuristic evaluation complements user testing. It can eliminate a number of usability problems without the need to "waste users", who sometimes can be difficult to find and schedule in large numbers (Nielsen 2011a). Also, these two categories of usability assessment methods have been shown to find fairly distinct sets of usability problems; therefore, they supplement each other rather than lead to repetitive findings (Desurvire et al. 1992; Jeffries et al. 1991; Karat et al. 1992 according to Nielsen 2011a).

Heuristic evaluation has its disadvantages. There are many competing and contradictory heuristic lists specifically meant for games (discussed more in the next sub-chapter) and it can be hard to choose the most appropriate one among them. The great variety of video games and platforms make it hard to produce a conclusive list of heuristics that

could be applied to all games. As Folmer (2007) points out, usability and accessibility problems are contextual, and many heuristics only apply to certain genres or platforms. It is also hard to condense the heuristics into all-encompassing rules. This can lead to the list conflicting with itself, such as the examples "*The game should have an unexpected outcome*" and "*there should be a clear overriding goal of the game presented early*". (Folmer 2007).

The method is also prone to subjective bias. Heuristic evaluation is sometimes described as expert-based usability evaluation method, making the experience and knowledge of the evaluators a key issue in the quality of results. While the evaluators do not need formal usability training, knowledge of usability design principles was preferred (Nielsen & Molich, 1990). While multiple evaluators can find more usability problems, their subjective views can also lead to disagreements of what is a usability problem. Research by White, Mirza-babaei, McAllister & Good (2011) showed that different heuristic lists have weak inter-rater reliability, meaning the consensus among the evaluators isn't high. This is attributed to the complexity of video games.

Heuristics help evaluators look for usability problems, but they can also prevent them from finding them. The list can restrict the evaluator's view and cause them to overlook issues that are not covered by the heuristics (Cockton & Woolrych 2002 according to Pinelle et al. 2008). If the usability problem falls outside the scope or it isn't well-matched with the target platform, evaluators (especially non-experts) might be primed to overlook those issues. This can be counteracted by careful selection and evaluation of the heuristic set to be used.

Despite the criticism, heuristics are a widely used and accepted usability evaluation tool (Nielsen 1994). Heuristic evaluation often requires less effort compared to a user testing and can net a large number of usability problems, especially if the situation permits the use of double experts - that is people who are experienced or knowledgeable about both the target platform or subject field and usability. Its suitability to early stages of design, its low requirements, inexpensiveness and speed make it a solid usability evaluation method.

5.3 Heuristics in game studies

Heuristics have been presented as a usability evaluation tool for games in many previous studies. The earliest heuristic set was presented by Malone (1982), but this was limited only to educational games. It was still groundbreaking in its notion that usability could be applied to improving games. In the early 1990's Nielsen published one of the most commonly cited works in the field of usability and human-computer interaction (HCI), *Ten Usability Heuristics* (Nielsen 1994). While it has also been found useful when evaluating interfaces in games (Federoff 2002), it was designed with mainly productivity software in mind, and thus it alone cannot provide a comprehensive evaluation tool for games.

The first more encompassing list of heuristics for games was presented by Federoff, based on Nielsen's and other literature in the field and on her own experiences (2002). Federoff's paper divided the heuristics into three categories: game interface, game play and game mechanics. Two years later Desurvire, Caplan & Toth (2004) published Heuristic Evaluation on Playability (HEP) based on Federoff's study. They introduced a new category, "game story", and replaced the "game interface" category with the more widely suitable "game usability". Both sets are quite detailed with 40 and 43 individual heuristics, respectively.

HEP in turn was taken by Röcker and Haar (2006) and tested for suitability for pervasive games. Their study showed that some of the categories were platform-dependent and would need reconsidering to be inclusive of all types of games and platforms. In the field of mobile games, Nokia released a framework for the evaluation of the playability of mobile games (Koivisto & Korhonen 2006). It included three modules: game play, game usability and mobility. The modules could be individually evaluated, making two of the three useful for evaluating non-mobile games as well, avoiding the platform-dependency issue discovered by Röcker and Haar.

In 2007 Schaffer released his own set of 21 heuristics. Schaffer (2007) argued that the heuristics introduced so far had been too vague and only applicable to post-mortem reviews and not useful as a tool during the design process of a game. He was the first to provide screenshots to accompany the heuristics, making the identification of the design issues even clearer. Continuing on new sets, in 2008 Pinelle, Wong & Tasch released a

set of heuristics based on game reviews. The study took the issues mentioned by the reviewers and gathered and distilled them into 10 heuristics (Pinelle et al. 2008). In the same year Desurvire and Wiberg provided an updated version of HEP called PLAY, which was also based on game reviews (Desurvire & Wiberg 2008).

In 2009 Koeffel, Hochleitner, Leitner, Haller, Geven & Tscheligi introduced a modular framework, which consisted of three sets of heuristics: game play/story, virtual interface and device- or application-specific. The third module can be switched to apply to the platform or application in question, enabling the framework to be used for for evaluating e.g. tabletop games. For the other two modules the study presented a set of 29 heuristics, which were focused on traditional video games and were compiled from several earlier studies. The study also compared the results of the heuristic evaluations from five games against the reviews gathered from game review sites, which showed a correlation between the results of the heuristic evaluation and the quality of the user experience (Koeffel et al. 2009).

With the rise of social games, the field has also applied heuristics to this new genre of games. Paavilainen's (2010) SoPlay heuristics were written specifically for the evaluation of social games. While the SoPlay heuristics are very close to the topic of this paper, unfortunately they are too vague for the purposes of my analysis.

Many of the studies attempted to create a comprehensive list of heuristics for the use of evaluating games. Even though heuristics are gaining traction within the game industry and have been more widely discussed and taught as a usability evaluation tool, none of these lists has appeared as a dominant example in game industry conferences or publications. This is likely due to the fact that a list that could be applicable to all games would be too vague to be of use in game development, and any list that would go into details would only be suitable in the genre or the platform it aims to improve. Additionally, the industry and the technology is constantly evolving, making the idea of producing an all-encompassing heuristic set ever harder.

Each game developer and each game is in a unique situation and should use a heuristic set that suits their needs. This is why I have chosen the list of heuristics for this study from several sources to suit the needs of my target games. To my knowledge the only similar study of using heuristics to evaluate Facebook games is by Almeida, Mealha &

Veloso and their heuristic evaluation of *Farmville* (Almeida et al. 2006).

In the next chapter I will go deeper into my analysis by providing background of the common features in the genre and what kind of information is useful to the player.

6 USABILITY ANALYSIS OF THE ATTACK PROCESS

6.1 The attack process

The common trait in all Town Defense games is attacking other players' bases. Because players are often able to affect each other's experience so directly, it is extremely important for the gameplay to be seen as fair. In order to achieve this fairness and have the players' strategic decisions matter, the game must provide the players with the right set of information in a clear manner at the right time. Because of the attacking of other players is often at the core of these games, I have chosen it as the focus of my research. In particular I will focus on the information the players need in this section and how it is represented to them.

The process of attacking another player can be roughly divided into three phases: scouting, attacking and viewing the results. Each phase requires the game to provide the player with different kinds of information.

In most games there are two parts to the scouting phase: selecting a target and then scouting the layout of their base. In target selection, player should have the means to select a suitable looking target from a pool of possible targets. In this phase main considerations are the target's level or power in comparison to the attacker's own and their availability for attack. Most games usually impose limitations to how often players can be attacked, in order to keep them from being discouraged or bullied. Making the target's availability for attack clear to the attacker already in the target selection saves them a lot of frustration. Additionally, a sorting function of some kind is usually very beneficial, if the pool of targets is large or if the player is looking for an already familiar target (such as a Facebook friend).

In the actual scouting of the base, the main purpose for the scouting player is to evaluate their chances of a successful attack and the potential risks versus the rewards. Players might have different criterias of what constitutes a successful attack, but nevertheless they should be able to have an understanding or at least a fair estimation of the target's strength. This information can be manifested in many ways, depending on the mechanics and balancing of the game. Generally players should be able to see whether

they can afford the attack, if some sort of cost is involved, possible troop deployment locations and the function and strength of different buildings or units, especially defensive ones.

If the attacker deems the target suitable, they should be able to quickly move to the attack phase. However, if the target turns out to be unsuitable for the attacker's purposes, they should also be able to quickly reverse their decision either by being able move back to home or to enemy selection to find a new target.

The attacking phase is easily the most information-laden of the three phases. The attack happens in real time with the attackers having no chance to pause to think longer about their decisions. During the attack, the attacking player should be able to easily see the number of troops they have at their disposal, where and how many can be deployed, their strengths or preferred targets, how much health both their own troop and the enemy units or buildings have and the time left to complete the attack, as many games impose a time limit for the attacks.

Finally, in the results phase player should be presented with a summary of the attack, which details how much resources and other rewards they gained, what kind of casualties they received and inflicted. From there the player should be able to quickly return home.

6.2 Analysed games

I have chosen four games for this analysis: *Backyard Monsters, Edgeworld, Social Empires* and *Galaxy Life.* These four were chosen from the more successful games at the time of writing with the idea to reflect the variety within the genre with their different styles, mechanics, target audiences and age.

6.2.1 Backyard Monsters

Backyard Monsters was developed by Kixeye, formerly known as Casual Collective (Kixeye 2011) and launched in May 2010. At the time of writing it has 1.5m MAU,

320,000 DAU and 21.3% stickiness. (AppData, Backyard Monsters).

Backyard Monsters' setting features a mix of fantasy and science fiction. In the game player has a yard, where they grow monsters and use them to attack the yards of other players to steal their resources. The graphics are reminiscent of 90's PC games with its 3D modeled monsters. It also has messy death animations and blood, so it is very much aimed at a hardcore audience. During its development it has been expanded to include a multiplayer map with outposts (secondary yards) and an underworld expansion called Inferno, which introduced a completely new set of monsters and buildings to the game.

6.2.2 Edgeworld

Edgeworld was developed by Kabam and officially launched in August 2011 (Kabam, 2011). At the time of writing it has 310,00 MAU, 50,000 DAU and 16.1% stickiness (AppData, Edgeworld).

Edgeworld features a science fiction setting, where player makes a base on an alien planet and defends it against hostile computer factions and other players. The prevalence and large amount of statistics available about each unit and building makes it a very suitable game for the more hardcore audience. It features a separate multiplayer map mode, which is only available to players who belong to one of the in-game alliances. A recent expansion introduced outposts to the game, allowing players to maintain two separate bases in the same game. Unique among the analysed games, *Edgeworld* allows players to play multiple games at the same time in different "sectors".

