Game Usability in Northern European Game Industry

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Abstract

In today’s heavily competitive game market making a game that stands out from the huge amount of available games has become very important. Even though the game might not be the most unique one out there, it still can offer a better playing experience than a similar competitor’s product by having better usability. Usability research could provide game companies with the tools needed to improve their games usability.

The aim of this survey was to find out if game companies are doing usability research and investigate their views on game usability. This research was conducted by sending a survey to Northern European game companies’ and the results were analyzed using descriptive statistics and content analysis.

Game companies regarded game usability to be very important in games and saw it as a broad concept. Their view corresponded well with the literature view that emphasises user experience. Companies used multitude of usability methods to improve their games usability but these methods and their usage has not stabilized. The most used methods were playtesting and observation whereas heuristic evaluation was one of the least used methods which seemed to be unknown method among the respondents.

**Keywords**

Game usability, playability, heuristic evaluation, game heuristics
Foreword

I would like to thank everyone who participated in this study.

Joonas Nissinen

In Oulu, 13.5.2014
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1. Introduction

The playing of games has increased in the past decade and its becoming more and more popular nowadays. Games have become an important part of the daily lives of the majority of Europeans, and are swiftly rising to be the central medium of culture. Video games are becoming the leading entertainment medium by replacing TV’s function and competing with movie and music industries in consumer spending (EGDF, 2011).

Competition is also fierce inside the game industry with a high volume of competing products and many companies producing similar games, differentiating from the masses is becoming very important. Making games that grab consumers’ attention and provide different experiences each time in order to avoid boring the player, is important in this highly competitive entertainment market (Pagulayan, Keeker, Wixon, Romero & Fuller, 2003).

Now that the competition between games and other forms of entertainment is intense, usability is becoming an increasingly important factor in games. For the consumer, buying and playing a game is voluntary, and if the game has problems affecting its user experience or entertainment value, players can easily stop playing it and do something else instead (Laitinen, 2005; Federoff, 2002). Because of the competition there are several similar game titles to choose from which raises the importance of usability in games since players can choose one that does not suffer from poor usability. Good usability is particularly important at the first hour(s) of gameplay since most players will immediately quit playing if they do not like the game (Davis, Steury & Pagulayan, 2005). Modern games are also getting bigger and more complex which makes ease of use a valuable factor in their design. (Laitinen, 2005; Laitinen, 2008)

Because games are nowadays becoming even bigger, more complex, graphically more photorealistic and more expensive to make, it is important to get the game sold, in order to cover the development costs and to make profit. Taking usability into account in the game’s development, especially in the early phases, could help lower the costs (Pinelle, Wong & Stach, 2008; Song & Lee, 2007; Desurvire, Caplan & Toth, 2004; Schaffer, 2008) and make it stand out of the crowd (Laitinen, 2005).

But usability in games is a relatively young field (Schaffer, 2008) and usability language is not typically being used within the games industry, so discussing in a language that both game developers and usability specialists understand is important (Federoff, 2002). Also the term usability is a difficult term which meaning can vary from person to person (Federoff, 2002). This leads to the need to define used terminology so that everybody understands each other.

With such a young field of study, game usability and its methods where the used terminology has not yet been standardized are important subjects to study in order to get results that could help us improve game development and game usability.
1.1 Research questions and methods

This research aims to survey the Northern European game companies to see if they are conducting usability research and to know what their view on usability is. The following three research questions are intended to be answered during this study:

- What usability methods are used in Northern European game industry?
- How game companies have defined the term “game usability”?
- Are game companies utilizing heuristic evaluation?

The objective is to get data on the applied usability methods (especially on the use of heuristics in game industry since they have been a widely researched topic) which could be utilized in the further development of the methods. This research also aims to get results that could be used in the unification of the used terminology.

Descriptive statistics and content analysis were used to analyse the data and survey research was used to acquire the data from the respondents.

1.2 Scope of the study

The scope of this study was limited to Northern European game companies in order to keep the workload manageable since there are hundreds of game companies in Europe alone. Northern Europe is composed of the following ten countries: Denmark, Estonia, Finland, Iceland, Ireland, Latvia, Lithuania, Norway, Sweden and United Kingdom (United Nations, 2013).

Since this study intends to expand the previous study done by Janne Rautio (2012), which focused on game usability in Finnish game industry, Finnish game companies were excluded from this study, because they had already participated. Also any Estonian game companies could not be found at the time when the list of game companies was being gathered.

1.3 Structure

Chapter 2 presents a short overview of game industry’s state while considering some reasons for its growth. It also introduces how usability, game usability and playability have been defined in literature. Chapter 3 examines heuristic evaluation and presents an overview of game heuristics. At the end of this chapter a summary of the previous research is also presented. Chapter 4 describes the used research methods and implementation and also presents some of the received data. Chapter 5 shows the results which are then discussed in chapter 6 and chapter 7 presents the conclusions. Cover letters and the questionnaire are presented in the appendixes.
2. Game industry and usability

This chapter presents a short overview of game industry’s state and gives few reasons for its growth using mostly consumer studies and surveys done by EGDF and ISFE. EGDF or European Games Developer Federation is an association that promotes and represents the computer and video game studios economical and political interests at the European level. These game studios are based in Austria, Belgium, Denmark, Finland, France, Germany, Luxembourg, the Netherlands, Norway, Spain, Sweden and the United Kingdom (EGDF, 2009a, 2009b). ISFE or the Interactive Software Federation of Europe represents video game publishers and the sectors interests towards EU and international institutions (ISFE, 2013).

This chapter also introduces the more traditional definition of usability which is commonly used to describe software products. Scientific articles by various authors are then explored in order to find out how usability is defined in the video game context (game usability) since usability by its current definition does not correspond to games because productivity software and games have different goals: games goal is to entertain and productivity software’s goal is to help the user in his tasks. Authors’ definitions to playability are also going to be shown because it is connected to game usability.

2.1 Overview to European game industry

Video games have become one of the popular entertainment mediums alongside the movie and music industries during the last decade. Only a few years ago it became the most popular media by overtaking movies in consumer spending on entertainment media (EGDF, 2011). Video game industry, which includes gaming hardware (PC, console) and games both physical and electronic for the before mentioned hardware and also to the smartphones, tablets and other devices that can play games, was estimated to be worth 67 billion dollars in 2012 and it has been projected to grow to 82 billion dollars by 2017. (Gaudiosi, 2012)

One reason for this popularity growth could be that the vast majority of our population is playing video games nowadays. Statistics show that about 75% of the population plays video games in the USA and some of the European countries play almost as much or even more. EGDF’s (2011) report also specifies an age distribution in who are playing in Europe. According to that almost all males and females between ages of 7 to 25 years and 50% of 25- to 50-year-olds play video games regularly. Another reason for the popularity growth could be that the platforms that we play and the locations where we play video games have diversified and become more innovative. We are no longer tied to our homes where our PC’s and game consoles are because of mobile gaming (games developed to smartphones, tablets and dedicated handheld consoles). Thanks to these devices we can play games while we wait for the bus or while we are travelling on the train. Technological advances have enabled us to make these devices more powerful so that they can run newer games so players are not limited to games like Nokia’s Snake. Also these smartphones and handheld consoles usually have internet connection through WLAN or 3G so players can enjoy gaming with their friends just like they would at home. How we play games has also changed through innovations in input devices: nowadays we can control the game characters through our body movement (XBox Kinect, Wii Remote).
Online gaming and especially social gaming are growing rapidly. On average 81% of European gamers are playing games online while almost half of them are playing them with other players (ISFE, 2012). The popularity of social gaming has been reported to increase 71% between 2010 and 2011 in US and UK. More of the younger gamers are taking interests in social gaming while it also attracts new gamers who have not played any games before. It also seems to be targeted more to the females than males, since 55% of players are female (Information Solutions Group, 2011). Some of the increase in online gaming could be contributed to the availability of high speed internet which has now become more common and widespread than in the past.

Online games, especially massive multiplayer games, have more immersive content nowadays and are thus more engaging. They are places where players can form communities with other players who share same interests (EGDF, 2012). Free online games have also contributed to this increase; in Europe 68% of gamers are playing free online games (ISFE, 2010).

But the biggest driver for the video game industry's growth seems to be online distribution according to Gaudiosi (2012). The revenue from online games is estimated to grow worldwide from 19 billion dollars to 35 billion dollars by 2017. This growth in online distribution is happening at the expense of traditional retail distribution. EGDF’s (2011) report also shows indications of growth in online gaming and distribution. The report also notes that European developers are preparing themselves for the upcoming shift, which is projected to happen by 2015, from retail distribution to online distribution.

2.2 Traditional usability

Usability has been defined by the International Organization for Standardization as the “Extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use”. Then this has been further opened up by specifying the terms effectiveness, efficiency and satisfaction. Effectiveness is measured by how accurately and completely users can accomplish specified goals. Efficiency is measured by how much resources are expended in relation to effectiveness. Satisfaction is measured by subjective rating the users attitude, liking and satisfaction with the product and its use (ISO 9241-11, 1998).

Nielsen (1993) provides another point of view to usability in his system acceptability model (Figure 1). In this model he has divided system acceptability into social and practical acceptability. One of the practical acceptability attributes, usefulness, is then divided into utility, usability and five usability attributes.
Figure 1. Nielsen's (1993, p.25) model of system acceptability

According to Nielsen (1993; 2012) usability is a quality attribute which is defined through these five quality components that are learnability, efficiency, memorability, errors and satisfaction.

- Learnability - how easily users can learn to use the system
- Efficiency - how quickly users can perform tasks after learning the design
- Memorability - how easily users can continue using the system after period of not using it without the need to re-learn how to use it
- Errors - do users make errors, how many and how severe they are and can users recover from them easily
- Satisfaction - how pleasant the system is to use

Usability is used to determine how easy to use user interfaces are but another important quality attribute is also needed to determine if product of software is useful. This another attribute is utility which is used in assessing if product or software does what users need it to do. It is not good if the products user interface is usable but it lacks the components that users need and vice versa (Nielsen, 2012).

2.3 Game usability

The above definition for usability does not correspond to games as it is so several researchers have tried to formulate a definition for usability in game context. Although many definitions for game usability have been presented, there has not been any commonly agreed on definition for it.

