A Video Game Design Experiment about Lucid Dreaming

Master’s Thesis in Media, Technology and Games

Sune Weber Pedersen
IT University of Copenhagen
ignis696@gmail.com

Supervisor: Alessandro Canossa
Abstract

This thesis deals with the analysis, design, implementation and testing of a video game prototype, which is intended for practicing lucid dreaming induction. Research indicates the potential of the video game medium in this end and the experimental game design has been the result of examining various study cases covering both video games and dreams, besides multiple lucid dreaming induction techniques. The design approach was more focused on creatively modifying existing techniques, in order to take advantage of the potential of the video game medium, than to simply copy them. This has led to establishing a set of formal design goals, with an emphasis on creating a game world simulating a dream, in which rehearsing can take place prior to sleep. The video game prototype is inasmuch an interactive training tool as it is an artistic video game experiment. With the aim of also taking the player experience into account, a set of aesthetic goals was also established, approached by the use of the MDA framework (Hunicke, LeBlanc & Zubek, 2004) and the player involvement model - related to the concept of incorporation (Calleja, 2011).

The video game prototype went through a usability test and a handful of subject matter expert reviews. Results suggest that the prototype had potential for inducing lucid dreams, but it is not without complications according to design features, which test participants and experts had mixed opinions about.
Acknowledgements

The author would like to thank the following persons for their appreciated assistance and help during the making of this master’s thesis:

Frederik Buus Sauer
Isaac Lenhart
Samuel Walz
Jayne Isabel Gackenbach
Stephen LaBerge
Ryan Hurd
Mert Akbal
PasQual Ourtane
Danni B. Schou
Preben Rosell
Hans Henrik Hvoslef
Benjamin W. Pedersen
Enric Llagostera
Alex Mintsiouslis
Stefan Lindgren Josefsen
Veselin Stoilov
Henrike Lode
Anchel Labena

...and last but not least, thanks to all the test participants!
Table of Contents

1 Introduction ................................................................................................................................. 1
  1.1 Problem Statement .................................................................................................................. 2
  1.2 Thesis Structure ..................................................................................................................... 2
2 Thesis Concepts .......................................................................................................................... 4
  2.1 Clarifying Dream Control and Lucid Dreaming ....................................................................... 4
    2.1.1 The Perspective of Unconscious Dreaming ...................................................................... 4
    2.1.2 The Perspective of Conscious Dreaming ......................................................................... 6
    2.1.3 Final Clarifications and Definitions ................................................................................ 9
    2.1.4 Concluding Initial Conceptual Research ......................................................................... 10
3 Literature Review and Related Work .......................................................................................... 12
  3.1 Brief History of Lucid Dreaming Research ............................................................................ 12
  3.2 Video Game Play Influencing Dreams ................................................................................... 14
  3.3 Dream Bizarreness and Nightmares ...................................................................................... 14
  3.4 Electronic Devices for Lucid Dreaming Induction .................................................................. 16
4 Approaches to Lucid Dreaming Induction .................................................................................. 19
  4.1 Electronic Approach ............................................................................................................. 19
  4.2 Mental Approach .................................................................................................................. 20
  4.3 Benefits of Implementing DILD Techniques ......................................................................... 21
    4.3.1 Multiple Techniques Can Be Incorporated in a Game ................................................... 21
    4.3.2 A Play Context Can Enhance Motivation for Practice .................................................. 22
    4.3.3 A Game Can Support and Facilitate Visualization ......................................................... 22
    4.3.4 No or Minimal Risk of Falling Asleep during Practicing .............................................. 22
  4.4 Shared Methods among DILD Techniques ............................................................................ 23
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.3.1 Relaxing Soundscape</td>
<td>43</td>
</tr>
<tr>
<td>7.3.2 Verbal Suggestions and Metacognitive Questions</td>
<td>44</td>
</tr>
<tr>
<td>7.3.2.1 When Non-Lucid</td>
<td>45</td>
</tr>
<tr>
<td>7.3.2.2 When Lucid</td>
<td>46</td>
</tr>
<tr>
<td>7.4 Game World and Navigation</td>
<td>49</td>
</tr>
<tr>
<td>7.4.1 Game World as a Dream World</td>
<td>49</td>
</tr>
<tr>
<td>7.4.2 An Infinite Game World</td>
<td>51</td>
</tr>
<tr>
<td>7.4.3 Graphics and Navigable Space</td>
<td>53</td>
</tr>
<tr>
<td>7.4.4 The Internal Journey</td>
<td>54</td>
</tr>
<tr>
<td>7.5 Voluntary In-Game Objectives</td>
<td>56</td>
</tr>
<tr>
<td>7.6 Illustrative Summary of Game Elements Used for Reaching Formal and Aesthetic Goals</td>
<td>57</td>
</tr>
<tr>
<td>8 Test Method and Results</td>
<td>59</td>
</tr>
<tr>
<td>8.1 Test Method</td>
<td>59</td>
</tr>
<tr>
<td>8.2 Usability Test Results</td>
<td>60</td>
</tr>
<tr>
<td>8.2.1 Light Sources, Difficulty Level and Reality Testing</td>
<td>61</td>
</tr>
<tr>
<td>8.2.2 Relaxing Sensation of Dreaming</td>
<td>62</td>
</tr>
<tr>
<td>8.3 Expert Subject Matter Evaluations</td>
<td>63</td>
</tr>
<tr>
<td>8.3.1 Feedback on Solutions for Reaching Aesthetic Goals</td>
<td>64</td>
</tr>
<tr>
<td>8.4 Feedback on Verbal Suggestions</td>
<td>66</td>
</tr>
<tr>
<td>8.5 Success as a Lucid Dream Induction Game</td>
<td>67</td>
</tr>
<tr>
<td>9 Future Work &amp; Discussion</td>
<td>69</td>
</tr>
<tr>
<td>9.1 Mnenomic Training</td>
<td>69</td>
</tr>
<tr>
<td>9.2 Goals and Rewards</td>
<td>70</td>
</tr>
<tr>
<td>9.3 Non-Diegetic Verbal Suggestions</td>
<td>71</td>
</tr>
<tr>
<td>9.4 Scary Game Elements</td>
<td>72</td>
</tr>
<tr>
<td>9.5 The Role of the Body during Play</td>
<td>73</td>
</tr>
</tbody>
</table>
10 Conclusion ........................................................................................................................................ 75
Bibliography ...................................................................................................................................... 76
Ludography ......................................................................................................................................... 83
Appendix A: Ludic Dreaming Communities and Online Resources ...................................................... 84
Appendix B: Electronic Lucid Dreaming Devices .................................................................................... 86
Appendix C: Mental Techniques for Having Dream-Initiated Lucid Dreams ........................................... 88
Appendix D: Reality Testing ................................................................................................................ 93
Appendix E: High Concept Document .................................................................................................. 94
Appendix F: Transcripts of LaBerge’s Audio Recordings ........................................................................ 96
Appendix G: Subject Matter Expert Evaluations ................................................................................... 98
Appendix H: Statistics of Quantitative Data from Usability Test .......................................................... 118
Appendix I: Questionnaire Data from Usability Test ............................................................................. 123
1 Introduction

