

Trotting the Globe: Evaluating and Categorizing Playful User Experiences of Google Earth

Pro gradu thesis

Matti Linna

Interactive Media

Department of Information Studies and Interactive Media

University of Tampere

November 13, 2010

UNIVERSITY OF TAMPERE

Department of Information Studies and Interactive Media

LINNA MATTI: Trotting the Globe: Evaluating and Categorizing Playful User Experiences of Google Earth

Pro gradu thesis, 115 pages + appendices

Interactive media

November 2010

ABSTRACT

Playfulness has been one of the theoretical frameworks used to discuss human-computer interaction since the 1980s with the aim to understand why it is enjoyable to use digital technologies. Various theories have been developed and the phenomenon has been analysed in many studies throughout the years. The subject is still open to further research, as understanding of it remains incomplete.

The three main aims of this thesis are: (1) To establish a basic understanding of playfulness in human-computer interaction by reviewing previous discussion on play and user experience, (2) to conduct a user study of Google Earth to discuss playful user experiences in its context, and (3) to discuss methodological issues of user experience research, especially focusing on systematic categorizing of the data. Google Earth was chosen as the research object as it is an interactive open environment. This design aspect can hypothetically elicit user experiences that can be meaningfully discussed using playfulness as a theoretical framework.

The data of the thesis was collected from 18 study participants using web-based experience diaries and user interviews. The data collection methodology is based on design probes, a specific approach for collecting user experience data. The data was analysed using the affinity diagramming method, which is a type of data content analysis. The main purpose of the affinity diagramming is to sort data into clusters that are built around common themes. The data analysis produced a total of 12 experience categories, each denoting different aspects of the user experiences present in the data. These experience categories were analysed further to filter out the experiences that can be considered playful.

The main findings of this thesis provide proof that Google Earth can elicit playful experiences on its users: the openness and wide range of possibilities the application offers for the users form a kind of playspace where the users can express individual desires and goals interactively and associatively. The core user experiences are formed through representations of travelling, social interaction and the large amounts of factual information the application offers for the users. The study also provides insight into the problems of analysing user experience data systematically. The data analysis shows that the complexity of human experience renders overtly strict models of playfulness irrelevant to some degree. Rather, the results of the study suggest that user experience data should not be approached only with pre-defined models, as they can impair the reliability and validity of the research.

Keywords: play, game, playfulness, user experience, user research, human-computer interaction.

Acknowledgements

This thesis was written by commission and with the financial support of Nokia Research Center. The central theme of the thesis and the core commission for NRC, playful user experience, was the foundation that the study was built on: bit by bit, the thesis found its focus through several iterations of different approaches. All material and conclusions presented in this thesis, good or bad, are my own.

Special thanks to Markus Horttanainen for providing assistance with the quantitative analysis of the data, professor Frans Mäyrä from the Department of Information Studies and Interactive Media at the University of Tampere for providing support and Jussi Holopainen of NRC Tampere for insightful comments and critical perspectives.

Table of Contents

List of Figures and Tables

1. Introduction	1
1.1. Overview of the Study	2
1.2. Previous Research	5
1.3. Structure of the Thesis	8
2. Frameworks	9
2.1. Play	9
2.1.1. The Ambiguity of Play	10
2.1.2. Classic Theories of Play	12
2.1.3. Play and Game	14
2.1.4. Play, Emotions and Motivation	15
2.2. Playfulness	20
2.2.1. Defining Playfulness	20
2.2.2. Playfulness and Personality	22
2.2.3. Playfulness in Human-Computer Interaction	24
2.2.4. Design of Playful Interaction	25
2.3. User Experience	28
2.3.1. Dewey and Technology as Experience	29
2.3.2. Defining User Experience	31
2.3.3. User Experience and Usability	34
2.3.4. Elements of User Experience	35
2.3.5. User Experience: Impossible to Define?	37
2.4. Playful User Experiences	39
3. Methodology	44
3.1. Towards a Valid Methodology	44
3.2. Study Participants	47
3.3. Data Collection Methods	48
3.3.1. Experience Diaries	49
3.3.2. User Interviews	51
3.4. Data Analysis Methods	52
4. Analysis of Collected Data	56
4.1. Summary of the Experience Categories	56
4.2. Diary Data: Analysis of the Experience Categories	60

4.2.1. Group 1: The Process of Exploration	60
4.2.2. Group 2: Meaningful Experiences	68
4.2.3. Group 3: Motivated Action	73
4.2.4. Group 4: Negative Experiences	77
4.2.5. Analysing the Experience Categories	82
4.3. User Interviews: Towards a More Detailed View	84
4.3.1. Reflection of Self as a User	84
4.3.2. Understanding the World	85
4.3.3. Exploring the World	87
4.3.4. Controlling the World	89
4.3.5. Social Experiences as Motivators	90
4.3.6. Aesthetics and Accuracy	91
4.4. Conclusions: Exploring Themes of Playfulness	92
4.4.1. Captivation as a Pointer towards Playfulness	92
4.4.2. Parallels with Internet Usage	93
4.4.3. Exploring the Boundaries of Closed Space	94
4.4.4. Freedom of Movement and Control	96
4.4.5. Experience of Social Connections	96
4.4.6. Challenge and Failure	97
5. Discussion	99
5.1. Post Mortem: Data Collection and Analysis	99
5.2. Methodological Implications	101
5.3. Implications for Design	103
5.4. Implications for Further Research	105
5.5. Conclusion	107
References	109
Appendices	116

List of Figures

Figure 1: Screenshot: Google Earth main screen	3
Figure 2: Screenshot: Google Earth flight simulator mode	4
Figure 3: The dynamics of user experience (Forlizzi & Battarbee 2004)	32
Figure 4: Elements of user experience (Kiili 2005)	36
Figure 5: Diary entries per day	51
Figure 6: Screenshot: 3-D modelled New York	69
Figure 7: Examples of embedded services in Google Earth	94

List of Tables

Table 1: Study participants	48
Table 2: Summary of the experience categories	57
Table 3: Definitions of the experience categories	59

1. Introduction

It took a long time, but as computers became more powerful and we learned more about how people used them, eventually we started catching the idea that, instead of designing software to work in the fashion that works best for the machine, we could design software to work in the fashion that works best for the people who use it, thereby skipping this whole business of sending file clerks to programming classes to improve their computer literacy. (Garrett 2003, 88.)

Human-computer interaction design and research has come a long way in understanding the role real people using digital technologies in the past decades. In the 1970s and 1980s, a common understanding of the relationship between technology and people was a single user sitting in front of a computer performing a prescribed task. In the 1980s there were also views that saw the user as a source of error, because people were seen as similar information processors as computers, but slower and more unreliable. These views were challenged with the idea that better design should be built on usability. Usability emphasises the importance of understanding the needs of the users in human-computer interaction. Especially from the early 1990s onwards usability-oriented thinking gained ground in developing working methods to design better systems. Towards the 2000s these views were further broadened to gain understanding of the full scope of human experience of technology. Now interaction with technology is understood to be as much about what people feel as it is about what they do. A commonly used term for this perspective is user experience. (Kuutti 2001; McCarthy & Wright 2004, 6-9; Mattelmäki 2006, 20-23.)

User experience is a concept that is widely discussed as the essential factor in good product design. Especially the relation between design and emotions has emerged among design researchers (Mattelmäki 2006, 20). It is not easy to design any particular user experience, however. In fact, it is probably more accurate to say that user experiences cannot be designed in the first place, but one can only design for a user experience (ibid.). This is because people are not passive, as they actively complete the experiences offered by interactive technologies for themselves (McCarthy & Wright 2004, 11). Consequently, users of interactive technologies are now considered as complex, emotional experiencers (Mattelmäki 2006, 20).

Play and playfulness are often referred to when there is discussion about fun and joy in computer applications. For instance, there are designers who directly consider playfulness as a key component in designing for enjoyable user experiences. There is an increasing amount of different design projects that aim to utilize this aspect to produce utilitarian applications that aim for better user experiences. One interesting example is *Ribbon Hero*, a game-like extension that can be installed to Microsoft Office. This is how the project website describes *Ribbon Hero*:

”Ribbon Hero is a *gasp* game for Office 2007 and Office 2010 (Word, PowerPoint, Excel and now OneNote!) designed to help you boost your Office skills and knowledge. If you feel Office can do a lot more than you have time to figure out, then Ribbon Hero is for you. Play games (aka "challenges"), score points, and compete with your friends while improving your productivity with Office.”¹

Ribbon Hero is thus aimed to provide a better learning experience of Microsoft Office by utilizing game-like structures. Another interesting example is a project where an achievement system, which is a secondary reward system developed for digital games, was implemented into a photo sharing service to “experiment playfulness outside the game domain, and to get feedback on user reactions to new kinds of content” (Montola et al. 2009, 94-95). These projects aim to utilize playfulness as a design approach with the aim to think outside the usability-based design orientation to provide better user experiences.

This thesis explores the concepts of play and playfulness and applies them as a theoretical background to evaluate user experiences of Google Earth, which is an interesting hybrid of utilitarian and entertainment affordances. The core hypothesis is that users who explore Google Earth experience playfulness through the use of the application: these playful user experiences are evaluated and analysed with the aim to expand understanding of playfulness in human-computer interaction.

1.1. Overview of the Study

This thesis has several goals. First, the aim is to produce a synthesis of the discussion concerning play, playfulness and user experience. I will especially pay attention to the different definition problems of these concepts. Second, to conduct a user study to establish understanding of the

¹ <http://www.officelabs.com/ribbonhero> (Accessed September 9, 2010)

user experience of Google Earth and to analyse these experiences from the point of view of play and playfulness. Finally, the aim is to gain insight into the process user experience research: is it possible to categorize and evaluate user experiences systematically? Next, I will go through some of the key parts of the study, starting with the focus of my research, Google Earth.

Google Earth is a virtual globe desktop application. According to the application website, it

lets you fly anywhere on Earth to view satellite imagery, maps, terrain, 3D buildings, from galaxies in outer space to the canyons of the ocean. You can explore rich geographical content, save your toured places and share with others.²

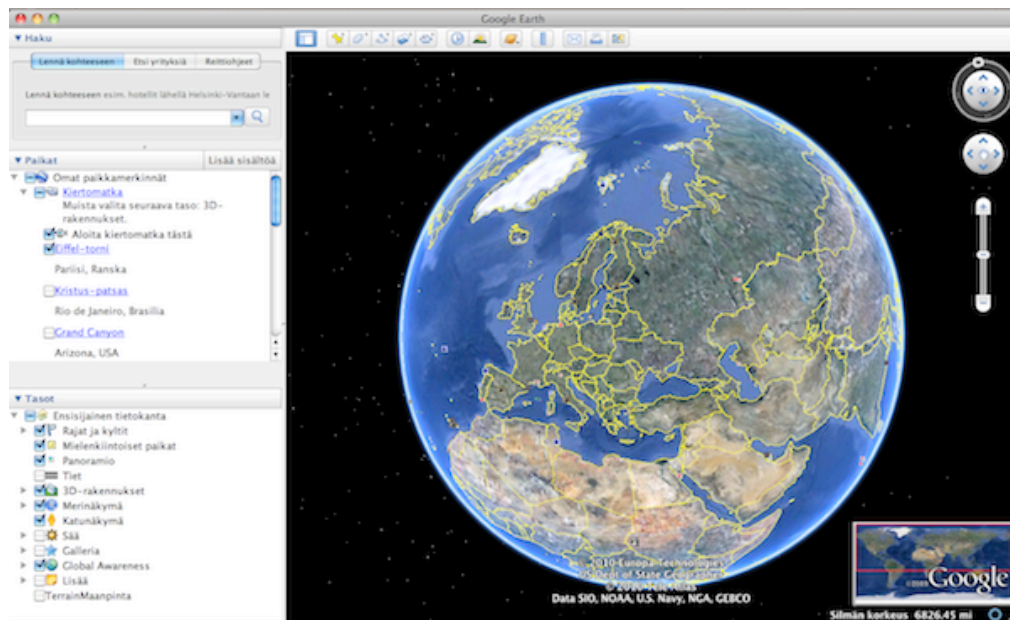


Figure 1: Google Earth main screen

Google Earth is divided between different modes. The basic view offers the user a realistic 3D model of the Earth that the user can rotate freely. There are also similar views for the Moon and Mars. In addition, there is a sky mode that gives the user the ability to view stars and constellations. Furthermore, there is a flight simulator mode that allows the user to fly around the environment in 3D-mode. There are a large number of integrated services included, such as Google's Street View, Wikipedia and Panoramio. Google Earth is currently available for a range of different operating systems including Microsoft Windows, Mac OS X and the Android and iOS mobile operating platforms.

² http://earth.google.co.uk/intl/en_uk/ (Accessed September 8, 2010)

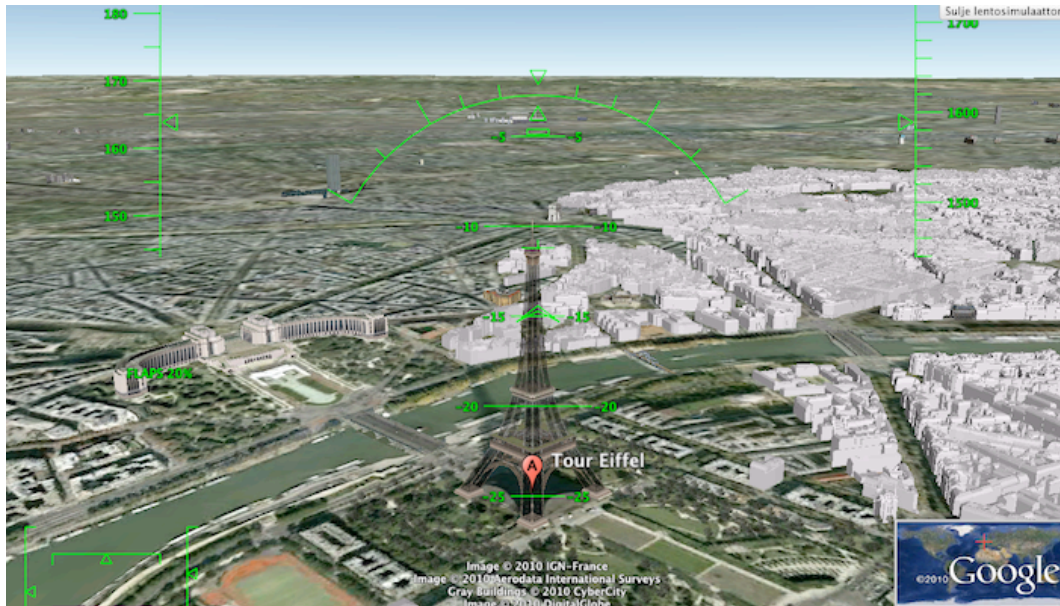


Figure 2: Google Earth flight simulator mode

Google Earth was chosen as the research object of the study because it has a diverse range of functionalities that can be applied in different ways. Its design is oriented towards a wide range of different uses: it can be used for simply wandering around the globe and visiting different locations, but it has many practical uses as well. The user is given control in using the application, meaning that the user is not forced to use the application in any particular way. Furthermore, the application contains a vast array of different features, some of which are not obvious at first sight. Because of these qualities Google Earth is interesting as it can hypothetically elicit a wide range of different user experiences and thus provide interesting material to be analysed.

The main parts of the thesis consist of a literature review of different theories and viewpoints of playfulness and user experience and a user study to analyse the user experiences of Google Earth. The theory section discusses the concepts of playfulness and user experience to provide a basis for the user study. The study section discusses the user experiences of Google Earth based on material collected from a total of 18 study participants.

My main sources are literature and journal and conference articles that discuss playfulness in human-computer interaction. Furthermore, I will use some classic and also more recent game studies literature to discuss games and play and the difference between the two concepts. As for different branches of academic theory, I will use a wide range of sources from different fields, such as developmental psychology, computer science, philosophy and biology. Thus this is a

multidisciplinary study by nature, as play and experience have been studied in such a wide range of disciplines. There are a few clearly non-academic sources included as well (e.g. Follett 2007; Garrett 2003; Gutgold 2010; Lazzaro 2004) which provide interesting ideas nevertheless.

As for the field of research, my thesis is inclined towards design research, as is most of user experience research in general. The aim is not to evaluate particular design solutions of Google Earth as such, but to explore the different outcomes these solutions produce. There is a problem with design research, however, as it is “inherently paradoxical”, “both imaginative and empirical”. The research must go beyond what is visible, and it is to some extent an act of imagination. It must also, however, be grounded in empirical evidence. (Johnson 2003, 39.) These issues are relevant to any research, but in this type of research they are especially important. It is required to form interpretation out of the analysis of the collected data, but also to make sure the interpretation is not unfounded.

User experience research generally is not devoid of problems. The complexity of human experience presents multiple challenges of especially reliability and validity, as the research area is inherently prone to subjective interpretation instead of empirically proven solid conclusions. The latter part of the thesis discusses the problems of the study extensively: for instance, the methodology used in this thesis is only one way to approach the data and thus there are issues that need clarification after the data analysis.

1.2. Previous Research

Playfulness has been studied extensively in the past especially in the field of developmental psychology. For instance, Lieberman (1977) studied the role of playfulness in different educational settings such as kindergartens and school classrooms. My main interest, however, are the studies concerning playfulness in human-computer interaction. For instance, Atkinson and Kydd (1997) have looked at the role of playfulness in Internet usage, Woszczynski, Roth and Segars (2002) have tried to bring together different theories of playfulness in computer interaction, and Webster (1988) points out possible benefits of making computer systems more playful in work environments. I will go through some of the previous research in this section to provide a context for my study.

Webster (1988) conducted a study to explore the role of playfulness in human-computer interaction especially in work environments with the hypothesis that “designing computer systems to make tasks at work more playful may result in real advantages to users and organizations”. The study focused on the perceptions of different users about what kind of situations they experience as play-like. Webster then analysed this data with several utilitarian applications, concluding that playfulness can result to users experiencing more “positive affect at work, heightened concentration, and less awareness of time.” (Webster 1988, 78-86.)

Webster and Martocchio (1992) developed a scale for evaluating computer playfulness to study the potential effects of playfulness in human-computer interaction. They used attributes such as ‘Creative’ and ‘Curious’ to measure the validity of their hypotheses of playfulness, including discussion of the relationship between personality and aptitude for playfulness in computer-interaction. They conclude that “microcomputer playfulness relates positively with computer attitudes, computer competence, and computer efficacy, and with outcomes such as involvement, positive mood, satisfaction, and learning.” (Webster & Martocchio 1992, 216.)

Atkinson and Kydd (1997) studied the relationship between motivation and playfulness in using the Internet. They hypothesized that those who rate high on measured playfulness also exhibit a high degree of Internet use, and that there are both work and leisure related motivational factors for Internet usage. Using the scale from Webster and Martocchio (1992), they conducted a study to test these hypotheses. Their study supported these hypotheses, and the authors conclude that there is “strong evidence” to support the relationship between playfulness and Internet usage. (Atkinson & Kydd 1997, 59.)

Yager et al. (1997) studied the effect of personality factors in playful interaction using, once again, the playfulness scale developed by Webster and Martocchio (1992). Based on their research, the authors argue that playfulness is a stable personality trait, meaning that playfulness is related more to the personality of the user rather than particular design solutions. Because of this they argue that “the stability of the playfulness trait will make attempts to manipulate individual playfulness unlikely to succeed”, and that the proper approach would be to tailor systems based on individual needs. (Yager et al. 1997, 47-48.) However, other research has challenged this conclusion. I will discuss the role of personality in playfulness in section 2.2.2.

Chiang and Lin (2010) explored the role of playfulness in digital online games and how different psychological needs influence the playfulness in online games, with focus on early adolescents. They separated between different types of playfulness: game-focused playfulness, where its role was pragmatic and functional, and self-focused playfulness, which denotes playing games with happiness and inspiration of imagination. Furthermore, they discuss the role of playfulness from point of view of learning and spontaneous creativity. They suggest that playfulness in online games can satisfy adolescents' psychological needs of establishing autonomy and intimacy, and that online gaming in general offers possibilities to seek excitement and pleasure that satisfies psychological needs of competence. (Chiang & Lin 2010, 628-635.)

There have been attempts to capture the scope of playful experiences with the premise that user experience can be categorized systematically. These include Costello and Edmonds (2007) with the emphasis on interactive art, and Korhonen, Montola and Arrasvuori (2009), whose focus is on digital games. Both aim to create a comprehensive framework to analyze playful user experiences with the aim to contribute to better design solutions of interactive systems. These two models are connected: Costello and Edmonds (2007, 90) propose that their framework could be used for other kinds of interaction design in addition to interactive art. Korhonen, Montola and Arrasvuori develop this idea to construct their own theory, the playful experience framework (hereafter abbreviated as PLEX), by extending the model to “make the framework more complete and usable outside the interactive art context.” (Korhonen, Montola & Arrasvuori 2009, 275.)

These are just some examples of the research done in the area of playfulness in human-computer interaction. A more comprehensive literature analysis is available in Kuts (2009). Kuts reviewed a large body of research on play and playfulness to identify “user interface characteristics that can affect playfulness”. According to Kuts, based on the literature review on playfulness studies the key aspects of playful user interfaces are “[c]reative enjoyment, challenge, curiosity, ability to customize user interface, fun-in-doing, exploration, feedback, fantasy, metaphor and social interaction”. (Kuts 2009.)

I will return to many of these studies during the course of this thesis, especially the PLEX model (Korhonen, Montola & Arrasvuori 2009). The theory section discusses in more detail some of the hypotheses and implications these studies offer for the study of playful experiences, and evaluates their outcomes critically by comparing their results with other research.

1.3. Structure of the Thesis

Chapter 2 discusses different theories of play, playfulness and user experience. The focus is on establishing understanding of both different definitions of these concepts as well as look at the differences between them. I will start by discussing the problems that defining play has, and then proceed to discuss different viewpoints of play starting with classic play theories, and move on to review the motivational factors behind play. The playfulness section discusses the differences between play and playfulness, and the importance of playfulness in human-computer interaction. Furthermore, the section includes discussion on proposed design solutions for playful interaction. The user experience section discusses the implications of technology as experience in general, and then reviews different approaches to user experience. Finally, the last section of the chapter discusses playful user experiences and especially the playful experience framework.

Chapter 3 discusses methodological questions, prominently some of the issues of qualitative research and possible solutions to improve the validity of research. The chapter also introduces my main analysis tools and presents the process of data collection and analysis.

Chapter 4 consists of analysis of the collected data and discussion of its implications from the point of view of playfulness. The chapter begins with a summary of the main results of the analysis, proceeding first to analysing the diaries, then the interviews, and closing of with a discussion of the combined findings and their significance.

Chapter 5 is the final chapter of this thesis. It includes analysis of the validity of this study, as well as critical reflection of the study process. I will also discuss some possibilities to expand this research and some points this study has to offer to research and design in general. Furthermore, I will discuss the validity of this type of user experience research by comparing the results of my study with previous discussion on playful user experiences.

2. Frameworks

Play, playfulness and user experience are the three central concepts of this thesis. On one hand, they are not academic concepts, and they are commonly used in everyday speech. On the other, there has been a wide range of attempts to define these concepts so that they could be used as analytical tools in academic research. This puts them in an interesting light, as there is a certain tension between the informal and the academic usage of these concepts. For instance, McCarthy and Wright (2004, 50) discuss the importance of defining experience, as it is used commonly in everyday discourse and thus leads to the false sense that the concept is free of the need for any further clarification: in fact, this is not the case, as McCarthy and Wright point out. Thus any attempt to use these concepts as a framework for systematic analysis is required to define them as thoroughly as possible.

This chapter starts with discussion on play and its ambiguity and follows with review on some influential theories of play. The playfulness section expands the notion of play to include the playfulness dimension, and discusses the differences between these two concepts. The user experience section adds the third concept to this discussion, after which I will proceed to gather some of the key points of this chapter to discuss playful user experiences.

2.1. Play

Play is a concept that even after extensive scholarly discussion remains ambiguous. For example, play theorist Brian Sutton-Smith writes in his important discussion on play, *The Ambiguity of Play*, that we “all play occasionally, and we all know what playing feels like. But when it comes to making theoretical statements about what play is, we fall into silliness” (Sutton-Smith 1997, 1). This is partly due to the vast range of academic disciplines that study play, which means that there are various viewpoints on play, some of which may be considerably difficult from each other. Play has been studied as a biological, physiological, sociological and cultural phenomenon, as well as from the perspective where play is a component in the various kinds of games that people play. This means that play has been studied practically in all areas of human life, from very different viewpoints. Some scholars “study the body, some study behaviour, some study thinking, some study groups or individuals, some study experience, some study language – and they all use *play* for these quite different things” (ibid., 6). The study of play, however, is not restricted to the human species, as the play of animals has also been studied extensively. Obvi-

ously the root of this definition problem is not that play has been studied in several academic fields. It is merely the result of the ambiguous nature of play itself. Play, in various forms, is present in such a vast range of human activities that it defies definition.

I will discuss play mainly by referring to the theories that are often discussed in modern game studies (e.g. Caillois 2001; Huizinga 2000; Sutton-Smith 1997) as they are relevant to the discussion of playful experience in the context of interactive applications, as modern videogames fall into the same category: users interacting with digital systems. Digital games also offer the kinds of playful and pleasurable experiences that are relevant to this study. I will also use sources from the field of developmental psychology and human-computer interaction.