Federoff (2002) starts defining game usability through the ISO 9241-11 standard. Although all three elements of usability (efficiency, effectiveness and satisfaction) are more or less applicable to games, they are not equally important in all aspects of playability. Efficiency and effectiveness play an important part in a game’s interface design, like in any other software, but they are productivity meters for software and thus less useful for games since games allow people to escape from productivity according to Federoff. Satisfaction, on the other hand, can be related to a game’s interface and also in its playability, thus making it central usability meter. Federoff’s definition for the concept of satisfaction in games includes fun, immersive environments and compelling experiences. Then Federoff proceeds to divide game’s usability into components adopting Clanton’s (1998) view. These components are game interface, game
mechanics and game play from which Federoff considers game play to be the most important element although all these components are needed for game to be functional and satisfying. In his research Federoff found out that the term ‘usability’ is not very familiar and it can be related only to the interface. Thus he proposes that the term ‘user experience’ might be better to describe all three areas of game usability because it might be broader, more accessible term.

Järvinen, Heliö & Mäyrä (2002) have shifted from analysing usability to studying user experiences in their study. They call this experience design research or social usability, the goal of which is to detect methods and elements which are essential to the production of experience-rich media products like games. When Järvinen et al. (2002) are talking about social usability they are referring to the “usage that is motivated by needs to be entertained, and moreover, entertained in a social setting where multiple individuals are taking part in the experience and communicating (exchanging meanings and interpretations) about it”. This notion of usability has its own goals and impulses and thus sets different evaluation criteria to digital entertainment and games. This does not mean that usability issues become needless but they become subordinated to the interaction and audiovisual content when the user is actually playing the game. Järvinen et al. (2002) point out that experiences, sensations, gameplay and synchronous communication are displacing information retrieval and usability. This does not mean that usability is not needed (notion of usability is still present in game evaluation, especially in control mechanism and interface analysing), it means that usability alone does not suffice to provide fun, enjoyable and joyful experiences in games. Because of this Järvinen et al. (2002) think that the concept of flow must be incorporated, alongside usability, to the notion of playability. This flow concept is based on Mihaly Csikszentmihalyi’s (1991) writings and ideas.

Pagulayan et al. (2003) think that game usability cannot be measured just by normal means like task times and errors, but players’ subjective experiences and attitudes towards the game also have to be measured. They have listed some of these subjective attributes that are common in games and which are important when evaluating them. These attributes are ease of use, challenge and pace, which all have an effect on games overall quality or fun that is often the goal of usability testing which tries to reduce obstacles to it according to Pagulayan et al. (2003). In other words user experience is an important part of game usability and usability testing.

Desurvire et al. (2004) introduced a set of heuristics for playability. In this article they saw game usability to be a part of playability along with game play, game story and game mechanics. Their definition of game usability covers the user interface and the interaction methods with the game by which they mean the different controllers like mouse, keyboard, heads-up display etc. In turn game play covers problems and challenges for the player, game story contains plot elements and game mechanics include the programming and unit interaction mechanics.

Korhonen & Koivisto (2006), like Desurvire et al. (2004), see game usability as a part of playability but they have combined some of Desurvire’s modules into the gameplay module and also added a new module for mobile content. So Korhonen & Koivisto’s playability model consist only of three modules which are gameplay, game usability and mobility. Their gameplay module contains game story and game mechanics which Desurvire et al. (2004) see as separate modules of playability. They incorporated game mechanics into gameplay because they saw them to be inseparable from each other (mechanics defining the game world’s rules and acting as the foundation to the gameplay which contains player interaction structures with the game world). Game usability in turn contains the game’s user interface and controls and other usability aspects on a general level. Mobility module covers the mobile context and its unique
characteristics. This playability model is modular so that each module can be used separately without the need to use all of them at once. Also gameplay and game usability modules are generic so one can use this model with any mobile game regardless of platform (Korhonen & Koivisto, 2006). This modular structure also makes it possible to add other modules to this model which happened the following year by the addition of multi-player module into this model by Korhonen & Koivisto (2007).

Laitinen (2008) has examined game usability through expert evaluation. In this expert evaluation the focus is to review game usability and gameplay without forgetting to take into account the additional requirements set by game type and platform. Game usability focuses on user interfaces which include screens, displays, menus, controls and other elements the player uses. Gameplay covers the game’s mechanics and interactions within the game and ignores the user interface. Game type and platform may require adding additional items to the evaluation heuristics or emphasizing some of them (for example mobile context in case of mobile games). These three areas are connected to each other and thus must be addressed in order make the game successful. (Laitinen, 2008).

Pinelle et al. (2008) have studied usability in video games and they have come up with a definition for game usability which is, according to their interpretation, “the degree to which a player is able to learn, control, and understand a game”. They exclude entertainment, engagement and storyline issues from their definition of game usability because these issues have strong ties to artistic and technical issues which include things like music, artwork, graphic quality and voice acting. They have based their definition of game usability on playability heuristics done by Federoff (2002) and Desurvire et al (2004) and on usability problems found in the survey and analysis of critical game reviews.

Papaloukas, Patriarcheas & Xenos (2009) have adopted a similar definition for game usability as Pinelle et al. (2008) but they have also added two new elements to it. These are the degree to which the player is able to be intrigued and enjoy a game. Papaloukas et al. have based their definition on the works of Pinelle et al. (2008), Fedoroff (2002) & Desurvire et al. (2004) on playability heuristics, Sweetser & Wyeth’s gameflow model and on Papaloukas earlier works. Papaloukas et al. (2009) point out that their work could be used to correlate video games’ usability with usability elements like fun, socializing and acquisition of knowledge.

Nacke (2009) has studied current game playability models and this research has lead to the conception of the high-level game development-centered usability model. The current game industry’s and research’s usability approaches have been integrated into this model according to the author. This model consists of measurable entities (technology-player-community) which are arranged from concrete to abstract and from theoretical construct to practical application (entity-quality-analysis method). This model is presented in the shape of a diamond where technology is placed at the bottom, since it is the starting point for all digital games.

2.4 Playability

Defining playability is also important since it is closely related to game usability and scientific community has not been able to reach a consensus on its definition (or its attributes and properties), which would help to guide future research and define issues that influence game experience (Sánchez, Zea & Gutiérrez, 2009; Korhonen, Paavilainen & Saarenpää, 2009).
Fabricatore, Nussbaum & Rosas (2002) have studied video game design and players preferences to find out what players want in video games and what factors determine video games’ quality. From the studies they have come up with a model that depicts the elements that determine the playability of action video games. They have divided the playability issues into three global elements which each contain their own set of design aspects. These three elements, according to players’ preferences, are entity, scenario and hierarchy of goals.

Entity includes design aspects like identity (entity’s role and attitude towards the player), energy (player health), equipment (interaction with environment/entities) and behavior (what entities can do). Scenario covers the player’s view (how the player sees the scenario through the camera) and transition methods between scenarios. Goals contain complexity factor, linearity (goals hierarchy; linear/nonlinear) and interface through which the player manages goal related information.

All these elements and their aspects affect how players perceive a video game’s quality and its playability. Besides specifying the elements that determine playability, Fabricatore et al. (2002) have also defined playability as “the instantiation of the general concept of usability when applied to video games and it is determined by the possibility of understanding or controlling the gameplay”.

Järvinen et al. (2002) see playability in two ways; as design guidelines (on how to implement game elements to achieve desired gameplay or social entertainment) and as an evaluation tool and research discipline similar to usability. They sum up playability as a “collection of criteria with which to evaluate a product’s gameplay or interaction”. In order to use playability as an evaluation tool, Järvinen et al. (2002) have come up with a concept where playability is divided into four components: functional, structural, audiovisual and social playability. These components include different variables that affect gameplay such as control mechanisms, rules, audiovisual style & appearance and desired contexts of use.

Kücklich & Fellow (2004) have examined play and playability concepts in their new media studies. They used popular game criticism’s definition of playability “the extent to which a certain game has the capability to provide enjoyment for a player over an extended period of time” to introduce the reader with the term (Kücklich & Fellow, 2004). Then they proceed to link playability with the term ‘replayability’ by which they mean the game’s power to get the player to continue playing although he/she has completed the game. Although playability seems to be defined by a game’s properties Kücklich & Fellow also think that playability is an ambiguous term and therefore the player’s skills and expectations also need to be taken into consideration when determining what keeps the player playing. Furthermore the authors think that playability is somewhat dependent on immersion, the player’s willingness to believe in a fictional world.

Sánchez et al. (2009) have studied playability in order to create a complete and precise definition for it and its attributes and properties because there has not been a consensus on its definition or its elements in the scientific community. They view playability as a concept, which is based on usability that should not be limited to the degree of fun or entertainment because these two concepts are so subjective. Sánchez et al. (2009) have come up with the following definition for playability: “a set of properties that describe the Player Experience using a specific game system whose main objective is to provide enjoyment and entertainment, by being credible and satisfying, when the player plays alone or in company”.
Because attributes that characterise playability are present in usability but have different meanings in game context Sánchez et al. (2009) have analysed games and their characteristics in order to characterise playability. They have come up with seven attributes: effectiveness, learnability, satisfaction, immersion, motivation, emotion and socialization. These attributes are then used to create the ‘Playability model for video games’ which shows the correspondence between usability and playability attributes and the descriptions for these two terms.

Sánchez et al. (2009) have described usability with the ISO 9241-11 definition and playability as “the degree to which specified users can achieve specific goals with effectiveness, efficiency and specially satisfaction and fun in a playable context of use”. They have then further explained the seven playability attributes by defining each of them and characterising each attribute with additional properties. Sánchez et al. (2009) have also considered the process of playability analysis, which is a complex process because of the multiple perspectives that can be used to analyse video game architecture, in their pursuit of the best player experience. This has led them to propose a classification for these perspectives which is based on six Facets of Playability that they introduced in this paper. These facets are Intrinsic, mechanical, interactive, artistic, personal and social playability. Video game’s overall playability can then be found out by calculating the total sum of values from all attributes from each facet of playability after analysing the game. The best player experience can then be guaranteed if playability is optimized within the facets according to Sánchez et al. (2009).