Edgeworld caused some controversy before its release, when Kixeye accused Kabam of copying *Backyard Monsters* with their game, which Kabam denied (Orland 2011).

6.2.3 Social Empires

Social Empires was launched by Social Point in January 2011. At the time of writing it is the most popular of the analysed games in terms of users with 6m MAU and 870,000

DAU, but it suffers from a below-average stickiness (14.5%). (AppData, Social Empires).

Social Empires presents a fantasy setting that mixes both medieval and high fantasy elements. It features units and monsters from many different sources, such as vikings and samurais as special hero units. It also has a vast amount of single-player content, which makes attacking other players unnecessary for progression and thus making it suitable for more casual audiences as well. This game has more mainstream look with simple, cartoony graphics and very mild depictions of violence.

A unique feature in this game is the computer-controlled enemies that spawn into the player's own map every four hours, which the player can choose to attack or ignore, if the enemies are far enough from the player's own town. It is the only analysed game where players are able to manually guide each unit and determine which target they should attack. Another distinctive feature is that all units can be used both for offense and defense without any special requirements or placement.

6.2.4 Galaxy Life

Galaxy Life was developed by Digital Chocolate, and is the most recent of the four games, launched in November 2011. At the time of writing it has 1.9m MAU, 380,000 DAU and 20% stickiness (AppData, Galaxy Life).

Galaxy Life's theme could be defined as a mix of cartoon and science fiction. In the game the player takes over responsibility of a colony of small aliens, who have escaped from their home planet. The game has some computer-controlled enemies, but they currently represent only a tiny portion of the game's content, which is mainly relying on player-vs-player content and newly added Alliance Wars feature, where player-formed alliances battle each other for points. Despite the colourful and cartoony graphics, the game features jarringly violent death animations and focuses mainly on the player-vs-player content, which places it in the more hardcore end of the genre.

6.3 Methods of analysis

To limit the extent of the study, I have chosen three higher objectives to form the basis for my analysis:

i – The interface provides relevant information in a clear and non-intrusive manner;
ii – The player understands the game's status and the feedback the game provides;
iii – The game supports both new, veteran and returning players.

The first two focus directly on user interface and information design, and the third evaluates the game's ability to cater for different kinds of players, both beginners and veterans. Returning players in this context refers to either beginners or veterans, who have been inactive or away from the game for a long time.

Based on these objectives, heuristics were defined to verify the implementation of the objectives in the game. The heuristics were selected and combined mainly from previous studies of heuristics and game design mentioned (Chandler & Josling 2010, Desurvire et al. 2008, Schaffer 2007). Many of the heuristics have been modified in their wording for better coherence and compatibility. I have also added some original heuristics suited to the platform and genre in question.

My study method has some flaws. As I'm conducting this heuristic evaluation alone, I cannot expect to identify all the existing usability problems in the chosen games. As mentioned in chapter 5.2., one person finds only about 35% of all usability problems, but with my experience in Facebook games and usability I believe I qualify as a double-expert and will be able to point out the most severe problems. Additionally, unlike in a normal heuristic evaluation, I've had a longer timeframe for my evaluation, which can help to counteract the problem.

A special limitation of Facebook games in regards to my study is that they are constantly updated, so the usability issues that I find might not exist in future versions of these games. All usability issues and features discussed in this thesis have been observed and confirmed last on 17.6.2012. Despite these limitations, I believe my study will provide useful information about how to identify usability issues and improve usability in Facebook games.

While there were also other usability issues present in the games, I have mainly focused on the ones related to attacking other players. I've also aimed to provide a more detailed explanation of the most glaring violations and just mention the others, in cases where I've found many examples.

6.4 The interface provides information in a clear and non-intrusive manner

6.4.1 All relevant information is displayed

This heuristic was selected to measure whether all games were showing all the necessary information to players. This information can change from game to game and mode to mode, so developers need to make sure the interface and other design decisions reflect that.

Three of the four games were not complying to this heuristic. In *Backyard Monsters* the player has difficulty gauging opponent's defenses, because the game offers no indication of what level their towers are and thus how powerful they are. As mentioned earlier in chapter 6.1., being able to gauge opponent's defense is one of the key parts of gameplay in this genre. Obscuring this information might also constitute a valid design decision, but it does not appear consistent across the game as the game features walls that have distinctive visual look for each upgrade level. Player can use the level of the central building to deduce the maximum upgrade level the defensive buildings can have, but this is quite difficult for the player to remember and promises no exact results.

Galaxy Life suffers from similar problem. Some of the defensive buildings (mainly turrets) have no visual upgrade levels. The level of the turrets has definite impact on their performance as higher level turrets can gain larger range in addition to extra damage and health. This is again inconsistent with rest of the game, because walls and many other buildings in the game become more grand as they upgrade. Again, the rough level of the defensive buildings can be deducted from the visual outlook of player's central building, but this requires extraneous effort from the would-be-attacker's side. On the positive side, both games give the attacker information about the possible

rewards of the attack in the scouting phase. In *Backyard Monsters* this is visualised through the "fullness" of the storage buildings, while in *Galaxy Life* the attacker is shown exact numbers of what the maximum loot from any particular base will be.

Social Empires has a very different approach to scouting, but unfortunately it has led to making it very difficult for players. To be able to scout other players' bases, the player first has to construct a building called "Eagles". The first obstacle is that the building is set behind a so-called paywall. In order to complete the building, the player must either get five friends to help them or pay premium currency. This seems harsh for a feature that is so integral to the genre. Once built, player gets three uses of this scouting function per day. In addition to these limitations, the actual mechanics of scouting are unusual. To scout the enemy base, player has to manually fly an eagle unit around the defender's base. The player is not able to scroll or zoom out as they normally would, because their view is limited by "fog of war". All enemy units will attack the scouting eagle on sight, making it possible to fail the scouting with the eagle being killed before the player has had the chance to view the whole base. The player has to simultaneously guide the eagle and try to get an understanding of the target's defenses, which is strangely inconvenient for a game that represents the more casual end of this genre.

It all seems needlessly difficult, because the attacker can get a perfect view of the defender's base in the actual attack phase. Because there is no time restraint in the attack phase, player can in theory freely browse the defender's base before the attack. However, there are two exceptions which makes this a risky tactic. First, as player can choose their starting location on the defender's map, they may accidentally end up in a location that already houses hostile units. Secondly, upon inspecting the base while in attack mode, they might come to the conclusion that it is way too heavily defended and thus quit the attack. This is important, because the game limits the player to three attacks in a six-hour period, starting from the first attack. This strategy would lose the player one of their three allotted attacks. As a conclusion, the game isn't giving the player very good tools for scouting and thus limits their potential of making informed choices of who to attack.

On the other hand, the only game complying to this heuristic, *Edgeworld*, is very generous with information when it comes to scouting an enemy base. The game shows

the potential attacker information about each building: its level and health, and in the case of defensive buildings, also the damage, rate of fire and range.

6.4.2 Game doesn't display irrelevant information

In this case, irrelevant information refers to information (text, visuals or audio) that isn't relevant to the situation at hand. At best, it is merely annoying and wastes precious screen space or player's attention. At worst, it subtracts the usefulness of genuine relevant information by obscuring it or making it difficult to find.

Backyard Monsters and *Social Empires* are in violation of this heuristic. In *Backyard Monsters* the game shows useless flavour text in attack mode (picture 1). In this mode, players can see the units they have on the left side of the screen and by hovering over each unit, they are shown a tooltip describing the monster and its favourite target i.e. the buildings it will try to attack before all others. The latter is very useful information, but the descriptive flavour text provides no relevant information related to the attack. This kind of information should be removed or relegated to a more appropriate space. It also takes space from the relevant information, target preferences, and makes it harder to find.

PICTURE 1. Screenshot from the attack mode in *Backyard Monsters*

In *Social Empires* the violation appears in the scouting phase. As explained in the previous chapter, the player has to manually fly an eagle to scout the base, but the player is also shown the statistics of the eagle in the information box at the bottom of the screen. These include “attack damage”, “attack speed” and “attack delay”, which gives the false impression of being able to attack enemies with the eagle, which the game doesn't allow in reality. If the player cannot attack, this information is rendered completely useless. This false image is also enforced by the other similarities to the attack mode: the game shows an enemy counter in the bottom right part of the screen and “Battle Menu” button on the bottom left. This is used to exit the mode, which is another violation and discussed more in chapter 6.4.5. While the mode is marked with a sign in the top right corner, which says “SPYING” above the target name, it is mostly out of the player’s sight. The game also gives plenty of mixed signals, but the worst of them is that when the player tries to exit the scout mode, they are asked “Do you wish to quit the battle?”, which is also accompanied by a picture of sleeping units and text that says “You haven’t killed anyone yet”. This goes completely against the idea and the actual mechanics present in the scouting mode.

6.4.3 Critical information stands out

In addition to showing all the relevant information, it is important that the game can also draw the player’s attention to mission-critical information and not let it get lost among the flood of information. The game should give visual priority to critical information, so that even if player is distracted or overwhelmed by all of the presented information, they can easily see the most important part of it.

This heuristic was violated by all examined games and in the exact same area: health bars. Their visibility during attack is important information, especially in games where surviving units are returned to the player after the attack (among analysed games, this applies to *Edgeworld* and to *Social Empires* and *Backyard Monsters* to some extent). Thus the player has the option to stop the attack before a unit is killed and to make a meaningful choice between saving the unit versus continuing with the attack. This is especially important in the case of units which have a high cost and/or production time.

Despite the poor visibility of the health bars in all the games, the actual problem differs slightly from game to game. In *Edgeworld* the health bars can be obscured from view by other units or buildings. It must be noted that *Edgeworld* does have a more detailed system for keeping track of units and their health, but it is available only on the company's own website and not in the Facebook version. As some of the more high-value units in the game require special materials to build, so losing one of these units represents a significant loss in time or money, making this a very frustrating design decision.

In *Social Empires* the issue is with size: the health bars are so small it is very hard to tell what amount of health the unit has left. This can be remedied by zooming in, but this results in a trade-off of having to sacrifice the wider view of the map, which can lead to player having to constantly move the screen around to keep track of the status of the battle. In *Galaxy Life* the size of the health bars is good, but the problem rises from visual effects: the health bars can be covered by the smoke rising from damaged buildings.