2.1.1. The Ambiguity of Play

Brian Sutton-Smith proposes that part of the problem of defining play is “due to the lack of clarity about the popular cultural rhetorics that underlie the various play theories and play terms” (Sutton-Smith 1997, 7-8). Sutton-Smith lists extensively the activities that are usually associated with play forms or play experiences:

- Mind or subjective play, such as dreams and imagination,
- Solitary play, such as hobbies and collections,
- Playful behaviours, such as playing tricks and playing around,
- Informal social play, such as joking and dancing,
- Vicarious audience play, such as television, concerts and theatre,
- Performance play, such as playing an instrument and being a play actor,
- Celebrations and festivals, such as Christmas and birthdays,
- Contests (games and sports), such as athletics and gambling,
- Risky or deep play, such as caving and hang gliding. (Sutton-Smith 1997, 4-5.)

This list gives us a good idea about the problem of defining play very thoroughly. Because there are so many activities that are associated with play activities or experiences, and many of these activities are highly subjective as experiences, play resists any universal definition attributed to it. Sutton-Smith argues that all these associations form different kinds of rhetorics of play, depending on what is referred to when discussing play. Sutton-Smith uses the word rhetoric “in its modern sense, as being a persuasive discourse, or an implicit narrative, wittingly or unwittingly

adopted by members of a particular affiliation to persuade others of the veracity and worthwhileness of their beliefs” (Sutton-Smith 1997, 8). This view suggests that instead of being a fixed concept or even a phenomenon, play is rather constructed in different ways depending on the context and the people defining it.

To clarify this view, Sutton-Smith defines the following seven rhetorics of play:

1. The rhetoric of play as progress, often applied to children’s play, stating that children adapt and develop through play.
2. The rhetoric of play as fate, usually associated with gambling and games of chance.
3. The rhetoric of play as power, applied to sports and athletics.
4. The rhetoric of play as identity, associated with traditional and community celebrations and festivals.
5. The rhetoric of play as the imaginary, applied to creative improvisation.
6. The rhetoric of the self, associated with solitary activities such as hobbies, the kinds of forms of play where play is “idealized by attention to the desirable experiences of the players”, such as fun and relaxation.
7. The rhetoric of play as frivolous, meaning the kinds of activities that are “idle or foolish”, referring to both play activities that are seen as the opposite of work and to the historical carnivalesque figures of tricksters and fools. (Sutton-Smith 1997, 10-11.)

For this reason Sutton-Smith proposes that the definition of play should be broad rather than narrow, “including passive vicarious forms as well as the active participant forms including day-dreams as well as sports and activities”. Sutton-Smith also proposes that “play is like language: a system of communication, not in itself either good or bad”. (Ibid., 218-219.) Here we come again to the aspect of artificiality of play: as language is dependent on meaning that is culturally and socially bound, also play can be understood as a way to express ideas about the human condition.

Sutton-Smith’s argument should be kept in mind before we venture more deeply into what play actually is, and at the same time remember that these types of lists do not constitute the definite truth about play. Sutton-Smith’s argument is in many ways more philosophical than practical, such as his view of play having no moral implications. This is a counter-statement to some of the moral arguments made about the nature of play as an element of human culture in the classic 20th century theories of play, which I will discuss next.

2.1.2. Classic Theories of Play

Dutch cultural historian Johan Huizinga (1872 – 1945) offers a classic and often quoted definition of play in his seminal work *Homo Ludens* (originally published in 1938):

Summing up the formal characteristics of play we might call it a free activity standing quite consciously outside “ordinary” life as being “not serious”, but at the same time absorbing the player intensely and utterly. It is an activity connected with no material interest, and no profit can be gained by it. It proceeds within its own proper boundaries of time and space according to fixed rules and in an orderly manner. It promotes the formation of social groupings which tend to surround themselves with secrecy and to stress their difference from the common world by disguise or other means. (Huizinga 2000, 13.)

Huizinga defines play essentially as free and voluntary activity. This means that play should happen only for the sake of playing, not because of any external incentive. In other words, play is something that one chooses to do (Prensky 2007, 112). Play happens in a space of its own. This space, which is often referred to as ‘magic circle’, has been widely discussed especially in modern game studies. It can be considered as “a special place in time and space created by a game”, which as a space is “separate from the real world” (Salen & Zimmerman 2004, 95). Furthermore, Huizinga takes a strong position in arguing that play should not lead to personal gain.

Huizinga’s definition, while it certainly has been influential, has been analysed and criticised extensively by several scholars. For instance, referring to play being outside ordinary life, Sotamaa (2009, 43) points out that we can “think of situations where games overlap with daily life and muddle or transgress the boundary between the game and rest of the world”. Salen and Zimmerman (2004, 94) use children’s play with dolls as an example of the transgression of the boundaries between play and non-play: even though there may be a line somewhere, it is not identifiable. In fact, the whole concept of a fixed play space has been criticized. Copier (2005) argues that using ‘magic circle’ even as a metaphorical concept is misleading. She goes on to suggest that the space of play is not a given space, but rather it is constructed between the actors present in play: the players of a game, for instance, create the boundaries of the game. This view is especially useful when discussing games and other play activities that occur in normal everyday life, such as a spontaneous session of soccer played during a lunch break.

Also, Huizinga's strong position of play as something that is "connected with no material interest" is perhaps too closely linked with the ideological agenda of *Homo Ludens* (Salen and Zimmerman 2004, 75), meaning that according to Huizinga 'true play' is something that should not lead to material or financial benefit. Gambling and card games that use real money as stakes are often used as examples to counter-argument this view, as there is financial benefit involved in them, as well as structures and interaction that are definitely play-like. For this definition, Huizinga seems to take a moral standpoint that could be read as a cultural critique, rather than analysing the actual phenomena of different play activities.

Without going too closely in all the critical points, we can say that Huizinga's definition has been influential for the discussion concerning how to define play, but from a modern point of view is so problematic that using it as such is not possible. *Homo Ludens* as a book, however, is especially important in arguing that one of the core essences of human behaviour is to play, whatever we ultimately define play to mean. Assuming that this is true, it is especially important to consider different kinds of playful interactions in any context, as such behaviour would be as natural to us as walking and talking.

Another important definition of play can be found in the seminal work of the French philosopher Roger Caillois (1913 – 1978), *Man, Play and Games*, originally published in English in 1961. Caillois builds on Huizinga's argument while taking a more systematic approach. According to Caillois (2001, 4), Huizinga's definition of play is "at the same time too broad and too narrow". Caillois then defines six qualities that characterize play as an activity: free, separate, uncertain, unproductive, governed by rules and make-believe (ibid., 9-10). Further, Caillois introduces four basic categories of play. These are *agôn* (competition), *alea* (chance), *mimicry* (simulation) and *ilinx* (vertigo) (ibid., 12-26). Caillois also defines two further classifications, which describe the degree of structure and organization of play activities: *ludus* (controlled play) and *paidia* (spontaneous play) (ibid., 27-35).

As we can see, many of Caillois's definitions are directly inherited from Huizinga, such as defining play as a free activity. Caillois's classification is almost taxonomical in its categorization of different elements of play. Perhaps it is even "too categorical in believing that classification could confine the sphere of play" (Sotamaa 2009, 40). Both definitions can also be criticized as culturally narrow-minded: Sutton-Smith warns that play "should not be defined only in the terms of the restricted modern Western values that say it is non-productive, rational, voluntary or fun.

These are not concepts that can prevail as universals, given the larger historical and anthropological evidence to the contrary” (Sutton-Smith 1997, 218).

These classic definitions of play offer some basic understanding on what play is as an activity. Furthermore, they highlight some of key problems of this thesis, such as the construction of play-space and the classification of play. Even though Sutton-Smith’s argument against defining play universally based on Western standards is valid, it is practically impossible to discuss any other culturally context-sensitive definitions within this study. Consequently, these are the definitions that I use as a base for further discussion on play, which continues with the complex relationship between play and game.

2.1.3. Play and Game

Many writers, such as Copier (2005), Sotamaa (2009, 41-42) and Salen and Zimmerman (2004, 308) point out possible language issues when defining play. Some languages, such as German and French, do not have separate words for play and game. This is a particularly interesting case for French, as the original title of Caillois’s *Man, Play and Games* in French is *Les Jeux et Les Hommes*, which does not differentiate between play and game like the English translation does. It is important to notice this difference, as the English translation holds that Caillois is primarily studying games, even though it can as well be said that Caillois is studying play (Salen & Zimmerman 2004, 308). For this reason it is important to discuss the relationship and differences between play and game, even though game is not an important concept in this study. It must be noted that often the words play and game are used as synonyms. For instance, Juul (2005, 32) reviews seven classic definitions of game, using the excerpt from Huizinga cited above as one of them, with the exception that Juul has left out the word ‘play’.

This linguistic discrepancy may be due to the fact that play and game cannot be separated from each other very clearly. The most important difference between play and game is the degree of structure distinguishable in the activity that is under observation. Play within game can be understood as play that is free movement within a more rigid structure (Salen & Zimmerman 2004, 310). Caillois’s terms *ludus* (controlled play) and *paidia* (spontaneous play) are sometimes used to point out this structural difference, *ludus* referring to organized game activities and *paidia* to free-form play. It is unclear, however, if there is a clear line to be drawn here, as Caillois’s con-

cepts could also be understood as the “different ends of a huge range of activities” (Korhonen, Montola & Arrasvuori 2009, 276).

This is perhaps because, as Salen and Zimmerman (2004, 72) point out, “[...] Play is both larger and smaller term than ‘game’, depending on the way it is framed”. Because there are a number of activities that are called ‘play’, but only some of them are games, game becomes a subset of play (Sotamaa 2009, 41). However, games can be seen to contain play, and so play is also a subset of game (ibid.). Games may contain goal structures that act as incentives to continue playing the game (Holopainen 2008, 45), but these structures are not necessarily present in free playing activities. Game then, is especially a structure that directs the player in some way and may contain play and playfulness, but to be able to play or be playful, there is no need for a game or games. A good distinction, if we wish to make one, between play and game could be that play is a free-form activity, and game is a rule-based activity (Juul 2005, 28).

2.1.4. Play, Emotions and Motivation

When discussing the different emotional experiences and moods associated with play, such words as fun, pleasure, enjoyment and involvement tend to surface (Walz 2010, 56). For instance, Starbuck and Webster (2006, 259) define play “simply as activity that produces both immediate pleasure and involvement”. Concerning games, Prensky (2007, 106) discusses the various reasons that makes games such an engaging experience, stating that “[c]omputer and video games are potentially the most engaging pastime in the history of mankind”. Prensky argues that this is because games contain play, which gives intense and passionate involvement, and that games are fun, which means they stimulate feelings of enjoyment and pleasure (ibid.).

Emotions have been researched extensively and thorough discussion on emotion theory is beyond the scope of this thesis. However, it is useful to have some kind of definition of emotions before venturing on. According to the emotion theorist Jon Elster (1999) emotions are introspectively experienced as having some special feeling, “much as each color is perceived having a unique qualitative aspect”. As for emotions as experience, many emotional reactions are “triggered almost instantaneously by cognitive or perceptual cues.” This cannot be a universal characteristic of emotion, however, as there are many emotions that defy this aspect. For example, anger and love “may creep up on us so gradually and imperceptibly that we do not notice what is happening”. Elster goes on to argue that emotion reactions are events rather than actions, mean-

ing that they are “passively undergone rather than actively chosen.” This is not a strictly universal characteristic though. We can “decide to get angry by thinking about an occurrence that has made us angry in the past”, meaning that emotions can be either spontaneous as well as intentional in some sense. The intentionality of emotions can be contrasted with visceral feelings such as pain or drowsiness that often cannot be controlled. In some cases, emotions can be only expressed with a personal object, like in the case of love or hate. Furthermore, emotions are limited in duration, and can be triggered by a cognitive state such as “wishful thinking, and it can itself be the object of cognition, as when we finally notice that we have fallen in love”. (Elster 1999, 25-31.)

Play is emotional activity. For example, psychologist Catherine Garvey suggests that there is a deep physiological and psychological connection between the development of smiling and laughter, which are basic human signs of enjoyment, and the development of play. She discusses the development of “group glee”, the development of spontaneous laughter among groups of children. She then goes on to state:

Although smiles and laughter are overt behavior, whereas play is an attitude or orientation that can manifest itself in numerous kinds of different behavior, this brief account of smiling, laughter and glee reveals many similarities to the development of play. (Garvey 1990, 22.)

Garvey argues that as children become more active in creating the conditions of a humour response, they also become more active in play: “In smiling and in playing, the growth of voluntary control is reflected in important changes in the organization of behavior”. Furthermore, children’s intellectual growth reflects both the ability to take pleasure in laughter and in play. Finally, both activities develop in similar kinds of contexts, such as social interaction and other environmental factors. (Ibid., 22-23.)

Fun, even though it is typically associated with positive emotions, has a more complex meaning when we look at it more closely. Prensky (2007, 106-109) discusses the various meanings of fun, stating that in fact fun means both “good” and “bad” emotional states. It can be associated with enjoyment and pleasure, as well as with amusement and ridicule. Perhaps fun, then, is a too elusive concept when discussing why playing games is enjoyable. When discussing game and play it would be more useful to look at the concept of flow (Holopainen 2008, 55).

Flow is a famous concept that is often used in association with playing and games. For instance, Kiili (2005) uses the flow theory as a framework for designing educational games. Flow is a mental state “in which people are so involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it even at great cost, for the sheer sake of doing it” (Csikszentmihalyi 1991, 4). Flow is especially good in discussing play-like activities, as a large proportion of flow experiences have been seen to occur in activities that require investment of “psychic energy” and could not be done without appropriate skills (ibid., 49). It is a good concept in trying to figure out why it is fun to play games (Holopainen 2008, 55).

To play, however, is not just about fun and enjoyment. Negative emotions, such as frustration from difficulty, disappointment from failure and resentment against opponents are present while playing as well (Järvinen 2008, 111). Yee (2006, 69-70) reports cases where playing online role-playing games proved to be too stressful for some players. Yee discusses negative emotions that are usually associated with work, concluding that “the blurring of work and play begs the question – what does fun really mean?” (ibid., 71). Pearce (2006, 19-23) discusses another case of a similar setting, where the dedicated players of the online game *Uru* went to great lengths to continue their play experience after the game servers were shut down. Pearce concludes that play has its own productive character (ibid., 24). Here the duality of fun is present as well: it may be fun to do hard work to produce something new as much as play a game for pleasure. Sometimes play may be work and vice versa, not just in the banal aphorism about play as children’s work. This is an interesting point especially in the context of computer usage, as “they are simultaneously fun to use and serious tools”, which means computers “are eroding the ritualized distinction between work and play” (Starbuck & Webster 2006, 273).

The range of emotions and experiences people have during play suggest there are various reasons why we play in the first place. There are several reasons, some of which are contradictory, but nevertheless highlight both why we play and what play is. Psychologist Nina Lieberman discusses the various theories of motivation behind play, concluding that “there is no clear-cut division between the why and the how of play” (Lieberman 1977, 17). It is important to understand the motivation behind play because play is a subjective experience which is influenced by several factors both internal and external.

Play can be seen as a time to discharge energy. This so-called surplus energy model explains that because the human species has developed conditions where there can be play for the sake of

amusement and leisure. On the other hand, play can also be a time to recharge energy through providing recuperation from work. Furthermore, play can be seen as the arena for practicing essential survival skills: from an evolutionary point of view this means that because both humans and animals play, it must be useful in the struggle for survival. (Lieberman 1977, 15-17.)

Fortunately there is no need to go very deep in behavioural psychology to discuss the motivation to play. A more useful approach for this thesis is to look at what are the reasons to play in interactive environments such as digital games. Lazzaro (2004) conducted a study on the various experiences of players of digital games. The study consisted of qualitative data gathered from a total of 30 study participants who played a number of video games. Based on the analysis of this data Lazzaro concludes that there are four key elements that trigger emotions in play:

1. **Hard Fun:** The opportunities for challenge, strategy and problem solving,
2. **Easy Fun:** The enjoyment of intrigue and curiosity, and the immersion of playing.
3. **Altered States:** The enjoyment of internal experiences as reaction to the visceral, behavioural, cognitive and social properties of play,
4. **The People Factor:** Play as mechanism for social experience. (Lazzaro 2004.)

Lazzaro's findings highlight the various reasons why it is pleasurable to play. To play is not simply about having positive experiences, but negative ones are integral to the play experience as a whole. The process of changing states between anxiety and stress to fun and relief may be one of key reasons why people find digital games so engaging. This is also what the flow theory aims to describe in other activities in human life.

Walz (2010) discusses the different types of motivational experiences as outcomes of specific play pleasure spaces. Walz's discussion is based on a definition of "play as a kind of movement that bridges player and play-other and affords space" which means that "each type of play must embody some kind of play-movement, i.e. kinesis" (Walz 2010, 65). Walz lists a total of 15 different types of pleasure spaces. These are, for example:

- **Contest space**, which is an outcome of any movement that aims to outmatch, such as racing,
- **Amusement space**, which is the result of laughing,
- **Creation space**, the outcome of any movement of creation,

- **Achievement space**, which derives from achievements such as levelling up,
- **Direction space**, which results from controlling and steering. (Walz 2010, 65-66.)

According to Walz, motivation in play is constructed through movement in different types of spaces. What is important to notice is that this definition encompasses both negative and positive emotional states through conceptualizing them into motivating factors. In other words, play motivation can result from both negative and positive emotions, and as such it is important to consider all types of emotions in the context of play instead of focusing simple maxims such as ‘fun’.

In conclusion, this section discussed the nature of play and the various theories of the nature of play both as an element of human culture, as well as its formal features in relation to other activities that are associated with play. The emotions people experience during play are complex and cannot be reduced to consider only positive emotions. Rather, there are emotionally vivid and multifaceted motivational aspects why people consider playing often as such an enjoyable experience. Play can be also considered as part of larger emotional dispositions, namely playfulness, which is the main focus of the next section.

2.2. Playfulness

Playfulness is the core concept of this thesis. Playfulness has been studied mainly in the behaviour of small children, but the playfulness of adults has not been a strong focus in research. Much of the research concerning playfulness has been done in the field of developmental psychology. Building on this data, playfulness has been studied as a behavioural factor in human-computer interaction especially from the 1980s onwards. This research has produced several theories of playful interaction.

In this section I will first discuss the difference of play and playfulness and sum up some of the definitions from other research. I will also discuss how personality is connected to playfulness, especially from the point of view of state and trait theories, which suggest somewhat contradictory premises for playfulness research. Furthermore, I will discuss some aspects of playfulness on human-computer interaction, and also present some ideas that have been proposed as the basis for playful interaction design.

2.2.1. Defining Playfulness

Definition of playfulness faces the same problems that Sutton-Smith considers problematic when defining play: the wide usage of the word makes it ambiguous. In everyday speech, the word playful is associated with enjoyment, fun or amusement (Youell 2008, 122). Playfulness has been studied mainly in developmental psychology, with focus on the playful behaviour of small children. In this point we face a problem of different age groups. Can definitions based on the behaviour of small children accurately predict playfulness in other age groups as well?

Play and playfulness are concepts that are easily confused to one another. This is because the line between the two is hazy at best, and very often it is impossible to define a specific situation or behaviour as either one. For example, if we take Caillois' idea of *paidia*, spontaneous play, and compare it with playfulness, it can be very difficult to distinguish a clear line between these two concepts. Furthermore, as already discussed, the concept of play affords several types of interpretations on how and what happens when we play. The same applies to playfulness: there are several behavioural patterns that can be connected to playfulness.

Play and playfulness are not entirely separable from each other. For instance, Salen and Zimmerman (2004, 303-309) discuss the relationship between the concepts using a three-level model, where “being playful” is an umbrella term that incorporates different types of play activities, from free playing to play within formal structures such as games. Being playful is the “broadest and most inclusive” of the three, and it

refers not only to typical play activities, but also to the idea of being in a playful state of mind, where a spirit of play is injected into some other action. For instance, we are being playful with words when we create nicknames for friends or invent rhymes to tease them. We might dress in a playful way or deliver a critique of a sibling in a playful tone. In each case, the spirit of play infuses otherwise ordinary actions. (Ibid., 303.)

Here is the core difference between playfulness and play: “The former is an attitude of mind; the latter is a passing outward manifestation of this attitude” (Dewey 1909, 162). To be playful means to engage into different activities in a play-like manner. Play is an activity, whereas playfulness is a cognitive and mental state that has certain characteristics. When an individual is playful usually it is also true that “some ingredient of play is still part of the behavioural repertoire” (Lieberman 1977, 2). Psychologist Biddy Youell (2008, 122) argues that in fact playfulness is an essential part of play, but in contemporary society many activities that are labelled as play are devoid of playfulness. As for the importance of playfulness in the human condition, it is “fundamental to our ability to function within social groups throughout our lives and it is “more than just a habitual way of thinking: it is a way of coping with the tension between personal freedom and social constraints which characterizes all forms of interaction” (Parker-Rees 1999, 61).

Salen and Zimmerman (2004, 304) discuss both play and playfulness as free activities that occur within more rigid structures. Taking this point further, game designer Martin Pichlmair (2008) argues that playfulness cannot occur in an environment that is not limited in some way:

Playfulness can manifest in any act allowing for limited freedom. If the structures were not limiting, playfulness could not occur. Playfulness is an attitude manifesting in the experience of approaching these limits, of exploring them. (Pichlmair 2008, 208.)

This is an important point: if the situation is not limited or restricted in some way, playfulness cannot manifest. The idea of exploring the limits of a particular situation is an especially import-

ant idea for my study. This idea can be expanded with paralleling play, which is “experiencing a situation without serious consequences”, with playfulness as “an accompanying attitude, a mental state of openness towards a situation” (ibid.). Playfulness means freedom from restriction, and as an attitude it “is one of freedom. The person is not bound to the physical traits of things, nor does he care whether a thing really means (as we say) what he takes it to represent” (Dewey 1909, 162).

To take an example of a developmental psychology study, Lieberman (1977) conducted research on playfulness of various age groups in classroom situations. She identified five components of playfulness: physical spontaneity, social spontaneity, cognitive spontaneity, manifest joy and sense of humour (Lieberman 1977, 23). These components can be exemplified as follows: cognitive spontaneity is the imaginative play of young children and combinatorial play of creative adults, social spontaneity is the ability to be comfortable in groups and move flexibly in and out of this type of social structure, physical spontaneity is present in unstructured play activities like jumping rope, manifest joy is the different types of pleasure and happiness, and sense of humour results from surprising and novel events, regardless of if the experiences is the producer or consumer of such an event (ibid., 74-93). These are behavioural qualities that Lieberman encountered during her research. Looking from a behavioural perspective, playfulness could refer to the personality: it is the quality or style of one’s play, and it “survives play and becomes a personality trait of the individual” (ibid., 4-5). I will discuss the relationship of personality and playfulness next.

2.2.2. Playfulness and Personality

Playfulness can be seen as both the result of the stable personality characteristics of certain individuals, or situation-specific behaviour that is not strictly dependent on personality factors. This is related to the discussion in social and applied psychology concerning the state and trait personality theories (Woszczyński, Roth & Segars 2002, 317). In summary, states and traits can be defined as:

General traits refer to comparatively stable characteristics of individuals that are relatively invariant to situational stimuli. States, on the other hand, refer to affective or cognitive episodes that are experienced in the short run and fluctuate over time. Unlike gen-

eral traits, states can be influenced by situational factors and the interaction between the person and the situation. (Webster & Martocchio 1992, 202.)

State theory holds that behaviour patterns depend on the situation and that they do not show much stability over time. For example, anxiety is a state that can be triggered situationally usually as a temporary reaction to a stressful environment. In computer interaction, the user's current state can be affected for instance by the technology used. The flow theory has been commonly used as a reference to instances where users become "so absorbed in a situation-specific activity that they actually lose track of time". Trait theory, on the other hand, holds that behaviour patterns are consistent over time and across situations, and that they can be predicted using the correct data. There is, however, also a third way called the interactionist approach. It combines both situational and long-term behaviour patterns. The interactionist theory suggests that personality traits provide long-term, stable and accurate prediction of behaviour, but the current situation should be considered as well. (Woszczyński, Roth & Segars 2002, 371-373).

The Big Five model is a commonly accepted model of different personality traits. It includes the following traits: extraversion, agreeableness, conscientiousness, openness to experience and emotional stability (Woszczyński, Roth & Segars 2002, 373). Using this five-factor model, Woszczyński, Roth and Segars identify two personality factors that are important precursors to playful interaction: openness to experience and emotional stability. First, openness to experience is important because individuals who are curious, broad-minded and adventurous, which is important to playful behaviour. Second, emotional stability compliments the first factor, as anxiety, nervousness and tendency to experience stress, which prevents creative and inventive behaviour. (Ibid., 376-378).

Playfulness then, can be either a state or a trait construct, or a combination of both. In research, it is at least partly a question of choosing the correct point of view for the needs of the study in question. For instance, Webster and Martocchio (1992) studied playfulness mainly as a personality trait. They do state, however, that "playfulness as a trait is not meant to suggest that an individual cannot feel more or less playful at various points in time" (Webster & Martocchio 1992, 203). Such a view would be somewhat strange, and thus it is important to keep in mind that there are several factors that have an effect on how people behave in certain situations, as the interactionist view suggests.