In 2009 European playability and user experience experts Nacke, Drachen, Kuikkanen, Niesenhaus, Korhonen, van den Hoogen, Poels, IJsselsteijn & Kort gathered to discuss methodological advancements and findings within player experience and playability research. In this paper Nacke et al. argued that “playability is the evaluative process directed toward games, whereas player experience is directed toward players [...] playability methods evaluate games to improve design, whereas player experience methods evaluate players to improve gaming”. They think that this separation of terms is important in the game design process because there is a need to choose what methods to use and when to use them during the process.
3. Heuristic evaluation and game heuristics

This chapter explains what heuristic evaluation is and how it can be done. Few reasons why it should be used are also presented. Although this usability method is mainly used to assess interfaces, it has gained popularity among game researchers who have created several game heuristic lists to be used in game evaluation. An overview of these game heuristics is presented in this chapter. Lastly the previous research presented in chapters 3 and 4 is summarized at the end of this chapter.

3.1 Heuristic evaluation

Heuristic evaluation is a usability method, a tool that can be used to perform usability evaluation, the goal of which is to find out usability problems from software's user interface design (Nielsen, 1993; Schaffer, 2008). Heuristic evaluation is done by a number of evaluators who inspect the interface using identified usability principles (a list of heuristics) in order to find out if the interface complies with the heuristics or not (Nielsen, 1993). The most well known heuristic list was developed by Jakob Nielsen and Rolf Molich two decades ago and the list comprises of ten heuristics. This list is known as Nielsen’s 10 heuristics, which are presented in Table 1. Other heuristic lists are Shneiderman’s eight golden rules (1998), Gerhardt-Powals research-based guidelines (1996) and Kamper’s principles and heuristics (2002) according to Schaffer (2008).

When using heuristic evaluation the number of evaluators should be kept small. One person can find about one third of the interface’s problems and the found problems tend to be different from person to person. This percentage of found problems is also dependant on the expertise of the evaluator. Novice evaluators who have no usability expertise will find fewer problems while experts (usability specialist, no domain knowledge) and double experts (usability specialist with domain knowledge) will find significantly more usability problems. While having more evaluators increases the percentage of found problems, but this progress will slow down and the costs of adding more evaluators will increase. So the recommended number of evaluators is around 3-5 but a cost-benefit analysis should be done to find out the exact number. Also more evaluators should be used when usability is a critical factor or the expected payoffs are large (Nielsen, 1993).

Performing heuristic evaluation is simple. First each evaluator will inspect the interface alone in order to avoid making any biased opinions. Depending on the evaluator this process will take one to two hours to complete but if the interface is larger and more complicated, smaller evaluation sessions, which focus on one part of the interface, should be held. When each evaluator has completed their inspection, they should each have a list of usability problems they have found with explanations as to why they see them as problems. Each of these problems should be linked to heuristic/heuristics they are violating and each problem should be rated based on their severity. After the individual evaluations, evaluators gather to discuss and aggregate the findings. The result of this should be a master list where the usability problems are arranged by their severity. This heuristic evaluation method can be extended to provide design advices by organizing a session, after evaluation sessions, where evaluators and design team
representatives discuss and brainstorm possible redesigns to the found problems. (Nielsen, 1993).

When and why to use heuristic evaluation? Heuristics can be used very early in the design process, even when there is not a prototype available, to find problems. Doing the evaluation early helps to save time and money because fixing something later is much more time consuming and expensive than finding the problem early before much work has been done. Also finding and fixing problems early avoids using real users time in the user testing to find problems that could have been found earlier through heuristic evaluation. Doing a single evaluation is not enough because updates happen and problem fixes can create new problems, so heuristic evaluation should be conducted several times during the design. Also other evaluation methods should be used, since one cannot find every usability problem by using heuristics, although heuristic evaluation is faster, cheaper and easier to do than other methods. (Schaffer, 2008).

**Table 1.** Nielsen’s revised 10 heuristics (Nielsen & Mack, 1994)

<table>
<thead>
<tr>
<th>Heuristic</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Visibility of system status</td>
</tr>
<tr>
<td>2</td>
<td>Match between system and the real world</td>
</tr>
<tr>
<td>3</td>
<td>User control and freedom</td>
</tr>
<tr>
<td>4</td>
<td>Consistency and standards</td>
</tr>
<tr>
<td>5</td>
<td>Error prevention</td>
</tr>
<tr>
<td>6</td>
<td>Recognition rather than recall</td>
</tr>
<tr>
<td>7</td>
<td>Flexibility and efficiency of use</td>
</tr>
<tr>
<td>8</td>
<td>Aesthetic and minimalist design</td>
</tr>
<tr>
<td>9</td>
<td>Help users recognize, diagnose, and recover from errors</td>
</tr>
<tr>
<td>10</td>
<td>Help and documentation</td>
</tr>
</tbody>
</table>

Although heuristics are mainly used to assess websites and software interfaces for usability problems, they can also be useful in game evaluation as “guidelines for the creation and evaluation of a usable game” according to Federoff (2002). In order to see if Nielsen’s heuristics could be helpful in evaluating a game’s usability Federoff compared them with game design heuristics that she had identified from literature. She found out that most of them can be used in game interface analysis but they failed to address gameplay issues. From the ten heuristics numbers 5 and 9, which address errors, did not have any corresponding heuristics in the literature, but these could still be useful when evaluating a game’s interface (Federoff, 2002). This leads us to the next section where game heuristics are talked about.
3.2 Game heuristics

Even though Nielsen’s heuristics can be used to some degree to evaluate games, there is still need to develop heuristics just for games, because these heuristics do not take into account a game’s characteristics. Several heuristic lists have already been developed to be used in game evaluation, but there have not been any which are as popular as Nielsen’s list is in traditional software usability testing. An overview of the existing game heuristics is presented in this section.

Federoff (2002) studied explicit and implicit game design heuristics that were utilized by a leading game developer. She spent one week inside a game company observing and interviewing five different game team members. Afterwards she compared the identified heuristics to the design heuristics she had gathered from the literature and came up with a list of forty heuristics. These heuristics are categorized into game interface, game mechanics and gameplay categories she considers to be important. This list is the first set of heuristics for games and acts as a starting point for further development of game heuristics (Federoff, 2002).

Desurvire et al. (2004) created a broad set of playability heuristics using the existing literature that consisted of productivity and playtesting heuristics. These heuristics are categorized into gameplay, story, mechanics and usability categories. This set of heuristics is known as HEP (Heuristic Evaluation for Playability) was tested against user study methodologies to verify its usefulness to find playability issues. Test results show that HEP was more effective in finding playability issues (especially in game story and usability categories) than the user study but the issues found by the user study were more game specific. HEP was found to be very helpful in early game design and its best suited for evaluating general issues. (Desurvire et al., 2004).

Korhonen & Koivisto (2006) developed the first set of playability heuristics for mobile games. This set of heuristics consists from 29 heuristics in game usability, mobility and gameplay modules. These heuristics are mainly used in pre-production and production phases but can also be applied in post-production. These heuristics have been very efficient in finding playability problems and their modular structure makes it easy to focus on specific game aspects when evaluating a game. This modularity also enables these heuristics to be used on other platforms (Korhonen & Koivisto, 2006). A year later Korhonen & Koivisto (2007) expanded their playability heuristics by adding a module for multi-player heuristics. This module consists of eight heuristics that are related to communication, amount of players, their visibility and behaviour.

Schaffer (2007) presents a set of specific usability heuristics in his white paper. These heuristics are presented with examples to clarify each one of them, which should make implementing them easier for the game designers. This set of heuristics is divided into five categories: general, graphical user interface, general gameplay, control mapping and level design.

Song & Lee (2007) studied massive multi-player online role-playing games (MMORPG) in order to find out key factors of heuristic evaluation that can affect game design. Song & Lee performed a literature review on computer game design & HCI and a usability evaluation on the MMORPG called World of Warcraft (WOW). This study led to the identification of 54 key factors for game design. These key factors are divided into four categories: game interface, gameplay, game narrative and game mechanics. The limiting factors of this study are cultural because it was conducted in a Korean setting, which affects the results. (Song & Lee, 2007).
Pinelle et al. (2008) came up with new set of usability heuristics the main focus of which is on finding usability problems, because they thought that earlier heuristics developed by Clanton (1998), Federoff (2002) & Desurvire et al. (2004) focused too much on engagement and fun and did not consider usability in detail. Pinelle et al. (2008) created their own set of heuristics by using PC game reviews and identifying usability problems from them through structured analysis. The authors excluded technical problems and also issues related to fun and engagement when creating these ten usability design principles. Although Pinelle et al. (2008) tested these heuristics and found them to be successful at finding a wide variety of problems, these heuristics still have some issues related to their scope and generalizability. The method used to create these heuristics used game reviews only from PC games so some new heuristics might be needed in order to fully use them when evaluating console games. Also the reviews were not done by usability professionals and did not focus solely on the usability issues so there is a possibility that some minor usability issues might be missed when using these heuristics. Pinelle et al. (2008) also excluded multi-player games when developing these heuristics because of their complexity, so a separate set of heuristics is needed in order to evaluate them. They also mentioned that serious games (simulators, training and education games) have different kinds of design goals so these games also need their own heuristics.(Pinelle et al., 2008).

Papaloukas et al. (2009) introduced a new set of usability heuristics for new genre video games. These new genre video games are games that “use specific and unique equipment”, like Wii Sports that uses the Wii Remote which enables the player to control the game through his own movements, “or are part of a general software category such as platforms of social networking”, like Pet Society that is embedded on a social networking site (Papaloukas et al., 2009). The authors’ heuristic list has 10 usability principles which address game play, interface and fun/challenge. In the future this heuristic list will be divided into three categories (game interface, game play and new genre games’ specific characteristics) and further evaluated with more games from different genres. (Papaloukas et al, 2009).

In 2009 Desurvire & Wiberg (2009) published a more refined version of the earlier HEP heuristic list (Desurvire et al., 2004) called PLAY (Heuristics of Playability), which was created by using existing research on game design principles and usability heuristics together with information on game design from several well known game companies’ game designers. These game playability principles were developed for FPS, RTS and Action Adventure game genres and they cover several categories: game play, usability, game mechanics, skill development, controller, game/story immersion, coolness, strategy and challenge. PLAY heuristics consist from 50 significant game design principles which can be used, as modules if needed, throughout development from the initial game design to the release phase. The PLAY principles have been perceived to be useful when gamers user experience needs are considered. (Desurvire & Wiberg, 2009).