Health bars in *Backyard Monsters* combine many of the problems presented above. The health bars are small and additionally they can overlap each other. Sometimes this even results in "blinking" health bars as the game rapidly changes the sorting order between two overlapping health bars. They can also be obscured by damage and loot indicators, making it extremely difficult to see how much health one's own monsters have left. In *Backyard Monsters* monsters sent out to attack are not returned to player, making it more understandable why the health bars are not paid more attention, but it is still irritating, especially for beginners.

Another issue in *Backyard Monsters* is the implementation of damage indicators (picture 2). The damage indicators float up from buildings and units to show how much damage was dealt. However, in this game they appear over the unit or building that dealt the damage, not the one who received it. The convention in many games is exactly the opposite, making this a confusing design choice. The game also doesn't differentiate between damage done by enemy units and by the player's own units, making it hard to tell what is happening when units are clustered together with enemy units or buildings.

PICTURE 2. Damage indicators in *Backyard Monsters*

To further confuse the player, the damage indicators are very similar to loot indicators, which float up from storage buildings when they are attacked to indicate how much resources the attacker is stealing. The font and the size of the text is similar, but whereas damage indicators are deep red, the colours of the loot indicators correspond to the colour of the appropriate resources. Together with the damage indicators, they produce a visual cacophony which makes it hard to keep track of the battle.

6.4.4 Symbols and menu item names are intuitive and obvious

This heuristic is especially relevant to social games, as players are rarely invested enough when they start playing to explore and learn the user interface. The buttons and their names must make it clear what the player can expect to find when clicking them, so that they feel in control of the game even before they have started to truly master it.

All games save *Galaxy Life* violate this heuristic. In *Backyard Monsters* a high-level player is able to send a special champion monster into the battle. This unit differs from

regular units not just in its increased health and damage, but in the player's ability to call this specific monster back before the battle is over. All other units are irretrievable after they have been flung into battle. At the beginning of the battle the player has two buttons next to the champion monster: "Send" and "Retreat". The latter is redundant at this point, because player can't retreat the monster, if it is yet to be placed. Upon clicking "Send" the player can place the champion into the battle, and the "Send" button is replaced by "Hold". The "Hold" button works as a cancel button, in case player does not want to place their champion monster. After placing the champion, the "Hold" button is greyed out but the button remains in place and visible. The button will have no further use in the attack as the player cannot resend a retreated champion back to attack. So at this point the player can only click "Retreat" to have any effect on the champion monster's behaviour. The use of two buttons is redundant and confusing. All of the functions could have been condensed into a single button, which could've changed its function and naming depending on the context. Additionally, the wording "Hold" is not immediately intuitive and could be replaced by a standard "Cancel".

Another violation comes in the target selection. Players can view this pool of targets either as a list or as a map. In the map each target has their picture pinned to the map with a different colored pin: red, yellow and green. It's never explained what these colours mean, and similar colours are not used in the alternative list view. This behaviour is also inconsistent across the game. In the separate Inferno map all pins are grey, and in the advanced map (to which players are automatically moved once they upgrade their Map Room) the game uses different colours altogether to denote members of the player's own alliance as well as members of friendly, neutral or hostile alliances, but the meaning of these colours isn't explained explicitly in the game either. The map view (excluding the one in the advanced map) could be deemed redundant as the list view holds much more relevant information about targets, and the distance between the yards on this map has no gameplay effect.

Edgeworld violates this principle in its scout mode. The scout mode features a large red left-facing arrow on the left side of the screen (with the recent update this button was moved to top of the screen), which redirects players back to their home base. In most cases the player has entered the scout mode from the enemy selection list, and due to the visual outlook of the button it gives the player the false assumption that it would take the player back to the list view. Hovering over the button does show a tooltip with text

"Return to your base", which helps counteract the problem but does not remove it. The player can enter the target selection list from scout mode, but must do this by clicking the "List" button at the bottom of the screen. The prominent colour and placement of the "Return" button makes it far more tempting to press it, leading player to waste time by having them return to their base needlessly while searching for a target. Adding a symbol or text "Home" in the button would make the button's function clearer to players.

Similarly, the "Attack" button in scout mode is also less than intuitive (picture 3). A recent update changed the formerly very clear and prominent "Attack" button into a more complex system. This is due to the addition of outposts, which means that players can have control of two bases and can use both bases to produce offensive units and attack with them. The new user interface reflects this change and gives players the option to choose from which base to send the attacking units from. Unfortunately this has resulted in the removal of the word "Attack" from the UI. The tooltip is also not helpful for beginning players as it only says "Warp Gate A" or "Warp Gate B" depending which one the player is hovering over.

PICTURE 3. Screenshot of the upper bar in the scout mode in *Edgeworld*

Social Empires also features confusing buttons. As mentioned briefly in chapter 6.3.2, a "Battle Menu" button is used in both scout and attack mode as the means to exit the battle. This button has two flaws. First, using the same button in both scout and attack modes can potentially misguide players into thinking they are already in attack mode while still scouting. Second, it does not give a novice player a clear exit signal. Other games utilise a very clear "End Battle" button, and *Social Empires* would benefit from this practice as well. The reasons for this convoluted wording are discussed further in

the next chapter.

The second misleading button is the “Options” button at the top of the screen in the World Map, which corresponds to target selection mentioned in the beginning of chapter 6. Usually in games the term “options” is used to denote more technical settings such as screen size, volume etc. This interpretation is amplified by the little gear symbol that is shown on the button. However, clicking this button opens up a pop-up that shows the player their current army and allows them to set their defensive strategy i.e. the behaviour of their units should they be attacked themselves. In reality, the player cannot adjust their screen size or volume at all in the World Map, which is another usability issue. For this button a better naming option would have been “My Army” or “Army Settings”.

6.4.5 Navigation and switching game modes is clear and effortless

In games that feature more than a single mode or screen, moving between different menus, modes or locations should be as easy as possible for the user. In addition to always being aware of where they are, the users should not be encumbered needlessly when they want to move between bases and modes.

All the games save *Edgeworld* failed to meet this heuristic. *Backyard Monsters* and *Social Empires* both violate it by not allowing players to move directly from scout mode to attack mode. This is bad design as it creates a break between the player’s decision to attack and actually executing that attack. This is also a violation of another heuristic observed in chapter 6.4.2. *Backyard Monsters* makes this especially difficult by forcing players return to home base, re-open the enemy selection list and then relocate their chosen target. This can become a significant chore as the enemy selection list can go on for several pages, and the current page is reset to the first every time the list is closed, making it even harder for the player to find their target. This issue has been remedied in the advanced map, but jarringly the error remains on the normal and Inferno maps. In *Social Empires* the player is only required to return to map and not all the way to home, but even that step should be cut and allow players to make their decision to attack and execute it without any unnecessary steps in between.

Another violation of this heuristic is not allowing players to sort through a list of targets, especially if the pool of possible targets is large. Navigating through an unordered list of random targets would be acceptable if all the targets were of equal value and strength, but that would almost completely defeat the purpose of having a list. *Galaxy Life* and *Social Empires* fail to meet this requirement. In *Social Empires* the player has no list view at all and no way to reorganise or search through possible opponents. *Galaxy Life* has a slightly better situation, where players can click a "Target Spotter" button and get a selection of enemies to attack. The targets are ordered according to their level, but the player can't sort the list in any way. *Galaxy Life* also has a slight navigation problem as players cannot easily return to enemy selection from scout. This violation overlaps with another one and is detailed further in chapter 6.6.4.

Another violation in *Backyard Monsters* comes later in the game, when players can take over and control several yards. There are two types of additional yards: Outposts, which players can take over on the advanced map, or the Inferno yard, which players are rewarded with for successfully completing the Inferno mini-campaign. Player can move easily between their main yard and the Outposts via a special button that appears in their UI once they have conquered their first Outpost. This button allows the player to cycle through all their yards except for the Inferno one. To move to the Inferno yard, players must scroll top-left far outside their normal view in their yard until they see the Inferno entrance building, click it and select "Enter Cavern". Players have to jump through similar hoops to return to their main yard. The additional click is enforced because clicking the entrance building brings up a small menu, where the player can choose to either enter the Inferno yard or transfer troops, making the process of moving to the Inferno yard one click longer and inconsistent with the rest of the game.

Social Empires has major flaws in this area. First of all, the game punishes players for navigation mistakes. In the World Map the player can hover over an enemy territory and get a tooltip menu, which shows the enemy's name, level and three buttons: "Profile", "Spy" and "Attack". Clicking on "Spy" or "Attack" buttons takes the player into that mode immediately without asking for confirmation. Additionally, this cannot be canceled, and the only way to exit the scout or attack mode is to first enter the mode (which the game forces the player to do anyway) and then exit through the "Battle Menu" button. As mentioned earlier in chapter 6.4.1., this is particularly punishing as players have a limited number of attacks and scouts they can do within a certain time

period, so each misclick also deducts from their chances to make their intended attacks or scouts during that time period. This flaw is even worse considering that the player's immediate neighbours (whom they might be prone to misclick on) are not always near their own level, making it more likely that their accidental target's level is too high compared to their own.

Social Empires also makes ending a battle needlessly complicated. In addition to having to know or guess that a battle can be ended prematurely by clicking the "Battle Menu" button (as discussed in chapter 6.4.4.), the player is required to click three buttons before being returned to the World Map. First the player is asked to confirm whether they really want to end battle. After that they are asked to share the results, but this can also be disregarded by clicking "Skip". Finally in the third screen shows the final results of the battle and the player needs to click an "OK" button before being taken back to the map. These options could have been condensed to two clicks - one for confirmation and one with the battle result plus an option to share or return to map. The first step would only be shown if the player is ending the battle prematurely. In the case that the player wins by destroying the target's Town Hall or loses by having all their troops killed, the confirmation phase is skipped, and the player is taken straight to the results screen.

The flow of exiting the battle could even be reduced down to just one click. The reasons for this convoluted system is that the same pop-up that allows the player to exit the battle also provides a tab with the breakdown of both the player's own and the enemy's army. This design already breaks the flow of the game as opening this pop-up fills almost the entire screen and pauses the battle. Due to a bug I observed several times, the game doesn't even always pause when entering this menu, making its usage very hectic and inconvenient. Because the pop-up offers these two completely different options, the player must always be asked to confirm their intention of exiting the battle, whereas other games just have a single-function "End Battle" button. For the exit process to be as smooth as possible, the developers should separate the "End Battle" and the strategic army view into separate functions.