Concerning the state and trait personality theories, I do not hold a strict position to one way or another in this study. As my research focus is on user experiences and not users, I will not go very deeply in different personality factors of my study participants, as such a view would have required a completely different approach in terms of methodology. However, it is useful to bear in mind that some individuals may engage into playful interaction more eagerly than others; we could state that it takes a certain kind of personality to be open to playfulness in the first place – especially after adolescence.

2.2.3. Playfulness in Human-Computer Interaction

Playfulness in human-computer interaction has been studied in the past from various perspectives. In such a context, playfulness is the ability to interact spontaneously, inventively and imaginatively with computers (Woszczynski, Roth & Segars 2002, 370). This is a somewhat vague description, but still gives some idea about what kind of behaviour should be expected from a person using a system that makes playful interaction possible. Why this is important in the first place is that such interaction leads into higher user satisfaction and promotes learning (ibid.). A good definition of computer playfulness could be, for instance, that it is a situation-specific individual characteristic” and it “represents a type of intellectual or cognitive playfulness” (Webster & Martocchio 1992, 202).

Referring to the previous section, playfulness in human-computer interaction can be either a state or a trait factor. Cognitive playfulness as a trait can be considered as influencing the ease of computer usage and helps learning new features (Yager et al. 1997, 45). However, playfulness can be as well a state factor. For example, concerning online games, Chiang and Lin (2010, 629) argue that “adolescent players’ in-game playfulness could be better described as momentary experiences (states of mind) when they interact spontaneously with online games, rather than as a stable playfulness trait”. Nevertheless, some research has concluded that playfulness is a stable trait (see Yager et al. 1997, 47), and yet contradictory statements are as valid, such as defining playfulness as “a mood, presenting a much longer duration than emotions [...] such as fun” (Rao 2008, 10).

An early study by Webster (1988) discusses the potential benefits of computer playfulness in work environments. Webster (1988, 78) argues that computers are a “natural area for exploring playfulness in work activities”. Webster uses the classic definition of play by Caillois (2001) as

an activity that is voluntary, exists outside the “real world”, is unproductive, governed by rules and its outcome is uncertain. According to Webster’s study, the activities that were perceived as playful in computer interaction contained features such as variable difficulty levels, multiple levels of goals, ability to protect the user from common errors, and audio or visual effects (ibid., 83).

Woszczynski, Roth and Segars (2002) form a series of hypotheses of playfulness in computer interaction. Using a set of various theoretical concepts, such as the flow state, they conclude that consequences of playfulness in computer interactions are three-fold. First, the flow state and playful behaviour are positively related to the user satisfaction with specific technology products. Furthermore, as research has shown a positive link between the flow state and learning, both the flow state and playful behaviour are linked to computer proficiency. Finally, they hypothesize that both the flow state and playful behaviour lead to innovativeness in the use of information technology. (Woszczynski, Roth & Segars 2002, 379-381.)

This view takes the flow state as a major factor in playfulness, and the writers suggest that “playfulness in computer interactions might primarily be a function of the flow state” (ibid., 383). While this view can be an excellent starting point on a theoretical level, it might not be sufficient if we want to transform this knowledge into something practical, such as interaction design. For example, Järvinen (2008, 104-105) considers the “basic idea of flow and optimal experience [...] interesting and useful as such”, but has failed to find “a way to take these notions beyond their general descriptiveness, i.e. to transform them into detailed enough analysis or design considerations”. Thus merely using the flow theory as a premise is insufficient in understanding playful user experiences.

2.2.4. Design of Playful Interaction

Some attempts have been made to form design models for interaction design that would somehow contribute to playful interaction. For example, Rao (2008) and Järvinen (2009) discuss the kinds of design factors that contribute to design of playful elements in social networks such as Facebook. While this discussion is first and foremost relevant to game design, there are several key points that are valid in non-game contexts as well.

Rao (2008, 10) considers playfulness as a disposition, “an introduction to play”. Rao then forms three key points for playful interaction design, which are strongly based on many definitions of playfulness discussed earlier:

- **Physicality:** as real life playfulness is strongly related to physical situations, physicality should be considered also in the design of playful interaction. This means adding the kind of symbolic affordances – imitation of physicality – that adds physical depth to the application or service.
- **Spontaneity:** because spontaneity is integral to playfulness, there should be room for free expression in interaction, so that the quality of spontaneity and humour is present to enable unmediated self-expression.
- **Inherent sociability:** Rao argues that playfulness is “intrinsically connected to social situations and cannot exist without them”. This should be considered in interaction design as representations of actions and performances that have an effect of other people. (Rao 2008, 10-11.)

Rao also adds that some further qualities of playful design are “fast rewards and a lot of positive feedback for user interaction; no negative consequences for experimentation; the ability to build on someone else’s work (open collaborative structures) and [...] ‘frivolous interaction’” (ibid., 11).

Järvinen (2009) builds on Rao’s definitions adding two more design factors, narrativity and asynchronity. Järvinen considers the success of many Facebook games as the result of stylizing the players’ various actions into part of the particular narrative rhetorics present across the social network. In practice this means propagating different narratives as an integral part of the social network. As for asynchronity, Järvinen argues that enabling the user to deliberately change the pace and tempo of the game creates variety and supports user activity. (Järvinen 2009, 98.)

Even though both Rao and Järvinen discuss these design features as pointers towards designing more playful games for social networks, they offer good clues of the kind of interaction that can be considered playful. For example, Rao’s emphasis on spontaneity is important, as spontaneous behaviour can be attributed to both Roger Caillois’ definition of play as well the idea that playfulness occurs in a restricted space. Spontaneous exploration and curiosity can be the very defin-

ing qualities of playful interactions, manifesting in enjoyment and positive experiences of discovery.

To sum up all these definitions, I refer with playfulness to a particular state of mind that manifests in different behavioural outcomes. In human-computer interaction playfulness is the outcome of using a system that elicits the user to have playful user experiences while using it. While individual behavioural patterns may affect this interaction, they are not the main focus in this study. Rather, the aim is to look at what kinds of experiences are included in playful interaction. Next, I will discuss the concept of user experience.

2.3. User Experience

What is experience? From a holistic perspective, experience is constituted by everything that we encounter in our lives, from the trivial daily grocery shopping to the defining moments of human life. Experiences build our knowledge, shape our attitudes and alter our motives. As John Dewey describes it: “Every experience is a moving force” (Dewey 1998, 31). Defining experience as everything that happens in human life does not take us very far in terms of having a set of useful concepts, however. This has been a common problem in the processes of product design, as experience and user experience, as until very recently, have been nothing but “ambiguous buzzwords” (Forlizzi & Ford 2000, 419). Also, the general state of the theory of user experience is still “quite patchy” (Kiili 2005, 34). Nevertheless, the different aspects of human experience have gained widespread interest in human-computer interaction research in the past. This is because “[u]nderstanding experience is an exceedingly critical issue for those tasked with designing interactive systems” (Forlizzi & Battarbee 2004, 266).

Several models of user experience have been created to try to understand especially the role of user experience in product design. Forlizzi and Ford (2000) sketch a framework that attempts to understand experience in relation to user-product interaction. Forlizzi and Battarbee (2004) discuss experience in interactive systems and propose ways to design experiences for them. Kankainen (2003) proposes methods for taking user experience into account in the concept design phase of a product design process. For a more hands-on approach, Garrett (2003) discusses user experience design as the design of different elements of an interactive system, with each element contributing to the goal of good user experience.

Very often the design of user experience is paralleled to user interface and usability design. While this is true to some extent, this type of thinking blurs the fact that user experience is a much larger phenomenon than simply something that happens when the user is interacting with the user interface of a particular product. Instead, user experience starts even before the user comes in touch with the product, and it is affected by both internal and external factors present before, during and after the use:

Experience is a very dynamic, complex and subjective phenomenon. It depends upon the perception of multiple sensory qualities of a design, interpreted through filters relating to contextual factors. For example, what is the experience of a run down a mountain on a

snowboard? It depends upon the weight and material qualities of the board, the bindings and your boots, the snow conditions, the weather, the terrain, the temperature of air in your hair, your skill level, your current state of mind, the mood and expression of your companions. The experience of even simple artifacts does not exist in a vacuum but, rather, in dynamic relationship with other people, places and objects. Additionally, the quality of people's experience changes over time as it is influenced by variations in these multiple contextual factors. (Buchenau & Suri 2000, 424.)

I will first discuss the concept of experience based on John Dewey's (1859 – 1952) theory of experience. While Dewey is perhaps best known as a philosopher of education, his academic work consists of a wide range of different topics, including discussion on experience of art, education and nature. Dewey has been "instrumental in helping designers understand the qualitative and definitive aspects of experience" (Forlizzi & Battarbee 2004, 262). As we shall see, much of the discussion on user experience uses Dewey's theory of experience as a major starting point.

2.3.1. Dewey and Technology as Experience

I will present Dewey's theory of experience based on his works *Art as Experience* (1934) and *Experience and Education* (1938). The former discusses aesthetic experience and how art should be considered more in terms of experience than some formal, physical characteristics of it. The latter discusses the importance of experience-based education. While neither is directly connected to the modern conception of user experience, both offer some good theoretical grounds on which many later theories of user experience have been built on.

Experience is continuous in the sense that it is interaction between people and their environments. Experience is also situational, as interaction is always situational: the conceptions of situation and interaction are inseparable. (Dewey 1998, 41.) There is a historical element in experience as well. The present experience, 'the experience now', is built on earlier experiences, which will also shape all future experiences. (Ibid., 27.) Experience is thus not only interaction between people and their environments, but also historical interaction between different experiences themselves.

Experiences can be categorized at least to some extent. Dewey makes a distinction between experience and *an* experience:

A piece of work is finished in a way that is satisfactory; a problem receives its solution; a game is played through; a situation whether that of eating a meal, playing a game of chess, carrying on a conversation, writing a book, or taking part in a political campaign, is so rounded out that its close is a consummation and not cessation. Such an experience is a whole and carries with it its won individualizing quality and self-sufficiency. It is *an* experience. (Dewey 1980, 35, italics in original.)

The core feature of an experience is that there is some type of process involved that comes to a closure in one way or the other. Experience is thus something that can be identified in a unified way, something that can be named under a coherent description: “The existence of this unity is constituted by a single *quality* that pervades the entire experience in spite of the variation of its constituent parts” (Dewey 1980, 37, italics in original). An experience contains various processes and parts, but is still identifiable under a single description.

McCarthy and Wright (2004) discuss the broader area of technology as human experience using Dewey’s notions of experience as one of their main theoretical backgrounds. They emphasise the importance of actual, felt experience in any discussion concerning technology as part of the everyday human experience. They argue on the basis of pragmatist philosophy, using Dewey as one example, that experience “is more personal than behavior; it involves an active self who not only engages in but also creatively shapes action” (McCarthy & Wright 2004, 54). This deeper understanding of personal experience should be considered as “an approach to viewing technology as experience that is open to the sensual, emotional, volitional, and dialogically imaginative aspects of felt experience” (ibid., 184).

This is one of the aims of user experience research: to understand the experience of using a particular product as thoroughly as possible. Through this thinking there has been a turn to practice in human-computer interaction studies: instead of controlled experiments in laboratory environments, technology usage is now being studied in the field, in the real, actual environments where people face technology in their everyday surroundings (ibid., 187). With this turn, various theories of user experience have been developed in the past aiming to understand the concept of user experience better.

2.3.2. Defining User Experience

From a HCI perspective, experience is usually defined as a particular user experience. User experience includes the aspects attributed to the concept of experience, but it is more focused in the sense that it refers to a particular type of interaction. Specifically, user experience is the experience of user interacting with an artefact, and this interaction is what constitutes the user experience. In other words, it is “the interactions between people and products, and the experience that results” (Forlizzi & Battarbee 2004, 261).

User experience is elusive. A vast range of literature has been written about it, but the concept remains under constant academic and product design related discussion. This is largely due to the all-inclusive nature of user experience:

Thus defining "the user experience" is difficult since it can extend to nearly everything in someone's interaction with a product, from the text on a search button, to the color scheme, to the associations it evokes, to the tone of the language used to describe it, to the customer support. (Kuniavsky 2003, 43.)

Forlizzi and Ford (2000, 419) divide user experience into three different categories: ‘experience’, ‘an experience’ and ‘experience as story’. First, experience is the “purest form of reference”, the constant stream that happens during moments of consciousness. Second, to have an experience is to experience something that has a beginning and an end. It is something that “allows us to feel powerful emotions, assess our system of values, and possibly make changes in our behavior”. Third, experience as story is the something that is communicated by the user in story form. Stories are “vehicles that we use to condense and remember experiences, and communicate them in a variety of situations to certain audiences”. (Ibid., 420.) These definitions do not describe what user experience actually is, but rather aim to describe the different processes that are included in it. Also, they are as vague as Dewey’s definition of experience and as such not very useful as theoretical concepts. However, in this study and also for user research in general, the concept of experience as story is the most interesting of these definitions, as it is a natural way of communicating a certain experience in a limited spatio-temporal setting. This is also what is often done in user research: users are encouraged to tell stories of their experiences. For instance, Korhonen, Arrasvuori and Väänänen-Vainio-Mattila (2010) collected data using experience reports, where users were asked to write open-ended experience stories. The ultimate aim of this type of re-

search is typically to gain insight into product design: “By collecting and understanding subjective user experiences, and synthesizing them to construct a formalized narrative in the form of a product, we can create beneficial products and experiences” (Forlizzi & Ford 2000, 423).

Forlizzi and Battarbee (2004) build their framework of user experience on this three-way model with the exception that they replaced ‘experience as story’ with ‘co-experience’. Co-experience is experience that is created together or shared with others. Certain experiences are thought to be worth sharing, and these shared experiences allow different interpretations made by others. (Forlizzi & Battarbee 2004, 263.) Figure 3 presents Forlizzi & Battarbee’s model of user experience.

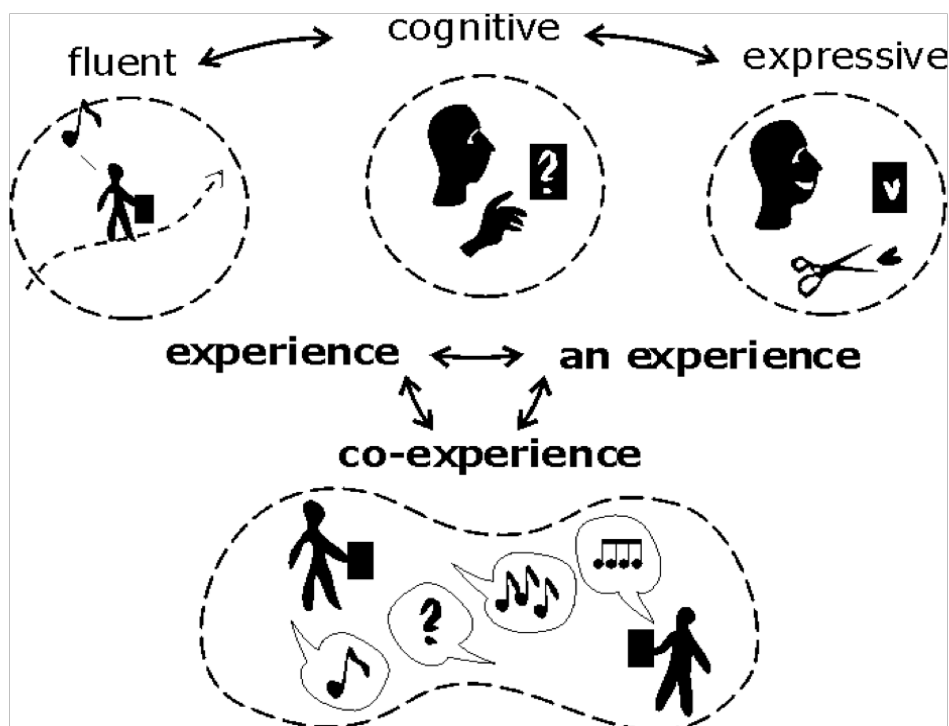


Figure 3: The dynamics of experience in interaction for individuals and in social interaction (Forlizzi & Battarbee 2004).

This framework is centred on interaction with a strong focus on social context. It presents experience as it is created in interaction between users and products, and also takes into account how these experiences are shared socially. (Ibid., 262.) Fluent interactions are “the most automatic and well-learned ones”, and they do not compete for attention. For example, riding a bicycle is a fluent user-product interaction, as it does not typically need much cognitive effort from the rider. Cognitive interactions focus on the product at hand, and they can lead to new knowledge, confusion or error, if the product does not match any previous knowledge of product use.

For instance, foreign bathroom appliances may cause confusion while encountered abroad. Cognitive interaction also cause some change in the user in the form of a skill or a solution. Expressive interactions help users form a relationship to a product or some part of it. This type of interaction typically involves modification or personalization of the used product, such as customizing a car or figuring out how to use a word processor creatively (Forlizzi & Battarbee 2004, 262).

User experience is a result of the user's previous experiences, expectations towards the product, and motivated action in a certain context (Kankainen 2003, 2). Dewey's notion that current experience is built on earlier experiences is true to user experience as well. McCarthy & Wright (2004, 122) point out that the complex relationship between past, present and future in experience must be understood as a move away from time being simple clock time, and that the continuity of experience is constructed through interaction between our expectations and past experiences, in both our cognitive processes, as well as in our culture and in social situations. To put this more clearly, for example "we don't just bring experiences of past and future films into a movie with us, we bring our experiences of the day we have just had and the day we expect tomorrow to be" (ibid.). In user experience context this means the continuity of past, present and future experiences in contextually dependent situations, where the individual user is at the core of the experience.

Motivated action as part of a user experience is something that is especially interesting. A motive can be understood as a need that is sufficiently pressing the user to act in some way (Kankainen 2003, 3). It can rise from both physiological needs, such as hunger or thirst, as well as from psychosocial states, such as the need to enhance one's self esteem. The motivation can be self-sustaining, as the present experience leads to more experiences and also modified expectations (ibid., 2). It is also useful to keep in mind that user experience of even a similar product may change over time (Norman 2004, 33), as well as the motivation to use it. In addition, satisfying a particular a motivation does not necessarily lead to a positive user experience (Kankainen 2003, 3).

2.3.3. User Experience and Usability

Usually user experience is paralleled to usability (Kiili 2005, 34). To be more specific, the phrases good user experience and good usability are very often used synonymously. This is perhaps because usability studies and user interface design are closely related topics. The user interface can be thought of as “everything that goes into the user’s immediate experience”, the response user gets when using any interactive system (Kuniavsky 2003, 48). However, user interface design and usability should be separated conceptually from user experience, as user experience is a much broader area of study.

From a certain point of view, usability and user experience are connected in the sense that if a system fails in usability, it may lead to frustration, distress and anxiety in the user; in other words, bad user experience. What is usability then? Jakob Nielsen, one of the most well-known usability researchers, defines usability as a collection of design attributes that are learnability, efficiency, memorability, minimum amount of errors and user satisfaction (Nielsen 1993, 26). The system should be easy to learn, efficient to use, easy to remember, it should have low error rate and it should be pleasant to use. While this list is far from exhaustive, it still gives a good point of reference for discussing usability and user experience. Generally speaking, usability aims at the removal of obstacles (Kiili 2005, 34). In other words, good usability should mean efficiency and ease in the use of a product. Often different kinds of heuristics are used to measure usability of a particular system: they form lists of reminders that the tested system should fulfil for good usability. These reminders can be, for instance, the demand for the system to provide appropriate feedback of the system’s status for the user, or that design should always aim to prevent as many errors as possible.³

However, it is far too straightforward to say that good usability automatically leads to a good user experience. This is largely due to the evidence found in usability studies that users make choices based on emotions rather than rational logic (Norman 2004, 18). For instance, Jokela (2004, 29) reports cases where products with poor usability were reported to have both negative and positive user experiences. This is because good usability does not automatically mean that the product is enjoyable to use (Norman 2004, 8). Also, the way users perceive the usability of a particular product is dependent on factors that are not directly related to usability, such as their

³ These points are taken from Jakob Nielsen’s usability heuristics, which is a famous and often used list of usability principles. See: http://www.useit.com/papers/heuristic/heuristic_list.html (Accessed September 10, 2010).

previous experiences with similar products, or their expectations towards a particular product (Jokela 2004, 33). This evidence suggests that there is a complex relationship between usability and user experience. It also serves as a good reminder of the multifaceted nature of user experience and the difficulty of designing products that elicit positive experiences.

Despite the problems with paralleling the two concepts, usability and user experience are so tightly connected that it is not reasonable to separate them completely from each other (Arhipainen 2009, 59). However, usability factors have been traditionally considered as ways to help achieve certain behavioural goals in work settings (Hassenzahl & Tractinsky 2006, 92). User experience should be considered in a much broader context than performing different tasks as effectively as possible, though the measurability of usability issues offers good pointers towards evaluating user experience as well.

2.3.4. Elements of User Experience

User experience can be understood as interaction between a user and a product, as well as certain elements in the product that contribute to that interaction:

User experience is not about how a product works on the inside (although that sometimes has a lot of influence). User experience is about how it works on the outside, where a person comes into contact with it and has to work with it. That interaction often involves pushing a lot of buttons, as in the case of technology products such as alarm clocks, coffeemakers or cash registers. Sometimes, it's just a matter of a simple physical mechanism, such as the gas cap on your car. However, every product that is used by someone has a user experience: newspapers, ketchup bottles, reclining armchairs, cardigan sweaters. (Garrett 2003, 10.)

While it is perhaps somewhat misleading to describe user experience as if it were a property of a product, it is nevertheless constituted in the user's interaction with a product's particular features. This is the type of thinking that is present in the field of user experience design, which in practice means designing different structural elements of the product with the aim of a particular type of user experience. It should be clear at this point, however, that this approach does not take the actual, felt experience into consideration, and thus has very little value outside the field

of interaction design, where user experience is often used synonymously with usability, as noted above.

A more useful way to approach user experience is not to consider it as a product feature, but as combination of different elements that consist of the product, the user and the interaction between all these elements.

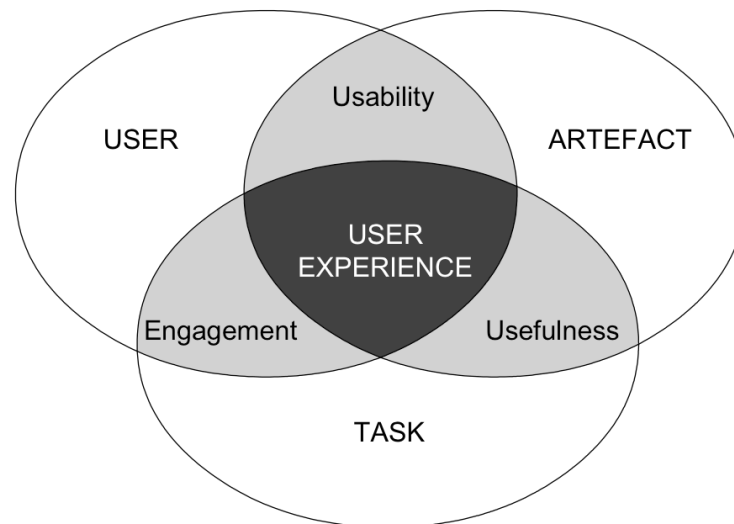


Figure 4: Elements of user experience (Kiili 2005)

Figure 4 presents user experience as the dynamics of three elements of user experience. It represents the interaction between the elements of user experience: user, task and artefact, from which the user experience emerges. Artefact refers here to any interactive product. Usability is determined in the interaction between the user and the artefact. Usefulness refers to the design of an artefact and how this design meets the requirements of the user. Engagement is the intensity and emotional quality of the user's involvement in initiating and carrying out activities. On the whole, the characteristics of the user, such as emotions, values and previous experiences determine how the user perceives the task and the artefact. (Kiili 2005, 34-35.)

2.3.5. User Experience: Impossible to Define?

Often literature that tries to define user experience conclude with the rather irritating notion that user experience is difficult to define. The problem is that after a lengthy and profound discussion on the topic there seems to be a lot of hesitation when it comes the time to make a real stand on the issue. Even though many models of user experience have been defined, “very little researched knowledge exists of the actual experiences products elicit on users”, and “there is a lack of vocabulary for researchers and designers to articulate the types of user experiences people have with products” (Korhonen, Arrasvuori & Väänänen-Vainio-Mattila 2010, 4052). Nevertheless, the concept does not seem to go anywhere:

After the change of the millennium, the user experience term has been everywhere; in scientific articles, in companies’ strategies and employee’s titles. User experience is not a buzzword anymore. It is a serious and significant matter which has a powerful impact on everything. (Arhippainen 2009, 44.)

Even though saying that user experience has a powerful impact on everything does not give any further clues about what it actually is, Arhippainen’s statement underlines the importance of even attempting to discuss the topic, as it has become such an important concept in both academic and industry contexts. I will conclude with what I think is a good summary of what user experience is constituted of. User experience

is about technology that fulfils more than just instrumental needs in a way that acknowledges its use as a subjective, situated, complex and dynamic encounter. [User experience] is a consequence of a user’s internal state (predispositions, expectations, needs, motivation, mood, etc.), the characteristics of the designed system (e.g. complexity, purpose, usability, functionality, etc.) and the context (or the environment) within which the interaction occurs (e.g. organisational/social setting, meaningfulness of the activity, voluntariness of use, etc.). (Hassenzahl & Tractinsky 2006, 95.)