Koeffel, Hochleitner, Leitner, Haller, Geven & Tscheligi (2010) wanted to create a comprehensive set of heuristics that could be used to evaluate multiple game genres and which would not solely focus on usability or user experience because both of these aspects are important for assessing video games overall quality. Koeffel et al. (2010) based their heuristics on existing literature but decided to make them independent of the flow approach due to criticism towards it. These heuristics are built around a modular framework consisting of three sections: Gameplay/game story section including heuristics regarding these topics, virtual interface section containing heuristics regarding only the displayed virtual interface and device specific section containing heuristics concerning tabletop games. Heuristics in the first two sections are generally applicable to video games and they represent a summary of existing heuristics. Expert-based heuristic evaluation was conducted on five games from different genres and the results
were compared to game reviews to see if games’ user experience could be determined by using heuristics. This seems to be possible but it should be noted that game reviews’ “score cannot represent the written review in its entirety and is therefore less accurate”, (Koeffel, et al., 2010).

Omar & Jaafar (2010) proposed an initial set of playability heuristics for educational games (PHEG) which still needs to be tested and evaluated in order to verify their usefulness. These 34 heuristics are grouped in five categories (interface, pedagogical, multimedia, content and playability) which present important elements in educational games evaluation. (Omar & Jaafar, 2010)

Sweetser, Johnson, Wyeth & Ozdowska (2012) introduced a detailed heuristic set for evaluating and designing real-time strategy games using Sweetser & Wyeth’s Gameflow model’s elements and criteria as its foundation. This Gameflow model aims to be a general model of player enjoyment to all types of games by providing generic heuristics or criteria to design and evaluate them. But because this model is generic in nature it “lacks details on how to achieve the criteria for specific game types”, Sweetser et al. (2012) decided to develop these 165 heuristics for RTS games to achieve high level Gameflow criteria in one game genre. These heuristics are structured around the models eight elements which are concentration, challenge, player skills, control, clear goals, feedback, immersion and social interaction. (Sweetser et al., 2012).

3.3 Summary of the previous research

When talking about usability, it is important to remember that it has different meanings depending on the context, since productivity software and games are different and have different goals as Pagulayan et al. (2003) have demonstrated in their article. So using the ISO 9241-11 definition for usability in game context is not advisable although its elements are more or less applicable to games (Federoff, 2002). This has lead to the need for defining usability in game context. There have been several researchers (Federoff, 2002; Järvinen et al., 2002; Pagulayan et al., 2003; Desurvire et al., 2004; Korhonen & Koivisto, 2006; Laitinen, 2008; Pinelle et al., 2008; Papaloukas et al., 2009) who have tried to define game usability but so far there has not been a consensus on its definition.

Researchers’ definitions for game usability can be divided into two groups. The first group (Desurvire et al., 2004; Laitinen, 2008; Pinelle et al., 2008; Korhonen & Koivisto, 2006) views game usability in a more traditional way where the focus is more on the interface and controls/other interaction methods with the game. Whereas the second group (Federoff, 2002; Pagulayan et al., 2003; Papaloukas et al., 2009; Järvinen et al., 2002) sees game usability as a broader concept, which includes game play and game mechanics alongside game interfaces and the more abstract concepts like fun, user enjoyment and experiences.

Although the definition of game usability varies and includes various elements/attributes which have different importance depending on the author, all these elements/attributes are nevertheless important in order for the game to reach its full potential (Laitinen, 2008) and to be functional, satisfying and fun (Federoff, 2002; Pagulayan et al., 2003). Because all these elements are important when assessing game’s usability, Federoff (2002) has suggested that the phrase “user experience” would better cover the broad definition of game usability and that this phrase would be more descriptive and would not only be associated to the interface when usability is talked about.
Concept of playability should also be taken into consideration when talking about game usability since playability has been seen as a top concept that contains game usability (Desurvire et al., 2004; Korhonen & Koivisto, 2006). Playability has been defined differently over the years where it has been seen as the instantiation of the general concept of usability (Fabricatore et al., 2002), as an evaluation tool and as design guidelines (Järvinen et al., 2002), some see it as the extent to which the game provides enjoyment which is dependent on immersion (Kücklich & Fellow, 2004), while others define it as a set of properties that describe player experience (Sanchez et al., 2009).

Defining and separating these terms is important for the game design process since their definitions have impact on the used methods and when these methods are applied in the process (Nacke et al., 2009). Game usability’s definition also affects heuristic evaluation, which is one of the available methods for evaluating a game’s usability, its scope and what categories the heuristic list has: does the list focus only on usability issues (Pinelle et al., 2008) or is usability viewed as a broader concept and thus the heuristic list has to address more categories like in Federoff’s (2002) list.

Heuristic evaluation is a quick, efficient, inexpensive and flexible method for finding usability problems (Federoff, 2002; Laitinen, 2008). This method can be used very early in the design process, which makes it a valuable tool for finding and avoiding mistakes early on before they become expensive to fix in the later stages of development. Recently researchers, like Federoff (2002), Korhonen & Koivisto (2006), Schaffer (2007) and Pinelle et al. (2008) to name a few, have created heuristics for games, in order to better address video games characteristics, since the traditional heuristic lists like Nielsen’s (1993) only address usability issues in the softwares interface and thus can only be partially used in video game context.

As a relatively young field, usability in games has yet to find common definitions for its concepts and although having many different playability heuristic lists, it is still lacking a conclusive comprehensive list (Desurvire et al., 2004; Schaffer, 2008). Also the available game heuristics need further development, since they have some problems in their comprehensibility and clarity, before practitioners can utilize them (Korhonen et al. 2009). Although as useful these playability heuristics can be, they are still one tool among other tools, which are needed in order to test the game’s usability as thoroughly as possible (Schaffer, 2008).
4. Research methods and implementation

Research methods that were used are described here alongside with a description of how this study was implemented. Some of the received data from the questionnaire is also presented here.

4.1 Research methods

In this study I used survey research to gather data from the respondents. Descriptive statistics and content analysis were then used to analyse the gathered data. These research methods are shortly described here.

Descriptive statistics

There are two ways to analyse quantifiable material: descriptive statistics and inferential statistics. With descriptive statistics the aim is to describe and summarize the data under study whereas with inferential statistics the aim is to make deductions from the data which extends beyond it. Central tendency or dispersion can be used to summarize the graphical presentation of the data (Trochim, 2006b; KvantiMOTV, 2004). In this study descriptive statistics together with graphical analysis were used to show the data from all the survey questions except the open ones. Histograms are mostly used to visualize the distribution of answers.

Survey Research

Survey is a research method where the goal is to gather data from a group of people by asking them questions. The survey can be any measurement procedure from a short paper-and-pencil feedback to a one-on-one in-depth interview as long as it involves asking questions from the respondents. Surveys are roughly divided into two broad areas which are questionnaires and interviews. This study was done by using questionnaire in the form of web-survey, because it is inexpensive and easy to administer to a wide number of diverse game companies that could then fill it at their own convenience. (Trochim, 2006a).

Content analysis

Content analysis is text analysis which aims to describe documents’ content verbally. This methods goal is to organize the data into a compact and explicit form without losing any of the information that it holds. When qualitative data is being analysed the purpose is to increase the information value by making the scattered data into a more sensible and coherent form of information.

When analysing qualitative data through content analysis, the data can be either inductive or deductive. Inductive data analysis was used for the surveys open questions. This inductive analysis can be described as a three phase process where the data is reduced, classified and abstracted. In the first phase data is reduced by leaving out anything that is irrelevant to the study through dividing information into pieces or summarizing it. In phase two the remaining data is examined in order to find out similarities and/or differences. These similarities are then classified into categories and
the categories are named, which condenses the material. In the third phase the essential information is sorted out and abstracting the categories is continued as long as it is possible. This abstraction ranges from the materials original linguistic expressions to theoretical concepts and conclusions. This content analysis can be continued after this classification by quantifying the material. In this process, calculations are made to see how many times something appears in the material, for example how many times the examinee expresses the same thing. (Tuomi & Sarajärvi, 2002).

4.2 Implementation

List of Northern European game developers was gathered by searching them from various websites. Then these companies’ contact information was retrieved from their websites. Most game developers that would receive the survey were found at Gamedevmap’s website (Gamedevmap, 2013). This website has a catalog of game development organizations around the world and this database is updated regularly. Wikipedia’s list of video/indie game developers (Wikipedia, 2013a; Wikipedia, 2013b; Wikipedia, 2013c), Game Republic and Game Developers websites were also used (Gamerepublic, 2013; Gamedevelopers, 2013) to add new companies into the list, which gamedevmap did not list. Game Republic is an industry-led games business network in England and Game Developers is an Irish game development community.

The survey was sent to 268 game companies. Originally the list had more companies in it, but it got shortened due to companies not having a website or working e-mail address anymore, not being a game developer or in few cases the company notified me (through email) that they were not being able to commit to this study.

The survey was created using Google docs Form. Participants could access the survey through a link in the cover letter (Appendix A) that was sent to their emails at 14.10.2013. A reminder message (Appendix B) was sent after three weeks at 4.11.2013 to those who had not answered the survey.

The survey (Appendix C) was based on the previous study’s survey done by Janne Rautio (2012) but it had some additions in the heuristic evaluation section in order to find out more about this methods usage. The survey consists of a shared section and sections to companies that conduct usability research and companies that do not. Those who do not conduct usability research are inquired the reasons for not conducting it and then they move to the shared section (page 10) and continue from there. Also those who conduct usability research have a different page to respond to in the heuristic evaluation section depending on if they use the method or not and then the survey continues normally to the end.

4.3 Received data

At first 14 participants answered the survey and after the reminder message 17 new participants had answered it. A total of 31 answers were received but this number dropped to 29 because of two answers being disregarded. One answer was disregarded because the company was not situated in Northern Europe and the other due to one company answering twice to the survey. This puts the response rate to 10.8%.

Plenty of time was given to the participants to respond to the survey while it was hoped that they would answer soon after reading the mail because Christmas was approaching and the companies would be busy finishing their games. In the end the survey was kept
open over the holidays and closed after the New Year, so that even the busiest companies would have time to participate.

Table 2. Respondent’s basic information. Asterisk (*) indicates a company that does not conduct usability research.