6.4.6 The interface is pleasant and consistent in colour, typography and dialogue design

In addition to fulfilling all the previous heuristics, it is important for the game to present a unified and pleasing graphic user interface. In addition to being easier to use, it can help engage the user and foster a sense of trust and professionalism.

Backyard Monsters and *Social Empires* violate this principle on many occasions, but I've selected just a few examples. In *Backyard Monsters* the settings buttons at the top right corner often overlap with the rest of the UI in the attack mode. As with some of the other violations, this does not appear consistently in the game, but has been improved on in the advanced map. The text in dialogues and buttons is often very small, making it hard to read. It is also often unorganised and unevened. A situation where this is particularly cumbersome is the battle results pop-up (picture 4). The amount of resources that the player looted are shown in plain numbers among the text, which has not been organised at all for better readability. Again, this has been partially improved in the recent Inferno addition, but remains unfixed in the main part of the game.

PICTURE 4. Screenshot of the battle results pop-up in *Backyard Monsters*

Social Empires has several violations as well. In the World Map view, the player starts off from island number 50 with the goal to conquer all islands in order and get all the way to island number one. The player can view the different islands with the island selection at the top of the screen. The player can move through the island by inserting a number into the field or by clicking on the arrow buttons on either side of the field. The arrow which takes the player to island number 49 is pointing to left, which is breaking

with the normal left-to-right reading convention of Western audiences. Similarly to *Backyard Monsters*, the game also suffers from bad use of fonts and text layouts, for example by centering bullet points with long sentences.

The button design in *Social Empires* is very inconsistent. The buttons come in all different shapes and colours: some have white outlines, text and icons within them have no consistent locations, some have tooltips or grow larger upon hover and some utilise a completely different font from others. This all makes it very hard to tell what is a button and what is not. A good example of this is the World Map button in the main view (picture 5). The button is visible next to the player's empire name and population in the top right corner of the screen. It is shaped like a globe with the word "world" and upon hover grows larger and shows a tooltip, which says "Fight against other empires". Upon entering the World Map another globe is shown on the top left corner with the text "World Explorer" in a different font and a faint light blue outline. However, the latter is not a button at all, even though it is remarkably similar to the first one.

PICTURE 5. Comparison of a decorative globe (left) and an actual button (right) in *Social Empires*

The first "World Map" button is also repeated in the interface but with different graphics. On the bottom right part of the screen, where majority of user interface buttons are situated, there is a button with a similar function, but this time it has a globe on a brown square background. This button shows the word "world" upon hover, but clicking does not immediately take player to the World Map but opens a fly-up menu with all the different game modes on it. Incidentally, there the World Map mode shows up as "PvP", which further adds to the inconsistency in the game.

6.5 The player should be able to identify what's happening in the game and the respective feedback

6.5.1 The player should be able to identify elements like avatars, enemies, obstacles, power-ups, threats and opportunities

Being able to differentiate between elements that are beneficial and harmful to a player's success is vital to allowing them to make an informed decisions about their strategy. The main confusion in the analysed games rises from their unit-to-unit combat situations, where it is important to be able to tell apart one's own and the enemy units.

Backyard Monsters and *Galaxy Life* fail to conform to this heuristic in the unit-to-unit combat situations. In *Backyard Monsters* players are able to construct defensive bunkers, in which they can place their own monsters to defend against the attacker's monsters. If both the attacker and the defender use the same monster type, there is no way to tell them apart visually. The game also displays inconsistent behaviour across different maps. In the Inferno addition, the confusion can happen more easily as monsters don't need to be placed in bunkers in order for them to defend the yard; the monsters will leave their housing to defend the yard automatically. *Galaxy Life*'s situation is almost identical. One solution to making these unit-to-unit situations more readable would be to make the enemy units appear in a different colour.

Social Empires partially complies to this heuristic. This game also features unit-to-unit to combat and implements the differentiation with a red circle that appears beneath all enemy units. However, as the circle appears beneath the units, it makes it hard to see, especially in situation where lot of units are crowded together.

6.5.2 Objects have consistent appearance and look like what they're for

Consistency and recognisability of objects is important in order to keep players from being confused or making misjudgments. Communicating the function of units and buildings and other in-game elements visually is paramount, as players are likely to be distracted and are not likely to read any long pieces of text explaining their function.

Backyard Monsters fails to comply to this heuristic in regards to its building and monster design. For the monsters, the graphic used to represent them in the menus is a detailed 2D image. In the gameplay the actual monsters are small, less-detailed 3D models, which often share just the most basic similarity with the image presented in the menus. This can confuse beginners and falsely set up their expectations. Additionally the design of the monsters does not often communicate their particular function i.e. their role in the battle.

The buildings in *Backyard Monsters* are also confusing. All the defensive buildings are marked with white and red stripes, which is a nice way to set them apart from all the others, but the stripes vary in placement and visibility. In fact in one building they do not look like stripes at all but squares. The purpose of many non-defensive buildings is not immediately clear, and some of them could even be confused for defensive buildings. For example the resource building that produces pebbles (one of the four main resources in the game) has a tube-like extrusion that looks very much like the mouth of a cannon. Another example of this is the Map Room (picture 6), the building that is used to access the yards of other players. Its visual outlook communicates nothing of its function. It features a large pair of scissor and a tiny hut with something that could be interpreted as a telescope at top. Still, from the scissors which are much more prominently displayed, the player does not get the idea of what the building's function really is.

PICTURE 6. Map room from *Backyard Monsters*

6.5.3 Game differentiates between interactive and non-interactive elements

Differentiating between interactive and non-interactive elements in the game is important in these games to allow players to easily focus on the relevant actions and information. Allowing players to get confused about what can be interacted with will keep them from being focused on the real challenges of the game and create frustration.

This heuristic was violated by *Backyard Monsters* and *Social Empires*. In *Backyard Monsters* the player may get the idea that they can interact with the defender's buildings. This is due to the cursor changing into a hand icon when hovering over buildings while scouting, but clicking on them doesn't do anything.

In *Social Empires* the violation appears both in scout and attack modes. Both of these modes show the action buttons and the friend bar (which shows all of the player's friends who also play the game) in the lower part of the screen. In scout and attack mode the whole lower part is non-functional, but shown nevertheless. The friend icons and the buttons even look clickable as they grow larger on hover, but do not actually do anything when clicked. This is also a violation of heuristics presented in 6.4.2., but in this case it is a double violation as the game also gives the appearance of being interactive. If the developers didn't want to hide this bar for some reason, they could have at least communicated to the player that the buttons are not functional in these modes.

6.5.4 There are multiple forms of feedback

As stated earlier, Facebook is a very distractive gaming environment and the genre features intense, information-heavy situations. That is why it is important to make sure that players get the feedback they're supposed to without interfering with their enjoyment of the game. Sending the same feedback through several channels (visual, text, audio) is excellent in allowing players to keep track of battles without having to pay attention to all the things at the same time. A great example of multiple feedback in Town Defense games is using sound effects for dying units. This allows players to keep an eye on something else and still letting them know that a unit has died. Varying the sound effect according to which unit died produces even more useful feedback.

Unfortunately none of the analysed games were in complete compliance to this heuristic. While all games communicated the death of units visually, there was a lack of feedback on the audio and text side. Worst performing is *Galaxy Life*, which has no sound effects for dying units. However, the issue is not so critical there, as the game employs small visual markers (picture 7) and also because the attack area is usually quite small, allowing players to keep an eye on most of their units in just one screen. In a game where the player has to scroll around or zoom out to get an overview of the whole battlefield, the other forms of feedback become more critical.

PICTURE 7. Visual marker indicating a death of a unit in *Galaxy Life*

The other games fare slightly better. In *Edgeworld* and *Backyard Monsters* both units and buildings make a generic sound effect upon destruction, but it is very hard to tell which unit or building was destroyed from the audio alone. As all units share the same sound effect, the sounds are also sometimes hard to tell apart, leaving players unsure about whether the dying sound was associated with their own or an enemy unit.

Social Empires also has generic dying sound for units, but none for destroyed buildings. This can be explained by the game's focus on unit-to-unit combat and its focus on units as the main part of defense instead of buildings. None of the games employed textual or even numeric counters of how many of the player's own units have been killed or remain. *Social Empires* shows a counter for remaining enemy units, but not one for the player's own.

All of the examined games also employ a separate background music for battle, which makes the transition to attack mode clearer. In the games where attack time is limited (all save *Social Empires*), none of them use audio cues to let the player know they are about to run out of time. Very few even use visual cues - in fact, *Backyard Monsters* was the only one to do so and even there it was rather subtle. When the player has only 30 seconds of time left, the numbers in the battle timer turn red. As a note, the timer box is situated in the top right corner next to other very similar looking boxes, so having the numbers turn red does not constitute a very noticeable effect.

6.5.5 All feedback is immediate

Immediacy of feedback is important so that players will understand the cause-effect relationships in the game and can adjust their tactics accordingly. Delayed feedback can cause disconnect and distraction in players. If feedback comes with more than 0.14 seconds delay, the human mind cannot make the immediate connection between the cause and the effect (Johnson 2010, 157). Delaying response to the player's actions will also cause them frustration as they feel that their actions have no effect on the game.

Every game complied to this heuristics save *Social Empires*. In *Social Empires* the player get most of their units back after an attack (even if they died), but through apparently random selection, some perished units will remain perished. However, the selection method is never made clear to player and non-returning units are not displayed to the player until after the battle is over. Having units survive through random luck is also not rewarding. This is counteracted by the players' ability to buy a Cemetery, where they can revive dead units in exchange for resources, allowing them to recuperate their losses. This is especially valuable in the case of units that have been purchased with real money.

6.6 The game supports new, returning and veteran players

6.6.1 Player is gradually introduced to advanced options of gameplay

In all of the games in the genre, the complexity increases as players build and upgrade their base, giving them access to new modes, units or even further buildings. This gives players time to get to grips with basic gameplay instead of overloading them with information. In line with this thinking, most games in the genre employ a starter protection for beginners, which keeps other people from attacking them until a certain time period has expired or until the player themselves decides to attack someone. Some games also bar players from participating in the player-vs-player content until they reach a certain level.