Lucid dreams are a specific type of dreams where the person asleep is aware about dreaming while dreaming (LaBerge & Rheingold, 1990). The experience of having lucid dreams, called lucid dreaming, is associated with exploring virtual realities, which, opposite digitally generated virtual realities, are internal mental constructions. Similarly, video games are characterized by virtual realities, which players can explore in varying degrees of freedom - dependent on the underlying code in the system. Thus video games offer alternative realities confined by sets of programmed rules and restrictions. What if these limits were removed and the player could do whatever she wanted? What sort of experience would be offered instead? Ultimately and principally, it would be an experience reminiscent of lucid dreaming, because in lucid dreams there are virtually no boundaries as the dreamer is aware about the illusory environment she inhabits. While dreaming lucidly, the person asleep knows the inhabited virtual environment is created in the mind and the only rules are the ones the mind is responsible for creating.

Besides the conceptual virtual resemblance between lucid dreams and video games, it has been demonstrated that playing video games is related to lucid dreaming induction (that is the occurrence of lucid dreams) (Gackenbach, 2006; Gackenbach, 2009a; Gackenbach, 2009b). American psychologist Jayne Isabel Gackenbach is the pioneering researcher within the peculiar field of lucid dreaming and video games, whose studies have suggested that both lucid dreaming and dream control can be a function of video game play. Dream control is associated with lucid dreaming and simply described, it is the ability to influence the discourses of dreams. It has been demonstrated that personal factors such as frequent play and years of video game play experience are influential on lucid dreaming and dream control. In a study case it is pointed out that lucid dreams and dream control are associated with all kinds of electronic media use but to a higher degree with video game play (Gackenbach, 2009a).

Factors which also have been shown to be associated with lucid dreaming and video gameplay include spatial skills (navigation) and the lack of vulnerability to motion sickness. It has been demonstrated that both players and lucid dreamers share these skills and traits (as reported in Gackenbach, 2009a).

These recent studies point out an undiscovered potential of video games. Supplementary to studies of psychology, neuroscience and phenomenology, game studies can be relevant for analyzing various parameters in game design potentially related to lucid dreaming and dream control. Also, conceptual and developmental approaches to create such dream experiences could be researched. So far no game has
been designed which specifically aim at affording players to experience lucid dreaming or dream control after play. This thesis tries to fill out this gap, as the problem statement below indicates, and will introduce an experimental approach to lucid dreaming game design.

1.1 Problem Statement

*How can video games be designed for practicing lucid dreaming?*

Due to thesis scope the problem statement is limited to lucid dreaming and excludes dream control. It has been demonstrated that also extended use of media before sleep can be influential on lucidity and dream control (Gackenbach, 2009a) and that game content can be transferred into dreams (Stickgold, Malia, Maguire, Roddenberry & O’Connor, 2000; Wamsley, Perry, Djonlogic, Reaven & Stickgold, 2010; Callaway, 2009; Murzyn, in press). Therefore the focus of game design will be how to design a video game prototype, which is supposed to be a sort of lucid dreaming practice/training game tool - ideally used prior to sleep. Practicing lucid dreaming refers to *rehearsing* having lucid dreams through video game play. This thesis is essentially a theoretical design experiment and not an experiment to be empirically evaluated due to scope of testing. This means that it is not part of the thesis to verify via testing if the design is successful in inducing lucid dreams after play. The emphasis is put on a creative approach to virtualized lucid dreaming practice and the point is not to obstinately argue for a definite solution, but rather show one of many possible ways to tackle game design. Nevertheless, the desired goal of successful induction of lucid dreaming after play will be referred to as the high level design goal throughout the rest of the thesis.

1.2 Thesis Structure

The structure of the thesis will be outlined. Chapter 10 is not described as it is a conclusion.

**Chapter 2**

First the briefly addressed concepts of lucid dreaming and dream control will be described in detail. This will provide insight into the theoretical background. Although it was stated that dream control is not included in the problem statement, it is difficult to separate dream control from lucid dreaming and the differences should be clarified.
Chapter 3

This chapter deals with a brief history of lucid dreaming research, certain dream studies involving games, and related work.

Chapter 4

Three existing approaches to lucid dreaming practice will be examined. It will be analyzed if they can be useful in the context of video game play design. Also, existing lucid dreaming induction techniques will be considered for implementation in the prototype.

Chapter 5

In this chapter the abstract notion of dreams as virtual realities will be covered. It will be used to investigate how presence/incorporation (terms the reader will later be familiar with) may be constructive to design for. The player involvement model will also be introduced.

Chapter 6

Two sets of design goals will be defined: formal and aesthetic goals. The MDA framework will be introduced and used to define the latter type of goals. The approach to designing for incorporation will be evaluated.

Chapter 7

In this chapter a description of the game prototype can be read. It is basically an analysis on how the design elements contribute to reach the formal and aesthetic goals.

Chapter 8

Two forms of testing will be covered: a usability test and an expert subject matter evaluation process involving four experts on the topic of lucid dreaming. Test results will be examined and discussed.

Chapter 9

A discussion on ways to improve the prototype takes place here. Except for considerations of the body’s role in this design experiment, issues uncovered via testing will be discussed.
2 Thesis Concepts

2.1 Clarifying Dream Control and Lucid Dreaming

Within the field of research there are two important concepts to elaborate upon, lucid dreaming and dream control. The purpose of this chapter is threefold:

1) To illustrate that there is ambiguity concerning the conceptual comprehension of lucid dreaming and dream control.
2) To define these concepts, supported by a comparative analysis, the design goals can only be set if the concepts are defined.
3) To select a perspective as the definition standard for the theoretical basis for design.

In the following, two conflicting perspectives on consciousness and dreaming will be addressed. There are several other perspectives in between but for the sake of simplicity only two are discussed (consciousness is quite a huge topic in itself).

2.1.1 The Perspective of Unconscious Dreaming

Why is it that dream control and lucid dreaming often are associated with each other? A key difference between the two concepts is that lucid dreaming is awareness about dreaming and dream control is the ability to exert influence on one’s dream (LaBerge & Rheingold, 1990). From the perspective of unconscious dreaming, however, the two concepts appear inseparable.