<table>
<thead>
<tr>
<th>Code</th>
<th>Size</th>
<th>Country</th>
<th>Platform</th>
<th>Respondent’s title/role</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>21–30</td>
<td>Denmark</td>
<td>PC, Mobile devices, Xbox 360, Xbox One</td>
<td>Studio Director</td>
</tr>
<tr>
<td>B</td>
<td>11–20</td>
<td>Denmark</td>
<td>Mobile devices</td>
<td>CEO</td>
</tr>
<tr>
<td>C</td>
<td>6–10</td>
<td>Sweden</td>
<td>Mobile devices</td>
<td>Founder &amp; CEO</td>
</tr>
<tr>
<td>D*</td>
<td>5 or less</td>
<td>Sweden</td>
<td>Mobile devices</td>
<td>CEO</td>
</tr>
<tr>
<td>E</td>
<td>6–10</td>
<td>Sweden</td>
<td>PC, Mobile devices</td>
<td>CEO</td>
</tr>
<tr>
<td>F</td>
<td>11–20</td>
<td>Denmark</td>
<td>PC</td>
<td>Community &amp; PR Manager</td>
</tr>
<tr>
<td>G</td>
<td>5 or less</td>
<td>UK</td>
<td>PC, Mobile devices, Xbox 360</td>
<td>Director</td>
</tr>
<tr>
<td>H</td>
<td>6–10</td>
<td>UK</td>
<td>PC, Mobile devices</td>
<td>Player Champion</td>
</tr>
<tr>
<td>I*</td>
<td>5 or less</td>
<td>UK</td>
<td>PC</td>
<td>No answer</td>
</tr>
<tr>
<td>J</td>
<td>101 or more</td>
<td>Sweden</td>
<td>PC, Mobile devices, Xbox 360, PS3</td>
<td>Games Lab Project Manager</td>
</tr>
<tr>
<td>K</td>
<td>5 or less</td>
<td>UK</td>
<td>Mobile devices</td>
<td>Communications Manager</td>
</tr>
<tr>
<td>L</td>
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<td>PC</td>
<td>VP sales &amp; marketing / GUI design</td>
</tr>
<tr>
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<td>PC, Mobile platforms</td>
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</tr>
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</tr>
<tr>
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<td>Mobile devices</td>
<td>Partner</td>
</tr>
<tr>
<td>P</td>
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<td>PC, Xbox 360, PS3</td>
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</tr>
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<td>Latvia</td>
<td>PC</td>
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</tr>
<tr>
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<td>PC, Mobile devices, Xbox 360, PS3</td>
<td>Designer</td>
</tr>
<tr>
<td>W</td>
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<td>PC, Mobile devices, Xbox 360, PS3</td>
<td>Senior QA Manager</td>
</tr>
<tr>
<td>X</td>
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<td>Ireland</td>
<td>PC, Mobile devices</td>
<td>Founder/CEO</td>
</tr>
<tr>
<td>Y</td>
<td>51–60</td>
<td>Sweden</td>
<td>PC, Handheld game consoles, Mobile devices, Xbox 360, PS3</td>
<td>CEO</td>
</tr>
<tr>
<td>Z*</td>
<td>5 or less</td>
<td>Ireland</td>
<td>Mobile devices</td>
<td>Director/Designer</td>
</tr>
<tr>
<td>Ä*</td>
<td>11–20</td>
<td>Sweden</td>
<td>PC, Handheld game consoles, Mobile devices</td>
<td>CEO</td>
</tr>
<tr>
<td>Å*</td>
<td>11–20</td>
<td>Sweden</td>
<td>PC, Mobile devices, Xbox 360, PS3</td>
<td>Lead Designer</td>
</tr>
<tr>
<td>Ö</td>
<td>21–30</td>
<td>Sweden</td>
<td>PC, Handheld game consoles, PS3</td>
<td>Lead Programmer</td>
</tr>
</tbody>
</table>

The most common respondent was the company’s CEO as we can see from Table 2. Company sizes varied from very small (1 to 5 employees) to large companies that employ over 100 workers (Figure 2). These game companies are mostly small ones which employ fewer than 11 workers (41,4% of all respondents) but 31% of the companies are still employing under 31 workers (11-30 employees). Most responses came from game companies that were located in Sweden and UK while no responses
came from companies located in Norway or Iceland. Seven out of 29 companies (24.1%) did not conduct usability research. About half of these companies were small 1-5 employee companies but the rest were a little larger employing 11-30 workers.

Figure 2. Size of the companies that responded to the questionnaire.

The most popular platforms to make games on were the PC and mobile devices with 21 respondents (72.4%) using either one or both of them, while consoles (PS3, Xbox 360, Xbox One and handheld game consoles) are the preferred platform in 14 game companies (48.2%). Twelve respondents have chosen to make games on a single platform (either with PC, mobile devices or Xbox) while the rest are making games on multiple platforms. Only two respondents have started to create games on the next generation consoles (Xbox One).
Figure 3. Distribution of game genres the respondents are using in their games.

Action and Puzzle games were the most popular ones, while MMO, Sports and Racing games were the least popular game genres among the respondents (Figure 3). Other used game genres were Quiz games, Visual novels, Kids games and Motion & camera gaming.

There were some conflicts with a few respondents’ answers, which have been taken into consideration in this research. For example some of the respondents had overlap in their answers when asked what usability methods they use (Figures 8) and what methods they might use in the future (Figure 9). These overlapping answers were deleted from the graph. Also a couple of the answers had some irregularities concerning the heuristic evaluation method where one had answered that they use the method in Figure 8 and later in the questionnaire they did not admit to using this method and the other had this the other way around. This might be due to picking the wrong method from the list/forgetting to pick the method from the list. Also some additional usability methods came to light later on in the questionnaire, which were added to the Figure 8. The respondent might have forgotten to add them in the first place or they might have come to mind at the time that the respondent was answering that specific question.
5. Results

This chapter presents the answers that the Northern European game companies gave to the questionnaire. The statistics presented in the following three sections focus around the research questions which tried to uncover the companies’ attitude towards game usability and usability research. The first section covers game companies’ thoughts about usability and what usability methods they are using. The second section presents how they define game usability and the third section shows how popularly heuristic evaluation is utilized in the companies.

5.1 Usability research and used methods

The questionnaire started with a poll to determine companies’ opinion about usability’s importance in games. The poll’s scale was 1-5, where 1 meant “Not important at all” and 5 meant “Very important”, and the average score was 4.66 among all respondents, while the average scores among those who conduct usability research and those who do not were 4.77 and 4.29. Companies’ opinion on usability’s importance was also compared between games and productivity software later on in the questionnaire (Figure 4). These results show that usability was seen as very important in games and almost as important in productivity software.

![Usability's importance in games and productivity software](image)

**Figure 4.** Usability's importance in games and productivity software.

Although companies see that usability is important, still seven game companies replied that they do not conduct usability research. From these seven companies, one is going to conduct it in the future, four are possibly going to and two are not going to conduct it in the future. Their reasons for not conducting usability research can be seen in Figure 5.
Usability research was mainly seen as too expensive to do, while companies also saw that they do not have enough expertise to do it. The companies that thought this way were mostly small, employing only 1-5 people. Also a couple of companies answered that they do not have enough time to do it or that it is not worthwhile to do.

Respondent’s opinions have been quite diverse with this claim (Figure 6), but most seem to think that they do not do enough usability research (44,8% of respondents). Only 24,1% of respondents are agreeing with this claim whereas the rest cannot decide. Companies T & Å think that they do enough usability research but their answers are contradicting the answers they have given at the start of the questionnaire, where they said that they do not conduct usability research. I cannot be sure if they have picked the wrong answer here or earlier by misunderstanding what was meant by usability research, although it was explained below the question.

If we compare these results with Figure 7, we can see that the companies think that usability research has been useful and they acknowledge the fact that they do not do it
enough. Although not all of them have experienced it to be as useful as they might have envisioned. The questionnaire does not explicitly answer if the company has conducted usability research before but it seems that company A has found it somewhat useful in the past while companies D & O have not found it to be useful.

![Usability research has been useful](image)

**Figure 7.** Claim about usability research being useful.

In most cases (21/22) the company itself is in charge of the usability research but there were six companies which said that a publisher and/or external company is also in charge of usability research together with the company. One company stated that their “publishing QA manager” is in charge of it with specialists. The companies are trying to find out issues concerning enjoyment, controls, interface, playing experience, intuitiveness, game design and gameplay with the usability research. Issues with game design, interfaces and enjoyment/playing experience were the most common among the answers. Issues regarding game design were mostly things that act as barriers to playing such as points where the player might get stuck or are otherwise difficult/frustrating/confusing, which might make players put the game away. Issues with interface and controls concerned about their usability, learnability and intuitiveness. Enjoyment and playing experience was about measuring fun and enjoyment and how to improve the overall experience, they also concerned the immersion, balance issues and obstacles to fun.
Playtesting was clearly the most used method (Figure 8), which was almost used in all companies, with the exception being company N, but they are going to use it in the future. The second most popular method was observation that was used in 17/22 (77,3%) of the companies. Interviews and focus groups were the third most popular (54,5%), followed by usability testing and think-aloud 50%, filmed play-sessions 45,5% and questionnaire/data logging 40,9%. The least used method was pluralistic walkthrough, which was not used at all, followed by cognitive walkthrough and empirical guidelines, which were used only in two companies. One company also answered that it was using one other method, which was “direct communication with the community through forums, Twitter and Facebook”. Only four companies used heuristic evaluation, although it has been a popular subject among the researchers. More about heuristic evaluation can be found in chapter 7.3.

When we take a look at the amount of methods that each company uses, we can see that companies employing over 100 people use most methods (three companies with an average of 8 used methods per company). The three companies employing 1-5 people used the second most methods (average of 6), which was closely followed by five big companies that employed between 41 to 100 people (average of 5,8), six companies that employed 6-10 people (average of 5,5), two companies with the size of 11-20 people (average of 4,5) and three companies employing 21-30 people (average of 4). The noteworthy thing is that company H claimed to be using 12 different methods, although it is a small company (6-10 people). These results are only directional since there were so few companies of each size category.

The question “Do you apply any methods of your own?” gathered a few more methods, that were not mentioned in Figure 8 or 9. These were rapid iterative prototyping, engagement monitoring through physiological measures, group playtesting and “X-factor”, which was described as similar to playtesting but which focuses on game aesthetics and pleasure.