All these various theories of user experience may not provide many actual tools for practical research, but they should help to understand the different aspects of user experience. There is a problem in each case however: the process of “reducing complex and nuanced phenomena to simplistic generalizations” (Järvinen 2008, 104). The affinity towards constructing different

models of user experience may miss sensitivity towards the actual, felt experience of the user. McCarthy and Wright (2004, 48) argue that the turn to practice in human-computer interaction studies was supposed to be about practical experience, but the tendency within research and design communities is to prefer simplified formulas. Then again, we can argue that understanding any complex phenomena they must be first reduced into less complex models (Järvinen 2008, 104).

2.4. Playful User Experiences

Drawing from the three previous sections, we should be able to conclude with some kind of definition of playful user experience. Playful user experience is a relevant concept, as it could act as a pointer towards higher user satisfaction:

[i]ntroducing playfulness to applications and services has great potential to improve user experience, as it can be both an effective instrument for the design and a significant addition to current formal user interfaces. Playfulness increases users' motivation to use the product, and learn new features and technologies of the device. Thereby it opens additional capabilities for designers and developers to introduce new functionality. (Kuts 2009, 1.)

While this statement is undoubtedly true on many points, it can be difficult to pinpoint the exact features and functionalities in interactive applications that are the source of playful experiences, as it is not certain what we get when we combine playfulness and user experience. When we look at the complexity of play and experience we can begin to understand the difficulty in establishing a clear view of the combined phenomena behind these concepts. This section discusses this question based on the previous theoretical discussion of this thesis. I will also look some of the different systematic approaches used to categorizing playful user experiences.

Considering the relationship of usability and user experience, we can say that usability is also connected to playfulness in the sense that both qualities aim at higher user satisfaction and better user experience. Usability and playful interaction are, however, in contradiction at least to some extent. Usability is about efficiency, and playfulness is about freedom and exploration. Playfulness can elicit positive user experiences, which is also one of Jakob Nielsen's key usability attributes. These positive experiences can change how users use the system, differently than what strict following of the usability attributes might suggest. User satisfaction can be manifested in different ways. For instance, if the user is having fun, then something has obviously been done right. Fun experiences are playful and liberating, and they should be taken into account in user interface design (Schneiderman 2004, 49). User interfaces aiming to be fun should be built on solid usability and reliability (ibid., 50). Nielsen also suggests that subjective satisfaction is an especially important attribute in non-work environments such as games (Nielsen 1993, 33). Per-

haps this is the reason why modern digital games are beginning to attract more attention as examples of interaction design where fun and enjoyment are at the core of the user experience.

Based on the definition of play, we can argue that a playful user experience should be a voluntary action, which is free-form but based on certain restricting factors. We can also consider the idea that playfulness always happens in a limited space, and much of the fun of playful interaction comes from testing the borders of that space. Also, the theory of playfulness suggests some type of social experience should be a part of playful experiences. The design factors by Rao (2008) and Järvinen (2009) for playful interaction give good ideas what playful user experiences are. There should be room for creativity, self-expression, sociability, spontaneity and excitement. Gutgold (2010) argues that any playful user experiences are also about overcoming learning obstacles that might otherwise prevent using some features of the product altogether. For instance, using Apple's iPhone as an example, Gutgold argues that the playful and fun user experience elicited by the iPhone enables elderly people to perform tasks they would not normally do.

This type of classification runs quickly into problems of definiteness. Different emotional states can be identified and classified as playful user experiences, but it is very difficult to make any watertight conclusions about which experiences are particularly playful. For instance, if we consider curiosity as a component of playful user experience, how can we identify the ways which playful curiosity is different from any other curiosity? Or can we claim that curiosity is playful, no matter what the context is? There are numerous attempts to classify playful experiences in this manner. For example, Follett (2007) defines playful user experience as the "elements of a digital design that engage people's attention or involve them in an activity recreation, amusement or creative enjoyment". Follett does admit this definition is broad, suggesting that there are also other factors that influence any playful user experience, such as the product's purpose, its features and functionality.

Both Follett (2007) and Gutgold (2010) argue that playfulness is in opposition of performing tasks efficiently, much in the same way as Nielsen (1993) discusses subjective satisfaction as usability attribute in non-work oriented environments. This adds a further point to the playful user experience: the user should not experience stress or the anxiety of performing tasks in a limited time frame or under the pressure of other negative factors, such as fear of failure. For example, play as a design principle could help overcome initial learning difficulties when using a new interactive product:

Play is also a way of overcoming technological barriers and eliminating people's knowledge gaps. When faced with an unfamiliar interactive tool or a new technology, many users' first reaction is one of hesitation or anxiety. But in a playground environment, we lose our fear of the unfamiliar and are quite happy to pick up unknown objects and just experiment with them. (Gutgold 2010.)

As for the motivational aspect, the enjoyment of play activity has often been approached by categorizing different pleasure categories (for a good overview, see Järvinen 2008, 181-199). For example, Sherry (2004) lists the following gratifications for playing video games:

- **Competition:** to prove to others who has the best skills can react or think the fastest;
- **Challenge:** to solve the puzzles or achieve goals such as getting to the next level or beating the game;
- **Social interaction:** to use video games to interact with friends and learn about the personalities of others;
- **Diversion:** the use of games to avoid stress or responsibilities to fill time, relax, escape from stress, and/or because there is nothing else to do;
- **Fantasy:** to do things that one normally would not be able to do, such as drive race cars, play professional football, or fly;
- **Arousal:** the stimulation of emotions as a result of fast action and high quality graphics. (Sherry 2004, 338.)

Comparing these to the different play spaces from Walz (2010) we can see clear parallels between these play gratifications and the movement-related pleasure that Walz discusses. Furthermore, we can see that playing includes experiences from as a wide angle as other areas of human life as well. The difficulty comes from defining what actually are strictly play-related experiences and what are not: can we draw a line between the experience of play and the experience of life in general?

Some of the more systematic attempts to define the essence of playful user experiences are two category-based models, one by Costello and Edmonds (2007) and the other by Korhonen, Montola and Arrasvuori (2009). I will focus here on the latter, as Costello and Edmonds' model is focused on the different pleasure categories of interactive art: they conclude that such a frame-

work is a useful tool when designing art installations (Costello & Edmonds 2007, 89). The second model, the playful experience framework builds on this model. PLEX is based on the hypothesis that “playful experiences emerge from interactive products that allow users to have a playful approach while using them”, and for this reason it is important to gain understanding on how to emphasize these experiences in product design (Korhonen, Montola & Arrasvuori 2009, 277).

The PLEX model is built on a wide range of definitions of play and game coming from different scholars, including Caillois and Csikszentmihalyi, for example. The PLEX model takes a taxonomical approach, and it aims to address questions on how to design utilitarian products that elicit playful user experiences (Korhonen, Montola & Arrasvuori 2009, 278). In PLEX, the initial categorization from Costello and Edmonds is expanded into 20 different categories that aim to define the different experiences of playful interaction. These categories can be found from appendix 1. With the hypothesis that videogames may offer good solutions on how to design better utilitarian products, Korhonen, Montola and Arrasvuori tested their model by applying it to three games: *Spore* (2008), *Grand Theft Auto IV* (2008) and *The Sims 2* (2004). They conducted a study on player experiences, and then analysed the results by using the PLEX framework.

The study supported the existence of these categories of playful experiences in the studied games. It does not offer any insight into why this is so, but if we accept the hypothesis that games have something to offer to the design of utilitarian products, then these categories give good clues about what kinds of experiences are included in playing games and how they could be replicated in other contexts. For this reason, Korhonen, Montola and Arrasvuori propose that PLEX can be used as an aesthetic tool for the design and evaluation of features that can make products more playful for users.

There are problems in the PLEX model, however. The authors ponder on some of the most critical issues. First of all, they concede that these 20 categories do not necessary cover the phenomena of playful experiences entirely. Second, they ponder if by classifying experiences into categories after this fashion, it may just be about classifying human experiences in general. Furthermore, they criticize the model of being just an arbitrary construction of design that while focusing attention on some experiences may at the same time implicitly hide others. (Korhonen, Montola & Arrasvuori 2009, 283.)

The PLEX model is an interesting attempt to define the categories of playful experiences, but I will not use it as an analysis tool. My approach in this thesis is somewhat similar, as I will analyse the collected data by sorting it into different categories of experience. Chapter 5.2 has further discussion on PLEX and the issues of experience categorization from a methodological point of view. The next chapter presents the process of data collection and data analysis before the actual analysis chapter, which will present a similar type of classification of experiences as the PLEX model.

3. Methodology

This section outlines the main methods used in the data collection and data analysis, and acts as a walkthrough of the process from data collection to data analysis. The first part deals with general questions and issues of qualitative research and offers insight into the analysis process. Then I will proceed to the data analysis methods, such as how the data was collected and whom it was collected from. Then I will present my main analysis tool, affinity diagramming, and present the process of the data analysis.

Before venturing on, I must place an important reminder. This is not an attempt to understand experience as it happens, nor is the emphasis on particular design solutions of Google Earth. This is an analysis of recollection and reporting of the experiences by people themselves, a kind of reconstruction of the processes of experience. In this sense, this study follows the emotionalist paradigm: the focus is on lived experience, and the aim is to produce data that gives authentic insight into people's experiences (Silverman 2005, 87-90). However, authenticity goes only as far as the users can describe their experience. This is an obvious limitation, as the data will describe how the users perceive their own experiences, and not necessarily reflect what actually is going on. The users can lie, they possibly cannot describe their experiences accurately enough to do justice to what they experience, only to name some of the limitations this type of data has. To access the user experience as it happens would have required a different research setting and different methodology.

3.1. Towards a Valid Methodology

Typically research is divided between qualitative and quantitative viewpoints. Roughly speaking, qualitative data analysis aims to answer the question "How?" whereas quantitative analysis is more focused on "How many?" (Silverman 2010, 118). Quantitative data deals with numbers, whereas qualitative data deals with meanings (Dey 1993, 11). Often it is understood that qualitative research provides a deeper understanding of the studied phenomena (Silverman 2005, 32). Quantitative and qualitative methods are sometimes placed in opposition to each other. However, it is possible to combine both viewpoints in the same study (Alasuutari 1999, 32). They can be understood as a continuum where one type of analysis supplements the other (ibid.). For this reason these viewpoints should not be pitted too strictly against each other, and "there is no reason

why qualitative researchers should not, where appropriate, use quantitative measures” (Silverman 2005, 37).

Qualitative data is characteristically interpretatively rich, multilayered and complex (Alasuutari 1999, 84). This means that qualitative data must be interpreted, but also that typically it can afford several different valid interpretations based on the point of view of the particular study: in principle, there are as infinite number of possibilities for the analysis as the researcher’s creativity and imagination allow (*ibid.*, 89). This presents both opportunities and challenges. The range of different viewpoints the material can be analysed from can provide an opportunity to develop a richer analysis, but on the other hand the chosen viewpoint must be relevant and based on solid justification.

According to Alasuutari (1999), qualitative analysis is constructed of two phases: reducing the data and solving the riddle. Reducing the data means making observations about the data that are relevant to the chosen theoretical and methodological viewpoint. The data is then reduced into raw observations, and at the same time discarding the data that is not relevant to the chosen viewpoint. After this the observations made from the data are combined to form a meaningful and limited set of observations, using some type of rule or denominator as a basis. The second part, “solving the riddle,” means forming interpretations of the collected data. This can mean forming structural entities of the data. In qualitative analysis, the data is examined as a whole, meaning that the data is thought to contain some inner logic. (Alasuutari 1999, 39-40.)

Then we have the questions of validity and reliability. Even though validity issues are present in all research, not just qualitative research, there is a special problem in qualitative analysis: we must carefully and critically construct research that is genuinely based on the investigation of all the data instead of just a couple of well-chosen examples (Silverman 2010, 275-276). For this reason qualitative methods have been criticized for providing insufficient and unclear quality criteria (Eskola & Suoranta 1998, 209). There are several strategies to provide validity for the research. One possibility is to use data triangulation, which means comparing different types of data, be it quantitative or qualitative, such as observation and interviews, and to examine if these different types of data corroborate each other (Silverman 2005, 233). Furthermore, triangulation can include using different methodologies or using both qualitative and quantitative data (Eskola & Suoranta 1998, 70-71).

As for reliability, the main source of quality of any qualitative research is the researcher herself. Reliability can be defined as three main attributes of the study: credibility, transferability and validation. These qualities are heavily connected to the researcher and her ability to critically evaluate her own role in the research. The researcher must pay attention that her interpretation of the data actually correlates to the experiences of the informants. Furthermore, the results should be transferable to another situation or process, even though sometimes this maybe not be possible because of the social nature of the construction of reality. Finally, the results should be supported by other studies dealing with similar phenomena. (Eskola & Suoranta 1998, 211-213.)

In this study my aim has been to adopt the best of both worlds. The main emphasis is on qualitative analysis, as studying the formation of user experiences with only quantitative methods would not be possible, as experience cannot be represented in simple numbers. My data is qualitative in nature, as is my analysis of it as well. However, I have combined some quantitative analysis of the data to the larger structure of research, mainly because of issues of reliability and validity. I have also used two different types of data and combined several branches of experience theory to provide validity by means of triangulation.

As for the analysis, one possible approach would have been to use a particular framework of playful user experience as an analysis tool. The playful experience framework (PLEX) would have been a prominent solution. I conducted a preliminary study with a similar approach in April 2010, in which I used the PLEX model as an analysis tool. This proved to be too problematic: the PLEX categorization was too regulatory, as it both directed my attention to things that were not in the material, as well as it did not help in detecting experiences that were outside the framework, but possibly identifiable in the collected material. Thus I discarded the idea to use the PLEX as an analysis tool. My reading of the data is filtered through the various theories of playfulness and user experience discussed earlier. However, the analysis section includes material that does not possibly fit the playfulness framework at all: I want to present all the findings, even though they might not be directly relevant to the topic of my study. This is because in order to understand the particularly playful experiences, I must first understand the experience of using Google Earth as a whole.

Even though I did not directly use the PLEX as an analysis tool, its influence can be seen on the analysis, as well as the influence of other similar approaches to playful user experience. Thus, even though my analysis is basically based on the collected data, the influence of the PLEX

model should not be ignored in the analysis. Some of the analysis results reflect the PLEX model to some extent: especially my naming convention is very much similar to the PLEX categorization.

3.2. Study Participants

The study participants were recruited mainly from existing personal social networks, such as friends, family, colleagues and so on. Also Facebook was used. The participants were offered a movie ticket as a reward for participation. After approximately two weeks of recruiting, the total number of participants was 18. This is already more than necessary, as Mattelmäki (2005, 69) recommends that the target group for this type of study should be between 5 to 10 people. However, 18 participants is a good number in terms of overall data validity, as it gives a lot more breathing room in the data analysis, and also a larger group lowered the risk of insufficient data quantity because of possible motivational, technical or other problems.

The participants were asked to evaluate their level of experience with Google Earth using a five-grade scale: 1) Never used before, 2) Beginner, 3) Intermediate, 4) Advanced, and 5) Expert. Six participants identified themselves according to 1) Never used before, seven according to 2) Beginner and four according to 3) Intermediate. None of the participants rated themselves as advanced or expert level users. One user did not supply this information, but this particular user had such severe technical problems that he was ultimately unable to supply any relevant diary entries, and thus the information is not relevant.

The participants were from various different age groups. The youngest participant was 23, and the oldest 50. However, there was a slight emphasis on users that were under 30 years old. The number of users aged 30 or under was 11, and the number of users aged over 30 was seven. Gender distribution was even. The majority of the users identified themselves as either completely inexperienced or beginner users. It is useful to remember however, that this does not necessarily reflect the actual skill level of the users, but their own image of how they see themselves as users of the application. Some of the more inexperienced users suffered from difficulties in using the application, with the majority of diary entries that dealt with negative experiences resulting from confusion towards the application's features or a feeling of lack of skill.

The following table presents key numerical data about the study participants:

Number of participants	18
Average age	31,2
Median age	26
Male users	9
Female users	9
Avg. diary entries / user	6.3
Inexperienced users	6
Beginner users	7
Intermediate users	4
Advanced users	0
Expert users	0

Table 1: Study participants

3.3. Data Collection Methods

The chosen data collection methods for the user study are user experience diaries and semi-structured interviews. These methods are based on design probes (see Mattelmäki 2006). Design probes are based on user participation by means of self-documentation. They are a collection of assignments “through which or inspired by which the users can record their experiences as well as express their thoughts and ideas”. Their purpose is to look at the users’ personal context and perceptions. Furthermore, they aim to explore new opportunities rather than solve known problems. (Mattelmäki 2006, 40.) In this study, even though the aim is not to develop design features for new products but rather to study existing user experiences, the probe viewpoint is valid as there are no indications that Google Earth would have been designed with playful experiences in mind.

These qualities fit the needs of my study fairly well, as the aim of my study is not to solve any well-known problems, such as usability issues. Rather, my aim is to increase understanding of what playful experiences are, and what are the particular playful user experiences in the processes of using Google Earth. Strictly speaking my approach does not fulfil the exact definition of design probes. I have only used a single set of diary assignments, whereas a full scale probing process should include several rounds of data collection, based on iterative development of the

assignments based on increased understanding of the users' experiences. Furthermore, the probe kits are more inclined towards pre-defined assignments instead of open-ended diaries, whereas the emphasis on my study is somewhere in the middle: the diary set contains both open-ended entries as well as assignment-like instructions.

There are both positive and negative aspects in this approach. The strengths relate to the openness and authenticity of the collected material, and probes offer "a contact surface for designerly associations and empathies". On the downside, they are highly subjective, and may produce ambiguous results, and it may be difficult to distinguish the highly relevant issues from the data. (Mattelmäki 2006, 62). For example, the diary method used for data collection can be problematic in terms of reliable and valid data, because

diary studies must achieve a level of participant commitment and dedication rarely required in other types of research studies. The burden of repeated queries and responses places substantial demands on the participant. To address this, investigators usually design diary instruments that are short and take several minutes to complete. Doing so can limit diary studies to less in-depth reporting of a phenomenon at each time of measurement. (Bolgerr, Davis & Rafaeli 2003, 591-592.)

Furthermore, we cannot really know what the effect of completing the diary is on the participants' experiences (ibid., 592). Thus there are several reservations that must be taken into account: the data can be ambiguous the way it has been collected may have had an effect on the data. However, these are problems that are present in any qualitative study, and though they must be taken seriously, they should not prevent from forming any credible conclusions based on the collected data.

3.3.1. Experience Diaries

Two different types of data were collected; experience diaries and interviews. Both are important part of the design probes process. Diaries are the "most typical forms of traditional self-documentation" (Mattelmäki 2006, 40). They can be either traditional notebooks, as well as electronic documents with "open or more structured questions where the participants are asked to record their feelings or activities during a certain period of time" (ibid., 76). Interviews aim to extend understanding of the experiences recorded in the diaries (ibid., 86). Even though the dia-

ries may have proved to be enough for a comprehensive analysis, adding interviews proved to be a good decision, as they provided significant additional understanding about the users' experiences.

All data was collected during June 2010 from 18 study participants. The data, both the diaries and the interviews was collected in Finnish, and all quotes and excerpts presented in this study are my own translations.⁴ First, the study participants were asked to keep a diary of their experiences with Google Earth over a period of seven days. They were instructed to use the application daily and also to record their experiences at least once a day. They were also asked to use the application on consecutive days if possible, and that if there would be pauses in the seven-day period, they should pick up where they left when they would start using the application again. Content wise, they were asked to record their experiences, feelings and emotions about the use of the application as extensively as possible.

Each day had its own instructions for using Google Earth. These instructions were merely referential, however, and most of them simply contained a request to use the application as the users would use it normally in their daily lives. Some instructions were more assignment-like. For example, one assignment was to use the application's tour planning function to plan the user's dream vacation. The assignments did not contain specific instructions about what the users should do, but rather to provide ideas to the users about how the application can be used. The emphasis was on free usage, as this is not a usability study and giving users specific assignments would not provide data about how they would use the application in a normal environment. This being said, the research frame is always artificial at least to some extent, and the users' experiences were without a doubt affected by the research.

In practice, the diaries were collected using a small web page I constructed for the study. The page contained instructions for the studies, as well as hyperlinks to pre-constructed Google Docs -forms for each day. This formed a kind of kit, where the users had the entire diary base accessible electronically in one place. Appendix 2 contains a screenshot of the web page, a translation of the diary instructions and a list of instructions for each day.

⁴ Even though I have tried to keep the translations as faithful to the original data as possible, the translations are corrected for readability rather than trying to maintain all features of spoken discourse.

The study participants provided a total of 114 individual diary entries, ranging in length from single sentences to several pages long descriptions of the users' activities. A summary of the diary entries can be seen from figure 5:

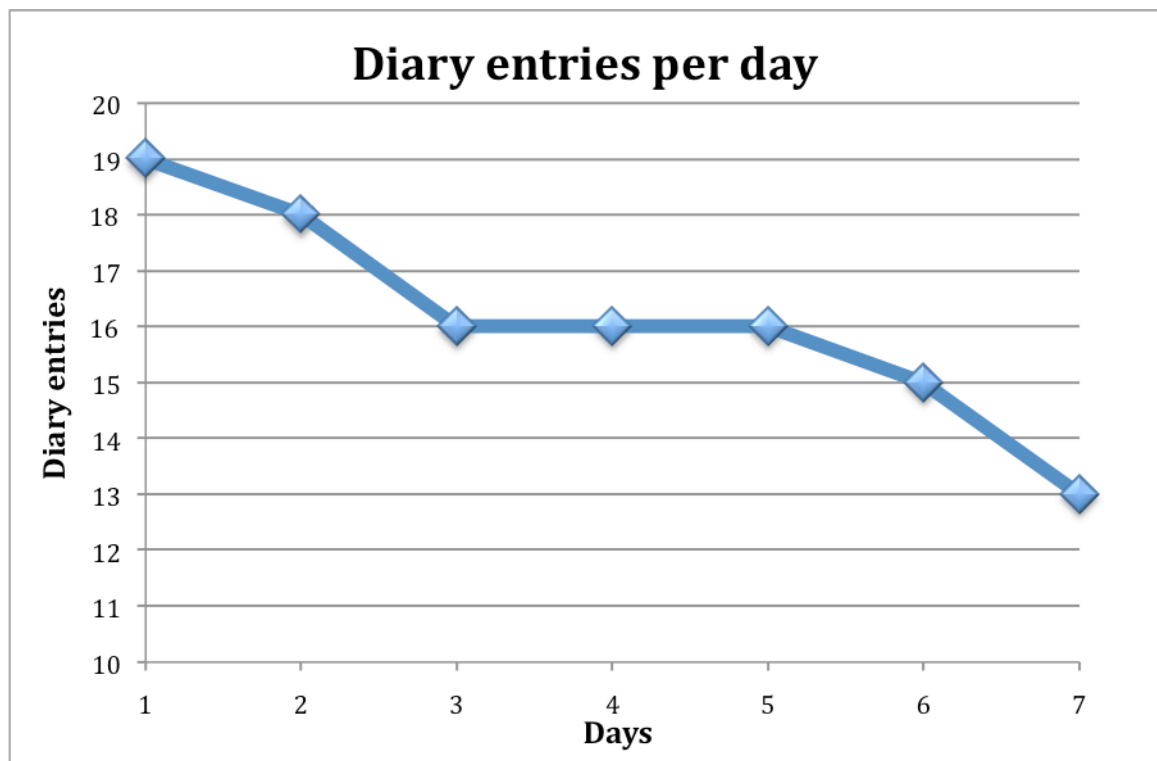


Figure 5: Diary entries per day

As we can see, the number of diary entries drops steadily as time progresses. However, the average number of diary entries per user was 6.3, which can be considered a fairly good number. This is because the entries from the more active participants compensated the fewer entries of others. I will discuss present criticism of the data collection more thoroughly in section 5.

3.3.2. User Interviews

Seven of the study participants were also interviewed using a semi-structured interview model. The interviews were aimed to provide more in-depth data about particular experiences of the users. All users were not interviewed because of time constraints, but the seven chosen interviewees provided enough of data to be analysed, as key themes began to saturate even before the last interviews were held. The interviews lasted between 25-40 minutes. All interviews were recorded and then transcribed into text. The interviews produced 33 pages of transcribed text with a total word count of 13 238. The amount of interview data is thus fairly small, but it is saturated

enough to act as what it was intended for: helping to understand the user experience in combination with the diaries. The interview structure can be found from appendix 3.

Hyysalo (2009, 126-127) lists several benefits and downsides of interviews in user experience research. They are a simple method for gaining information of the users' experiences from a vast range of areas. Problems are related to people's aptitude for describing what they should do or think instead of what they are actually doing or thinking. Interviews can only obtain the information that the users can and want to share. It is very difficult to describe accurately one's experiences, and especially details can be difficult to remember afterwards. Furthermore, the interviewer can also affect the interview with leading questions, or with questions that are simply too difficult or do not concern the user's perceived experiences.

Even though interviews alone may have provided enough data for analysing user experiences, in combination with the experience diaries they provide a comprehensive set of data especially from the point of view of research reliability. In this thesis, the interviews complement the diaries: their function is to provide a deeper understanding of the diary analysis and its implications. As for the interview questions, my aim was to keep the questions as neutral as possible, while giving the interviewees food for thought. The interview structure contains the questions that I used in all interviews, but each interview contained also user specific questions based on their diaries or answers to other interview questions. Any data obtained with questions that seemed to lead the users in answering a certain way were discarded before the data analysis.