This view is expressed through the tradition of Freudian psychology, where dreams are believed to be unconsciously processed and not experienced by the dreamer consciously, contrasting waking cognition (Kahan & LaBerge, 1994). In general, this implies we are neither conscious nor reflective while dreaming. In the paper, Are dreams experiences?, American philosopher Daniel Dennett’s begins with this remark: “The “received view” of dreams is that they are experiences that occur during sleep, experiences which we can often recall upon wakening” (1976, p. 156). Dennett goes on saying that “Received it certainly is … not only has it been virtually unchallenged, it has been explicitly endorsed by Aristotle, Descartes, Kant, Russell, Moore, and Freud” (1976, p. 156). From this point of view, dreams are denoted unconscious
experiences and lucid dreams conscious experiences. In this perspective, dreams are experiences which are auto-piloted by the unconsciousness, why they cannot be controlled by default, and only by consciously recognizing that you are dreaming, you can deliberately control dreams. This is nevertheless a rather unnuanced view and not compliant with modern findings, which will be investigated soon.

Figure 2.1 illustrates the division between lucid dreaming, dream control and normal dreaming from the perspective of unconscious dreaming. It shows for instance that lucidity is inclusive for lucid dreams and lucid-control dreams (which the green circle illustrates). In a lucid-control dream both lucidity and dream control are present, whereas a lucid dream is denoting a dream where you are only lucid (aware about dreaming).

Also notice that in this figure, dreams are divided into conscious and unconscious categories (which the dotted horizontal line indicates). In this context, lucid dreams and conscious dreams are synonymous, similar to lucid dreaming and conscious dreaming. Likewise are unconscious and non-lucid dreams synonymous. Conversely, this does not imply that consciousness and lucidity are identical per se.

By merely reducing dreams to unconscious mental activities, interpreted as inner experiences, this perspective relies on a simplified dichotomous idea, which relate to habitual unreflective behavior (in the extreme metaphorical end, we are but reduced to zombies during ordinary dreams). Psychologist Edmund Freud is famous for having claimed that dreams are the “royal road to the unconscious” (1900, p. 608).
Despite this claim is over a century old, the idea that dreams are unconscious experiences is still prevalent. Levitan and LaBerge (1993) sums this up well in this quote:

> Much of the dream-based therapy (although not all) has operated on the premise that dreams are things that happen to people, rather than events that people generate. The creator of dreams has been named the “unconscious”. Because of this and the prevailing notion in the scientific world that sleep is unconsciousness, it has become common for people to believe that dreams occur in the unconscious mind, independent of the conscious ego. (1993, p. 2 in printed form - source unnumbered)

Three important opinions associated with the perspective of unconscious dreaming were found:

1) Discourses in dreams are *presented* by the unconscious and the outcome is arguably deterministic.
2) Unconscious dreaming is synonymous with normal dreaming and both lucid dreaming and lucid-control dreaming can be juxtaposed with conscious dreaming.
3) There is a dependency relationship lucidity and dream control, meaning that the acquirement of the latter requires the achievement of the former.

### 2.1.2 The Perspective of Conscious Dreaming

From the perspective of conscious dreaming, conscious dreaming is not limited to lucid dreaming nor lucid-control dreaming but encompasses dreaming in general - in particular REM dreaming.

Levitan and LaBerge (1993) suggest that dreams cannot simply be unconscious experiences. They argue that dreams are conscious experiences because humans are capable of recalling dreams to varying degrees. In contrast, events which are not consciously experienced cannot be accessed by memory, opposite dreams.

Tracey Kahan and Stephen LaBerge say that “findings from studies of reflective awareness during dreaming indicate that differences between waking and dream cognition have been exaggerated and that the quality of the cognitive activity in dreaming has been underestimated” (1994, p. 249). *Reflective awareness* is synonymous with being reflective in dreams and this is associated with lucid dreaming. One
example is German physician Moers-Messmer, who while dreaming, reflectively reasoned that his shadow fell awkwardly in accordance with the position of the sun while standing on a hill (as cited in Kahan & LaBerge, 1994, p. 252). The findings, which Kahan and LaBerge refer to, have contributed to the impression that cognitive processing is more similar to waking experiences and that reflectiveness is more prevalent in dreams than earlier believed. Further testing supports these findings (Kahan & LaBerge, 1996; Kahan, LaBerge, Levitan & Zimbardo, 1997; Kahan, 2001).

A third reasonable and simple argument for reflective thinking and rational skepticism being possible in dreams is put forth by asking rhetorically: How can we realize that a dream is a dream, if we cannot reflect while dreaming? The Moers-Messmer anecdote is not only an example of reflectiveness while dreaming; the experience also resulted in lucid dreaming. At least this gives rise to the hypothesis that reflectiveness is a requirement for lucid dreaming to occur.

The idea of conscious dreaming leads to questioning the role of the unconscious anew. To which extent are dreams playgrounds rather than theatres with fixed plots, analogically speaking? To which degree can dream discourses be influenced by the dreamer? Is the function of dreams to present content for a passive dreamer or rather to engage him? And ultimately, how much control do we have on our dreams? These questions are obviously related to the concept of dream control. The next logical question to ask is whether dream control is causally related to lucid dreaming, in Laberge and colleagues’ point of view?

Leviatan and LaBerge (1993) argue that dream control come in different sorts. One variant they call concurrent control and they define it as:

Concurrent control is [the] ability to determine or alter the course of a dream in “real time”, as it happens. This type of control is not limited to lucid dreams, anymore than our effect on the world is limited to times when we are thinking about what we are doing. Anytime we make a choice or act in a dream, we are controlling it. We may be unconscious of the reason for our choice, but the decision nonetheless originates within the self. (1993, p. 1 in printed form - source unnumbered)

Stating that concurrent control is not limited to lucid dreams, it also implies that dream control in its totality cannot be causally related to lucid dreaming. Given that concurrent control corresponds to every single choice or act we make in a dream, it seems that dreamers are rather controlling dreams than the
unconscious in this view. Dream discourses are certainly not deterministic by default; dreamers always have a choice. Nevertheless, by claiming that we can also be unconscious of the reason of a choice being made, it means that dreamers are not necessarily reflective or aware about a given situation all the time. Similarly, while we are awake we can also perform unconscious actions, such as placing the car keys at a place forgotten a moment later; or driving on a monotonous highway, only to have forgotten where we are geographically located minutes later. Essentially, being conscious in dreams is related to being aware and reflective of the dream choices as well as of the actions performed. From the view point of LaBerge and colleagues, this is not synonymous with being lucid per se.

Figure 2 is an expanded version of figure 1 and illustrates that the concept of dream control is more diverse from the perspective of conscious dreaming.