None of the games were found in breach of this heuristic, but there were some interesting details in some of the executions. In *Edgeworld* players can access the multiplayer map mode straight from the start, but only if they are part of an alliance. The mode is completely optional, and it has a separate tutorial which can be revisited at any time. The reason to allow beginning players to participate in the map mode can be attributed to the game allowing each player to have bases in different sectors. Players in different sectors cannot interact with each other, so this is akin to allowing players to play multiple parallel instances of the game at the same time. Starting in a new section means that the player has to start building their base from scratch with none of the resources transferring over to this new sector (except for the premium currency). By allowing all players to access the map, the veteran players can immediately start helping their alliance even if they start anew in a different sector.

Social Empires offers four additional modes, which are unlocked at different levels. Player-vs-player and map modes unlock at level 6, tourney mode at level 15 and survival at level 20, giving players plenty of time to familiarize themselves with the game. None of the extra modes are mentioned in the tutorial, but for each mode player can view a help pop-up explaining the purpose and rules of each mode.

6.6.2 Players can revisit tutorials and/or the help section

This heuristic helps to track whether the games are accommodating to beginners or returning players, who might have forgotten how to play or how a specific feature works.

Only *Galaxy Life* was in breach of this heuristic. The game provides no help sections or revisitable tutorials at all. In a recent update the game added hints to loading screens, but they are very generic and randomised, so they cannot be trusted to help the player with any specific problem they might be having. The other three games featured an external help section, although none of them were accessible from the main user interface, but were located in the tabs on top of the game screen. All the games also have forums on external websites, but these usually require separate sign-up, and they are often not indicated in the game as a source of help.

Backyard Monsters has a FAQ on an external website, but at the time of writing it is still partially incomplete despite the game being over two years old. The developers seem to rely on player-produced guides on the forums for more detailed content. The game does provide a separate help pop-up for its advanced map, but inconsistently nothing for the other two maps. *Social Empires* performed the best out of the four. The players can find information about new modes through a help pop-up in the respective modes, but in addition they also have an extensive help section which did not take players out of the Facebook environment.

6.6.3 The game provides context-sensitive help

In addition to revisitable tutorials and help sections, this is one of the best ways to inform players discreetly. Showing the necessary information only when it is needed and relevant is very similar to the first heuristic in chapter 6.4.1, but the information in this case is often only relevant to a portion of players (namely beginners) and thus should be easily dismissable by players who are not interested in the information.

All games provided some measure of context-sensitive help, mostly in the form of

tooltips. *Backyard Monsters* was the only game that violated this heuristic.

In the advanced map the game gives a new statistic for all the yards called “height”. This is never explained to the player in the game, but through the forums I was able to find out that it affects the two other stats which are shown underneath it (but not in a manner that suggest connection between the two): tower range and resource production. The ”higher” yards get bonus to tower range (the range of defensive units) but affects resource production negatively, while ”lower” yards have decreased tower range but increased resource production. A more accurate term could have been “elevation”, but that could’ve also been confusing to players. The simplest way to solve the problem would be to include the explanation in the advanced map help or provide a tooltip on hover.

Another feature which would’ve required some clarification is the truce mechanic. In the enemy selection phase, the player also has the option to request a truce with another player, but the game doesn’t explain what this actually means. Through experimentation I discovered that if both sides agree to this truce, the game imposes a seven-day protection to both players from each other’s attacks.

6.6.4 Frequent tasks are streamlined

The more experienced players become, the faster they want to accomplish the most frequent and basic tasks that they’ve already mastered. The games should support this increase in interaction speed in order to provide for veteran players.

In all the games except *Edgeworld* finding a suitable target is made more arduous than it has to be. In *Backyard Monsters* the player is forced to return home between scouting and attacking, as mentioned in chapter 6.4.5. In *Galaxy Life* the player is forced to return to home base between two scouting attempts. Aggravating this is that the “Target Spotter” function, which should provide players with a list of suitable targets within their range, isn’t available in the home base or “Planet” view. The player is forced to navigate to either “System” or “Galaxy” view, making each trip to home base useless. Players are able to bookmark systems (a cluster of a handful of players), but as even these bookmarks aren’t available to attack straight from home base, this helps very

little. The only targets available for attack or scout straight from home base are the player's friends, which many players will not want to irritate in this way, or the people in the player's attack log, but they are listed chronologically without any sorting function or even level indicators. Neither of these groups can be guaranteed to be available for attack either, and the game does not indicate availability in scout mode, making many scout trips useless.

Social Empires also has several problems in this area, stemming from earlier heuristic violations. As mentioned in chapter 6.4.5., in *Social Empires* playera are not able to sort through their targets or view them in list format. The game presents the player a handful of targets per island, and if the player finds no suitable targets there, they have to start shuffling through all the other islands. This process is slowed by the manual scouting problem shown in chapter 6.4.1. Finally, exiting both scout and attack modes is made needlessly complicated as noted in chapter 6.4.5.

Social Empires also has an additional violation in troop movement. Moving large groups of troops is possible with the square selection tool, which can be activated either by pressing Space or clicking the Square selection tool in the main UI. This tool allows the player to select multiple units at once by first activating it and then clicking and dragging to adjust the size of the square area. Releasing the mouse selects all the units within the square. The square selection tool has an upper limit of 20 troops, which the game doesn't explicitly state. The player can also select similar and nearby troops by double-clicking, but the method by which troops are deemed similar is not clearly explained.

6.6.5 There are multiple goals in the game

Goals here can be understood to mean two things: higher overarching goals, which give players more than one way to succeed in the game, and quests, which give players more concrete, short-term goals to reach for. The latter are often used to guide the player after the tutorial and help expand the player's knowledge of the game by reiterating points presented in the tutorial or by introducing more advanced features.

All of the games were found to be in accordance with this heuristic. All games feature

both building and attacking elements, allowing players who eschew one of the elements to focus more on the other. Most often new and better units are unlocked through the building gameplay, forcing more aggressive players also to expand on their base.

On the quest side, all games were also compliant with the heuristic, although in *Galaxy Life* players were able to run out of quests to complete. This was due to the newness of the game and has been somewhat remedied since. It seems it is possible to run out of quests in *Backyard Monsters* as well, but many players will by then have reached the advanced map, at which point they join an alliance or acquire goals of their own, making them self-guided and independent of game guidance.

6.6.6 The player is aware of their current goal

In order for the short-term goals and thus guidance to work, the player has to be aware of their current goal or goals. Players should also be notified when they complete one of their goals and if they receive new ones.

All of the games save *Galaxy Life* had mixed results with this heuristics. Many of the games had a quest list, but it was or could be hidden from player view, making quest progress monitoring or even completing more time-consuming than in other social games.

For example, in *Backyard Monsters* the player is given two ways to view the quest list: one is a “shortlist” of 10 quests in a collapsible window on the bottom right part of the screen, the other is “Quests” button just above the box. The latter takes player to a pop-up which shows all the quests available in the game. The shortlist shows the 10 most immediate quests for the player, which are mainly focused on base upgrading. However, all quests do not fit in one view, so the player must scroll to see all 10. As it is possible to collapse the shortlist, it can lead to players forgetting about the quests. Additionally the game does not notify player when quests are finished beyond the tutorial, making it possible to ignore the quest structure altogether. This is also unfortunate as the player has to manually claim the rewards of the quest instead of being automatically awarded them upon completion. This is somewhat understandable as some of the rewards are monsters, for which players have limited space.

Edgeworld has a similar approach to quests, but this time all the quests are hidden in a pop-up that can be opened by clicking the character on the bottom left side of the screen. This pop-up shows all the possible quests in the game, but allows the player to sort through them by category. It also points out the most pertinent quest to the player with a “recommended” marker next to that quest. This quest will also always be the topmost in the list. Players are notified when they complete a quest even if it happens in attack mode. Finished quests are always visible as an exclamation mark above the character. This is useful as the game does not give out quest rewards automatically, but requires the player to go to the quest list and pressing “Claim” button next to the completed quest.

In *Social Empires* the current quests are available on the left side of the screen. The player can see the top two quests as icons, but the rest are hidden in a separate quest list which can be accessed by clicking the character below the icons. The game does notify the player when they complete a quest, but it does not tell them which quest they completed. Also, new quests are indicated to the player but viewing them requires the player to open the full quest list. This can lead to the player completing quests without ever knowing what the quest actually entailed.

In *Galaxy Life* goals are available on the top left side of screen, but a minor neglect appears in that the goals aren’t visible in the scout or attack mode in any of the games, even though some of them require players to perform certain things in these modes.

7 DISCUSSION

In my analysis, 17 unique heuristics were used to verify three higher objectives for each of the four analysed games. In total the games had 28 violations out of possible 68. Individually, *Backyard Monsters* had 11 violations, *Edgeworld* 2, *Social Empires* 9 and *Galaxy Life* 6. The violations were spread out across the heuristics, as only three heuristics didn't have any violations at all.

It must be noted that this analysis covered only a part of the content in these games, and thus cannot be taken as complete evaluation of the examined games. Also, I purposefully excluded the assignment of severity ratings to the heuristic violations to limit the scope of my thesis. This limits the possibility of evaluating more extensively the amount of inconvenience caused by these violations to the players.

The first objective ("the interface provides relevant information in a clear and non-intrusive manner") grouped together heuristics related to information and its presentation. Together the games had 17 violations out of total 24. The performance of the games was rather uneven in this area. *Backyard Monsters* and *Social Empires* did not comply with any of the heuristics in this category, while *Edgeworld* and *Galaxy Life* both had only two and three violations respectively (table 1).

TABLE 1. Heuristics and results for objective 1
Y = Yes, N = No, O = Other

OBJECTIVE 1	The interface provides relevant information in a clear and non-intrusive manner											
Heuristic	*Backyard Monsters*			*Edgeworld*			*Social Empires*			*Galaxy Life*		
	Y	N	O	Y	N	O	Y	N	O	Y	N	O
All relevant information is displayed		X		X				X			X	
Game doesn't display irrelevant information		X		X				X		X		
Critical information stands out		X			X			X			X	
Symbols and menu item names are intuitive and obvious		X			X			X		X		
Navigation and switching game modes is clear and effortless		X		X				X			X	
Interface is pleasant and consistent in colour, typography and dialogue design		X		X				X		X		

In my analysis I singled out the strength of an opponent's defenses as a key example of relevant information that the player needs, particularly from the visual outlook of

defensive buildings. It can be argued that for some of the games, the layout is more important than the individual level of each building. However, this proved to be inconsistent in many of the analysed games as all the other buildings became visually more grand as they were leveled up. So if the game provides the opportunity to improve and upgrade buildings, why not also give them the pleasure of seeing them changed visually as well? This would mix well with the elements of social bragging and add intimidation factor to a high-level base.