3.4. Data Analysis Methods

The diary entries were analysed using the affinity diagram method. This method is particularly suited for this type of study, as it helps to understand what kind of mental models people build, what kind of terminology they use to describe what they do, what their methods are, what kind of goals they have, and what kind of value systems they have (Kuniavsky 2003, 176-177). All these points are related to the experiences people have while interacting with a product, especially to what kinds of inner processes are incorporated in particular experiences.

The affinity diagram is a method that is intended to group individual bits of data into trends and clusters. This is done by processing the data into single notes, where each note holds one central idea, such as a sequence, interaction or mental model. The notes are then labelled, randomized

and finally sorted into clusters. Each cluster accumulates into a group of notes that are related to each other. The sorting is done until the notes run out, after which there should be a diagram where the data is sorted into trends. (Kuniavsky 2003, 176-178.)

Affinity diagramming is a type of content analysis. In traditional content analysis, textual data is described quantitatively: the data is sorted based on frequency and volume, such as counting the times a certain expression is present in the data. The unit of measurement can also consist of expressions, sentences or phrases, for example. (Eskola & Suoranta 1998, 186.) The difference between affinity diagramming and content analysis is that affinity diagramming is not strictly a quantitative or qualitative method, but rather somewhere in between. The amount of data in each cluster has some significance, but the analysis is not based on pure numbers.

Affinity diagramming is a fairly simple method, but applying it to the analysis of user diaries presents a challenge. Because the diaries are accounts of people's thoughts and feelings, they often contain instances where it is very difficult to identify where one central idea or thought ends and another begins. Thus separating them into smaller individual notes is somewhat dangerous, as how the data is sorted will have an effect on the analysis itself. For instance, one possible approach could have been to separate the diaries simply by sorting them into individual sentences, which then would have been grouped together. This would have presented too many problems, however. First, the number of cards would have been overwhelming. Second, even single sentences can contain different ideas that should be grouped differently. Finally, this would have completely eradicated the context where particular experiences have been formed, once again impairing the analysis.

My approach was to read through all the material, and then one by one separating individual pieces of text into separate chunks, and then forming cards out of them. The cards were labelled with the day the entry was written on and the user's initials. To help with the data analysis process, each card was also numbered individually. My general principle was to separate the text into meaningful chunks, such as a process that has an end and a beginning, a clearly distinguishable central thought, feeling, or experience, and so forth. For this reason the length of the text on the cards varies a lot, ranging from very short sentences containing only a few words to lengthy accounts of what the user is doing. Even though I tried to contain individual ideas as effectively as possible, some cards still contain two or more ideas that can be understood as separate experiences. This is reflected on the analysis, and I will deal with this issue in the actual analysis sec-

tion. Furthermore, it should be taken into account that experiences often cannot be separated from each other without breaking the causal chain that the overall experience is built of. This means that there is a degree of arbitrariness in the process, as some of the cards could have been formed differently with the same premise.

After a lengthy process of reading the diary entries and separating them into smaller chunks of text, I ended up with 602 individual cards. This was too much to conduct the affinity diagramming effectively, so after carefully reading through the cards I chose to ignore all the cards that seemed to contain data not relevant for my study. These included accounts of technical issues and thoughts that clearly had nothing to do with actually using the application. Even though these cards did contain accounts of people's experiences, using them in the analysis would have proved to be tricky, as reflecting and comparing them with other's people's experiences would have been practically impossible because they lack the context of using the application. Furthermore, having too many cards would have been harmful to the analysis process, as it is easier to identify central themes with less data. With this done, I had 461 individual cards, which is also the number of cards used in the affinity diagramming. The final analysis was done on two separate sessions, both independent from each other, meaning that data was sorted in both sessions from the ground up. The sessions lasted approximately seven hours each, and after both sessions I ended up with 12 clusters for different user experiences.

Categorizing qualitative data this way means making decisions about organizing the data in a way that is useful for the analysis: data categories do not exist in isolation, and there has to be some understanding about how a single category fits the wider analytical context (Dey 1993, 97). In categorizing the experiences into clusters I have followed the approach used in other similar types of experience studies, such as Sherry (2004) and Korhonen, Montola and Arrasvuori (2009): I labelled each cluster with a separate instance of experience, for instance 'Exploration' and 'Failure', with each denoting a particular process or mindset that can be identified as a single experience. The clusters are then grouped into larger groups with the aim to understand the larger context of the user experiences beyond the single clusters denoting particular individual experiences. The beginning of the next chapter includes a summary of these experience clusters and quantitative analysis of the differences between the two analysis sessions.

The interviews are in a supportive role in this study. The interview analysis aims to deepen the understanding of the user experiences based on the diary entries: I use the experience clusters as

focal points to identify central content from the interviews, with the aim to broaden especially the context of the users' experiences. The interviews also offer a broader view into the users' experiences, as the users discuss their relationship with the application and the process of using it much more profoundly in the interviews than in the diaries.

4. Analysis of Collected Data

In qualitative research, the balance between the amount of data samples presented in the analysis and the conclusions based on them is always problematic. If there are a large number of samples (like quotes of text) in the research paper, this might produce merely a report of the collected data instead of actual research and also render the analysis unnecessarily heavy to read. The upside is that this way the reader can make her own conclusions better. If, however, the amount of samples is low, the reader is left at the ability and good intentions of the researcher to report real conclusions based on actual data. (Eskola & Suoranta 1998 180-181.)

The structure of the analysis section aims to address this problem by starting off with a summary of the results of the experience categories formed through affinity diagramming, and then presenting substantial number of quotes from the diaries to produce a comprehensive picture of the collected experiences. Then, I will move on to analyse the interviews more closely, using the diary entries as a framework to pinpoint the more interesting points from the data. Finally, the last part of the analysis section is focused on conclusions and discussion of the relevance of the findings.

4.1. Summary of the Experience Categories

To understand the user experience as a whole, it must be deconstructed first. By using the affinity diagramming method, I have broken down the diary entries into separate instances of experience. After two sessions of sorting the cards into clusters, there were 12 different experience categories found. A summary of the results divided between the categories can be seen from table 2:

Experience category	Number of cards, session 1	Number of cards, session 2	Number of same cards	Overlap percent ⁵
Curiosity	39	38	24	61.5
Exploration	43	37	20	46.5
Discovery / Accomplishment	50	43	28	56
Visual	46	51	37	80.4
Social / Personal	42	35	31	73.8
Immersion	30	25	10	33.3
Mastery / Control	54	70	45	83.3
Captivation	8	8	8	100
Information pleasure	35	38	22	62.8
Confusion	41	37	27	65.8
Failure	31	41	24	77.4
Disappointment / Boredom / Frustration	37	38	22	59.4

Table 2: Summary of the experience categories

As we can see from the table, most categories were fairly similar sized after the both sessions. The ‘Failure’ category is much smaller after the second session, and the ‘Mastery / Control’ category is significantly larger. As for overlap between the sessions, we can see that some categories were fairly consistent after both sessions, whereas others suffered from significant deviation. After the first session there were five cards that were not clustered, but during the second session these cards were clustered as well. In terms of size, we can see that there is some consistency in the number of cards in each category, with most of them containing between 30 to 50 cards. The only exception is the category ‘Captivation’, which contains only eight cards. Even though this category is small compared to the others, I chose to separate it as its own because of its relevance for the topic of this study.

The categories ‘Curiosity’, ‘Information pleasure’, ‘Social / Personal’, ‘Visual’, ‘Mastery / Control’, ‘Captivation’, ‘Failure’ and ‘Confusion’ remained fairly consistent throughout both sessions, maintaining a 60 percent or higher number of similar cards. The categories ‘Exploration’ and ‘Immersion’ suffered from deviation, with a below 50 percent score of similar cards. However, save for the category ‘Captivation’, all categories had some interchange between them. This is due to two things. First, it is because of the way the diary entries were separated into individual cards containing separate extracts of text. As it was practically impossible to isolate sin-

⁵ The overlap percent is calculated based on the number of cards from the first session proportioned to the number of same cards after both sessions.

gular experiences from the data, many cards contain material that could be interpreted in different ways, depending on the situation and what the researcher is particularly looking for. Second, it is in general difficult to separate the whole of experience into separate instances that could be interpreted in an unambiguous way.

I have based my analysis on the second session of affinity diagramming. The basis for this decision is my own increased understanding of the material: as much of the data is subject to interpretation, I consider that the second reading of the material provides a more solid ground for analysis. During the stage of the second diagramming I already had an understanding of the data based on the first session, and the second session deepened and broadened this understanding. Another possibility would have been to separate only the cards that were present in the categorisations on both sessions, but this would have resulted in possible loss of interesting and relevant material. Thus, for the sake of the analysis I will hold that the second session is the final categorization that I will base my discussion on.

A good reminder at this point is that this is only one way to categorize this data. First of all, even if the same categorization would have been retained throughout both diagramming sessions, but the person carrying out the categorization would have changed, it is possible that the deviation between the sessions would have been much greater. This thought could have been broadened and utilized as a complete re-categorization of the data by another researcher, which could have possibly produced interesting insights for the analysis. Unfortunately this was impossible because of practical reasons. Nevertheless, the categorization used here should be approached critically.

There are no categories that are centred directly on positive experiences, such as fun and amusement, because as a grouping theme ‘fun’ would have been too elusive, as discussed earlier. I will, however, deal with fun and amusement thorough the analysis of the experience categories. Negative experiences, which even though later in the analysis are presented as a group of their own, should also be considered more broadly: negative and positive states are included in the same experiences, and when discussing user experiences there should be understanding that these states are two sides of the same coin, with a large grey area between them.

The following table presents definitions and diary examples of the experience categories:

Experience category	Description	Diary example
Curiosity	Curiosity towards strange and unfamiliar places, and functions and features of the application.	“Absolutely interesting to see different countries, cities and attractions!”
Exploration	Sense of being able to explore features and content of the application. Experience of virtual travelling.	“I explored the place where Titanic sank. It was really great to explore the place, especially on the sea level.”
Discovery / Accomplishment	Pleasure from discovering new places and new functionalities in the application. Sense of accomplishment from finishing a sequence.	“It feels like I discover new, interesting features from the application all the time.”
Visual	Positive experiences related to visual stimuli.	“I typed in the Golden Gate Bridge in the search field. I noticed the impressive 3D-model of it. Together with the terrain shapes and buildings the overall look is quite impressive.”
Social / Personal	Experience of connection with places and people that have personal significance.	“I thought I’d try the stalking opportunities of the application and typed in a friend’s address in Helsinki in the search field. I added a marker there and tried the same with my home address.”
Immersion	Experience of “being there”, feeling of being part of the action.	“I get a feeling like I get to visit, at least in half, all kinds of unfamiliar locations.”
Mastery / Control	Experience of having a sense of mastery over the application, and using the application as a tool for self-expression.	“I viewed the street views around the world with the Street View function. It worked well and images were clear. It was easy to use, because even I managed.”
Captivation	Experience of flow, using the application for long periods of time.	“I found the flight simulator from the menu, and there went the rest of the day. The way it is done is really addictive.”
Information pleasure	Pleasure resulting from learning new information and having a new point of view.	“There’s a lot of nice information about the Moon and Mars and it’s exciting to watch the planet’s surface portrayed in different ways.”
Confusion	Experience of not understanding the application’s features, or not understanding what the application can be used for.	“It looked really nice, but I didn’t really understand what I was supposed to look at.”
Failure	Sense of failure for not accomplishing desired aims and goals.	“I decided to find the Eiffel Tower. Finding it felt painfully difficult and frustrating; I couldn’t get to the view I wanted, and in addition the application got stuck and slow.”
Disappointment / Boredom / Frustration	Negative experiences from the application not meeting the user’s desires or expectations. Lack of mental stimulation.	“So many markings gave me such high expectations. I feel a bit disappointed.”

Table 3: Definitions of the experience categories

Next, I will go through all the experience categories, whether or not they can be associated with play or playfulness. The attempt is to construct a comprehensive image of the users' experiences, because understanding the whole process is important so that we can begin separating the instances where playfulness is clearly present.

4.2. Diary Data: Analysis of the Experience Categories

I have divided the 12 experience categories further into four different groups. The groups are built around common themes or processes of action. There is some overlap between the groups, as many individual experiences contain clues of different kinds of other experiences. The point of the grouping is thus to highlight particular sides of the user experiences reported here, not to offer a definitive classification of them.

Note on the diary excerpts: each text example is embedded in quotation marks, which denote the beginning and the end of an excerpt. The excerpts are also numbered and tagged with gender and age of the user. Even though some excerpts may seem to form seemingly causal relationships with each other, they are not necessarily from the same diary entry or even from the same user. Furthermore, these are just excerpts, and thus it is useful to remember they have been selected because these particular excerpts contain clues about the users' experiences. They do not contain information about the context or the larger process they belong to. I have added necessary contextual information as explanations where necessary.

4.2.1. Group 1: The Process of Exploration

The first group contains experiences of curiosity, exploration, discovery and accomplishment. These clusters describe a higher-level process of the users finding their way around the application and the space it offers them to explore. These categories are tightly connected to each other: they represent different phases of a continuous process. Even though this process was not explicitly described by any of the users, it is still identifiable from the diaries. This representation is a kind of a reconstruction based on numerous diary entries from several different users.

Curiosity

First of all, the application itself aroused feelings of curiosity, meaning that features, functions and content the application presents to users inspire the users to explore and try new things. There were numerous ways the users' sense of curiosity was raised. Curiosity can be related to a general sense of experiencing something new:

1. "In itself this is quite interesting, as I've never tried anything like this before."
[Woman, 26]
2. "First time using Google Earth. I'm really excited, searching for the big cities in different countries and looking at them." [Woman, 48]

Also particular features and content of the application can inspire this feeling as well:

3. "This gives you the kind of initial feeling that there is so much information both as maps and as links to different sites about the Earth." [Man, 36]
4. "The application enables great opportunities for virtual travelling, which gives feelings of curiosity and desire for adventure." [Woman, 24]

Furthermore, the sense of unravelling new things feeds more and more the feeling of curiosity as this user learns new features and functions:

5. "The more I use the application, the more features I seem to find from it, as well as possible ways to use it come to mind as well, like 'hey, I could check this and that and explore that' etc." [Woman, 26]

This particular excerpt is very interesting. The user experiences the application as if there were multiple layers, and that uncovering each layer reveals something new and interesting. This can be related to a sense of pleasure for understanding that there are a vast range of different ways and possibilities to use the application:

6. “I notice that there seems to be many interesting functions in the application, such as the space view and displaying the sunlight on the scenery, but I don’t explore them more closely yet.” [Woman, 26]
7. “All this makes you thirst after all the information that I’ve managed to peek into during this short period of time.” [Man, 36]

Moving on, another important factor is the very thing Google Earth is about: the Earth. Many users were inspired by the fact that the application presents them ways to explore the planet. This can be a major source for inspiration:

8. “So then, this globe of ours is really the great interest of mine.” [Man, 36]
9. “I viewed randomly different cities around the world I was curious about.” [Man, 26]

Also exploring different locations using particular features of the application can, by providing information, strengthen this motivation. In this case the user has switched on the Global Awareness function, which offers information about various charity programmes, non-governmental organizations and so forth:

10. “However, I can’t deny that I got curious about a lot of things, like the World Heritage Sites, and the Greenpeace and Water Aid programmes”. [Man, 26]

In excerpt 11 the user has enabled the function Wikiloc trails, which offers routes for hiking and exploring:

11. “The Wikiloc biking trails are really interesting, especially when you can get from a link to a place where you can get a map about the altitude difference and evaluate the level of demands of the trail.” [Man, 36]

There are help features that can also intentionally try to inspire curiosity in the users:

12. “Mostly I used the function for interesting places. It was nice to explore different locations and sights with its help.” [Man, 26]

In summary, this category consists mainly of curiosity towards the application itself, but also curiosity towards the content matter, the Earth. A major factor is the information the application offers about the Earth in various forms, such as text and visual stimuli. The impact of information will be further discussed with the ‘Information pleasure’ category.

Exploration

Whereas curiosity can be seen as the precursor for meaningful action, exploration is the actual execution of that action. Exploration is connected to the users’ experience of having the possibility to explore different places of the world without physical restrictions, and to be able to move effortlessly from one location to another based on association. A typical way to use the application was to explore the world randomly:

13. “Today I wandered around the world, looking at sights.” [Woman, 48]
14. “Today I went cruising in space, the Moon and Mars. Absolutely the most enjoyable thing this far!” [Woman, 26]
15. “I explored the starry sky, Mars and the Moon with the application. I checked randomly some marked places. It was interesting to see the panorama photos of the planets.” [Man, 26]

Also specific locations were explored, meaning that the use was more goal-oriented:

16. “I explored The Mariana Trench and Piazza San Marco in Venice. Thousands of places where I would want to visit.” [Man, 26]
17. “I went travelling and saw the Statue of Liberty, the Notre Dame, The Great Wall of China and Taj Mahal.” [Woman, 23]

The users' paralleling using the application explicitly to travelling is noticeable. Travelling was frequently brought up as a real world analogue. Many users perceived virtual travelling as one of the core features of the application, meaning that this was the way many users not only used the application, but thought it as the way the application should be used.

18. "Using the application when thinking about travelling can be more like 'it would be nice to visit that place sometime...' or if you've already decided where to travel, you can still explore different locations and find locations you haven't known about before." [Man, 26]

In general, exploration was seen as highly enjoyable activity:

19. "Zooming the starry sky seemed like interesting: I got to satisfy my 'little explorer' aspirations again. You get to explore these interesting things that are difficult to see in real life without observation towers and the like, and you get to learn interesting new things, which always feels like worthwhile." [Woman, 24]
20. "Today I felt good using the application: I got to adventure in exotic places and empathize as if I'd almost visited there myself for real. My topmost feelings were excitement and enjoying the experiences." [Woman, 24]

Furthermore, another aspect of exploration was the way many users explored the features of the application. This is directly linked to the curiosity factors described earlier. The following excerpts describe how the users test what the application is capable of:

21. "After this I started to test how accurate views have been built from the attractions and large cities." [Man, 26]
22. "And of course I had to try it. So, all knobs and toggles to the full. There's a lot of stuff on the screen I tell you. The computer runs hot like a volcano and my blood circulation slows down." [Man, 36]

Even though the attempt described in excerpt 22 leads to a noticeably negative outcome, it is still an important example of how users try to make sense of the application, even if it means trying

to stress test it to see what it can do. Some users also chose to use the application without constraints, even carelessly:

23. “I thought I’d try to see if navigating in the fighter mode would work and how long the journey takes with the F-16, performing kamikaze attacks in the end of course.” [Man, 33]

24. “I found the zooming function accidentally: with the Mac you can use the touchpad to zoom in closer. Earlier I’ve done this using only the double click. I don’t know if this is the right way, but at some point I got frustrated with some of the illogicalness of the application and started to use it in a way carelessly: I didn’t aim for caution in my commands anymore.” [Woman, 24]

Excerpt 23, the description about fighter navigation, gives a hint of something that begins explicitly to touch the study’s topic: the user is innovatively trying new ways to use the application and testing what it can do. Excerpt 24 shows that a usability issue can also liberate the user to use the application in a different way. Depending on the situation, this can be either a good or bad phenomenon. In this case, I consider it as good, as the user has tried to find logic and build a coherent mental model of the application, but after failing to do so has decided not to care and just to use the application in a new way.

Noticeably many users pondered on the use of instructions, with some stating that it is in fact more fun to use the application without them:

25. “I guess you could read the instructions more carefully. But this is more fun.” [Woman, 26]

Conscious ignoring of instructions can hint that some users were more inclined to explore the application’s features in a more creative way than following prescribed instructions. This also suggests that at least some users considered using the application easy enough for them to test it without help, a point that to some extent is debunked with the ‘Confusion’ and ‘Failure’ categories.

Discovery / Accomplishment

Discovery and accomplishment can be seen as the fulfilment of the process that begins with curiosity. I deal with experiences of discovery and accomplishment together because as phenomena they are very much similar to each other, or in some cases completely interchangeable. Discovery is finding new information, functionalities or features in the application. Accomplishment is the fulfilment of desired action, possible after a challenging situation.

First of all, experiences of discovery come from understanding the application's features more thoroughly. This is very much the same as the curiosity excerpts described above. However, the process is a bit different. Users come to understand, through the process of discovering new functions and features, what the application can do:

26. "I only start to realize, bit by bit, how versatile possibilities this application has. Bring on some more!" [Man, 36]

27. "I also started to realize how much stuff there is in there. You can't even really comprehend all that with just a few sessions of use. Instead, it takes regular use and different motives to get a grasp of the application." [Woman, 26]

The logical next step is to try the freshly discovered new features:

28. "As a new thing I tried the route planner. It's quite useful. The instructions were accurate and the approximate travel time was also there." [Man, 50]

29. "I noticed you can use the text search even in space mode, and after that finding different constellations is a lot easier." [Woman, 26]

Experiences of discovery and accomplishment can be extremely important in terms of motivation:

30. "This [successful action] produced joy of discovery, which has been a bit lost during the past few days because of the application crashing. Now I feel like curious

again and joyful for learning new things, even though this discovery was relatively small.” [Woman, 24]

In excerpt 30, the user has managed to find a particular place with the application, even though prior to this the user reported she had considerable difficulties in using the application. This leads to a major increase in motivation to use it. Furthermore, a general sense of perceiving the application features better can be motivating:

31. “Using the application starts to be much more easier than in the beginning. Now I even noticed that you can see places from different points of view, even though I complained about the lack of this feature earlier.” [Woman, 23]

32. “I discovered a new way to use the application: to visit places where you probably won’t ever visit in the real world. Excited about this, I decided to go to Mount Everest hoping that its slopes would be as meticulously modelled.” [Woman, 26]

Motivational factors will be reviewed in more detail with the ‘Mastery / Control’, ‘Captivation’ and ‘Information pleasure’ categories.

As for content, the application can be used to discover and experience new things about the Earth:

33. “When you rotate the globe from a little further away, you realize what a large portion of it is water. Truly a water ball then.” [Man, 36]

34. “I found the place [The Mariana Trench] and zooming, or rather diving into the deep felt really exciting.” [Woman, 26]

These experiences consist mainly of the users describing what they are doing with the application, how they use it and what kind of experiences are included in learning to use the application. Furthermore, the experience of exploration generally is a dominant aspect of the overall user experience of Google Earth, mainly because the application allows the users to explore different locations on different planets and space. Notice that excerpt 34 also contains experience of immersion, which will be discussed in more detail in the next group.

4.2.2. Group 2: Meaningful Experiences

The second group consists of visual, social and personal and immersion experiences. The defining element is the meaningfulness of these experiences to the users, in many cases in connection to their own lives or the lives of other people, or the effect of the users' experience as being part of the action themselves.

Visual

Visual experiences formed one of the largest clusters in the analysis: Google Earth relies heavily on visual stimuli and also provides information with visual clues. Many users describe their experience of the visual elements of the application in many diary entries as one of the dominant aspects of using the application. First of all, many users expressed appreciation of the visual appearance of the application. Especially the 3D-modellings of cities and terrain were thought to be impressive, along with pure visual pleasure:

35. "There were even textures added to the buildings and the general impression is nice. At the same time I viewed the Statue of Liberty, which also looks laudable."
[Man, 33]
36. "The modelling of the underwater topography of the sea warmed my heart."
[Woman, 23]
37. "Flying from one location to the other looks like fun, when the scenery changes and ultimately focuses on the destination." [Woman, 26]



Figure 6: 3-D modelled New York with the Statue of Liberty in the front and parts of the city in the back-ground. Notice the shadow of the statue.

There were numerous visual experiences that were meaningful to the users. Visual content provoked emotions on a wide scale from relaxation and amusement to fear and excitement.

38. “Flying and looking at the scenery is fun and somehow relaxing.” [Man, 36]
39. “I got to ‘stand’ on the top of Mount Everest and felt almost comical excitement because I was able to look around to all directions from the mountain top and everything was smaller than the mountain.” [Woman, 24]
40. “The infinity of space causes a slight feeling of fear in me, and exploring Moon and Mars as well. I guess this was because of the realistic views, the atmosphere was genuine and the views clear.” [Woman, 26]

41. “Except that the 360 degree panorama images are cool! You lose sense of distance the moment you jump on the street level and then you can rotate around in the scenery. I like this. It looks hot in the Egypt desert.” [Woman, 26]

As these excerpts show, some of the most strongest and meaningful experiences the users had were related to visual elements of the application and the way the users were able to interact in the representation of the Earth the application offers them to explore. Visuality is just a part of the experience however, and these are not experiences purely elicited of visual stimuli. Rather the visual aspect of the application complements the other experiences the users had while using the application.