Figure 2.2 Various dream types’ relations to lucidity and dream control from the perspective of conscious dreaming
In relation to the perspective of unconscious dreaming, three contrasting points can be deduced:

1) The dreamer can control dreams by making choices at any time but there are different types of control.
2) Conscious dreaming is overall synonymous with all types of dreaming, however, we can be both consciously aware and unaware in dreams. To be aware while dreaming is to be conscious in dreams. On the other hand, to be lucid in dreams is identical to being aware about dreaming.
3) The dreamer does not have to be lucid dreaming in order to control dreams. Kahan and LaBerge (1993) state that “In dreams, control appears to be highly correlated with, but not an inevitable consequence of lucidity” (p. 252). As such, lucid dreaming and dream control are not causally related.

2.1.3 Final Clarifications and Definitions

Because lucid dreaming and dream control are not causally related, according to the perspective of conscious dreaming, it is possible to be observing a lucid dream while not controlling or influencing the dream. This may be due to deliberately choosing not to or because the dreamer is not aware of her control ability, despite being lucid. In the latter case, a dream would be labeled a lucid dream instead of a lucid-control dream, see figure 2. On the other hand, you can control a dream without being aware about dreaming. This type of dream has been called a (non-lucid) control dream according to figure 2.

According to research findings, dream control falls into three categories: manipulation of dream content, self-control, and actions. The first two categories correspond to the concepts of external and internal dream control (LaBerge & Rheingold, 1990). External manipulation covers alterations of perceivable dream content, which implies changing objects’ properties or dimensions in dream space; potentially leading to shape transformations, disappearance, scaling, translation, spatial distortion, etc. Internal manipulation deals with changing the inner state in the dreamer (or the psychological state of the dreamer). The inner state represents both the state of mind and emotional attitude of the dreamer and it influences the contents of the dream; therefore changing it will affect the contents too.
Table 2.1. Definitions of lucid dreaming and multiple types of dream control

<table>
<thead>
<tr>
<th>Primary concept</th>
<th>Secondary concept</th>
<th>Tertiary concept</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lucid dreaming</td>
<td>-</td>
<td>-</td>
<td>Awareness about the fact that you are dreaming</td>
</tr>
<tr>
<td>Dream control</td>
<td>Concurrent control</td>
<td>-</td>
<td>The ability to make a choice or perform an action while dreaming</td>
</tr>
<tr>
<td>Manipulative control</td>
<td>Internal control</td>
<td>-</td>
<td>The ability to exert influence on one’s dream by manipulation of the state of mind and emotional attitude of the dreamer</td>
</tr>
<tr>
<td></td>
<td>External control</td>
<td>-</td>
<td>The ability to exert influence on one’s dream by manipulation of perceivable content</td>
</tr>
<tr>
<td>Performative control</td>
<td>-</td>
<td>-</td>
<td>The ability to use extraordinary powers while dreaming</td>
</tr>
</tbody>
</table>

However, the third kind of dream control, actions, does not really fit into the binary division of internal and external dream control. As such, a third dream control category is suggested, performative control, which relates to this exemplified set of abilities: fly, walk through matter, jump incredibly high, etc. For the sake of referential simplicity, all three referred categories can collectively be called manipulative control.

2.1.4 Concluding Initial Conceptual Research

The perspective of conscious dreaming will make up the theoretical foundation for the thesis due to the fact that LaBerge and the Lucidity Institute have had a major influence on recent lucid dreaming and dream control research. Another reason for the choice is that these LaBerge and colleagues have proved lucid dreaming scientifically. Also, the perspective is up to date with recent research (Kahan & LaBerge, 2011). Having defined the core concepts, it is time to frame the initial design approach.

It is important to point out that the term lucid dreaming both cover lucid dreams and lucid-control dreams. This is clear from literature research. This means that both these types of dreams are related to the high level goal of game design.
Besides framing in the thesis concepts, the initial research also gave rise to two early design considerations:

1) The research results and theory of conscious dreaming indicate we reflect while dreaming. As will be exemplified in chapter 3, game experiences can transfer into dreams. Because lucid dreaming is associated with reflectiveness, it will be valid considering how reflectiveness about dreaming can be part of game design.

2) Although lucid dreaming and dream control are not causally related, would designing for dream control improve game design in the desired direction? It is hypothesized that if dream control is part of the gameplay and the player has dream control abilities, the sensation of being in a dream could potentially be enhanced. Given that the dreamer incorporates game experiences into dreams, this sensation may be adopted as well and could increase the chances of realizing dreaming.

Next it will be examined, what relevant literature and related work, the field of lucid dreaming has to offer.
3 Literature Review and Related Work

3.1 Brief History of Lucid Dreaming Research

The term lucid dream is usually believed to be coined by the Dutch psychiatrist Frederik van Eeden and first used in his article *A study of dreams* (1913). Considered to be anecdotal, it took many years before lucid dreaming was accepted within scientific circles, including the field of cognitive science and neuroscience. In 1968, the year which propelled the flower power revolution characterized by publicly increased interest in altered states of consciousness, British philosopher Celia Elizabeth Green published the book, *Lucid Dreams* (1968). It was the first extended book on the subject, classifying characteristics of lucid dreams and distinguishing them from out-of-body experiences. The door to scientific research had been opened and in the next decades groundbreaking scientific work and elaborative studies would follow. American psychologist Patricia Garfield introduced a set of practical approaches to dream control across many cultures in her best-selling book, *Creative Dreaming* (1974), which was one of the first successful Western attempts to seriously and extensively examine dream control in a pragmatic popular way.

There are noticeably key persons related to thesis work: Jayne Isabel Gackenbach, who has already been introduced in the first chapter, and American psychophysicologist Stephen LaBerge. Their research has been immensely influential on this thesis. Gackenbach created the Lucidity Association in 1981 and Laberge formed the lucidity Institute in 1987. Both have contributed a great deal to the research field but on an individual basis, Gackenbach is pioneering within dream research related to video games, conducted since the mid-00s, and LaBerge is the most scientifically influential researcher and has made a widespread impact on the recognition of lucid dreaming and dream control. In regard to this thesis, his established methodological approaches and the underlying philosophical foundation is of particular interest. Lucid dreaming is a phenomenological experience, usually deemed subjective and associated with psychoanalytic work, which makes its recognition become challenging by scientific standards in the

---

1 Noticeable in this context, are the books of Carlos Castaneda, being somewhat representative for a spiritual tendency during that time period. The first of his books was also released in 1968 and these books influenced the New Age movement and inspired lucid dreaming practice. Several of his books cover lucid dreaming to varying extent and address alternative techniques within this field; in particular *The Art of Dreaming* (1993). The writings are not scientific and discussions go on whether the anecdotes are factual or fictional.
past. However, during LaBerge’s Ph.D study at Stanford University (1980a), he began on the quest of verifying the seemingly paradoxical phenomena of lucid dreaming (LaBerge & Rheingold, 1990). It is generally accepted that LaBerge and colleagues were the first to scientifically prove lucid dreaming and the methodology was simple at initial inspection: being previously instructed in one of LaBerge’s lucid dream induction techniques (1980b), proficient lucid dreamers demonstrated via physical responses that they were lucid during testing. Specifically, pre-determined patterns of eye movements were signaled, implying unambiguous cues in waken physical reality to be physiologically registered by a polygraph.² Several tests of this type have been conducted to strengthen the verification of lucid dreaming (LaBerge, 1990).