Some of the usability issues manifested in the same form in several of the examined games. All games failed to show off their health bars properly. Some of the games also had problems allowing players to move straight from scouting to attacking or to sort a large number of potential targets, which can become a source of major frustration for players. The more aesthetic qualities of the user interfaces were also evaluated, and there consistency turned out to be the biggest issue in the non-conforming games.

Information design and presentation is an important part of game design and should not be neglected, especially when the games involve competitive player interactions. The developers should think about what is the critical information in their game and display that clearly and prominently. This information is likely to change throughout the course of the game, and the question of what players needs to know in a given situation needs to be considered for each one of them. While this will produce more work for the development team, good information design is an integral part of a good user experience.

The second objective (“the player understand the game’s status and the feedback the game provides”) featured heuristics that measured the audiovisual feedback provided by the game. While there can be some overlap with the first objective, this one was meant to focus more on the elements of the game that were not clearly related to the graphical user interface of the game such as in-game buildings and audio feedback.

The performance of the games was better here compared to the first objective. Together the games had 6 violations out of maximum 20. *Backyard Monsters* was the least compliant with three violations, followed by *Social Empires* with two and *Galaxy Life* with one, while Edgeworld no violations at all. Two of the heuristics resulted in inconclusive marks (table 2).

TABLE 2. Heuristics and results for objective 2

Y = Yes, N = No, O = Other

OBJECTIVE 2	The player should be able to able to identify what's happening in the game and the respective feedback											
Heuristic	*Backyard Monsters*			*Edgeworld*			*Social Empires*			*Galaxy Life*		
	Y	N	O	Y	N	O	Y	N	O	Y	N	O
The player should be able to identify game elements such as avatars, enemies, obstacles, power ups, threats and opportunities		X		X					X		X	
Objects have a consistent appearance and should look like what they are for		X		X			X					
Game differentiates between interactive and non-interactive elements		X		X				X		X		
There are multiple forms of feedback			X			X			X			X
All feedback is immediate	X			X				X		X		

Two of the five heuristics in this category were concerned with the visual design of in-game elements like buildings and units. The violations for the first one arose from the unit-to-unit combat situations, where players were in danger of losing sight of which units were their own and which the enemy's. While *Social Empires* did have visual markers for enemy units, they earned it only an inconclusive mark because of the poor implementation.

The second heuristic tracked the visual consistency and affordance of the in-game elements. Affordances are particularly important in these games, where many of the in-game items are not merely decorations but items with important functions. Being able to see an item's function from its visual outlook is thus important. The function of an item can be explained through other means as well, but they can be more easily ignored or forgotten, while the visual cues from the item itself will always remain present and serve as an unobtrusive but constant reminder.

The inconclusive results regarding multiple forms of feedback were due to the fact that while the games employed some auditory and visual feedback, there was room for improvement. The lack of clearly distinct sound effects for different units perishing made them less useful than they could've been. While in some games having a different sound effect for each unit would result in too much work, having one for each type (e.g. infantry, flying units etc.) would've proven to be much more helpful.

Confusion and misinterpretation are rarely things any game designer has in mind for their players to experience, but neglecting to consider and design the audiovisual feedback of the game can lead exactly to that. Especially in games where players can negatively affect other players virtual property and/or suffer losses while doing so, it is important that players are constantly shown the status of the game and fed relevant feedback in a clear way. In narrowing down the focus of my analysis, I excluded the defender's viewpoint, but in the context of these games, it is as important as the attacker's. Many games in this genre offer little or no feedback on what happens during an attack on the player's base. This can be a major source of frustration for players, especially due to the asynchronous nature of most games. Most of the time they are not present or aren't allowed to view the attack as it happens. If the players do not get this feedback later when they return to the game, it makes it very hard for them to improve their defenses, which can diminish their enjoyment of the game.

The third objective ("The game supports both new, veteran and returning players") was included to evaluate if the games can adapt to the needs of players at different skill and engagement levels. The number of violations was the smallest of the three: only 5 violations out of maximum 24. This time *Backyard Monsters* was joined by *Galaxy Life* as the least compliant game, both with two violations. *Social Empires* had only one violation and *Edgeworld* none at all. However, three of the four games earned inconclusive marks in one of the heuristics (table 3).

TABLE 3. Heuristics and results for objective 3
Y = Yes, N = No, O = Other

OBJ. 3	Game supports both new, veteran and returning players											
Heuristic	*Backyard Monsters*			*Edgeworld*			*Social Empires*			*Galaxy Life*		
	Y	N	O	Y	N	O	Y	N	O	Y	N	O
Players are gradually introduced to advanced options or gameplay	X			X			X			X		
Players can revisit tutorials and/or help sections			X			X			X		X	
Game provides context-sensitive help		X		X			X			X		
Frequent tasks are streamlined		X		X				X			X	
There are multiple goals in the game	X			X			X			X		
Player is always aware of their current goal			X			X			X	X		

The positive sign in this category was that all the examined games complied with two heuristics: "Players are gradually introduced to advanced options or gameplay" and

"There are multiple goals in the game". This shows that while these games are more hardcore than many others on Facebook, they are not limited to the stereotype of these games and can provide for the more casual players as well. I must note that in evaluating the games based on these heuristics, I had to analyse gameplay outside the confines of the attack process.

The inconclusive marks for the three examined games arose in the heuristic regarding the player's awareness of their current goal. This was due to the user interface hiding the goals out of sight, which can lead to players forgetting about them or having to constantly check back to remind themselves of what their goal is. It can be argued that in many of these games, players create their own goals, especially if the game is more focused on the player-versus-player content, but this is still an important guiding tool for starting players and thus should not be neglected.

The area where all the games had the poorest performance was the streamlining of frequent tasks. The non-conforming games didn't allow players to move smoothly between different targets or from scout mode to attack mode. Many of these violations overlapped with the navigation issues, but this was understandable as navigation forms a large part of the attack process. Developers should focus more on making these frequently occurring tasks more pleasant and smooth exactly because they occur so often and will cause repeated frustration if they are badly designed.

Accommodating different skill levels and types of players is an important design consideration, because serving only beginners or veterans will hurt the game in the long run. The best way to attract new players is to make starting and returning to the game easy. While tutorials are an extremely important part of this process, I had to exclude that part from my thesis as that is a topic for a whole study in itself.

The overall results are interesting as the number of heuristic violations show a trend of inverse correlation with the popularity of the game (measured with both DAU and MAU mentioned in chapter 6.2.). *Social Empires* and *Backyard Monsters*[4] have significantly more players than the other two, and they also show significantly higher noncompliance rate (9 and 11 compared to 2 and 5). While usability is an important

[4] During the writing of this thesis, *Galaxy Life* overtook *Backyard Monsters* both in terms of DAU and MAU, but before this change *Backyard Monsters* was the 2nd most popular of the Town Defense games.

issue, this clearly shows that it is not the only factor that contributes to the success of a social game. I theorise that a wealth of content, limited scope, lack of large-scale competition and more hardcore target audience can contribute to the success of a social game despite existing usability issues.

If usability is so important to making a successful game, why do we still have games with bad usability? One reason could be attributed to the lack of widespread tools and methods for measuring and improving usability. This is hindered by the variety of genres and platforms, each of which can have differing conventions and definitions of good usability. For this problem, heuristics can provide a solution, but more research as well as discussion and education about their use is needed.

Usability should be an extremely important issue for developers of free-to-play games, because the players have no pre-investment in a free game and thus have little incentive to "learn" it. As the results of my research point out, this is not always so. I attribute this to the lack of competition and the target audience of the examined games. As the target audience consists largely of hardcore social gamers, they already have some gaming experience, and can thus can be expected to be better at interpreting and navigating more complex user interfaces than casual social gamers. One possibility could even be that the bad usability is intentional, acting as a filter to weed out the less-monetising casual players. However, as the competition for hardcore social gamers increases, the expectation is that the games with better usability will rise to the top.

Another reason for poor usability can be that designing for good usability or fixing existing usability issues (e.g. providing unique graphics for each building level mentioned earlier in this chapter) can require extensive work from the development tream. This does not always fit within the budget and the scope of the games, so even if the developers are aware of and wish to improve the usability or fix the issues in their games, they simply do not have the time or money to do it.

Abundance of content can also be used to mask or compensate for usability issues. To keep players engaged, the developers often have to release new content on a regular basis. Thus, developing new content and features plus fixing the most urgent bugs take precedence over other aspects of the user experience. Usability issues often do not have same urgency to them and can remain unnoticed or ignored for a long time.

Additionally, if the uses are not complaining about the usability issues, and the metrics show no decrease in users or their activity due to them, it can be hard for the developer team to detect the issues or justify why they should be prioritized over other tasks. Users might also get used to the usability problems and learn to maneuver around them, if the game manages to hook them with exciting gameplay and regularly updating content.

8 SUMMARY

I started my thesis by outlining the current audience of Facebook games in chapter 2. I explored the definitions of “casual” and “hardcore” and how they relate to games, players and play styles. The outcome is that these stereotypes related to the terms do not accurately reflect reality, but would be best used to describe play styles instead of gamers and games. However, I had to acknowledge that their widespread use makes them a useful shorthand, as they have no reasonable alternatives at the moment. I also took a close look at the average social gamer, a person who plays games on social networks, and into the habits of casual and hardcore social gamers, where the latter were a smaller but potentially better monetizing audience.

In chapter 3, I moved to compare Facebook to traditional gaming platforms from the viewpoint of a game developer and looked at the advantages and disadvantages to developing games for it. I also looked at the evolution of Facebook games and explored the reasons for the rise of niche genres on Facebook. One of the main reasons for this was that the audience is maturing and the market is saturating, creating a need for exploring more complex and engaging game types and genres. This has given rise to the Town Defense, which was introduced in detail in chapter 4.

In chapter 5 I laid down the reasons why usability is important to games. I presented heuristic evaluation as a useful tool for game companies to assess their usability and a quick summary of its previous use and findings in academic studies.

Chapter 6 introduced the four games that were the focus of my research and the method of my analysis, which consisted of a set of 17 heuristics that were divided into three higher objectives. The results of my research point to that usability issues are still rife in the genre, surprisingly more so in the more popular games.