Figure 8. Used usability methods and techniques.
Figure 9. Methods or techniques that might be used in the future.

There were some overlapping answers between Figures 8 and 9. These answers are removed from Figure 9, since the companies already said, in Figure 8, that they were using these methods. Game companies are most interested to try using focus groups in the future. One company has stated that it does not have plans to try new methods in the near future. Biometric data tracking (heart rate, galvanic skin response) was suggested for the “Other” category by company J. Companies G, J, K and W were the most interested to try multiple new methods in the future.

Figure 10. Usability methods application.
Companies are somewhat using their own applied versions of the usability methods (Figure 10), but this usage has not stabilized yet (Figure 11). Deciding if their use has stabilized or not was seen as rather problematic, which can be seen in the amount of undecided opinions (45.5% of all respondents).

![Figure 11. Usability methods stabilization.](image)

Usability is tested and evaluated at all stages of production (Figure 12) but it is almost always done at least in production (the only exception being company S, which tests and evaluates it in pre-production and post-production). Five companies (5/22) tests and evaluates it only in production while seven companies (7/22) do it in all stages. Four companies (4/22) do it in pre-production and production while five companies (5/22) perform it in production and post-production.

![Figure 12. Stages of production at which usability is tested and evaluated.](image)
Game companies are mostly testing game’s usability with the alpha version but working prototype, first playable version, beta version and release version are also chosen to be tested almost as often (Figure 13). Paper prototype or similar is the least tested version. Company H is only testing game usability with the first playable version, company X uses alpha and beta versions while company W test only the alpha version or does a vertical slice test.

**Figure 13.** Game versions that companies use to test game usability.

Companies are using mostly their own employees as test subjects as can be seen from Figure 14, but friends and acquaintances, random people and players from the target group are being used as test subjects almost as often. In one company the test subjects vary depending on the project. The testing is usually performed in the office, but testing online, at home, in a test lab or in the field (cafes, public events, university) also got a few answers.

**Figure 14.** Test subjects that game companies use in usability testing.
5.2 Defining game usability

This section presents the game companies’ answers to the questions and claims concerning game usability. These questions revealed us how the game companies view this concept and what aspects they think it includes.

Figure 15 shows us what aspects game companies think the concept of game usability includes. The most popular game usability aspects were user interfaces, controls and user experience among the companies who conduct usability research. This is also the case with the companies who do not conduct usability research. Unlike the other group that thinks that flow, gameplay, level of challenge and game mechanics are also important aspects of game usability, these aspects have only received a few supporters among the companies who do not conduct usability research. Fun has received the least amount of support to be part of game usability, although significant amount of respondents think it should be included in it. Respondents did not think that any additional aspect should be included in the concept.

![Figure 15. Aspects of game usability.](image)

When asked to describe game usability with their own words, the respondents included some of the same aspects mentioned in Figure 15 to their answers. Their answers indicate that game should be easy/intuitive to learn and easy to use, while the interface should disappear, which are needed for immersive experience with the game. The next couple of extracts bring up the immersion aspect that is affected by usability.

Company S - “A good usability basically extends the users ability to experience the game without noticing the interactive context”.

Company Ä - “Usability helps the player to get into the game experience by making sure the player focuses on playing the game rather than how to control it”.

It seems to be clear that game companies view on game usability leans more to the direction of a broader definition of this concept which is supported by Federoff & others.
Game usability's goal is to develop more easily understandable user interfaces

Figure 16. Claim about user interfaces role as part of game usability.

User interfaces understandability has been seen as important by both groups (Figure 16), although it is not seen as equally important as finding problems in user experience (Figure 15). Even though company O strongly agrees with this claim, it does not think that user interfaces should be included in game usability. Otherwise the results seem to follow companies’ opinion about user interfaces in Figure 15.

Game usability's goal is to develop more understandable controls

Figure 17. Claim about controls role as part of game usability.
Understandable controls (Figure 17) alongside with easily understandable interfaces seem to be equally important goals for game usability, although understandable controls are less important to a couple of companies, who do not conduct usability research, when compared with understandable interfaces. Like interfaces company O does not think that controls are part of game usability either, although it agrees with this claim.

![Game usability's goal is to find problems in user experience](image)

**Figure 18.** Claim about user experiences role as part of game usability.

One of the more important goals of game usability, which is being emphasized by the answers, is finding problems in user experience (Figure 18). Most of the respondents are agreeing strongly with this claim. While companies U, W and D are strongly agreeing with this claim, they still do not think that user experience is included in game usability according to answers given to Figure 15 question.
Figure 19. Claim about playability's role as part of game usability.

Finding problems in playability is also seen as important (Figure 19), even if playability itself can be difficult to define, as there are many definitions for it in the literature (chapter 3.3) and its relation to game usability can be unclear as one company has noted, when asked to define game usability in their own words: “This question is difficult to answer because playability is sometimes but not always considered to be part of usability and it answers different questions”.

Figure 20. Claim about level of challenge’s role as part of game usability.
Respondents are mostly agreeing with the Figure 20’s claim but there are also those who are somewhat disagreeing with it or do not have any opinion about it. Companies that do not do usability research do not seem to agree with this claim but they do not think that the level of challenge is an aspect of game usability either. Also four companies that somewhat or strongly agree with this claim do not think that it is an aspect of game usability either.

Game usability’s goal is to reduce barriers to fun

![Graph showing responses to the claim that game usability's goal is to reduce barriers to fun.](image)

**Figure 21.** Claim about fun’s role as part of game usability.

Figure 21 shows that game companies have diverse opinions about the claim that game usability’s goal is to reduce barriers to fun. It is interesting to note that while respondents consider fun to be the least important aspect of game usability (Figure 15), about $\frac{3}{4}$ of respondents thinks that reducing barriers to fun is one of game usability’s goals. This is considerably higher than the number of respondents who think fun is an aspect of game usability. Also four companies from those that do not conduct usability research and two companies from the other group do not think that game usability includes fun, although they strongly agree with this claim.

### 5.3 Heuristics

Only four companies are using heuristic evaluation, whereas the remaining 18 companies do not use it, although they have expressed that they are maybe going to use it in the future. The only exception was company N, which was not going to use it in the future, stating that they have their own methods when asked about the reason (Figure 22). Game companies do not seem to know this method because the majority of them expressed this to be the reason for not using it. Other popular reasons were that it is too time consuming, company not having enough people to use it and no knowledge how to use it. There was also one company that said that the existing heuristic lists do not suit their games, which might be true, since Korhonen et al. (2009) have noted that these lists still need improving before practitioners can utilize them. When asked about any other reason company Q pointed out that “Why fix something that is not broken” and also added that they do not have time to test new methods as of now.
Figure 22. Reasons for not using heuristic evaluation.

The companies that use heuristic evaluation were mostly large ones employing over 80 people, while one of them was a small one with fewer than 10 people. These companies’ own employees conduct the evaluation and they are using either their own list, Nielsen’s list or Federoff’s list for the evaluation (Table 3). Company W has also specified that when they are using heuristics they evaluate several different sources in order to come up with heuristics that suit them best.

Table 3. Respondent's answers concerning the usage of heuristics.

<table>
<thead>
<tr>
<th>Code</th>
<th>Who does the evaluation?</th>
<th>Whose task it is to perform inside the company?</th>
<th>How many people are conducting the evaluation?</th>
<th>What heuristic list is used for the evaluation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>Company’s own employees</td>
<td>Player champion</td>
<td>1</td>
<td>Nielsen’s Federoff’s</td>
</tr>
<tr>
<td>J</td>
<td>Company’s own employees</td>
<td>Anyone within the user research team</td>
<td>1</td>
<td>Nielsen’s Own list</td>
</tr>
<tr>
<td>U</td>
<td>Company’s own employees</td>
<td></td>
<td>6 or more</td>
<td>Own list</td>
</tr>
<tr>
<td>W</td>
<td>Company’s own employees</td>
<td>QA Specialists</td>
<td></td>
<td>Own list</td>
</tr>
</tbody>
</table>

Heuristic evaluation has been found to reduce problems and/or severity and not to be too time consuming, while it is also cheap, easy to use and an effective way to find problems (Figure 23).
**Figure 23.** Reasons to use heuristic evaluation.

Respondent’s answers in Figure 24 are only directional because only four companies are using heuristic evaluation. The answers to the different claims about heuristic lists are also quite dispersed and there are many undecided opinions about the claims, which make the generalisation of answers difficult. Considering all this, companies have felt that existing heuristic lists are somewhat too general and they are somewhat comfortable with the comprehensiveness of the heuristic list which they use, although they think there is not a single comprehensive heuristic list. There is also a need for specialized heuristic lists for different game genres. Companies feel that they do not have to make a new heuristic list for every new game.

**Figure 24.** Respondent’s thoughts about existing heuristic lists.
6. Discussion

Game companies are seeing usability in games as a very important factor, which was also the case in the earlier study with Finnish game companies (Rautio, 2012). One reason for this opinion could be the fact that nobody wants to buy and play a game that has poor usability. This is supported by Rajanen & Marghescu (2006) study, where they have discovered that game usability and the quality of user interface are very important for players when they are deciding to buy a game.

Although usability was seen as a very important factor in games, not all companies conducted usability research. This was the case in a few small companies (1-20 employees) that said they lacked the expertise and resources to conduct it. Although they were not conducting it at the moment, most of them were possibly going to conduct it in the future. This decision should prove to be a good choice since usability research can help game developers to find issues that block players from having fun while playing the game and help identifying other problems (Davis et al., 2005). The research results from the survey also indicate that the companies have found usability research to be useful and they have recognised that they should be doing more usability research.

Game companies in this study are using multiple usability methods (5-6 on average) the usage of which has not been stabilized yet. Large companies are using more methods than the smaller ones, which is not surprising. The most used methods were playtesting and observation which were followed by a group of other methods that were almost equally popular amongst themselves, but which were used in 45-55% of the companies. These methods were focus groups & interviews, usability testing & think-aloud, filmed play-sessions and questionnaires & data logging. Among the least used methods were pluralistic & cognitive walkthrough, empirical guidelines, eye tracking and heuristic evaluation. Pluralistic walkthrough not being used in any game company might be due to it being better suited on evaluating interface “heavy” productivity software with paper prototypes.