The previously mentioned institutes are responsible for a great amount of networking and sharing of written information among dream researchers. The Lucidity Institute’s quarterly newsletter, NightLight, was published from 1989 till 1996, and contains information related to lucid dreaming in various forms: methodologies, practical tips, recent research, new findings, shared experiences, etc. Similarly, the now-defunct Lucidity Association published the Lucidity Letter (later renamed Lucidity) until 1993; a periodical also used for sharing ideas, experiments and communication within the communities in idealistic thread with the association’s conferences and activities. It is also worth pointing out the International Association for the Study of Dreams (IASD), a non-profit association which has also contributed with investigations on various aspects of lucid dreaming.

There exist multiple online communities and resources dealing with lucid dreaming information. Many of these have been used for research and design inspiration. Ideas for play-oriented lucid dreaming induction techniques have been discussed at forums. Dream reports are posted there too and occasionally reading about incorporation of game play elements in dreams has been inspiring.

See appendix A for an overview of visited communities and online resources used in research.

² In fact LaBerge was technically not the first to carry out the eye signaling technique as he found inspiration in earlier but less convincing experiments. The vague results were likely due to the lack of using proficient lucid dreamers as eye movement and pattern recognition mapping were seemingly more dependent on chance than control (LaBerge & Rheingold, 1990). Alan Worsley was the first person to use eye signaling as a test subject for parapsychologist Keith Hearne’s experimentation in 1975 (Gackenbach & Bosveld, 1990).


3.2 Video Game Play Influencing Dreams

Having outlined research focusing on lucid dreaming and dream control, the next step is to examine research covering the influence of media exposure on dreams - in particular video games. There have been conducted experiments with pre-sleep media stimuli, involving video game play. Stickgold, Malia, Maguire, Roddenberry, and O'Connor (2000) arranged having test participants play a modern version of Tetris (Alexey, 1984) prior to sleep in a study on the function of episodic memory in dreams. Both amnesiacs and non-amnesiacs participated, where the former group lacked declarative memory (that which can be recalled consciously), and despite of this and thereby not being able to consciously recall playing Tetris, parts of gameplay experiences nevertheless influenced hypnagogic content. Moreover, there were reported images from earlier versions of Tetris, suggesting that memories, apparently not of short-term nature, can nevertheless be influential on dream content.

Continuing this sort of memory research, Wamsley, Perry, Djonlagic, Reaven, and Stickgold (2010) did a study where test participants played Alpine Racer 2 (Namco, 1996), an arcade-like skiing simulation game, used as pre-sleep stimuli. It is noticeable that the reporting method used for both tests was to wake up test participants at various periods of sleep and that the earlier the participants were awakened, the more direct and concrete the mapping between game and dream content would be in general.

Doom (id Software, 1993) has been used as pre-sleep stimulus too (Callaway, 2009). After an hour of play, nearly all test participants dreamt about Doom. Interestingly, frontal areas in the brain were activated in experienced players while dreaming. When playing again after sleep, their play skills had improved due to continued (simulated) play while dreaming. It is promising that merely one hour of play is enough for game content to be adopted into dreams.

3.3 Dream Bizarreness and Nightmares

Not only have altered conscious states in dreaming been an area of interest in relation to video game research; the contents of dreams have also been analyzed among gamers and a sample of indicative

---

3 Hypnagogic content refers to what is dreamed about during hypnagogia: the transitive state between wakefulness and sleep.
patterns were recognized in a couple of studies. It was examined that hardcore gamers/high-end gamers\(^4\) tend to have averagely more imaginary and dead characters in their dreams than the norm (Gackenbach, Matty, Kuruvilla, Samaha, Zederayko, Olischefski & Von Stackelberg, 2009); also when compared to those who scarcely or never play (Gackenbach, Kuruvilla, 2008a). Characters do not only cover human beings but also folkloric, mythological and fictional beings; for instance vampires, zombies and extraterrestrial beings. Anecdotes cover transformations of the dream body into the shape of strange aforementioned entities, which indicates that identification and the role of avatar during video game play can affect the self-perception of the player’s dream body. Moreover, it has been further analyzed in studies that high-end gamers had more bizarre dreams than low-end gamers (Gackenbach, Kuruvilla & Dopko, 2009; Gackenbach & Dopko, in press). Bizarre dreams basically cover discontinuity and incongruity in connection with experiencing events, characters, locations, etc. In addition, it has been hypothesized that there is a connection between bizarreness in gamers’ dreams and creativity (Gackenbach, Kuruvilla, 2008a).

Focus on nightmares and traumatic experiences expressed in dreams have been covered in dream research extensively; yet it has also been coupled with video games research and TV watching (Van den Bulck, 2004; Schredl, Anders, Hellriegel & Rehm, 2008). The nature of nightmares among video game players have been investigated (Le & Gackenbach, 2009) and findings demonstrate that during dreaming, high-end gamers also tend to experience less aggression and threatening situations than the norm - contrary to expectations (Gackenbach & Rosie, 2011). However, when high-end gamers do have aggressive dreams, the experiences are more brutal and exaggerated (Gackenbach & Rosie, 2011). Another study case involved gamers from the military as test participants (Gackenbach, Ellerman & Hall, 2011). In this study case it was found that high-end gamers experienced less threat and war contents in dreams, related to their military background, than low-end military gamers.

\(^4\) The definition of a hardcore gamers among Gackenbach and colleagues may vary from other scholars’ and laypersons’ definitions. Gackenbach writes, “Throughout the studies we generally defined the hardcore gamer as someone who: 1. Play video games on average several times a week; 2. Typically played for more than two hours per gaming session; 3. Played 50 or more video games over his lifetime; and 4. Has been playing video games since grade three or earlier” (Gackenbach, in press, p. 6). Also, the notions of hardcore gamer and high-end gamer are apparently used interchangeably; with no clear definitional distinction between them.
3.4 Electronic Devices for Lucid Dreaming Induction

Other related work which is interesting to examine covers electronic devices designed for induction lucid dreaming induction. Similarly to video games, they have the capability of carrying out programmed procedures which potentially facilitate lucid dreaming induction. Stephen LaBerge was the first to design a prototype of this sort in 1985 and after several iterations carried out by him and colleagues at the Stanford University, it was published as a product called DreamLight (LaBerge & Rheingold, 1990). On the surface, the product is merely a sleep mask but it is also “a portable computerized biofeedback device ... designed to deliver light cues during REM sleep” (LaBerge & Lynne, 1995, p. 1). When worn, DreamLight can register REM sleep by tracing eye movement. Having registered eye movement, it then sends out either flashing lights or sounds. These are visual and auditory cues which should notify the dreamer that she is dreaming – therefore they are called dream cues. Dream cues are keys to recognizing that one is dreaming. The inspiration for this electronic approach is the fact that sensory stimuli originating in the sleeping environment can be incorporated into dreams (LaBerge & Lynne, 1995). However, this approach to incorporating dream cues can have a tricky side. In dreams, flashing lights may be experienced as everything from fireflies to suns. The dreamer may not necessarily associate such visual input with dream cues.