The focus of my analysis was narrowed down to a few games in this particular genre and even further limited to a particular area in them, but my findings can be of value to developers hoping to develop a game in this genre or who are interested ins improving the usability in their games with heuristic evaluation. Usability in Facebook games is a rich topic for further research, as I have only scratched the surface in this paper.

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REFERENCES

Activision Blizzard. 2012. Activision Blizzard Announces Record Fourth Quarter and Calendar Year 2011 Earnings. Press Release. Released 9.2.2012. Read 8.7.2012. http://investor.activision.com/releasedetail.cfm?ReleaseID=647732

Adobe. 2012. Statistics. Read 2.8.2012. http://www.adobe.com/products/flashruntimes/statistics.html

Almeida, S., Mealha, O. & Veloso, A. 2006. Heuristic Evaluation of ”Farmville”. Read 12.12.2011. http://gaips.inesc-id.pt/videojogos2010/actas/Actas_Videojogos2010_files/VJ2010-FP_P_21-30.pdf

AppData. Backyard Monsters. Read 13.9.2012. http://www.appdata.com/apps/facebook/342684208824-backyard-monsters

AppData. Category: City. [Access requires AppData Pro account.] Read 13.9.2012. http://www.appdata.com/leaderboard/apps?genre_id=24

AppData. Developer Leaderboard. Access requires AppData Pro account.] Read 13.9.2012. http://www.appdata.com/leaderboard/developers?list_select=devs&metric_select=dau&fanbase=0&genre_id=1

AppData. Edgeworld. Read 13.9.2012. http://www.appdata.com/apps/facebook/119952871410011-edgeworld

AppData. Farmville. Read 13.9.2012. http://www.appdata.com/apps/facebook/102452128776-farmville

AppData. Galaxy Life. Read 13.9.2012. http://www.appdata.com/apps/facebook/112125248878790-galaxy-life

AppData. Games Leaderboard. [Access requires AppData Pro account.] Read 13.9.2012. http://www.appdata.com/leaderboard/apps?list_select=apps&metric_select=dau&start_date%5Bmonth%5D=8&start_date%5Bday%5D=1&start_date%5Byear%5D=2012&fanbase=0&genre_id=1&platform_id=Select+platform&language_id=Select+language

AppData. Kabam. Read 13.9.2012. http://www.appdata.com/devs/429-kabam

AppData. Kixeye. Read 13.9.2012. http://www.appdata.com/devs/32549-kixeye

AppData. Social Empires. Read 13.9.2012. http://www.appdata.com/apps/facebook/100495476683973-social-empires

AppData. Strategy & Combat. [Access requires AppData Pro account.] Read 13.9.2012. http://www.appdata.com/leaderboard/apps?genre_id=652661

Beyond Facebook - A Look At Local Social Networks in Europe and and Latin

America. 2011. Read 18.5.2012. http://www.superdataresearch.com/wp-content/uploads/2011/10/SuperDataViximo_BeyondFacebook_100711.pdf

Bohn, D. 2012. How Facebook makes money: 85 percent from ads, 12 percent from Zynga. Released 1.2.2012. Read 24.6.2012. http://www.theverge.com/2012/2/1/2764825/facebook-revenue-ads-12-percent-zynga.

Boyer, S. 2009. L337 Soccer Moms: Conceptions of "Hardcore" and "Casual" in the Digital Games Medium. Master's thesis. Pages 2, 54, 115. Read 20.5.2012. http://digitalarchive.gsu.edu/cgi/viewcontent.cgi?article=1052&context=communication_theses

Brown, N. 2012. Another dev accuses Zynga of cloning. Edge. Read 7.7.2012. http://www.edge-online.com/news/another-dev-accuses-zynga-cloning

Carless, S. 2010. GDC Europe: Zenimax's Firor On How 'Casual Is The New Hardcore". Released 17.7.2010. Read 17.5.2012. http://www.gamasutra.com/view/news/120754/GDC_Europe_Zenimaxs_Firor_On_How_Casual_Is_The_New_Hardcore.php

Casual Games Association. 2007. Casual Games Market Report 2007. Read 17.5.2012. http://www.casualgamesassociation.org/pdf/2007_CasualGamesMarketReport.pdf

Casual Games Association. 2012. FAQ. Read 17.5.2012. http://www.casualgamesassociation.org/news.php#top

Chandler, C. & Josling, J. 2011. Having Fun Yet? Ten Usability Heuristics for Games. Presentation at SXSW Interactive 2011. Viewed 7.12.2011. http://lanyrd.com/2011/sxsw/sctgg/

Clipperton Finance. 2011. The New Era of Social Games: Who Can Topple *Zynga*'s Tower? Read 2.8.2010. http://www.clipperton.net/SocialGaming/Social_Gaming_Research_Report_by_Clipperton_June302011.pdf

Contestabile, G. 2012. Opinion: It's what you you do with freemium that counts. Released 27.2.2012. Read 19.5.2012. http://www.edge-online.com/opinion/opinion-its-what-you-do-freemium-counts

Cutler, K. 2012a. Developers say Facebook Credits converts fewer paying users than hoped. Released 8.2.2012. Read 18.5.2012. http://www.insidefacebook.com/2012/02/08/developers-say-facebook-credits-converts-fewer-paying-users-than-hoped/

Cutler, K. 2012b. Kixeye Is the Lucrative Dark Horse of Facebook Gaming. Released 18.4.2012. Read 24.5.2012. http://techcrunch.com/2012/04/18/kixeye-lucrative-dark-horse-facebook-gaming/

Desurvire, H. Caplan, M. & Toth, J. 2004. Using Heuristics to Evaluate Playability of Games. Proceedings of CHI '04 Extended Abstracts on Human Factors in

Computing Systems (Vienna, Austria, April 24 - 29, 2004). CHI '04. New York, NY: ACM Press, 1509-1512.

Desurvire, H. & Wiberg, C. 2008. Game Usability Heuristics (PLAY) For Evaluating and Designing Better Games: The Next Iteration. Online Communities and Social Computing: Third International Conference, OCSC 2009, Held as Part of HCI International 2009, San Diego, CA, USA, July 19-24, 2009, Proceedings, 557–566.

Dickens, A. 2007. The Hardcasual Gamer. Released 5.11.2007. Read 18.5.2012. http://www.nintendolife.com/news/2007/11/the_hardcasual_gamer

Dredge, S. 2012. Facebook builds European social games team following startups' success. Released 22.2.2012. Read 19.5.2012. http://www.guardian.co.uk/technology/appsblog/2012/feb/22/facebook-games-europe

Dureyee, T. 2011. Ex-Playdon Exec Rick Thompson Calls for Higher Quality Social Games. Released 10.10.2011. Read 18.5.2012. http://allthingsd.com/20111010/ex-playdom-exec-rick-thompson-calls-for-higher-quality-social-games/

Edery, D. 2012. Standing up for ourselves. Blog entry. Released 29.1.2012. Read 7.7.2012. http://www.edery.org/2012/01/standing-up-for-ourselves/

Entertainment Software Association. 2011. Essential Facts about the Computer and Video Games Industry. Read 18.5.2012. http://www.theesa.com/facts/pdfs/ESA_EF_2011.pdf

Entertainment Software Association. 2012. Essential Facts about the Computer and Video Games Industry. Read 26.6.2012. http://www.theesa.com/facts/pdfs/ESA_EF_2012.pdf

Facebook. 2012a. Platform. Read 19.5.2012. https://www.facebook.com/platform

Facebook. 2012b. Key Facts. Read 3.8.2012. URL: http://newsroom.fb.com/content/default.aspx?NewsAreaId=22

Federoff, M. 2002. Heuristics and Usability Guidelines for the Creation and Evaluation of Fun in Video Games. Read 25.5.2012. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.89.8294&rep=rep1&type=pdf

Folmer, E. 2007. Designing Usable and Accessible Games with Interaction Design Patterns. Released 17.5.2007. Read 12.12.2011. http://www.gamasutra.com/view/feature/129843/designing_usable_and_accessible_.php?page=3

Fuloria, P. 2012. Introducing subscriptions and local currency pricing. Blog post. Released 19.6.2012. Read 2.8.2012. https://developers.facebook.com/blog/post/2012/06/19/introducing-subscriptions-and-local-currency-pricing/

Gaudiosi, J. 2012. Facebook Turning its Attention to Core Gamers. Released 21.6.2012. Read 24.6.2012. http://www.gamesindustry.biz/articles/2012-06-21-facebook-turning-its-attention-to-core-gamers

IHS. 2012. Facebook Gaming Boom Ends, Posing Challenges for Operators. Press release. Released 24.2.2012. Read 18.5.2012. http://www.isuppli.com/media-research/news/pages/facebook-gaming-boom-ends-posing-challenges-for-operators.aspx

Information Solutions Group. 2010. 2010 Social Gaming Research. Read 17.5.2012. http://www.infosolutionsgroup.com/2010_PopCap_Social_Gaming_Research_Results.pdf.

Information Solutions Group. 2011a. 2011 PopCap Games Social Gaming Research. Read 17.5.2012. http://www.infosolutionsgroup.com/pdfs/2011_PopCap_Social_Gaming_Research_Results.pdf.

Information Solutions Group. 2011b. Social Gamer Research Study. Read 17.5.2012. http://www.infosolutionsgroup.com/pdfs/2011_Kabam_ISG_Social_Games_Research_Results.pdf

International Game Developers Association. 2006. 2006 Casual Games White Paper. Read 17.5.2012. http://www.igda.org/sites/default/files/IGDA_CasualGames_Whitepaper_2006.pdf

ISO 9421-11. 1998. Ergonomic requirements for office work with visual display terminals (VDTs) – Part 11: Guidance on usability.

Jacobs, M. & Sihvonen, T. 2011. In Perpetual Beta? On the Participatory Design of Facebook Games. Proceedings of DiGRA 2011 Conference: Think Design Play. Read 17.5.2012. http://www.digra.org/dl/db/11312.19220.pdf

Johnson, J. 2010. Designing with the Mind in Mind: Simple Guide to Understanding User Interface Design Rules. Burlingtong, MA, USA: Morgan Kaufmann, 157.