Some of the most common and effective methods for identifying player experiences are think-aloud, Rapid Iterative Testing and Evaluation (RITE), heuristics, playtesting, and A/B testing according to Desurvire & El-Nasr (2013). The results from the survey indicate that playtesting seems to be the only widely used method, from those five methods, among the respondents who conduct usability research. On the other hand it could be said that think-aloud is a common method since a little over half of the companies used it in this study. Heuristics were used only in four companies, one company mentioned using rapid iterative prototyping and A/B testing was not mentioned. With only two of the five most common methods in common use along with the fact that heuristics seems to be an unknown method among the companies (Figure 22), it would seem that information about the available methods might be needed to made more known to the game companies. Although we cannot be sure how well the companies know these methods, if at all? Are they being used with different names inside the companies or were some of the used usability methods left unsaid? Or are they a part of some other method that was mentioned?

If the results of this study are compared to the previous study (Rautio, 2012) in the case of used usability methods, it can be seen that the used methods and their usage percentages are almost identical between the Finnish game companies and the Northern
European game companies with few notable exceptions. Finnish game companies are not using eye tracking and the use of filmed play-sessions is minimal when compared to other companies. Think-aloud was also used very little in Finnish companies and it was not so widely used in Northern Europe either, although it is supposed to be one of the most widely used fast and cost-effective methods that “reduces bias and inaccuracies common to player self-reports” because player has to verbalize his thoughts when he plays and not sometime later on (Desurvire & El-Nasr, 2013). This relatively low usage of think-aloud could be due to the possibility that it might distract the player and influence or even change the player’s task performance (Hoonhout, 2008) and this is why game companies do not use it as much. Or it could be due to some other reason altogether. The utilization rate on usability testing was also lower in Northern European game companies than in Finnish companies. The data do not provide answer for this but the methods definition might have something to do with it, since there is a thin line between usability testing, playtesting and defect testing according to Swink (2008). Usability testing being more expensive and taking longer to conduct than playtesting (Davis et al., 2005) could also have something to do with the lower utilization.

It is evident that the game companies in this study are utilizing a multitude of methods in order to improve the usability of their games, but only a few (4/22) of them are utilizing heuristic evaluation, although it is one of the most common and effective methods (Desurvire & El-Nasr, 2013) and it has been a popular research topic. It seems that this method is not so well known among the companies, which can be seen from the results (Figure 22) where majority of respondents did not know this method or how to use it. There were also conceptions that using it would be too time consuming or that the company would not have enough people to do it. These assumptions are incorrect, since this method is considered faster than other methods (Schaffer, 2008), quite inexpensive in terms of time and cost (Desurvire & El-Nasr, 2013), and even a single person can perform it, although using more evaluators is recommended in order to find more problems (Nielsen, 1993). There was also one company that said that the existing heuristic lists do not suit their games, which might be true, since game heuristics are a relatively new thing and they are based on definitions, like playability, that do not yet have a commonly accepted definition. Also Korhonen et al. (2009) have noted that these lists need improving before practitioners can utilize them fully.

Game companies that use heuristic evaluation have experienced existing heuristic list to be a bit too general and that no single list is comprehensive enough. This has also come up in the literature, where researchers have noted that some heuristic lists include rather broad heuristics (Schaffer, 2008; Korhonen et al., 2009) or research results suggest the list to be best suited for evaluating general issues (Desurvire et al., 2004). This could explain why the most used list was company’s own list. The idea of different game genres having their own specialized heuristic lists gained support among the respondents, which is also supported in the scientific community, which has already produced many heuristic lists for different genres like MMORPG, FPS, Action-Adventure and RTS (Song & Lee, 2007; Desurvire & Wiberg, 2009; Sweetser et al., 2012), as can be seen in chapter 4.2. Although some heuristic lists try to be comprehensive so that they can be used to evaluate a multitude of games in different genres (Koeffel et al., 2010), these lists will have heuristics that are not equally relevant in all genres or are even irrelevant (Livingston, Mandryk & Stanley, 2010), which might make the list unnecessarily large and harder to use.

Game companies are seeing game usability as a broad concept that includes user interfaces, controls, user experience, flow, level of challenge, gameplay and game mechanics. However companies that did not conduct usability research viewed flow, fun, gameplay, game mechanics and the level of challenge to be less important aspects in game usability than user interfaces, controls or user experience but nevertheless they
are seeing it as a broad concept. Although fun was the least popular choice among the aspects, it still got notable support. This view corresponds with Federoff, Pagulayan et al., Papaloukas et al. and Järvinen et al.’s view that considers other game aspects, beside user interface and controls, to be part of game usability. The only notable difference between this study and the previous one (Rautio, 2012) on game companies view on game usability was that the least popular aspect was game mechanics.

For game companies game usability is about making the game easily approachable, intuitive to learn and easy to use with a transparent interface layer in order to give immersive experience to the players. Finding problems in user experience & playability and developing more understandable user interfaces and controls are seen as important goals for game usability, which conforms to the above view.

The game companies in this study usually start to test game usability when they have a working prototype and this testing continues until the game is released. Only three companies that are testing game usability with working prototype or with the first playable version are using heuristic evaluation to help them identify usability problems. These early game versions would be ideal place to start using heuristics (Desurvire et al., 2004; Pinelle et al., 2008) since finding problems and fixing them later on will become more expensive and more time consuming. Heuristics could also be used as early as in concept design phase, where they help inspire a creative player experience (Desurvire & El-Nasr, 2013).
7. Conclusion

In this thesis Northern European game companies’ usability research habits and their view on game usability were examined and the aim was to get answers to the following three research questions: What usability methods are used in Northern European game industry? How game companies have defined the term “game usability”? Are game companies utilizing heuristic evaluation?

The results indicate that usability is seen very important in games and doing usability research has been experienced to be useful, although not all game companies can do it because they lack expertise and money. There was still interest to start conducting it in the future, so making the up to date information about the different usability methods (their strengths, weaknesses and how to use them) better available to game companies should be helpful. There are some less costly methods that do not require as much expertise to use as some of the others, which should help those game companies, which have fewer resources, in getting started to make more usable games with better playing experience. Also the companies who are already conducting usability research could benefit from better knowledge availability by possibly finding methods that could give better results or suit better in their game development process.

This study has shown that game companies are using multiple different usability methods to conduct usability research in order to find out issues mostly in the game design, playing experience/enjoyment and interface & controls. The most used methods are playtesting and observation followed by focus groups, interviews, usability testing, think-aloud, filmed play-sessions, questionnaires and data logging. Usually the companies are using their own applied versions of these methods but this usage is not very systematic yet. It was also shown that game companies’ think that user interfaces and controls alone do not make out the game usability because especially the user experience among other aspects needs to be included. This view corresponds best with the literature view that emphasizes user experience.

Regarding the used usability methods, this study also tried to find out the scope of heuristic evaluation utilization in the companies’, which was one of the three research questions. The results showed that this method was used very little and the companies that used it had constructed their own heuristics instead of using one of the available heuristic lists. The most common reason for this method not being used was that it is not well-known among the respondents.

This work contributes by providing researchers up to date information about what kind of usability methods game companies are using to evaluate their games and what kind of methods they might be using in the future. These results could suggest researchers what kind of methods should be studied more thoroughly or point out new research topics that will advance the research on game usability and at the same time provide useful results to game companies. The results of this study support Federoff, Pagulayan et al., Papaloukas et al., and Järvinen et al.’s broader view of the game usability definition. These results could help researchers to formulate a commonly recognized definition for game usability.

Although this thesis results might not be very useful to game companies at the moment, researchers can still use them in their own research, which then could provide directly
usable results, for example new or improved usability research methods, to game companies. However this thesis still could be useful to game companies because it contains information about the available game heuristics and heuristic evaluation, which is apparently a quite unknown usability method among the game companies according to this thesis results. This information could help game companies to start using heuristic evaluation and help them to find useful heuristics they could use.

This study had also it shortcomings and limitations. The survey could be improved by being clearer about the different terms and meanings since there is no way of knowing if the respondent understands all of them. This was suggested by one of the respondents and also Federoff (2002) has pointed out that usability language is not typically used within game industry. This study was also limited to Northern Europe gaining only 29 responses and the survey did not receive answers from all countries. Also the low usage of heuristics makes it difficult to draw conclusion from the existing heuristic lists.

This study could be repeated in a larger scale to get more responses and verify the results which then could be used to create unified term for game usability. Unifying the used terms could benefit game designers and those with common usability background by decreasing the possibility of misunderstanding each other, which could hinder game development.

Heuristics could be studied more since the few companies that used them indicated that existing lists lack comprehensibility and are too general. It would be interesting to know how companies own heuristic lists differ from the existing lists in their comprehensibility and structure. This could help in the development of better heuristic lists that would be more usable in game development. Studying different game genres and creating specialized heuristic lists for them could also be done in the future. Game companies could also need more information about the existing methods and their usefulness since at least the heuristics seemed to be quite an unknown method. But I cannot be sure how largely this applies to other usability methods since the survey did not reveal how well the companies knew the other methods they are not using.
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Appendix A. Cover letter for the survey

Hi.

I am making a survey about game usability in Northern European game companies. The goal of the research is to find out what usability methods are used in the industry and what role does usability have in game development. The research is made for the Department of Information Processing Science in University of Oulu and the gathered data from survey will be the base for my Master’s Thesis. Thesis supervisor is Mikko Rajanen from the Department of Information Processing Science. Survey has been sent to Northern European game companies.

The goal is to help developing European game industry and game usability methods. Usability research is already an important part of the traditional software development and lately it has also gained more popularity in game development. Game usability is a new research area and it’s growing in significance. Mapping how game usability is utilized in practice can help to develop evaluation and designing methods and also to find out the best ways of utilizing game usability in game companies.

The research will be freely available after it is finished and I can send the thesis or a synopsis of it to all who participate in the survey. Respondents or the company’s names won’t be published anywhere nor will they become apparent in the thesis. The more companies answer in the survey the more comprehensive and valid the research will be. That is why it is important that as many companies as possible would find 10-15 minutes to answer in the survey. That survey can potentially benefit both the company and whole game industry in general. Even if your company doesn’t do any usability research their answers would still be very beneficial for the study.