![Figure 1. NovaDreamer* Printed Circuit Board](image1)

![Figure 2. NovaDreamer* Front View](image2)

![Figure 3. NovaDreamer* Third Eye View](image3)

*Figure 3.1. NovaDreamer images*

There has been conducted several experiments with DreamLight (LaBerge, 1988; LaBerge & Levitan, 1988; LaBerge & Rheingold, 1990; LaBerge & Lynne, 1995). Some results prove that DreamLight can be
advantageous in regard to lucid dream induction and that lucid dreams are definitely not entirely induced by the placebo effect (LaBerge & Lynne, 1995).

In 1993, the more sophisticated NovaDreamer was released, which when upgraded with the SuperNova Dreamer interface box becomes no less than the SuperNovaDreamer. It enables showing and saving quantitative data, such as the rate with which dream cues were sent during a night and their intensity (brightness for lights and volume for sounds). Also does the SuperNovaDreamer allow the user to type in data to be uploaded to her PC or Mac; data such as the total amount of dreams, total amount of lucid dreams, and the amount of spotted dream cues. In this way, it is also a personal statistics log for analyzing how the user’s induction success rate relates to settings, which the user has full control of (cue rate, intensity, etc.).

Both DreamLight and SuperNovaDreamer also have a “dream alarm feature”, which is claimed to enhance dream recall according to the Lucidity Institute’s website. Both devices can be expanded with DreamSpeaker, which allows for a digitally recorded voice sample to be played during REM sleep. The sample can both be a dream cue and a reminder for your personal lucid dream goal. P.E.S.T. (Programmable Electronic State Tester) is a small box-shaped device, which is used to remind the wearer to do a reality test whenever a signal is send. A reality test is simply put, a test where you reflect upon
whether you are dreaming or awake and it will be examined closer in the next chapter (appendix D offers in-depth information about reality testing). The P.E.S.T.’s device’s ways of signaling are the use vibrations, beeps or light flashes.

There exist several other dream masks, which fundamentally are clones of the ones addressed, e.g. Remee, DreamStalker Pro, and REM-dreamer. See appendix B for a list of addressed lucid dream induction devices - incl. links for further info.

There are some potential issues with the examined devices. Many dream masks are too clumsy and awkward to wear for several hours straight. The Lucidity Institute’s masks are very expensive (some models used to cost around $1000 per copy). P.E.S.T. seems almost redundant as most people have a cell-phone, which has embedded vibration technology and compatible alarm features. Acquiring video games for practicing lucid dreaming seems to be a relatively cheap alternative to the generally expensive dream masks. The big difference between video games and the reviewed electronic devices is that video games offer virtual environments, potentially beneficial for practicing lucid dreaming. These environments provide an entirely different set of possibilities for how electronic and digital input can be used to facilitate lucid dreaming.

In the next chapters, various existing approaches to lucid dreaming induction will be examined and it will be analyzed whether they do fit or not into lucid dreaming practice in a virtual game environment.
4 Approaches to Lucid Dreaming Induction

Given that the high level design goal is lucid dreaming induction, it is relevant to address existing approaches designed with the same goal in mind. These will be analyzed in the light of video games, first and foremost for the sake of inspiration. There exist three approaches to lucid dream induction:

1) Electronic
2) Mental
3) Neurochemical

The electronic approach covers the use of electronic devices, like the NovaDreamer described in chapter 3. The mental approach constitutes exercises found in books, on websites and in other literary sources, which are not dependent on electronic or digital input. The neurochemical approach covers using alkaloids and stimulants, said to improve lucid dreaming induction (Yuschak, 2006) by affecting the activity level of neurotransmitters. Supplements are hard to relate directly to game design, should the emphasis be the game itself and not the player’s chemically altered state of mind. It is beyond the scope of this thesis to involve experimentation of alkaloids and stimulants as this would cover complex areas such as neuroscience and chemistry. Besides, there may be ethical issues related to it, for instance nicotine is an alkaloid which has been experimented with in a lucid dreaming induction context (Yuschak, 2006). Compared to the other approaches, the use of supplements also appears to be less widespread, researched and empirically covered than the other types of approaches.

4.1 Electronic Approach

The induction techniques related to electronic devices which are designed for operating during REM sleep, e.g. DreamLight and NovaDreamer, cannot be directly applied to video games due to the play situation (we do not sleep when we play). Nevertheless, these devices are inspirational.

It has been proved with DreamLight that lights work quite successfully as cues for remembering dreaming when sent to the dreamer during REM sleep (LaBerge, 1988; LaBerge & Levitan, 1988; LaBerge & Lynne, 1995). It is relevant to ask if a similar type of mnemonic signal is useful in a video game context.

The true power of the aforementioned type of electronic devices is to automate the process of sending cues to remind the user that she is dreaming. Because video game design is expressed through
programming, it means that designing also involves taking control over which information the player will receive and how often. By using the simulative power of games and automation, mnemonic training of metacognition can take place in a controlled manner.

Memory plays a central role for multiple lucid dreaming induction techniques. Yet, it is ironic that experienced lucid dreaming practitioners do not always remember to practice memory training, for instance asking the question: “Am I dreaming?”. LaBerge and Rheingold writes: “If you are like most people, you are used to relying on external reminders and therefore need practice in remembering intentions using only your own mental power” (1990, p. 63). This is when technology comes handy. They afford us to become automatically reminded about something. Like alarms tell us when to wake up from dreams and coded light may tell us to realize we are dreaming, programmed cues may teach us to remember the intention of becoming lucid for instance.

4.2 Mental Approach

The mental approach covers techniques which afford for the practitioner to become lucid, purely by mental practice.