Social / Personal

Users described various ways they experienced personal or social connection while using the application. The most important aspect of social experiences was the ability to use the application to explore familiar places, such as the users’ home areas, or their relatives’ homes. Almost all users tested if they could find their own home from the map and if there were buildings or other structures visible:

42. “Today I explored the areas around my home.” [Man, 26]

43. “It was exciting to explore the map of Tampere and the municipalities nearby, and search for my own home.” [Woman, 23]

In some cases this was also related to testing what the application can do:

44. “Just to test the application, I set out to map out different locations that are familiar to me, like my home, the summerhouse and my childhood home.” [Man, 26]

45. “Then I tried to search for my own home. I found the place, but the house wasn’t there.” [Woman, 47]

The second aspect was the instances where the users used the application to form a connection with people they know:

46. “After the sea adventure I decided to go to the coast of Germany to ‘visit’ a friend. When I explored his current location I immediately felt like closer or better connected to my friend. It was as if I could see him any moment.” [Woman, 24]

47. “I explored volcanoes and Wikiloc biking tours in Chile. The country is topical now as a friend from there is going to visit us soon.” [Man, 33]

48. “I went to Bristol to search where my friend lives.” [Woman, 26]

Noticeably, there are no explicit features or functions in Google Earth that would give the users clues to explore social spaces with the application. Furthermore, there is no built-in way to use the application particularly socially. This did not prevent the users from using it this way. This is an important point, as it suggests that social and personal connections may become an important part of the user experience if there is even an indirect opportunity to form them.

Finally, some users were inspired to ponder existential questions after using the application:

49. “When I viewed the images from Mars and the Moon it felt strange, there they just are and there’s just rocky grounds everywhere. It raised a lot of thoughts; have we maybe gone too far in exploring the space and maybe our focus is drifting too far away from ourselves. On the other hand, for some people it can be really important to learn about space and its infiniteness, through which you can then understand your own life and the world better.” [Man, 26]

Immersion

Immersion was for some users the ability to “go along for the ride”, in other words to experience locations, views and movement as representations of real-world action, as if they were part of the action themselves:

50. “Everytrail is nice. People have uploaded stuff like their car trips and have taken photos of impressive locations, which enables the viewer to go along for the ride.” [Man, 33]
51. “At first I couldn’t find the canyon at all, but then I did and I got to the vantage point as well. I slid the eye switch that I use to turn the camera angle as if I were standing at the vantage point myself.” [Woman, 24]
52. “The star sky function was a really nice surprise. The space has always been interesting and the application opened whole new possibilities to explore space, even so that you can feel like you’re flying in space yourself, which of course feels really exciting and fun.” [Woman, 26]

The second aspect of immersion was the sense of perceiving and understanding the world in a meaningful and realistic way:

53. “I created routes and viewed locations mostly inside Finland. I utilised the application to observe distances and viewed map images of larger cities. Especially the structure of the metropolitan area was more easy to perceive with the application.” [Man, 24]
54. “I try to find the Castle Bravo test site, which was the largest weapon detonated by the United States (approx. 15 megatons). The atolls don’t look that badly damaged, but you can see a crater clearly at the CB test site, which is not surprising considering the size of the bomb.” [Man, 33]

Note that the excerpts 53 and 54 are very much similar to many excerpts in the ‘Information pleasure’ category. So similar, in fact, that it is not clear if there is any difference at all between these experiences. This is a good example of the degree of arbitrariness that we are forced to when we need to dissect the flow of human experience into self-containing categories. There is some benefit to this, however: this enables us to look at the similar instances from different points of view. In this case, both categorizations are as accurate and true, but the way the experiences have been grouped reveals something different from the same experience.

4.2.3. Group 3: Motivated Action

The third group includes the categories ‘Mastery / Control’, ‘Captivation’ and ‘Information pleasure’. Their combining element is the positive motivation of why people perceive using the application is fun or worthwhile and why they would keep using it voluntarily.

Mastery / Control

Sense of mastery of the application is a key motivational factor. Users who expressed understanding the application’s functions and considered using the application easy had generally more positive experiences than the users who struggled with it. These excerpts describe instances where users considered using the application easy, and consequently a positive experience:

55. “Moving around from one location to another is really easy and useful.” [Man, 50]

56. “I used the route planning function the first time. It works! The search was fast, the instructions clear and the map was good.” [Woman, 26]

Furthermore, the feeling that the users were able to express what they want to do with the application was a major force in gaining pleasure from using it:

57. “I tried playing around with the sun with the time switch on the slopes of the canyon. I felt excited and enjoyed the views.” [Woman, 24]

58. “Recording can be found easily from that play-pause-reel spot, the image of a disk is clear for that purpose. So in the end I managed to construct a mapping of the route from the place to another I wanted. It was fun to follow the route!” [Woman, 26]

59. “The application rotates and zooms the view really nicely. One way to use the application for me would be to get to know different routes and locations beforehand, so you’re not dumbfounded when you get to new places.” [Man, 33]

There were several accounts of specific processes of use where the sense of control and ability to use the application the way the user wants are identifiable:

60. “Then I ended up rotating the globe and playing around with the rotation speed.”
[Woman, 26]

61. “I click, I rotate, I use the search function to find places.” [Woman, 26]

62. “I went to explore space again and see different sights. Mostly repeated old stuff. I also went to follow the movements of sea animals. I followed the route of a white shark.” [Woman, 23]

Finally, sense of mastery through it being able to express individual desires are directly linked to motivational factors in using the application:

63. “I found the place marker from the menu, it’s been implemented simple enough and it’s really useful. I marked some places that are important to me with it. The marker stands out on the map well and helps you to find particular locations again. You can also add information on the markers, which is a good thing.”
[Man, 24]

64. “I use the tour function too. It works well and is really useful: you can explore for example different attractions on the route.” [Woman, 23]

65. “It’s of course a lot nicer to look at the images when you can use the map to orient the image’s location exactly to for example a melted down reactor, which is an advantage compared to ‘regular’ Chernobyl image galleries.” [Man, 33]

Especially excerpt 65 shows that it can be motivating and pleasurable if the users have a sense or feeling that they can use the application to perform actions that are not possible in other contexts. Furthermore, many users appreciated how they could perform accurate actions with the application to produce outcomes that match their personal interests.

Captivation

Even though reported experiences of captivation were numerically relatively few in proportion to the other experience clusters, I separated them as a separate category for two reasons. First, these experiences describe a sense of flow, which is an important aspect of this study, and important in any play-like activity. Second, because the instances here convey such deep and meaningful experiences, separating them as their own category highlights their importance as part of the larger processes of experience.

66. “An hour goes by easily while you’re using the application, and you don’t even notice the time passing.” [Woman, 48]

67. “Finally I search the Sagrada Familia in Barcelona and forget myself to view it and the city for a long time. The three-dimensional view was fun and it’s nice that the application shows also restaurants and hotels in the area. You could utilize this in travel planning.” [Woman, 26]

68. “I viewed different travel locations and sought links to hotel offerings. You can find new things with the application every day, and time goes by nicely.” [Woman, 48]

69. “Rotating the Earth differs a lot from other map services, and I managed to play around with it for a long time, viewing different places of the Earth and zooming in on interesting locations.” [Woman, 26]

These excerpts give many clues about why the users experienced captivation during some sessions of use. Especially when we connect these to other experiences accounted here, we can see that there are several factors at play which motivate and engage the users to use the application for long periods of time and to lose their sense of self in the process. Furthermore, these experiences describe many key points about the motivation keep using the application beyond the requirement of participating in a research: interesting information that is readily available, and which can be browsed intuitively and expressively. I will focus on this point in the next category.

Information pleasure

This experience category is somewhat questionable in the sense that it could have been incorporated to other categories as well, prominently to the curiosity, exploration, discovery and immersion categories. I decided to separate these instances of experience as a separate category because I believe they convey something important about why people are motivated to use Google Earth. First of all, there is understanding that the application offers a vast amount of diverse information:

70. “There’s an impressive amount of information about volcanoes, planet resources and the like.” [Man, 33]

71. “There are a lot of locations on the map, and you can get more information about them by clicking on them.” [Woman, 39]

As mentioned earlier, users paralleled exploring different locations often to travelling. This virtual travelling experience is just one side of this aspect: another is utilizing the application as an interactive travel planner. This is connected to the users’ sense that the application offers credible and accurate information of the world. Because of this many users perceived the usefulness of the possibility to make travel plans as one of the application’s core advantages:

72. “I did a tour today. You can use the application to map out different locations and sights beforehand, if you’re going to travel.” [Woman, 48]

73. “If I think about possible uses for this service in the future, it’s probably before travelling. I don’t think that my travel plans can change because of this, but the plan can become more accurate, and you can get some first tastes of what you can expect from the trip.” [Man, 26]

74. “I tried different routes inside Europe. It’s really useful when you can see the amount of time you need for the trip and you can also view different attractions that are on the route.” [Woman, 23]

These excerpts are quite similar to the accounts of virtual travelling presented in the exploration category. The difference is that these excerpts describe the understanding of the application's usefulness as a virtual tour guide and travel planner, whereas the exploration experiences were about the actual process of 'travelling'.

Finally, there is the factor that many users reported as highly pleasurable: the amount of information the application offers about the world was experienced as motivating and intellectually stimulating.

75. "I really like all the masses of information about the sea that you can filter and explore with the application." [Man, 36]

76. "There's really a lot of information and photos about different locations. The photos are good and you can also zoom in on them." [Man, 29]

77. "Earthquakes were found from all over the globe. Most of them in Thailand or Indonesia area. The earthquake in Sweden that was in the news today was there as well." [Man, 50]

These excerpts show the experience of comprehension: the application provides information and content the users can utilize to observe the world from different perspective in various ways. This can be extremely motivating and also an enjoyable experience.

4.2.4. Group 4: Negative Experiences

The fourth and final group consists of different negative experiences. There were clearly negative experiences reported in other groups as well, but these categories contain the major instances where the users clearly were struggling with the application. Many problems were due to usability issues. Furthermore, negative experiences prompted the users to be more prone to analyse their own skills and relationship with the application.

Confusion

Experiences of confusion were largely due to the users not understanding how to use the application and why they should use it in the first place. During the beginning of the diary period, many users who did not have any previous experience of using Google Earth reported that they had difficulty in understanding what the application can be used for:

78. “There seems to be a lot of features in the application, but I don’t know how to utilise them for anything.” [Man, 26]

79. “[Using the application] feels laborious. I haven’t found out what the possibilities of the application are, or what its intended use is.” [Woman, 26]

Furthermore, some users thought the overall look and feel of the application was difficult to understand:

80. “At first sight the application looks confusing because there’s so many different spots and sections, and there seems to be a lot of buttons above the map view whose purpose is unknown to me.” [Woman, 24]

81. “There’s a lot of those layers and the layers have sub-layers and sub-sub-layers and so forth. It just feels like a bit much and too difficult to control. Or not a bit, but a lot. Would be nice if there was some kind of clearer presentation of everything so you could assimilate better all the information that is in there.” [Woman, 26]

There were also a lot of different issues with general usage of the application with the users not understanding what they can and should do. Furthermore, there were instances indicating usability issues that lead to confusion of the application’s functions:

82. “Again the application feels really difficult to use: all of a sudden I had somehow managed to, without knowing how, flown off to the sky and there was only blue visible. Getting away from there felt really difficult and frustrating, and in the end

I managed to get back just by double clicking the Bristol marking on the history.”
[Woman, 26]

83. “When viewing attractions it occurs to me that I haven’t seen anything in the application that would indicate if it’s still downloading. Maybe there’s some kind of hourglass or meter there somewhere, but I haven’t seen it. Sometimes there’s some confusion if I still need to wait or is the terrain properly mapped already.”
[Man, 33]

Experiences of confusion were prominent in the early phase of the user research, especially with users who did not have any experience in using Google Earth beforehand. For these users, as knowledge of the application increased, the accounts of confusion decreased, which was expected. For some users the realization of the application’s functionality did not come until very late, but this realization led to considerable strengthening of motivation.

Failure

There were several cases where the users tried to accomplish finishing a process or finding a specific place, but failed to do so for various reasons:

84. “I tried to search for different shipwrecks with their coordinates, but the search didn’t find anything. Then I tried to search for them with the ship names, with the same result.” [Woman, 26]
85. “I also tried to tag the cities, or put a place marker on them. I failed miserably. I managed to set the place marker, but I couldn’t get it as permanent in the map. When I set a new marker, the old one disappeared.” [Woman, 24]

Then there were cases of clear usability issues, which resulted in the users not accomplishing their desired goal:

86. “In the street view it’s frustrating that you have these guiding arrows or something visible, but when you try to click on them, it just opens up a new pattern of arrows, and you just can’t click on the original ones at all.” [Woman, 24]

87. “It still feels really difficult to move around in the street view. I try to drag and tow and double-click, and I never remember which one of them works. It’s quite frustrating and irritating, because then you can’t really move around as smoothly as you’d like.” [Woman, 26]

For some users, these problems resulted in extremely negative feelings and self-reflection of their own abilities to use the application:

88. “All these things that I just can’t manage to do feel depressing: I feel like I don’t know how to use the application, or that I’m a little stupid.” [Woman, 24]

89. “I just keep on grinding, even though I feel strongly that other stupid people like me won’t try again, if they don’t get it the first time what the application is supposed to be used for.” [Woman, 26]

90. “Now I feel like all those skills I had before, like managing to find sights, have disappeared and all there is left is a strange feeling of failure.” [Woman, 47]

Even though experiences of failure resulted in such negative outcomes that many users considered stopping using the application altogether, it is noticeable that even considerable difficulties were quickly forgotten when the users managed to accomplish or complete a desired outcome, and the motivation to use the application in these cases was considerably strengthened. The categories related to this are ‘Discovery / Accomplishment’ and ‘Mastery / Control’.

Disappointment / Frustration / Boredom

These experiences could have been further divided into categories of their own. The reason I have included them in one category is two-fold. First, it was easier to group them this way, as increasing the amount of experience clusters would have made the overall analysis process a lot more laborious. By using one cluster for several different experiences gave me the possibility to focus better on other categories that are more relevant to the study focus. Second, they do have something in common: all these experiences have a significant meaning for the users’ motivation to continue using the application, and thus they are important in understanding why the users

would choose not to use the application outside the somewhat artificial context of contributing material to a research.

First, we have disappointment. This was largely due to the application not meeting the users' expectations towards it, be they lack of content or insufficient functionality:

91. "I tried finding the Sydney opera house, but I couldn't find it which was disappointing. All I could see was skyscrapers at the location where it said Sydney Opera house." [Woman, 23]

92. "I see the markings of interesting places, but when I click them I often get nothing but the name of the place, a couple of photos and the address. It doesn't really arouse any curiosity or interest." [Woman, 26]

Experiences of frustration were largely because of the same issues as disappointment:

93. "I zoomed there for a while and slid the time switch, but I couldn't get the WTC towers on display. I don't know if I looked at the wrong place. All I could see was the construction site for the building that's being built on the WTC location, and it didn't go anywhere whether it was the year 1974 or 2001. This felt frustrating again." [Woman, 24]

Finally, boredom was a result of two things: the users did not either consider the content interesting, or that they did not grasp any new ways to use it which resulted in a kind of saturation point:

94. "In the beginning I used the application a lot and tested the features I could find, but now I can't really think of anything else to do." [Man, 24]

95. "[About viewing Mars and Moon:] Sure when you have nothing but solitary balls of sand it's not very interesting to find out what their properties are in itself." [Man, 33]

4.2.5. Analysing the Experience Categories

The diary excerpts offer a mass of information about the users' experiences with Google Earth. They show that a single application can elicit a wide range of different experiences in the users. The categorization is not concerned with the subject of playfulness, though, but the aim of the excerpts presented above is to construct a comprehensive picture of the different experiences with Google Earth. To start moving towards the area of playfulness, I will use Malone (1980) to analyse the experience categories further.

Malone (1980) discusses various factors that make computer games more fun and entertaining. The three key elements of fun in games are challenge, fantasy and curiosity. Challenges are formed through goals, which should have uncertain outcomes and variable difficulty levels. Challenging situations and achieving goals are important because they engage a person's self-esteem. Fantasy refers to physical or social situations not actually present and divided into two categories: extrinsic and intrinsic fantasy. Extrinsic fantasy depends on whether or not skills are used correctly. Intrinsic fantasies, on the other hand, present more interplay between the skill and the fantasy. The fantasy depends on the skill, and the skill also depends on the fantasy: typically problems are presented in terms of the fantasy world. The third element, curiosity, means "the motivation to learn, independent of any goal-seeking or fantasy-fulfillment". This can be further divided into sensory curiosity and cognitive curiosity. The former "involves the attention attracting value of changes or patterns in the light, sound, or other sensory stimuli of an environment" and the latter as the desire to establish more form in existing knowledge structures. (Malone 1980, 162-166.) Malone's definition has been influential, and has not lost its appeal during the last 30 years of discussion. For example, Sherry (2004), Korhonen, Montola and Arrasvuori (2009) and Walz (2010) all provide classifications of play experience that contain similar definitions as Malone's three attributes in one form or another. Thus, we can use this three-point approach to analyse the experience categories to identify playful experiences.

All three categories – challenge, fantasy and curiosity – are identifiable from the 12 experience categories discussed above. Using Malone's definitions we could establish the following:

- *Challenge*: The categories 'Exploration', 'Discovery / Accomplishment' and 'Failure' fall under this definition. Understanding and obtaining goals forms an important part of the play experience. Google Earth does not have explicit goals to offer for the users, and

it is left to the users themselves to determine what they want to use the application for. However, it is unclear what kind of goals the users were able to identify. Some of the most powerful negative experiences were elicited because some users did not understand the application's features well enough. Those users who had more positive experiences constructed goals for themselves. This is in accordance with Malone's discussion on multi-level goals: "A complex environment without built-in goals should be structured so that users will be able to easily generate goals of appropriate difficulty" (Malone 1980, 163). There seems to be an issue with these goals with Google Earth, which according to Malone means that "unless beginners have some suggested projects of the right difficulty level, they might easily pick tasks that are discouragingly difficult" (ibid.). As especially many beginner users had difficulties using the application, this seems to hold true with Google Earth.

- *Fantasy*: 'Exploration', 'Visual', 'Social / Personal' and especially the 'Immersion' category include experiences attributable to Malone's definition. These categories are mostly formed of social and physical situations that are not actually real. Especially visual experiences and immersion are connected, as many of the immersive experiences were formed through experience of physical closeness through the visual stimuli of the application. Social experiences formed another cluster where there was a degree of fantasy involved: the users were required to use their imagination while using the application to form meaningful connections.
- *Curiosity*: The categories 'Curiosity' and 'Information pleasure' both include experiences of cognitive curiosity as described by Malone. As such they are the key motivational categories to learn and explore the application, and possibly the most important factors in establishing positive user experiences in this context.

Malone's categories highlight the core playfulness identifiable from the experience categories discussed above. However, the range and complexity of the experiences means that it is problematic to consider the overall user experience of Google Earth as playful. Some of the experiences do not fit this viewpoint at all, while others can offer strong clues about the nature of playfulness in computer interaction. Next, I will move on to analyse the user interviews to provide a more detailed perspective into the user experiences.

4.3. User Interviews: Towards a More Detailed View

The interviews differ from the diaries in several ways. They are, for obvious reasons, stylistically and linguistically much more decentralised than the diaries, meaning that the interviews are much less focused on accounts of actions, and rather contain ideas and thoughts from a larger sphere. In the interviews, the users try to make sense of their experience and understand it more profoundly than in the diaries.

The interviews highlight the importance of sharing experiences. These interviews form stories of the users' interaction with the application: the story reflects both the users' perceptions of themselves as users of the application, as well as the actual processes of interaction. Even though the interviews contain similar data as the diaries, they are different as accounts of experience. While the diaries contain more factual accounts of the users' activities, the interviews are more reflective: the users discuss their experiences critically and more analytically.

I have used the experience categories described earlier as focal points to identify central themes in the interviews. I consider the categories 'Exploration', 'Mastery / Control', 'Social / Personal' and 'Visual' as the key categories of experience: they all fit into the different models of play experience discussed earlier. Other categories do as well, but I will use these four themes – exploration, control, sociality and visuality – as the binding factors in this section.

The interviews are content-wise very similar to the diaries, but the difference comes from the form of the narrative: the users describe the process of experience much more in detail. Thus, I use considerably longer extracts in this section to discuss the user experiences from a slightly more focused view. I will start with discussing the users' view of themselves and their motivation to use the application, and then move to analysing the four key experiences.

4.3.1. Reflection of Self as a User

Even though this is not a study about users, some insight into the way the study participants view themselves as users of the application is useful for understanding their experiences better. One of the interview questions was about how the users perceived their own role as users of the application. The following excerpt highlights the complexity of the relationship between the user and the application.

“At times I thought I’m really bad with it, like what’s the problem now, I don’t understand. Some of the really basic stuff, like when I tried to zoom in on something, or when I tried to rotate the camera angle in a way that my eyes would be on the level of the horizon, felt really difficult sometimes. Sometimes it was like I’m really bad at using it or I felt I’m somehow stupid when I didn’t succeed in something. On the other hand, sometimes I got a superior attitude in using it: this application is just bad and that I’m too clever for it! Like it’s just badly programmed and that’s because it doesn’t work. And then there was this child-like attitude when I got really excited about something, like when I was on a mountain. The kind of child-explorer thing, like someone who is just messing around in naive excitement.” [Woman, 24]

As we can see, the users’ relationship with the application can change dramatically over time, from extremely negative emotions to feeling of positive mastery. This means there are several different mindsets users have during the course of using the application, and this also is reflected on the user experience. Consider here the relationship between usability and user experience: even though usability is not the only thing that has an effect of user experience, usability factors contribute significantly in the formation of both good or bad user experiences.

Based on the experience diaries, especially the data categorized in the ‘Failure’ and ‘Confusion’ clusters, Google Earth is not an easy application to use. Many users did not seem to have difficulty in grasping the basic functions, but advanced features seemed to be incomprehensible to many users. This is an issue of motivation: failure to use the application does not encourage to use the application at all, not to mention to use it playfully.

4.3.2. Understanding the World

Google Earth presents the users a realistic representation of the world as it is. A clear analogue is a classic scale-model globe that can be rotated around on the Earth’s axis. A physical globe offers mostly geographical information, whereas there are basically no limits to the amount or type of information that can be included in Google Earth. Consequently there is a lot of information available in the application, from basic geography to detailed descriptions of sights and attractions of particular places, for instance. In addition there are different modes available, such as the weather mode, which allows the user to observe weather patterns in almost real-time:

“It was just nice to stroll around and view different places. It kind of makes you feel that Earth is actually quite small when you look at it from that point of view. And it’s nice to see all kinds of earthquake stuff when they are updated, and weather information as well.” [Man, 50]

“If you’re a person who doesn’t travel much, you can look at stuff like the Statue of Liberty or the Arc de Triomphe, and the like. And perceive things a lot better, like the maps, basically they’re like blueprints of cities like Helsinki or Hamina, and you can see the shape of the city and you can go and see it and look closer.” [Woman, 23]

On a general level, this aspect presents the users both challenges and opportunities. The amount of information can be extremely confusing and result in a feeling of overwhelm. On the other hand, the feeling of almost an infinite amount of information can inspire the user to use the application creatively, and the ability to perceive the kind of body of knowledge that is not available elsewhere. While some users struggled with the application because of this, some experienced the informational aspect as liberating and enjoyable. The following lengthy excerpt describes one user’s engagement with the application:

“One day I travelled to Iceland, and then I just rummaged the whole country through and through, like scenery-wise and I looked what is in there, like volcanoes, and it was like I could discern the whole country. I spent a lot of time there, I was really interested in what there is in Iceland as a whole. I didn’t even notice that my goodness how long I’ve sat here in front of the computer and explored this. I think it gave me a good perception of the country, and that’s the best thing about it, because I’ve never been very good at geography, when people talk about different places you try to perceive where they are. It really opened it up for me that I could go to whichever country to see what is actually in there and what kind of places there are, like what kinds of altitude differences and sights. It kind of opened these countries for me, like the kind of big picture of it, and it was really good for me in terms of learning at this age, it felt like my goodness, I’m actually educated here at my computer!” [Woman, 48]

This is first and foremost a learning experience. The user has access to the kind of learning environment she has not has the possibility to explore before. Once again, the key point here is free-

dom: the user has access to explore different location in the order and the way she herself chooses to, and this leads to both a positive user experience and a to an excellent demonstration of the learning potential of the application.

4.3.3. Exploring the World

Exploration was one of the key processes described in the diary entries. Based on the diaries, we can say that exploration in Google Earth is a process containing different phases from curiosity to discovery. These phases are all important, as the central motivating factor for exploring – be it either new features or content – is to find something new and exciting.

“I think it was interesting, and I think it’s like you have an opportunity to learn new things with it, which feels nice, kind of like your inner explorer is let loose.” [Woman, 26]

“I felt like I was an explorer, I wanted to familiarise myself with the application. When something new like this is put in front of you, I want to see what it gives to me.” [Woman, 48]

One user explicitly described ‘cruising around’ as a highly enjoyable activity. Here the user describes her experience of ‘cruising’:

“It was nice, it was like intuitive and improvisation-based, like you can just do about anything that comes to mind. For example I think the first time I really had a feeling that this is actually a lot of fun was when I tried to do something in New York, and it felt really difficult. Then I just wiggled the city back and forth, and then I found a kind of strange looking neighbourhood accidentally, and then I got interested like what is this place, and then I went to Wikipedia and... It’s like chance and coincidence play a big part there, and associations, like things just spring to mind.” [Woman, 24]

Notice an important factor here: according to the user “chance and coincidence play a big part” in finding new places, locations and information about them. What is important is that there is free room for association and improvisation, as the user continues describing the experience:

“Yeah, the cruising! It was like a stream of consciousness kind of action, which was nice. And then there’s the thing that it’s so easy to go from one place to another, like I want to go to Mount Everest, and then it’s I’ll just go! That’s nice.” [Woman, 24]

This is an excellent example of personal creativity many users experienced while using the application. The basic premise is very simple: finding interesting locations. This can be formed into creative action by allowing the users to perform the action associatively and freely.