Kabam. 2011. Kabam Launches Edgeworld on Facebook and Google+. Press release. Released 11.8.2011. Read 27.5.2012. https://www.kabam.com/corporate/news/press/kabam-launches-edgeworld-on-facebook-and-google

Kixeye. 2011. Casual Collective becomes Kixeye, announces massive Backyard Monsters success. Press release. Released 28.4.2011. Read 26.11.2011. http://www.kixeye.com/wp-content/uploads/2011/08/CASUAL-COLLECTIVE-BECOMES-KIXEYE-1.pdf

Koeffel, C., Hochleitner, W., Leitner, J., Haller, M., Geven, A. & Tscheligi, M. 2009. Using Heuristics to Evaluate the Overall User Experience of Video Games and Advanced Interaction Games. Read 12.12.2011. http://mi-lab.org/wp-content/blogs.dir/1/files/publications/uxInGames_Koeffel_et_al.pdf

Kohler, C. 2010. Q&A: Pac-Man Creator Reflects on 30 Years of Dot-Eating. Web

article. Read 17.5.2012. http://www.wired.com/gamelife/2010/05/pac-man-30-years/

Korhonen, H., & Koivisto, E. 2006. Playability heuristics for mobile games. In Proceedings of the 8th Conference on Human-Computer interaction with Mobile Devices and Services (Helsinki, Finland, September 12–15, 2006). MobileHCI '06, vol. 159. New York, NY: ACM Press, 9-16.

Laitinen, S. 2005. Better Games Through Usability Evaluation and Testing. Released 23.6.2005. Read 28.11.2011. http://www.gamasutra.com/view/feature/2333/better_games_through_usability_.php

Liu, D. 2011. The Next Step for Facebook Credits. Blog post. Released 24.1.2011. Read 17.5.2012. https://developers.facebook.com/blog/post/451/

Lovell, N. 2011. Whales, Dolphins and Minnows. Blog post. Released 16.11.2011. Read 26.6.2012. http://www.gamesbrief.com/2011/11/whales-dolphins-and-minnows-the-beating-heart-of-a-free-to-play-game/

Malone, T.W. 1982. *Heuristics for Designing Enjoyable User Interfaces: Lessons from Computer Games.* Proceedings of the 1982 conference on Human factors in computing systems table of contents. Gaithersburg, Maryland, US: .

Nielsen, J. & Molich, R. 1990. Heuristic evaluation of user interfaces. Proceedings of ACM CHI'90 Conference on Human Factors in Computing Systems, 249-256.

Nielsen, J. 1992. Finding usability problems through heuristic evaluation. Proceedings of the SIGCHI conference on human factors in computing systems. Monterey, CA, USA: ACM Press, 373-380.

Nielsen, J. 1993. Usability Engineering. Burlington, MA, USA: Morgan Kaufmann.

Nielsen, J. 1994. Heuristic Evaluation. In Nielsen, J., and Mack, R.L. (Eds.), Usability Inspection Methods. New York, NY, USA: John Wiley & Sons.

Nielsen, J. 2011a. Characteristics of Usability Problems Found by Heuristic Evaluation. Read 12.12.2011. http://www.useit.com/papers/heuristic/usability_problems.html

Nielsen, J. 2011b. Usability 101: Introduction to Usability. Read 22.12.2011. http://www.useit.com/alertbox/20030825.html

Nielsen, J. 2012a. Severity Ratings for Usability Problems. Read 24.6.2012. http://www.useit.com/papers/heuristic/severityrating.html

Nielsen, J. 2012b. How to Conduct a Heuristic Evaluation. Read 3.7.2012. http://www.useit.com/papers/heuristic/heuristic_evaluation.html

NPD Group. 2010. Extreme Gamers Spend Two Full Days per Week Playing Video Games. Press release. Released 27.5.2010. Read 26.6.2012. http://www.npd.com/press/releases/press_100527b.html

Orland, K. 2011. Kabam, Kixeye Clash Over Game Copying Accusations. Released 27.7.2011. Read 13.5.2012.

http://www.gamasutra.com/view/news/36088/Kixeye_Kabam_Clash_Over_Game_Copying_Accusations.php

Paavilainen, J., Kultima, A., Kuittinen, J., Mäyrä, F., Saarenpää, H. & Niemelä, J. 2009. GameSpace: Methods and Evaluation for Casual Mobile Multiplayer Games. Read 17.5.2012. http://tampub.uta.fi/bitstream/handle/10024/65773/978-951-44-7730-0.pdf?sequence=1

Paavilainen, J. 2010. Design and Evaluation Heuristics for Social Network Games. Presentation at MindTrek 2010. Read 15.3.2012. http://soplayproject.files.wordpress.com/2010/10/soplay_mindtrek_2010_workshop_presentation.pdf

Perez, S. 2011. Nearly 40% of Facebook Users are Mobile App Users. Released 29.12.2011. Read 24.6.2012. http://techcrunch.com/2011/12/29/nearly-40-of-facebook-use-is-from-mobile-apps/

Pinelle, P., Wong, N. & Stach, T. 2008. Heuristic evaluation for Games: Usability Principles for Video Game Design. CHI Proceedings 2008. Read 18.5.2012. www.irit.fr/recherches/ICS/projects/twintide/upload/447.pdf

Portnow, J. 2009. Opinion: Redefining Casual For The Hardcore. Released 28.4.2009. Read 17.5.2012. http://www.gamasutra.com/view/news/114193/Opinion_Redefining_Casual_For_The_Hardcore.php.

Preece, P. & Scott, D. 2011. Social Games Don't Have to Suck. Presentation at Casual Connect Seattle 2011. Viewed 8.7.2012. http://casualconnect.org/content/Seattle/2011/Social_Games_Dont_Have_to_Suck_CCS_2011.pptx

Purdy, D. 2012. Facebook: Growth Engine. Presentation at Facebook Ecosystem CrunchUp. Released 3.8.2012. Viewed 9.8.2012. http://techcrunch.com/2012/08/03/230-million-people-played-games-on-facebook-com-in-the-last-30-days/

Radoff, J. 2011. Game ON: Energize Your Business with Social Media Games. Hoboken, NJ, USA: Wiley. pp. 27-29, 39-40.

Reynolds, B. 2009. The Social Gaming Tipping Point. Presentation at GDC Austin/Online 2009. Presentation Slides. Viewed 2.8.2012. http://gdcvault.com/play/1011894/The-Social-Gaming-Tipping

Ricchetti, M. 2012. What Makes Social Games Social? Released 17.2.2012. Read 18.5.2012. http://www.gamasutra.com/view/feature/6735/what_makes_social_games_social.php

Rose, M. 2012. The Future of Games with David Braben. Released 19.5.2012. Read 26.5.2012. http://www.gamasutra.com/view/feature/135104/the_future_of_games_with_david_.php?page=3

Röcker, C. & Haar, M. 2006. Exploring the Usability of Video Game Heuristics for Pervasive Game Development in Smart Home Environments. In: C. Magerkurth, M. Chalmers, S. Björk, L. Schäfer (Eds.): Proceedings of the Third International Workshop on Pervasive Gaming Applications (PerGames'06), May 6, Dublin, Ireland, pp. 124 – 131.

Salanga III, F. 2010. Developing for Facebook was like tantric sex. Released 27.10.2010. Read 19.5.2012. http://www.examiner.com/article/developing-for-facebook-was-like-tantric-sex

Schaffer, N. 2007. Heuristics for Usability in Games. White paper. Read 15.5.2011. http://gamesqa.files.wordpress.com/2008/03/heuristics_noahschafferwhitepaper.pdf

Shih, G. 2012. After Farmville success, Zynga not ready to plunge into mobile. Reuters. Released 10.7.2012. Read 2.8.2012. http://www.reuters.com/article/2012/07/10/net-us-zynga-mobile-idUSBRE86918U20120710

Smith, J. 2009. Exclusive: Discussing the Future of Facebook with CEO Mark Zuckerberg. Blog post. Released 3.6.2009. Read 19.5.2012. http://www.insidefacebook.com/2009/06/03/exclusive-discussing-the-future-of-facebook-with-ceo-mark-zuckerberg/

Social Networking Sites and Our Lives. 2011. Read 18.5.2012. http://pewinternet.org/~/media//Files/Reports/2011/PIP%20-%20Social%20networking%20sites%20and%20our%20lives.pdf

Thomsen, M. 2011. We're Going to Need Another Category: Going Hardcore on Facebook. Released 11.10.2011. Read 26.5.2012. http://www.gamasutra.com/view/feature/6507/were_going_to_need_another_.php

Tsotsis, A. 2010. 200 Million People Are Playing Facebook Games. Released 21.9.2010. Read 18.5.2012. http://techcrunch.com/2010/09/21/200-million-people-are-playing-facebook-games/

Takahashi, D. 2012. Kabam looks beyond Facebook for its growth in core hardcore social games (exclusive). Released 16.2.2012. Read 19.5.2012. URL: http://venturebeat.com/2012/02/16/kabam-looks-beyond-facebook-for-its-growth-in-hardcore-social-games-exclusive/.

Tyni, H., Sotamaa, O., & Toivonen, S. 2011. Howdy Pardner!: On free-to-play, sociability and rhythm design in FrontierVille. Copy received from authors.

Ventrice, T. 2010. Evolving the Social Game: Finding Casual by Defining Hardcore. Released 21.9.2010. Read 17.5.2012. http://www.gamasutra.com/view/feature/6143/evolving_the_social_game_finding_.php.

Warman, P. 2012. Mid-Core Gaming. Sizing and Profiling the Opportunity in Western and Emerging Markets. Presentation at Casual Connect Europe 2012. Viewed 18.5.2012. http://casualconnect.org/lectures/business/mid-core-gaming-sizing-and-profiling-the-opportunity-peter-warman/

White, G., Mirza-babaei, P., McAllister, G. & Good, J. 2011. Weak Inter-Rater

Reliability In Heuristic Evaluation of Video Games. White paper. Read 17.5.2012. http://www.informatics.sussex.ac.uk/research/groups/interact/people/gareth/Weak%20inter-rater%20reliability%20in%20heuristic%20evaluation%20of%20video%20games.pdf.

Zynga. 2011. Hear Ye! Hear Ye!: Create Your Own Happy Ending with Zynga's CastleVille. Press release. Released 14.11.2011. Read 18.5.2012. http://company.zynga.com/about/press/press-releases/hear-ye-hear-ye-create-your-happy-ending-zyngas-castleville

Zynga. 2012. Zynga Reports Fourth Quarter and Full Year 2011 Financial Results. Press release. Released 14.2.2012. Read 17.5.2012. http://investor.zynga.com/releasedetail.cfm?ReleaseID=648577