LaBerge & Rheingold distinguish between two types of dreams which can be exercised for: dream-initiated lucid dreams (DILDs) and wake-initiated lucid dreams (WILDs) (1990, p. 79 - 80). The latter type of dreams is induced by techniques based on the Tibetan dream yoga tradition and aim for “falling asleep consciously. This involves retaining consciousness while wakefulness is lost and allows direct entry into the lucid dream state without any loss of reflective consciousness.” (LaBerge & Rheingold, 1990, p. 79). Although it may at first sound unlikely and paradoxical that this can happen, several researchers have successfully experimented with inducing WILDs (LaBerge & Rheingold, 1990; Tholey, 1983). WILDs, however, are obviously problematic designing for: to design for the player falling asleep is very much akin to designing an experience which is simply plain boring. Also, the aspect of interactivity which characterizes games is hardly compliant with the requirement of falling asleep. Moreover, test results and

---

5 It is very popular to discuss dream types at various online forums (see appendix A for researched examples). On the forums, many spectacular dream types exist, e.g. FILD (finger-induced lucid dream), SSILD (senses-initiated lucid dream), VILD (visually incubated dream), HILD (hypnosis-induced lucid dream), etc. It should be noted these acronyms are rather representative for specific methods than for types of dreams and they can all fit into the MILD and WILD categories. Also, these techniques are often developed by dreaming communities, their success rates are dubious and they have not been thoroughly tested.
LaBerge’s personal experiences point out that “Generally speaking, WILDs are less frequent than DILDs; in a laboratory study of seventy-six lucid dreams, 72 percent were DILDs compared with 28 percent WILDs.” (LaBerge & Rheingold, 1990, p. 80).

Instead, DILD techniques are hypothesized to be valid to design for. In appendix C, a list of researched popular and thoroughly tried out DILD techniques are described in simplified form. Numerous DILD techniques have similarities. Several of the techniques share a meditative or mindfulness-like approach (this term will be defined later). Relaxation is also strongly associated with the practice of DILD techniques.

One example of a DILD technique is a Tibetan technique used to affirm yourself that all that exist around you are of the substance of dreams. It has been accepted as a valuable practice in the West (LaBerge & Rheingold, 1990; Gackenbach & Bosveld, 1990; Wangyal, 1998). As an accomplished scholar and lama in the Tibetan Bön Buddhist tradition, Tenzin Wangyal Rinpoche explains: “Throughout the day, practice the recognition of the dream-like nature of life until the same recognition begins to manifest in dream.” (1998, p.90). LaBerge’s version of this technique, called the power of resolution, adds to the practice that the practitioner will set up the conscious intention of realizing dreaming in the forthcoming dreaming when going to sleep (see appendix C).

### 4.3 Benefits of Implementing DILD Techniques

It needs to be analyzed why implementing DILD techniques into a game may be useful if the game is used as pre-sleep stimuli. In the following, arguments for this are presented.

#### 4.3.1 Multiple Techniques Can Be Incorporated in a Game

A game allows for incorporated techniques to be used simultaneously during play. These techniques may for instance include visualization, verbal suggestions, and reality testing where visual, auditory, and mouse-keyboard input can support them respectively. Results show that techniques may work more effectively when used in combination (Levitan & LaBerge, 1989; LaBerge & Rheingold, 1990). The interactivity aspect of video games allows for a creative approach for implementing techniques in combination with others.
4.3.2 A Play Context Can Enhance Motivation for Practice

The aspect of interactivity in video game allows for challenging and motivating the practitioner. It is rather individual to players why a game is motivating to play. Regardless, researchers have tried to classify reasons of motivation for play on various levels (Huizinga, 1949; Lazzaro, 2004; Yee, 2006). There are various game elements which may afford intrinsic motivation, a thrilling engaging game world, rewards/power-ups, achievements, etc. Also, if play is part of training, play may motivate the player. To become successful with lucid dreaming induction, training is usually hard work (LaBerge, 1980b; LaBerge & Lynne, 1995) but the game aspect may contribute with turning practice into a more attractive playful activity.

4.3.3 A Game Can Support and Facilitate Visualization

Not all people are good at visualizing, which many pre-sleep exercises rely on. A game can support the sensation of visual, auditory, and tactile input; at least game graphics are more stable than mental images. During visualization practice, it is for less experienced practitioners a common challenge to retain the inner mental picture and not become led astray by mental drifty visions or interfering thoughts (even when verbally guided). This risk is arguably reduced in a game context. Test results from game experiment show that video game playing can improve visualization skills (Crown, 2001), spatial visualization, and mental rotation (Rosser, Lynch, Cuddihy, Gentile, Klonsky & Merrell, 2007). This also means that video game-based lucid dreaming training is beneficial for using mental techniques.

4.3.4 No or Minimal Risk of Falling Asleep during Practicing

Several techniques are supposed to be done in bed prior to sleep. Thus there is always is a risk of falling asleep. The necessity of having eyes open and being (inter)active while playing, instead of being physically passive, virtually eliminates the risk. This means that using video game play for pre-sleep lucid dreaming practice is a stable practice in this regard.
4.4 Shared Methods among DILD Techniques

An overview over lucid dreaming induction techniques can be found in Appendix C, which has also been used for analyzing shared methods among DILD techniques. These techniques have been quite influential on how to approach the thesis game experiment but describing the techniques in detail is beyond the scope of this report. Instead, a summary of the researched techniques is given in appendix C.

There are four kinds of shared methods: Intention Setting (IS), Reality Testing (RT), Recall (R), and Visualization (V) - the initials in parentheses are shown in the table. The table below illustrates which method(s) each analyzed lucid dreaming induction technique includes.

<table>
<thead>
<tr>
<th>Techniques</th>
<th>IS</th>
<th>RT</th>
<th>R</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power of resolution</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Critical state-testing</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Intention</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Reflection-intention</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Mnemonic induction of lucid dreams (MILD)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Autosuggestion</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wake back to bed (WBTB)/Scheduling time for lucid dreaming</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Hypnosis</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Look at your hands</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Table 4.1. Distribution of methods for a sample of DILD techniques*

This methodological research has been useful for finding commonalities across a sample of methods, which are inspiring for game design.

Notice that relaxation is often a fundamental requirement for lucid dreaming induction. It has not been included in the table as it is not a method in itself.
4.4.1 Intention Setting

Intention setting relies on a mixture of will-power and conscious attention towards the aim of becoming lucid during sleep. Intention setting is often closely related with visualizing intended outcomes. Theoretically, a strong intention for having lucid dreams is sufficient for induction but this is seemingly rarely enough.

4.4.2 Reality Testing

Reality testing is the conscious process of analyzing whether you are dreaming or not in a given situation. When asleep, we are most of the time not aware about dreaming and a reality test performed in sleep may result in lucid dreaming. If done repeatedly while awake, we may potentially start doing it during sleep, due to habit, and frame the mind to become regularly reflective about dreaming. There are several ways of doing reality tests in practice. LaBerge exemplifies one way of performing reality testing:

Find some writing and read it once (if you can), look away, then reread it, checking to see if it stays the same. Every time I have tried this in my own lucid dreams the writing has mutated in some way. The words may no longer make sense or the letters may turn into hieroglyphics. (1990, p. 53)

Text is also generally transformative in non-lucid dreams. Text therefore works as dream cues, which indicate that you are sleeping. Using watches for reality testing, such as your wrist watch in waking life, is “an equally effective state test [alias reality test]” (1990, p. 53), LaBerge says. Reality testing is as much a cognitive skill as it is a perceptual skill. It both requires practice in recognizing dream cues and learning to address self-reflective questions like: “Are you dreaming right now?”