One important part of exploration as described by the users was ‘travelling’. These definitions are almost interchangeable, but there is a difference. Travelling was frequently brought up as an analogue when there were specific locations involved, especially if these locations contain well-known sites, buildings or other content that are historically or culturally significant:

“I think the nicest thing about it was that you could sort of travel around the world simply by sitting in front of your computer, to look at sights. That president’s building in the United States, the White House, was really clearly visible. It was nice that you could discern things like that.” [Woman, 48]

Experience of travelling is immersive and captivating, as this user describes:

“I got excited one day about travelling around the world, viewing places I’ve visited and where I would want to go. I must have spent at least three hours with the application when I strolled around. It must have been because there were some really nice pictures and everything was clearly visible, the pictures were bright, and you could see all the scenery really well, like the buildings and...” [Woman, 48]

There is, once again, a quality of immersion identifiable from the experiences of travelling. The feeling of “being there” that virtual travelling produces can establish a strong bond between the user and the application, forming the kind of basis that enable the user to have both sensory and emotional experiences while using the application.

4.3.4. Controlling the World

Many users discussed the experience of being able to control different areas of the application in the diaries. A significant example of this is the experience of being able to explore the world in a way that the user is able to control the exploration without constraints, both metaphorically and literally.

“I don’t know how to say this, I guess it was the way you can kind of freely zoom into different places in detail in a fun way, like you could use the Street View to look at places. Somehow I think it was a lot of fun that you could browse the streets.” [Woman, 26]

At this point I asked the user to elaborate what she means by freely zooming:

“Somehow the thing that you could rotate it, like when you have the globe there initially very large, and then you can rotate it yourself wherever you want to, then view places, then rotate a bit, like I wonder what’s in here? It was a lot of fun.” [Woman, 26]

This point was also raised when asked what this user experienced as easy or pleasant. The user continued to describe how rotating and zooming felt useful, and also that the experience of zooming in on specific places was important:

“I still have to say that the zooming and viewing places and well, like for instance you could build your own routes there, and then watch them; it takes you along for a flight of the route, to follow what there is on that trip. It was made so easy, you could pause and fast forward.” [Woman, 26]

These excerpts suggest two important points. First of all, the experience of control over the application is important overall for a good user experience. The second is the experience of physically interacting with the application. Many users described the way they “rotate the world” by grapping it and zooming into different places. This also incorporates the experience of getting very close to the locations the users explore, as physical representations they further strengthen the sense of control.

4.3.5. Social Experiences as Motivators

Experiences of social connection and personal reflection were another important part of the diary entries. Many users described trying to find places like their own homes, or the homes of relatives or friends. Some users went even beyond this, and used the application to connect with people on a deep emotional level. This user describes how she used the application locate and connect with friends abroad:

“It was an exciting feeling, you get a feeling like you’ve actually visited somewhere, almost have. I have a couple of friends who are abroad; I could go where they live. I felt like I could almost see him when he’s on the beach there. Even when you know that you can’t, it still makes you feel like at that moment you are closer to that person, especially when you have all those weather functions and you can set them to show you how it’s like there at that moment. Like it’s sunny there now, wonder if he’s outside? Like you’ve half-visited somewhere and, it feels a bit naive, you haven’t actually visited anywhere, but my child-like mentality doesn’t let that bother at all.” [Woman, 24]

This experience is triggered not only because Google Earth allows the user to travel to the location where the friend is, but also because the application provides visual and informational clues about the current real-world situation in that particular location. Other aspects of the application, namely the feeling of simulation and realism, thus strengthened the sense of social experience.

Furthermore, the social side of the application was for some users merely the consciousness of other people using the application:

“I think that the social side of it was that I went visiting places where people I know live, and then you kind of experienced some kind of strange connection to them. Maybe it was also social that when you to go visit some place, and then there’s someone, like at the WTC site there’s someone who goes there and models the place just to pass time, and you experience some kind of connection to that person who is totally stranger to you, that wow, you’ve managed to do that and you’ve visited this place two weeks ago.” [Woman, 24]

Even though this is perhaps stretching the idea of being social, it is an interesting point to notice that the users acknowledge other users as well. This suggests that the experience of using the application is far from being a solitary user in front of a single computer, but rather there are aspects of complex social dynamics behind that experience.

4.3.6. Aesthetics and Accuracy

Experiences related to visual stimuli were mostly positively described in the diaries. Aesthetic pleasure was often related to famous and distinguishable locations, such as large cities and locations:

“I went to see the Grand Canyon, it was really nice. I remember that as a positive experience, I watched the sunlight and you could zoom into it really well and the 3D models were good.” [Woman, 23]

“Looking at the star sky was really exciting! I had forgotten about that, but it was really thrilling, like that you can go anywhere you want, and when you zoomed in there was always some new star there, and it was like wow!” [Woman, 24]

Visual pleasure was in many cases related purely to enjoying the imagery of the application. However, there is more to this than merely the aesthetic pleasure derived from the imagery. The visuality of the experience is also related to the feeling of realistic depiction of the world, and the accurate 3D-models. Here we come again to the point about the importance of information:

“The thing that you could see and discern all the maps, distances, what you do, like your own trip, and plan everything, I can utilize this even now. All that information, everything you could get from there, when you have all these links that you can click, the icons, and view what’s in there. It’s a lot of information. For example the sights, you have different images from these areas.” [Woman, 23]

It is merely not the visual appearance of the imagery that is pleasant: the enjoyment comes also from the experience of viewing visual information as well. The application offers the users information about the world via visual stimuli to complement the informational aspect of it.

4.4. Conclusions: Exploring Themes of Playfulness

The diaries and interviews form several different trends of user experience. I consider the most important ones the way people explore the world with the application, finding new places and information, or visiting places familiar to them. Furthermore, aesthetic pleasure derived from using the application could be paralleled to playing digital games to some extent. Third, the prospect of social connectedness the application presents to the users is important. The big question is, are these experiences playful? Can we identify particularly playful behaviour based on the data collected here? What kind of conclusions can we make in terms of trying to understand what playful user experiences are on a general level?

4.4.1. Captivation as a Pointer towards Playfulness

Ermi & Mäyrä (2005) present a model of gameplay experience, “designed to guide attention to the complex dynamics that are involved in the interaction between a player and a game” (Ermi & Mäyrä 2005, 21). The model is built on analysis of games, but I consider it reveals key points of the user experiences reported in this study. The model uses immersion, which means “becoming physically or virtually a part of the experience itself” (ibid., 18) as a key concept. The three dimensions of the model are:

- **Sensory immersion:** related to the audiovisual execution of the game,
- **Challenge-based immersion:** feeling of immersion that is at its most powerful when one is able to achieve a satisfying balance of challenges and abilities,
- **Imaginative immersion:** one becomes absorbed with the stories and the world, or begins to feel for or identify with a character and the area in which the game offers the player a chance to use her imagination, empathise with the characters, or just enjoy the fantasy of the game. (Ibid., 21-22.)

Consider these dimensions in relation to the user experiences of Google Earth. It is not a game; yet we can identify all these three dimensions from the collected user experiences. Visual enjoyment, the sense of mastery and the strong relationship the users expressed with the world while using Google Earth point towards an experience of playing a game rather than interacting

with a utilitarian application. Furthermore, the captivation and immersion (or flow) experienced by the users can be seen as the embodiment of these three dimensions. A model of gameplay experience cannot be used directly to explain playful experiences, as the two concepts are not interchangeable or even very similar. However, many of these same qualities can be attributed to playful experiences as well, especially the imaginative dimension which is connected to the creative aspect of playfulness.

Cognitive psychology considers learning as a three-stage process: encoding, information storage and retrieval (Eysenck & Keane 2005, 189). One aspect of the learning process is implicit learning, which means that the learner is not consciously aware of what is being learned (ibid, 210). Captivation is essentially the feeling of flow, which means the sustainability of optimal stimuli level. In Google Earth's case the stimuli consists mainly of information and the process of learning that information in an enjoyable way. The creativity of the process can be seen in the way the users connect bits of information into larger clusters, much in the same way a learning process means encoding information into meaningful bits of data. There is a level of implicitness in this process as well: users discussed the learning potential of the application after several sessions of usage, when they had realised gaining large amounts of new information. One possible explanation for this is that Google Earth offers the users a vast amount of information in a confined space, a kind of information playground, that the users can freely explore and discover places of their own personal interest instead of following some predefined logic.

4.4.2. Parallels with Internet Usage

Many users explicitly used the word "browse" when they described exploring different locations with the application. This suggests that the experience may have been similar to browsing Internet pages with a web browser. The way users described how they find new information from the application and how they perceived the application as a vehicle to obtain information suggest further clues to the similarity of the experience: many users jumped associatively from one location to another searching for interesting information as it comes along much in the same way as someone who browses web pages intuitively, jumping from one site to another using hyperlinks that connect the sites together.

Figure 7 presents some, but not all, of the different embedded services Google Earth has:



Figure 7: Examples of embedded services in Google Earth

One possible explanation for the web-browsing analogue is that the users viewed the application as a similar kind of open environment that the seemingly endless matrix of web pages forms. There is no distinct line between the Google Earth interface and the rest of the web: in fact, Internet connection is required to use the application effectively, as much of its content is connected integrally to web based services such as YouTube and Wikipedia. Some users made constant references to these services and reported using them, which means that it is very difficult to identify where the use of Google Earth ends and other services begin. This is an important issue in the formation of the user experience, as it is probable the users also cannot distinguish the difference between these normally distinguishable spaces.

4.4.3. Exploring the Boundaries of Closed Space

Google Earth presents the users a virtual space, a playground of possibilities that are not obvious, however. The users description of uncovering different layers of the application can be seen as openness towards uncovering what the application is contains. In this sense the application could be compared with a matryoshka doll: when one layer is removed, there is a new layer

underneath. Each layer opens up new possibilities to use the application, but also removing the layers becomes meaningful action in itself, and the process is thus almost self-sustaining to the point when there are no more layers to remove, and the doll is empty inside. Even though this is perhaps extending the metaphor too far, I consider this aspect a fundamental component in the user experience of Google Earth. I asked one of the users in the interview if there was anything she could compare Google Earth to, and she responded:

“Something where you would have different layers and you could dig further and deeper, but I can’t think of anything what it could be.”

By exploring the space that the application metaphorically and concretely presents, the users often became more and more interested in different features of the application as they continued using it. The integration of other web services deepens this experience, as the blurry boundaries between these different services can further expand the notion of the possible spaces the users can interact in.

This aspect manifests both as negative and positive user experiences. As the data analysis shows, some users considered the “overwhelming” amount of information and the seemingly endless list of features as simply too much to handle, resulting in anxiety and confusion, and lack of motivation to continue using the application. On the other hand, many users felt empowered by the feeling that the application does not reveal all its secrets instantly and there is constantly something new to discover.

Perhaps this difference is due to the different ways the users construct the space they move in. Walz (2010) discusses movement in different play spaces as important factor in play activities. One example of these play spaces is possible worlds, the kind of worlds that can be realized for the play activity. Walz remarks that in the end it is the players who “negotiate where, with whom, and with what [they] draw the magic circle to play-move within a possible world of possible worlds” (Walz 2010, 126). In other words, the users construct the play space actively to form the kind of meaning they choose the best for them. Some users can construct the space as meaningful and rich for themselves, as others fail to see the possibilities offered to them.

Google Earth’s playspace has an interesting factor: it expands as the users continue to explore the application. Perhaps the differences in the experiences of the possibilities of the application

can be explained by the experience of space. For some users, the space is not closed, but an endless terrain that is simply too big to even for them to begin exploring it. For others, the space is understandable as a restricted but expandable area that is open to form possibilities as the users choose to utilize it. This can result in extremely different experiences of the application.

4.4.4. Freedom of Movement and Control

Exploring space is a form of movement. This movement can be either restricted or free; in the case of Google Earth, the users have a considerable amount of freedom to express themselves associatively and creatively. There is a physical aspect that is connected to this as well. The users' experience of both realistic representation of the world by providing a space where to move and the ability to symbolically grab and move around are factors that contribute to the general sense of expressive movement.

There is a downside here, however. Google Earth fails in usability in many principles, such as providing the users clear paths, preventing errors and providing visible clues of the system status, just to name a few. For some users, these issues were simply too much to handle, and their motivation to continue to use the application was severely impaired on many occasions.

4.4.5. Experience of Social Connections

Google Earth has some in-built functions that are intended for social use. For instance, it is possible to share the user's location via e-mail to other users. What is surprising is that none of the users reported using these features. This can be either because the users did not realize these features exist, or that none of the users considered these features interesting enough to test them.

There were many experiences of social and personal connection identifiable, however. Some of these experiences reflected even a strong bond to other people via using the application. For example, as mentioned earlier, almost all users chose to explore personally important locations such as their home, and also to explore the locations where their relatives or friends live or travel. Here I want raise a point made about digital games:

Yet, aside from the hypothetical true single player game, few single player games are completely devoid of a social element. With both traditional folk games and commoditi-

zed proprietary games it is almost impossible to play without at least the knowledge that others play the same game. Theoretically, just this knowledge that others also spend time engaged in the same (well, similar) activity makes the play social. Playing the game increases the social capital of the player as she is able to discuss the experience of playing the game. (Stenros, Paavilainen & Mäyrä 2009, 84.)

There is a dimension of social connection present in Google Earth as well, even though it does not enable a “multiplayer” mode explicitly. I consider this to be a result of other features of the application, such as detailed models of cities and real-time weather information, and so forth. As the application depicts a realistic image of the world – or at least the feel of realistic representation – the users can also experience the presence of other people while using it.

This implies not only people’s general desire to form social connections, but also an element of social playfulness many theories of playfulness raise as an integral part of behaviour. The application enables the users to reflect their personal history by exploring locations important to themselves. There is a narrative element present in this aspect, as well, because the social experience of social connection can be considered as personal reflection through the use of the application.

4.4.6. Challenge and Failure

As mentioned earlier, Google Earth is not a very easy application to use. The question is, can it provide the kind of positive challenge that could elicit playful interactions? Based on the reports of failure and confusion, there are significant obstacles in the application that may form negative mental blocks for some users. However, the data also shows that there is a quality of emancipation in the process of solving challenging situations. In many cases the experiences of distress form a challenge for the users, but if they were able to overcome them, the challenges formed positive learning experiences that strengthened the quality of the experience.

The issue is that for some users the application does not present enough incentives to continue using it and to overcome the challenging situations the users may encounter. Here the personality traits of these users had probably some effect on the user experience. Some users embraced the application and enjoyed the learning process, and considered the possible challenges as positive experiences. For other users, however, these challenges formed obstacles to continue using the

application. They also resulted in a negative self-image as a user: those who had difficulties often blamed themselves instead of the application. Some users also evaluated the application critically and made suggestions how to improve it.

If we consider the idea that playfulness has a positive effect on the learning process, we can also consider the failure experiences to as an argument to support this claim. Playful user experiences can and even should have elements of challenge, but the outcomes must be positive instead of negative: positive outcomes generate better learning experiences both for understanding how to use the application and how to utilize to achieve goals of personal interest, whereas negative outcomes lead to the exact opposite.

5. Discussion

This thesis used the framework of play and playfulness to analyse user experiences of Google Earth. The theory chapter discussed particularly the problems of defining the concepts of play, playfulness and user experience, and concluded with a section to bring these concepts together. The methodology chapter of the thesis described the process of collecting and analysing user experience data based on the user diaries and interviews. Finally, the latter part of the thesis analysed and discussed the collected data using the theoretical discussion of play and playfulness as interpretative tools.

This final chapter of this thesis discusses the different issues of both this particular study as well as user experience research in general. I will also discuss questions of design and further research based on the conclusions of this study.

5.1. Post Mortem: Data Collection and Analysis

Collecting data for this type of study proved to be challenging in terms of data validity. There is a fundamental conflict between the aims of the study and the data collection, as playful experiences should be voluntary, and participation in a research reduces the aspect of voluntariness at least to some extent. There were some more practical problems in the data collection as well that resulted in some negative outcomes.

In retrospect, the study period for the experience diaries proved to be too long. As the chart in the methodology section illustrates (see figure 5, page 51), the number of diary entries per day dropped significantly towards the end of the study period. Some users explicitly reported feelings of lack of motivation towards using the application. For example, one user reported that “if it wasn’t for the study, I wouldn’t have bothered to open the application again”. 12 participants out of 18 completed the entire study period, writing at least one diary entry per day, and some users wrote two entries on some of the days. Even though there were no explicit reports of experience of performing tasks or forced execution, participating in a study may have prompted feelings of obligation for some users as the above quote illustrates. It is possible that a shorter study period could have helped the less motivated users to provide the diary entries more enthusiastically. Another possibility would have been to conduct the study with a similar diary kit, but conducted with a more relaxed pace over a longer timeframe. This was not possible with this

study because of practical constraints, but for future reference it is an option that would be more preferable over a tightly scheduled study period.

Furthermore, the instructions proved to be unclear to some users on some points. Some users thought that they had to use the application and write diaries every day, which again may have affected the motivation and the degree of voluntary use for some users. The instructions should have emphasised more that there is no need to use the application or write the diary every day. Also, based on the diary entries, some users had understood that they should evaluate the application instead of their own experiences. This latter issue was not critical though, as these entries also provide valuable data how the users perceived the application and consequently can be used to evaluate their experiences as well.

As for the positive aspects, users found the diary kit easy to use. Feedback was positive, and none of the users explicitly reported having any problems with writing the diary entries. Furthermore, the assignments proved to be in good balance between free usage and more task-oriented assignments. Several users reported that the assignments that prompted them to use particular features of the application helped them to realise the full potential of the application. These assignments, as I feared beforehand, did not seem to have any significant negative influence on the users' experiences. However, performing assignments is not in line with the idea of 'being playful': the approach in this study was to try to give the users as much freedom as possible, while also giving them ideas how to use the application in new ways. What the effects of this approach had on the user experiences were is extremely difficult to analyse.

Thus, from a more philosophical viewpoint the entire study setting was corrupted from the beginning. Because this is a study about play and playfulness, which in principle should be voluntary action free from burdens of forced execution, collecting data this way does not reflect entirely truthfully how users would actually use the application playfully. The knowledge of participating in a study and also getting a reward for it may have had serious effects on the conscious processes of the participants, as well as writing a diary based on a readymade form.

The process of analysing the collected data was characterised by a constant struggle to maintain integral validity of the analysis. The reason the data was analysed with the affinity diagramming method instead of using a pre-constructed analysis framework such as the PLEX model was to provide a fresh look at the data. The findings reflect the actual experiences of the users more

credibly because they were formed out of the data instead of using pre-existing categories of experience. The problem with any model attempting to capture the scope of experience is regulation: using any such model to analyse a set of data can potentially lead to findings that the model describes, but are not in fact present in the data. Using the affinity diagramming method provided some freedom from this constraint, as even though I categorized the experiences to form a kind of model using the concept of playfulness as a framework, the categories are more data-driven as they would have been if I had used a prescribed list of categories.

There is an important issue of reliability in this approach, however. Even though the categorization reflected reasonable integrity in my understanding of the data, it does not mean that the categorization is the only universal reading that could be made from this data. The fact that the experience categories leaked from one another in between the analysis sessions prove that it is extremely difficult to categorize experience this way: it is simply too complex and too liable to subjective interpretation to be confined within solid boundaries.

In conclusion, the data collection could have been improved by emphasising the voluntary aspect of using the application in the instructions more. The timeframe could have been looser as well, because this would have enabled more breathing room for the participants to complete the diaries in a way that would have suited their personal schedules better, which possibly would have had a positive effect on the general validity of the data. The problems of the data analysis are more important, however. I will discuss some of the implications of this type of experience categorization.

5.2. Methodological Implications

Chapter 2.3.5. discussed the problems in defining user experience and especially the issues in reducing it to design and research models. This is not merely a problem of building theoretical models, but also an issue in any user experience analysis as well. As mentioned above, the process of categorizing the user experiences into instances of experience was not a straightforward process. This raises the question if it is sensible to analyse experience in this fashion in the first place. Is it possible to separate these extremely complex processes into lists of individual entries?

The PLEX model (see chapter 2.4.) is built on the assumption that user experiences can be categorized systematically. It is not the first to do so, as the authors of the model point out: “Several game researchers, media artists and designers have aimed to classify various pleasures, elements, uses, gratifications and experiences of play” (Korhonen, Montola & Arrasvuori 2009, 277). The framework has two main weaknesses – that contradict each other at least to some extent – which the authors also admit: The experience categories defined in the framework may not describe playful interaction accurately enough. A possible solution to this could be to add further definitions in the framework, thus expanding it to cover the phenomena more thoroughly. This, however, would only emphasize the second problem, which is that the framework already covers a broad range of human experiences, and as such it could well lose its effectiveness to being too inconclusive.

These issues do not cover the fundamental problem the model has, however. First of all, the main issues of this type of classification are related to the ambiguity of the user experience. Even if experience as it happens could have instances that are separate, it is unclear if any data collection method could produce the kind of material that would capture these instances credibly enough, which renders any systematic analysis of such data fundamentally incomplete. The second problem is the constructivist aspect of any user experience model. By building models of user experience the model not only describes the experience, but also constructs it by creating meaning where it did not exist before. This issue deepens the more thorough the model aims to be, because of the ambiguity of the categories and their interpretation.

For instance, the PLEX model separates between ‘Fantasy’ and ‘Simulation’ with the distinction that the former is “experience of make-believe involving fantastical narratives, worlds or characters” and the latter “experience of perceiving a representation of everyday life”. My categorisation of the Google Earth user experiences under the denomination ‘Immersion’ is based on a very similar approach. However, if we would apply the PLEX model for the analysis of the user experiences of Google Earth, how accurately we could state which of these experiences belong to which category? For example, many users reflected the enjoyable aspect of flying over and exploring the Moon and the Mars. These experiences do not belong in the ‘Fantasy’ category, as they do not involve fantastical narratives, save perhaps for science fiction. They do not strictly belong to the ‘Simulation’ category either, because it is fairly safe to say that the users do not experience a representation of everyday life while exploring these planets. Take another example: the PLEX model defines ‘Completion’ as “experience of completion, finishing and closure,

in relation to an earlier task of tension” and ‘Discovery’ as “experience of discovering a new solution, place or property”. My approach was to use a kind of joint category for these experiences because they are extremely difficult to separate from each other. For example, users who searched their own homes with Google Earth both performed a task as well as aimed to find a place of interest: the outcome was that there were both the joy of discovering the place as well as the feeling of completion of the task. Even though we can say that both experiences are real, how can we credibly distinguish where the experiences are separate from each other? Or more importantly, is there any way to identify which action by the user resulted to which experience? This ambiguity means that there is a certain degree of forcing meaning into places where another approach could possibly produce very different meanings. Consequently, categorizing experiences means that the model imposes meaning where meaning possibly does not exist; and as well fails to produce meaning where it could exist.

Similar issues exist in the categorization done in this study as well. There is a point in this approach, however: the advantage of this type of process is that it raises the researcher’s understanding of the data by providing a clear – if flawed – look at the complexity of it. The key is interpretation: by constructing larger branches of these instances research can provide a clear look both to the micro-level details as well as to the macro-level processes that form the actual findings. Nevertheless, this should not displace the awareness of the ambiguity of the data analysis process.

5.3. Implications for Design

It is difficult, if practically impossible to form solid design attributes out of such a limited study as this. Rather, some of the findings can be used to strengthen previous discussion on design for playful experiences, especially the points raised by Rao (2008) and Järvinen (2009). Even though they discuss prominently design for social networks, some of the findings of this thesis can be reflected through them to produce interesting insights. I will go through some of these design implications next.

Social experiences are important: One of the key findings of this study is how users form meaning through social experiences. In particular, these social experiences were formed without any clear incentives to do so: users formed social connections spontaneously. This suggests that

even if there would not be clear functions for social interaction, users will explore this dimension if there is something in the application that provides this possibility.

Allow spontaneous action: Many users discussed the pleasure of being able to travel around the world associatively, and spontaneously formed connections between different locations and information. Possibility of free exploration enables this type of use, as the application does not place constraints on the paths the users choose to take.

Physicality adds depth: Being able to physically interact with the application provides better user experience, even if the physicality is only symbolic. This aspect has two dimensions. First, the users considered the realistic representation of the physical world to enable them to form a deeper bond with the application, as it gave them the possibility to interact with different locations in a seemingly concrete way. The other is the physicality of the interaction: being able to take a hold of different elements of the application provides a concrete sense of being in control and mastering the interaction.

Negative outcomes: Some of the powerful negative experiences of some of the users suggest that there are issues in the learning process of Google Earth. This seems to be connected to the discussion by Malone (1980) of different levels of goals: some users were unable to form these goals, which resulted in bad user experiences. One possible approach to solve this problem could be to implement a sandbox environment commonly used in many digital games. Gee (2008) describes this sandbox environment in a game that is in many ways a similar open interactive environment as Google Earth, *Rise of Nations* (2003): “[T]here is never a real distinction between learning and playing. The tutorials are simplified versions of playing the game. The game itself has a number of difficulty levels and at each level players must refine their skills and learn new ones” (Gee 2008, 61). The idea of the sandbox is to provide clear clues for the users for different functionalities through simplified examples of interaction. Possibly this type of tutorial mode implemented in Google Earth – or any type of similar open interactive environment – could help some users in learning the application better and hence proving better user experiences.