Basically anyone from the company can answer to the questionnaire but it preferably should be someone who is the most familiar with usability research and testing and evaluation methods used in the company. Of course you can make it a joint effort to answer the questionnaire together with several people. It takes about 10-15 minutes to fill the questionnaire. I hope to have the answers within a week.

You get to the questionnaire from the link below.

https://docs.google.com/forms/d/1HncZ-ZfuCnxO9bvVPfDiVUjHJhpUK_5upZweKkPDqYI/viewform

Thank you for cooperation!

Researcher: University of Oulu
Department of Information Processing Science
Joonas Nissinen
Joonas.Nissinen@student.oulu.fi
Appendix B. Reminder letter for the survey

Hi.

I sended 14.10.2013 email about the survey on game usability in Northern European game companies. This research is made for the Department of Information Processing Science in University of Oulu and the date would be used in my thesis work. I haven’t received your answer yet.

Now would be an excellent opportunity to take part in the development of game industry and methods which every game company could utilize. Participation is quick and easy through the attached link to the questionnaire. Each participant in this survey will greatly help this study regardless of your company doing or not doing usability research & testing.

It takes only 10-15 minutes or less to fill the questionnaire and basically anyone in the company could answer it. But it would still be preferred to have a person who is (most) familiar with usability and testing to fill in the questionnaire. The answers will be processed anonymously. This research could produce important and useful data to support usability research and its development. I can send the thesis or a synopsis of it to all who participate in the survey.

I hope you will take part and answer to the questionnaire as soon as possible.

You get to the questionnaire from the link below.

https://docs.google.com/forms/d/1HncZ-ZfucNxO9bVpDifiVUjHJhpuk_5upZweKkPDqYI/viewform

Thank you for cooperation!

Researcher: University of Oulu
Department of Information Processing Science
Joonas Nissinen
Joonas.Nissinen@student.oulu.fi

Research made for: University of Oulu
Department of Information Processing Science
Mikko Rajanen (Mentor for the Master’s Thesis)
mikko.rajanen@oulu.fi

If you have already answered to the questionnaire but still got this message then I would ask you to email me at Joonas.Nissinen@student.oulu.fi, because then there must have been somekind of error in saving the questionnaire or company name was not given and thus you got this remainder.
Appendix C. Questionnaire

Game usability in Northern European game companies

It takes about 10 – 15 minutes to answer the questionnaire. This survey is part of a research for the Department of Information Processing Science in University of Oulu. Answers will be handled anonymously and confidentially. More info: Joonas.Nissinen@student.oulu.fi

* Required

How important is usability in games in your opinion? *

1 2 3 4 5

Not important at all ○ ○ ○ ○ ○ Very important

Do you conduct usability research in your company? *

Do you evaluate and test the usability of your games alongside the other testing and development. Do you possibly apply some usability methods and techniques, like usability testing, heuristic evaluation, observation, etc.

○ Yes
○ No

Continue >

6% completed

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If you answered “No” to the question “Do you conduct usability research in your company?” on the first page, you go to this page. After this the questionnaire continues on page 10.
Game usability in Northern European game companies

(3/12) Methods

What usability methods and techniques do you utilize in your company for conducting usability research?

- Heuristic evaluation
- Cognitive walkthrough
- Pluricentric walkthrough
- Usability testing
- Playtesting
- Focus groups
- Interviews
- Questionnaires
- Empirical guidelines
- Think-aloud
- Observation
- Filmed play sessions
- Eye tracking
- Data logging
- Other: [ ]

Are you going to try some new methods or techniques in the future?

Are there some methods or techniques in addition to the current ones that will be utilized in the future concerning usability research?

- Heuristic evaluation
- Cognitive walkthrough
- Pluricentric walkthrough
- Usability testing
- Playtesting
- Focus groups
- Interviews
- Questionnaires
- Empirical guidelines
- Think-aloud
- Observation
- Filmed play sessions
- Eye tracking
- Data logging
- Other: [ ]

Do you apply any methods of your own?

Are there some methods in use that aren’t on the previous lists? Do you perhaps use some methods or techniques that you have developed yourself?

[ ]
Game usability in Northern European game companies

(4/12) Methods

Who is in charge of the usability research?
Who actually performs the testing and evaluation?
☐ Company itself
☐ Publisher
☐ External company
☐ Other: 

In which stage of production do you test and evaluate usability?
☐ Pre-production
☐ Production
☐ Post-production

With what is game usability tested?
What version of the game do you test and evaluate?
☐ Paper prototype or similar
☐ Working prototype
☐ First playable version
☐ Alpha version
☐ Beta version
☐ Release version
☐ Competitors’ product
☐ Other: 

What are you trying to find out with your usability research?
Here you can write freely about what the goals of your usability research are.

What methods are in use in different phases of the development?

33% completed
(5/12) Methods: Usability testing

If you don’t use usability testing, you can skip this page and go straight to the next page.

Who arranges the usability testing?

☐ Company itself
☐ Publisher
☐ External company
☐ Other: 

Who in the company arranges the usability testing?

Person(s) role/title

Who are the test subjects?

☐ Company’s employees
☐ Friends and acquaintances
☐ Random people
☐ Players from the target group
☐ Other: 

What kinds of tasks are given to the players?

☐ Structured tasks
☐ Open-ended tasks
☐ Other: 

Continue » 41% completed
(6/12) Methods: Usability testing

If you don't use usability testing, you can skip this page and go straight to the next page.

Where do you test?
In what kind of place is the usability testing conducted?

What are you looking for in usability testing?
What kind of data is collected and what are you observing? Do you collect qualitative or quantitative data? Are you paying more attention to people's behaviour or to the success rate, number of errors, etc.

50% completed
(7/12) Methods: Heuristic evaluation

Do you use heuristic evaluation? *

- Yes
- No
(8/12) Reasons not to use heuristic evaluation

Why don’t you use heuristic evaluation?

- Don’t know the method
- Don’t know how to use it
- Don’t think it is worthwhile
- Existing heuristic lists don’t suit our games
- Didn’t produce good results previously
- Not enough people to do it
- Too time consuming
- Too expensive
- Other: ____________________________

Any other reasons for not using heuristic evaluation?

______________________________

Are you going to use heuristic evaluation in the future? *

- Yes
- No
- Maybe

If you answered “No” to the question “Do you use heuristic evaluation?” on the previous page, you go to this page. After this the questionnaire continues on page 10.
Game usability in Northern European game companies

* Required

(9/12) Methods: Heuristic evaluation

Who does the heuristic evaluation?
- [ ] Company’s own employees
- [ ] Outside experts
- [ ] Other: 

Whose task is to perform heuristic evaluation inside the company?
What is the person(s) role that performs it?

How many people are conducting the evaluation?

What heuristic list is used for the evaluation?
- [ ] Nielsen’s heuristics
- [ ] Melissa Federoff’s heuristic list
- [ ] Descombes, Caplan & Teltz (Heuristic Evaluation for Playability)
- [ ] Karrenberg & Holmström Nielsen’s Heuristics
- [ ] Pinella, Wong & Stach heuristics list
- [ ] Your own list
- [ ] Other: 

Why are you using heuristic evaluation?
- [ ] It’s cheap
- [ ] It’s an effective way to find problems
- [ ] It’s easy to use
- [ ] It’s not too time consuming
- [ ] It reduces problems and/or their severity found in later testing
- [ ] Others are also using it
- [ ] Other: 

What do you think about the existing heuristic lists? *

<table>
<thead>
<tr>
<th>Heuristic list(s) we use are comprehensive enough</th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Undecided</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heuristics are too general</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>There isn’t a single comprehensive heuristic list</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Different game genres should have their own specialized heuristic list</td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>We need to make a new heuristic list for every new game</td>
<td></td>
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</tr>
</tbody>
</table>

[Image of a button: < Back | Continue >]

75% completed
Game usability in Northern European game companies

(10/12) The concept of game usability

What aspects do you think the concept of game usability consists of? *
Choose the alternatives that in your opinion are affected by game usability and that you examine when talking about game usability.

☐ The level of challenge
☐ Fun
☐ Controls
☐ User experience
☐ User interfaces
☐ Game mechanics
☐ Gameplay
☐ Flow
☐ Other: 

How would you define game usability?

[Text field]

83% completed
# Game usability in Northern European game companies

## (11/12) Thoughts about usability

**What do you think about the following claims?**

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Undecided</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Usability is important in productivity software</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Usability is important in games</strong></td>
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<tr>
<td><strong>Usually we use our own applied versions of the usability methods</strong></td>
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<tr>
<td><strong>Our usability methods and the way we use them have stabilized</strong></td>
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<tr>
<td><strong>We do enough usability research</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Usability research has been useful</strong></td>
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</tr>
</tbody>
</table>

**What do you think about the following claims concerning game usability?**

**The goal of game usability is to …**

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Undecided</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Develop more easily understandable user interfaces</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reduce barriers to fun</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Develop more understandable controls</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Find the appropriate level of challenge</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Find problems in user experience</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Find problems in playability</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Required*
Game usability in Northern European game companies

* Required

(12/12) Respondents information

On what platform do you make games?

- [ ] PC
- [ ] Handheld game consoles
- [ ] Mobile devices
- [ ] Xbox 360
- [ ] PS3
- [ ] Wii / Wii U
- [ ] Other: __________

What type of games you make?

- [ ] Action
- [ ] Adventure
- [ ] Action-adventure
- [ ] Arcade
- [ ] Fighting
- [ ] FPS
- [ ] MMO
- [ ] Puzzle
- [ ] Racing
- [ ] RPG
- [ ] Shooter
- [ ] Simulation
- [ ] Sports
- [ ] Strategy
- [ ] Other: __________

The size of your company

Approximately the number of employees you have:

- [ ] 1-10
- [ ] 11-50
- [ ] 51-200
- [ ] 201-1000
- [ ] 1001-5000
- [ ] 5001-10000
- [ ] 10001-50000
- [ ] 50001-100000
- [ ] 100001 or more

Company is located in

- [ ] __________

Your title/role in the company

- [ ] __________

Name of the company *

This information is only for mentioning the received answers and it won’t appear in the thesis or in any other place.

- [ ] __________

Feedback and suggestions:

- [ ] __________

[Back] [Submit] 100%. You made it.