Furthermore, there are some points that I want to raise in addition to these. The following paragraphs contain more thought experiments than any clear design implications:

Excess of information is not necessarily a bad thing: Typically usability-oriented design emphasises that users should not be flooded with too much information too fast. In Google Earth's case many users enjoyed this particular aspect of the application. The continuous flow of information and the seemingly endless amount of it formed an essential part of the user experience for some users. However, there is also a dangerous pitfall here, as not all users found this aspect a positive experience.

Users' sense of space has an effect on the experience: Google Earth provides a large, physical representation of space for the users to explore freely. The users can interact in this space and explore the boundaries of it to enrich their sense of understanding of the application. However, the blurry boundaries between the application and its integrated services can also mean that the users do not have a clear understanding of which parts in fact are part of the application and which are external. Whether this has a positive or a negative effect on the user experience is unclear.

5.4. Implications for Further Research

User experience research is a form of design research that can sometimes provoke more questions than provide answers. Especially the research on playful user experiences is an area where there are questions of both the philosophical backgrounds of the research as well as the problems related to reliable analysis of the experiences.

For example, one of the aspects of the user experiences described in this study was that it was on some occasions not clear for the users what it was in fact what they were using. There are a large number of additional services included in Google Earth, such as YouTube and Wikipedia, and also the application is fundamentally integrated into the web as well. This means that it is very difficult to assess which areas of the application in fact are the core features of Google Earth and which are not. The relevant point is that for the users this does not have any significance: for them, "using Google Earth" means using everything they can find from the application, including those services are not 'native' components of it. Perhaps then studying the user experiences of single applications can be a challenge from these grounds and the focus should be more on the larger context of use.

One major flaw in this thesis is that the study does not take the context of use into account at all: the context is Google Earth and nothing more. Even though some users reflected the effect of their other activities to their use of Google Earth, for instance different distractions, as a whole it is impossible to say what the effect of the contextual factors had in the formation of the user experiences. Thus, a logical next step would be to consider how the users' other experiences impact the user experience of Google Earth. One possible approach could be to take the results of this study and design another study, which would focus more on contextual factors in the formation of the experiences, and compare the results to gain deeper and broader understanding of the topic.

Context-dependent study could also highlight some of the more design oriented research questions, particularly in what type of situations playful experiences are clearly beneficial for the user? Here we return again to the issues of usability and playfulness, and the contradictory goals of usability and playful based interaction design: effectiveness and expressive freedom. The aim of this study was not to produce insight into where playfulness is an apt approach to interaction design. One further step in this direction would be to try and research the relationship of the users' goals, desires and expectations and compare their relationship to playful experiences. This approach could bring further understanding about where and why playful design should be applied.

Another direction could be to apply constructionist approach to the framework of playful user experiences. For instance, Lampinen (2005) conducted a user experience study from a constructivist viewpoint to analyse how users see themselves as users of new technologies with the conclusion that "an experiencing user" is constructed discursively (Lampinen 2005, 120). A similar approach could be used to analyse playful user experiences: the formation of playfulness constructively could increase understanding about what kind of structures of meaning and processes of meaning making playful user experiences consist of, as well as to strengthen understanding on how to develop validity of their analysis without falling into the constructivist trap described earlier.

5.5. Conclusion

In the end, it seems that there are so many reservations about both the theoretical framework of this study and the issues of the data collection and analysis, that there is the inevitable difficult question of what kind of conclusions the study can produce. Or perhaps the conclusion is that there are no conclusions because of the complexity of the phenomena. Much in the same way many user experience discussions make reservations about the ultimate definition of it, perhaps there is a similar situation here: we have too many open questions to say that the results point to one way or the other.

This is not the right way to conclude any research. Any credible study should be able to point out some analytical implications that cannot be questioned at least in the context of the particular study. If nothing else, there should be insight into the problems of the research process itself, if no other conclusions can be made. In this case, I consider the major findings of this thesis related to both. First, the user experience data shows that in the context of Google Earth, users relish social connectivity, consider aesthetic factors as important, creatively make associative connections between different parts of the application and enjoy the flow of information the application produces for them to absorb. Even though these points cannot be considered as universal aspects of the user experience, they still offer interesting and relevant insight into the various experiences and the motivational factors of the users.

These results could be utilized in the research of other studies on non-game open interactive environments, such as Second Life, Facebook or Wikipedia. The issues of applying theoretical knowledge of playfulness into a user experience study suggest that any attempt to produce viable results in this area should be based on meticulous analysis of playfulness and also be aware of the dangerous pitfalls of the research, prominently the questions of categorizing experiences within overly strict definitions that can produce biased conclusions having no real value. Categorizing experiences can be an effective analysis method in user experience research if used correctly and with the appropriate critical attitude towards the analysis results.

Comparing these findings to previous studies on playful experiences shows that there are parallels between these results and the conclusions of other studies. Many theoretical models of playful experiences include emphasis on social aspects, creative association and immersive interaction. Especially if we broaden this comparison to include digital game playing experiences, the

connections become even stronger. Aesthetic value of the experience similar to the one reported in this study is important especially in many modern games that rely on audiovisual stimuli to produce enjoyable experiences for the players. Google Earth can elicit the kind of playful experiences often encountered in games as well as other interactive media applications.

Play and playfulness are deep and complex types of human behaviour. Using these concepts as analytical tools to discuss user experience can be difficult, but also provide interesting and insightful commentary. This thesis, with the small contribution that it can bring to the ongoing discussion, provides further proof that playfulness can and should be researched in many types of digital interaction instead of focusing on one limited area such as games. Playfulness can explain a wide range of different user experiences and perhaps as a viewpoint form the most credible framework for understanding what we do and how we behave with interactive technology.

References

- Alasuutari, Pertti. 1999. *Laadullinen tutkimus*. Tampere: Vastapaino. (Original publication 1993)
- Arhippainen, Leena. 2009. *Studying User Experience: Issues and Problems of Mobile Services. Case Adamos: User Experience (Im)Possible to Catch?* Oulu: Oulu University Press.
- Bolgerr, Niall, Davis, Angelina & Rafaeli, Eshkol. 2003. "Diary Methods: Capturing Life as it is Lived". In *Annual Review of Psychology* 54(1), pp. 579-616.
- Buchenaus, Marion & Suri, Jane Fulton. 2000. "Experience Prototyping". In *Proceedings of the 3rd Conference on Designing Interactive Systems: Processes, Practices, Methods, and Techniques*. New York: ACM, pp. 424-433.
- Caillois, Roger. 2001. *Man, Play and Games*. Urbana: University of Illinois Press. (1961)
- Chiang, Yu-Tzu & Lin, Sunny S.S.J. 2010. "Early Adolescent Players' Playfulness and Psychological Needs in Online Games". In *Social Behavior and Personality* 38(5), pp. 627-636.
- Copier, Marinka. 2005. "Connecting Worlds. Fantasy Role-Playing Games, Ritual Acts and the Magic Circle". In S. de Castell & J. Jenson (Eds.), *Changing Views – Worlds in Play: Proceedings of the Second International Conference of DiGRA*. DiGRA Digital Library. Available online: <http://www.digra.org/dl/db/06278.50594.pdf> (Accessed October 21, 2010).
- Costello, Brigid & Edmonds, Ernest. 2007. "A Study in Play, Pleasure and Interaction Design". In *Proceedings of the 2007 Conference on Designing Pleasurable Products and Interfaces*. New York: ACM, pp. 76-19.
- Csikszentmihalyi, Mihaly. 1991. *Flow. The Psychology of Optimal Experience*. New York: HarperPerennial.
- Dewey, John. 1909. *How We Think*. London: D.C. Heath and Co.
- Dewey, John. 1980. *Art as Experience*. New York: Perigree Books. (1934)

Dewey, John. 1998. *Experience and Education*. West Lafayette: Kappa Delta Pi. (1938)

Dey, Ian. 1993. *Qualitative Data Analysis. A User-Friendly Guide for Social Scientists*. London: Routledge.

Elster, Jon. 1999. *Strong Feelings: Emotion, Addiction and Human Behavior*. Cambridge (MA): MIT Press.

Ermi, Laura & Mäyrä, Frans. 2005. "Fundamental Components of the Gameplay Experience: Analysing Immersion". In S. de Castell & J. Jenson (Eds.), *Changing Views – Worlds in Play: Proceedings of the Second International Conference of DiGRA*. Vancouver: University of Vancouver, pp. 15-27.

Eskola, Jari & Suoranta, Juha. 1998. *Johdatus laadulliseen tutkimukseen*. Tampere: Vastapaino.

Eysenck, Michael W. & Keane, Mark T. 2005. *Cognitive Psychology: A Student's Handbook*. Hove: Psychology Press.

Follett, Jonathan. 2007. "Engaging User Creativity: The Playful Experience". In *UXmatters.com*. Available online:
<http://www.uxmatters.com/mt/archives/2007/12/engaging-user-creativity-the-playful-experience.php> (Accessed July 13, 2010).

Forlizzi, Jodi & Battarbee, Katja. 2004. "Understanding Experience in Interactive Systems". In *Designing Interactive Systems, DIS'04*. New York: ACM, pp. 261-268.

Forlizzi, Jodi & Ford, Shannon. 2000. "The Building Blocks of Experience: An Early Framework for Interaction Designers". In *Designing Interactive Systems, DIS'00*. New York: ACM, pp. 419-423.

Garrett, Jesse James. 2003. *The Elements of User Experience. User-Centered Design for the Web*. Indianapolis: New Riders.

- Garvey, Catherine. 1990. *Play*. Cambridge (MA): Harvard University Press. (1977).
- Gee, James Paul. 2008. *Good Video Games + Good Learning. Collected Essays on Video Games, Learning and Literacy*. New York: Peter Lang.
- Gutgold, Shira. 2010. "Playful User Experiences". In *UXmatters.com*. Available online: <http://www.uxmatters.com/mt/archives/2010/05/playful-user-experiences.php> (Accessed July 13, 2010).
- Hassenzahl, Marc & Tractinsky, Noam. 2006. "User Experience – A Research Agenda". In *Behaviour & Information Technology* 25(2), pp. 91-97.
- Holopainen, Jussi. 2008. "Play, Games and Fun". In Olli Leino, Hanna Wirman & Amyris Fernandez (Eds.), *Extending Experiences. Structure, Analysis and Design of Computer Game Player Experience*. Rovaniemi: Lapland University Press.
- Huizinga, Johan. 2000. *Homo Ludens. A Study of the Play-Element in Culture*. London: Routledge. (1938)
- Johnson, Bonnie McDaniel. 2003. "The Paradox of Design Research". In B. Laurel (Ed.), *Design Research: Methods and Perspectives*. Cambridge (MA): MIT Press.
- Jokela, Timo. 2004. "When Good Things Happen to Bad Products: Where Are the Benefits of Usability In the Consumer Appliance Market?". In *Interactions* 11(6) pp. 28-35.
- Juul, Jesper. 2005. *Half-Real: Video Games Between Real Rules and Fictional Worlds*. Cambridge (MA): MIT Press.
- Järvinen, Aki. 2008. *Games without Frontiers. Theories and Methods for Game Studies and Design*. Tampere: Tampere University Press.
- Järvinen, Aki. 2009. "Game Design for Social Networks. Interaction Design for Playful Dispositions". In *Proceedings of the 2009 ACM SIGGRAPH Symposium on Video Games*, pp. 95-102.

Kankainen, Anu. 2003. "UCPCD: User-Centered Product Concept Design". In *Designing for User Experiences. Proceedings of the 2003 Conference on Designing for User Experiences*. New York: ACM, pp. 1-13.

Kiili, Kristian. 2005. *On Educational Game Design: Building Blocks of Flow Experience*. Tampere: Tampere University of Technology.

Korhonen, Hannu, Montola, Markus & Arrasvuori, Juha. 2009. "Understanding Playful User Experience Through Digital Games". In *Proceedings of the 4th International Conference on Designing Pleasurable Products and Interfaces*, pp. 274-285.

Korhonen, Hannu, Arrasvuori, Juha & Väänänen-Vainio-Mattila Kaisa. 2010. "Let the Users Tell the Story: Evaluating User Experience With Experience Reports". In *Proceedings of the 28th International Conference Extended Abstracts on Human Factors in Computing Systems*. New York: ACM, pp. 4051-4056.

Kuniavsky, Mike. 2003. *Observing the User Experience. A Practitioner's Guide to User Research*. San Francisco: Morgan Kaufmann.

Kuts, Ekaterina. 2009. "Playful User Interfaces: Literature Review and Model for Analysis" In *Breaking New Ground: Innovation in Games, Play, Practice and Theory. Proceedings of DiGRA 2009*. DiGRA Digital Library. Available online: <http://www.digra.org/dl/db/09287.38077.pdf> (Accessed September 7, 2010).

Kuutti, Kari. 2001. "Hunting for the Lost User: From Sources of Errors to Active Actors – and Beyond". Paper written for the Cultural Usability –seminar, Media Lab, University of Art and Design Helsinki. Available online: http://mlab.taik.fi/culturalusability/papers/Kuutti_paper.html (Accessed September 8, 2010).

Lampinen, Minttu. 2005. *Users of New Technology. A Discourse Analysis of a New Technology User*. Tampere: Tampere University Press.

Lazzaro, Nicole. 2004. "Why We Play Games: Four Keys to More Emotion Without Story". Available online: http://www.xeodesign.com/xeodesign_whyweplaygames.pdf (Accessed July 5, 2010)

Lieberman, J. Nina. 1977. *Playfulness: Its Relationship to Imagination and Creativity*. New York: Academic Press.

Malone, Thomas W. 1980. "What Makes Things Fun to Learn? Heuristics for Designing Instructional Computer Games". In *Proceedings of the 3rd ACM SIGSMALL Symposium and the First SIGPC Symposium on Small Systems*. New York: ACM, pp. 162-169

Mattelmäki, Tuuli. 2006. *Design Probes*. Helsinki: University of Art and Design.

McCarthy, John & Wright, Peter. 2004. *Technology as Experience*. Cambridge (MA): MIT Press.

Montola, Markus, Nummenmaa, Timo, Lucero, Andrés, Boberg Marion & Korhonen, Hannu. 2009. "Applying Game Achievement Systems to Enhance User Experience in a Photo Sharing Service". In *Proceedings of the 13th International MindTrek Conference: Everyday Life in the Ubiquitous Era*. New York: ACM, pp. 94-97.

Nielsen, Jakob. 1993. *Usability Engineering*. Boston: Academic Press.

Norman, Donald. 2004. *Emotional Design. Why We Love (or Hate) Everyday Things*. New York: Basic Books.

Parker-Rees, Rod. 1999. "Protecting Playfulness". In L. Abbott & H. Moylett (Eds.), *Early Education Transformed*. London: Routledge.

Pearce, Celia. 2006. "Productive Play. Game Culture From the Bottom Up." In *Games and Culture* 1(1), pp. 17-24.

Pichlmair, Martin. 2008. "Venturing into the Borderlands of Playfulness". In *Technoetic Arts: A Journal of Speculative Research* 6(2), pp. 207-212.

- Prensky, Marc. 2007. *Digital Game-Based Learning*. St. Paul: Paragon House. (2001)
- Rao, Valentina. 2008. "Facebook Applications and Playful Mood: The Construction of Facebook As a 'Third Place'". In *MindTrek '08 Proceedings*. New York: ACM, pp. 8-12.
- Salen, Katie & Zimmerman, Eric. 2004. *Rules of Play. Game Design Fundamentals*. Cambridge (MA): MIT Press.
- Sherry, John L. 2004. "Flow and Media Enjoyment". In *Communication Theory* 14(4), pp. 328–347.
- Shneiderman, Ben. 2004. "Designing for Fun: How Can We Design User Interfaces to Be More Fun?" In *Interactions* 11(5), pp. 48-50.
- Silverman, David. 2005. *Interpreting Qualitative Data. Methods for Analysing Talk, Text and Interaction*. 2nd edition. London: Sage. (2001)
- Silverman, David. 2010. *Doing Qualitative Research. A Practical Handbook*. 3rd edition. Los Angeles: Sage.
- Sotamaa, Olli. 2009. *The Player's Game. Towards Understanding Player Production Among Computer Game Cultures*. Tampere: Tampere University Press.
- Starbuck, William H. & Webster, Jane. 2006. "When Is Play Productive?" In William H. Starbuck (ed.), *Organizational Realities: Studies of Strategizing and Organizing*. New York: Oxford University Press, pp. 257-275.
- Stenros, Jaakko, Paavilainen, Janne & Mäyrä, Frans. 2009. "The Many Faces of Sociability and Social Play in Games". In *Proceedings of the 13th International MindTrek Conference: Everyday Life in the Ubiquitous Era*. New York: ACM, pp. 82-89.
- Sutton-Smith, Brian. 1997. *The Ambiguity of Play*. Cambridge (MA): Harvard University Press.

Walz, Steffen P. 2010. *Toward a Ludic Architecture: The Space of Play and Games*. ETC Press.

Webster, Jane. 1988. "Making Computer Tasks at Work More Playful: Implications for Systems Analysts and Designers". In *Proceedings of the ACM SIGCPR Conference on Management of Information Systems Personnel*. New York: ACM, pp. 78 – 87.

Webster, Jane & Martocchio, Joseph J. 1992. "Microcomputer Playfulness: Development of a Measure With Workplace Implications". In *MIS Quarterly* 16(2), pp. 201-226.

Woszczynski, Amy B., Roth, Philip L. & Segars, Albert H. 2002. "Exploring the Theoretical Foundations of Playfulness in Computer Interactions". In *Computers in Human Behavior* 18(4), pp. 369-388.

Yager, Susan E., Kappelman, Leon A., Maples, Glen A., & Prytubok, Victor R. 1997. "Microcomputer Playfulness: Stable or Dynamic Trait?". In *The DATA BASE for Advances in Information Systems* 28(2), pp. 43-52.

Yee, Nick. 2006. "The Labor of Fun. How Video Games Blur the Boundaries of Work and Play". In *Games and Culture* 1(1), pp. 68-71.

Youell, Biddy. 2008. "The Importance of Play and Playfulness". In *European Journal of Psychotherapy and Counselling* 10(2), pp. 121-129.

Appendices

Appendix 1: Definitions of PLEX categories (Korhonen, Montola & Arrasvuori 2009)

Category	Description
Captivation	Experience of forgetting one's surroundings.
Challenge	Experience of having to develop and exercise skills in a challenging situation.
Competition	Experience of victory-oriented competition against oneself, opponent or system.
Completion	Experience of completion, finishing and closure, in relation to an earlier task of tension.
Control	Experience of power, mastery, control or virtuosity.
Discovery	Experience of discovering a new solution, place or property.
Eroticism	Experience of sexual pleasure or arousal.
Exploration	Experience of exploring or investigating a world, affordance, puzzle or situation.
Expression	Experience of creating something or expressing oneself in a creative fashion.
Fantasy	Experience of make-believe involving fantastical narratives, worlds or characters.
Fellowship	Experience of friendship, fellowship, communality or intimacy.
Nurture	Experience of nurturing, grooming or caretaking.
Relaxation	Experience of unwinding, relaxation, or stress relief. Calmness during play.
Sadism	Experience of destruction and exerting power over others.
Sensation	Meaningful sensory experience.
Simulation	Experience of perceiving a representation of everyday life.
Subversion	Experience of breaking social roles, rules and norms.
Suffering	Experience of frustration, anger, boredom and disappointment typical to playing.
Sympathy	Experience of sharing emotional feelings.
Thrill	Experience of thrill derived from an actual or perceived danger or risk.

Appendix 2a: Screenshot of the diary web page (in Finnish)

Tervetuloa Google Earth -tutkimukseen!

Ohjeita kokemuspäiväkirjan tekemiseen:

Ennen kuin aloitat: Lataa itsellesi Google Earthin viimeisin versio. Ohjelman saat ladattua [tästä linkistä](#). Jos sinulla on jo ohjelma tietokoneellasi, varmista että se on vähintään versio 5.1.

Lisäksi täytyy pari perustietoa itsestäsi: [linkki kyselyyn](#).

- Käytä ohjelmaa **päivittäin**. Tee myös vähintään yksi päiväkirjamerkintä päivittäin.
- Pyri tekemään koko seitsemän päivän mittainen jakso peräkkäisinä päivinä. Jos jokin päivä jää välistä, jatka siitä mihin olet jäänyt. Älä siis jätä yhtään päiväkirjamerkintää tekemättä, vaikka aikaa menisikin pidempään kuin viikko.
- Kunkin päivittäisen session jälkeen tee päiväkirjamerkintä päivälle varattuun lomakepohjaan. Älä jätä päiväkirjamerkinnän tekemistä myöhempään ajankohtaan, sillä yksityiskohtia on vaikea muistaa jälkikäteen.
- Kuvaile päiväkirjamerkinnässä ensin lyhyesti, mitä teit päivän aikana. Tämän jälkeen kuvaile **kokemuksiasi** ohjelman käytöstä, sekä sitä, millaisia **tunteita** ohjelman käyttö herätti. Esimerkiksi: turhauttiko jokin seikka, onnistuiko jokin helposti, oliko jokin vaikeaa? Voit ajatella päiväkirjamerkintää esimerkiksi pienenä **tarinana**.
- Lomakkeeseen pääset allaolevien linkkien kautta. Kukin lomake avautuu selaimesta riippuen uuteen välilehteen tai ikkunaan.
- Lomakkeessa on kenttä päiväkirjamerkinnälle, nimelle sekä sähköpostiosoitteelle. **Täytä kaikki kentät kaikkina päivinä.** Kun olet täyttänyt kentät, lähetä päiväkirjamerkintä painamalla Lähetä-painiketta.
- Huomaa, että kun olet lähettänyt lomakkeen, et pääse enää muokkaamaan lähettämäsi tekstiä. Tämä ei haittaa: jos haluat, voit aina lähettää useamman päiväkirjamerkinnän päivässä!

Vastauksia tai käyttäjiä ei tulla arvostelemaan millään tavalla! Kaikki kokemukset ovat tärkeitä tutkimuksen kannalta, joten pyri kuvaamaan niitä mahdollisimman kattavasti.

Linkit päiväkirjapohjiin:

1. päivä
2. päivä
3. päivä
4. päivä
5. päivä
6. päivä
7. päivä

Jos sinulle tulee ongelmia tai kysymyksiä, ota minuun yhteyttä joko puhelimella (040 561 0921) tai sähköpostilla.

Appendix 2b: Translation of the instructions for keeping experience diaries

Welcome to the Google Earth –study!

Instructions for keeping experience diaries:

Before you start: download the latest version of Google Earth. You can download the application from this link. If you have the application installed already, please check it is version 5.1. or newer. Also fill in some basic information about yourself: link to the survey.

- Use the application daily. Write also at least one diary entry per day.
- Try to complete the whole seven-day period on consecutive days. If you miss one day, continue from where you left off. Don't leave any diary entries undone, even if it takes you more than a week.
- After each daily session write the diary entry to the reserved form for that day. Don't leave writing the diary to a later time, because it is difficult to remember details afterwards.
- In the diary entry, describe shortly what you did during the day. After this describe your experiences of using the application, and also what kind of emotions using the application evokes.
- For example: was something frustrating, easy, or difficult? You can think of the diary entry for example as a small story.
- You can access the forms using the links below. Each form opens in a new tab or window, depending on the browser you use.
- The form contains a field for the diary entry, your name and your e-mail address. Fill out all fields for all days. When you have filled out the fields, send the diary entry by pressing the Submit-button.
- Notice that when you have submitted the form you cannot edit the text you have sent. This is not a problem: if you want, you can always send more than one entries per day!

The answers or the participants will not be criticised in any way! All experiences are important for the study so aim to describe them as accurately as possible.

Links to the diary forms:

Day 1
Day 2
Day 3
Day 4
Day 5
Day 6
Day 7

If you have any problems or questions, contact me either via phone or email.

Appendix 2c: Daily instructions

Day 1

Explore the basic functions of the application: moving around, finding locations, zooming and so forth. If you are already familiar with the application, you can use it as you choose.

Day 2

You can use Google Earth to admire different sights around the world. Visit the locations of different sights and explore them by using the application's features.

Day 3

Use the application today as you choose. Explore interesting features, think of different ways to use the application, test out different things open-minded!

Day 4

You can use Google Earth to look at other celestial bodies besides the Earth. Explore the starry sky, the Mars and the Moon with the application!

Day 5

Use the application freely as you choose.

Day 6

You can use Google Earth for route planning as well. Plan your dream vacation with the application and map out your route as accurately as possible!

Day 7

Use the application freely as you choose. You can for example explore an interesting feature that you have used less. This is the last day of the study. Thank you for your time!

Appendix 3: Interview structure

1. Describe writing the experience diary. Were the instructions clear? Were the practical arrangements sufficient?
2. What kind of expectations and images you had about Google Earth?
3. How would you describe using the application on a general level?
4. Was there something in the application that particularly raised your interest?
5. Was there something that you found particularly pleasant?
6. How about unpleasant?
7. Was there something you found difficult?
8. How about easy?
9. How did you see yourself as a user of the application? What was your role?
10. How would you describe the visual aspect of the application?
11. Did you have social experiences while using the application?