For elaborated information on reality testing see appendix D.

4.4.3 Recall

Recall refers to mentally recognizing events from memory or mnemonics (mental techniques for improving memory). First, recall may simply cover you focusing on remembering your dreams when you wake up. Second, it may cover reflecting on what you have recently done. If you cannot recall a sequence of events, or the remembered sequence of events appears serially incongruent, you are likely dreaming. Third, it may cover you remembering the intention to become lucid and/or do reality testing at specific occasions. There are other variations of applying the method of recall but the mentioned three are prevalent. The conscious act of recalling is often, if not always, assisted by visualization.
4.4.4 Visualization

This covers actively imagining and envisioning events and actions. Visualization is not restricted to vision but is an internal perceptual process, which can involve all five senses. Usually, it involves the practitioner visualizing herself dreaming, becoming lucid while dreaming and carrying out intended tasks while lucid. Visualization is thus used as a tool for rehearsing the desired future.

4.5 Analysis Summary

For the sake of summary and overview, the model below illustrates the chronological process of analysis in this chapter, from top to bottom.

![Figure 4.1. Process of analysis for chapter 4, consisting of three narrowing steps](image-url)
4.6 **Formal Design Goal 1: Implementation of All Four Shared Methods**

A design decision is to implement all shared methods, found across a sample of DILD techniques, in the thesis game prototype. By covering all methods in a holistic manner, a more thorough approach to lucid dreaming induction implementation is guaranteed. It is however not guaranteed that the game will succeed in lucid dream induction per se, only testing will show.

It is not an aim to implement all the listed techniques in the game. Neither is the aim to directly copy techniques and implement them step-by-step in the thesis game prototype. The challenge is to figure how all four methods can be implemented in a way that beneficially utilizes the advantages of the video game medium (techniques serve as inspiration instead of being copy-paste solutions). Also, such a solution would hardly be possible without modifications.

It is difficult to make a comparative analysis between the success rates of all techniques and pinpoint the superior ones. Simply because far from all existing techniques have been thoroughly tested and not comparatively to each other under controlled conditions. Also it is quite individual which techniques work best (LaBerge & Rheingold, 1990). Therefore, this thesis is rather about implementing modified lucid dreaming induction techniques in creatively constructive ways, than about rigorously analyzing which lucid dreaming induction techniques work best. It is likely they work differently once implemented anyway.

Conclusively, the first formal design goal has been chosen. Having researched approaches and techniques for lucid dreaming induction, a more abstract conceptual investigation on dreams and virtual realities comes next.
5 Dreams as Virtual Realities

It was mentioned in the introduction that dreams could be associated with virtual realities. This theoretical concept will be examined closer and it will be analyzed how this relates to game design.

Several authors have compared dreams with the simulation of reality reminiscent of virtual reality (Moller & Barbera, 2006; Nielsen, 2011). Antti Revonsuo views dreaming as a virtual reality simulation in our brains (Revonsuo & Salmivalli, 1995) and has related it to “inner presence” (Revonsuo, 2006).

The term presence has been discussed a lot in virtual reality and video game circles and is originally derived from the term telepresence in relation to remote machine operation (Minsky, 1980). Presence is often denoted broadly as the subjective experience of “being there”, which implies some sort of psychological transportation (Heeter, 1992; Ijsselsteijn & Riva, 2003). Presence is not only related to computer-mediated experiences. Matthew Lombard and Theresa Ditton define presence in very general terms as experiencing the “illusion that a mediated experience is not mediated” (Lombard & Ditton, 1997, p. 1). Mel Slater and Sylvia Wilbur define presence as “a state of consciousness, the (psychological) sense of being in the virtual environment” (Slater & Wilbur, 1997, p. 607).

The dream-virtual reality concept is intriguing. The motivation for addressing this concept as well as presence is not entirely theoretical. The research done in this chapter should lead to valid design considerations, which can lead to an extended formulation of design goals.

5.1 The Mediated Dream

If dreams can be viewed as conceptually synonymous with virtual realities, can game experiences similarly be viewed as mediated dreams? This question itself provides inspiration for an interesting design concept. The metaphor of dreams as virtual realities gives rise to the idea of creating a game world simulating a dream. This game world could be the frame for a rehearsal space where lucid dreaming practicing can take place in a playful manner.

Moreover, lucid dreaming induction techniques are based on visualizing “being there”, in relation to presence, which here refers to being in an imagined dream. As addressed earlier, video game play supports and facilitates visualization. A high level of presence potentially means having an easier time experiencing the sensation of being in a dream in a play context. Presence does not only facilitate this make-believe sensation, it hypothetically also intensifies the experience of visualization. Will it at all be
possible to design a game which can offer play experiences which are comparable with dream experiences?

Moller and Barbera write that dreaming “may be regarded as a natural experiment in presence; in fact the “gold standard” by which other immersive environments may be compared.” (2006, p. 105). This statement motivated for a very interesting study case to be carried out, which compared dream presence with mediated presence related to video game play (Gackenbach & Rosie, 2011; Gackenbach, Rosie, Bown & Sample, 2011). The aim of the study was to investigate how influential the degree of interactivity and fidelity are on the incorporation of game content into dreams. In addition, the aim was also to investigate on the influence of fidelity and interactivity on presence. Forty test participants were used in this study and were randomly assigned to one of four groups, as shown below.

<table>
<thead>
<tr>
<th>Activity and condition</th>
<th>Interactivity</th>
<th>Fidelity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Playing a game with virtual reality goggles</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Watching a recorded play session with virtual reality goggles</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Playing a game in front of a TV</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Watching a recorded play session in front of a TV</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

*Table 5.1. The four types of test activities and conditions*

The game to be tested was *Mirror’s Edge* (EA Digital Illusions CE, 2008), a fast-paced first person action game inspired by the urban movement discipline of parkour. Hence this study case will later be referred to as *The Mirror’s Edge* study case. Test participants were instructed to indulge in the mediated experience only once and report dreams for 14 days afterwards. Questionnaire items were based on the conceptual notion of presence associated with Lombard and Ditton (1997) (as cited in Gackenbach & Rosie, 2011). Test participants had to fill out a questionnaire immediately after the mediated experience and report

---

6 According to the Oxford Dictionaries fidelity can mean: “The degree of exactness with which something is copied or reproduced” (Fidelity, n.d.). Regarding high fidelity, for instance, think Hi-Fi stereo or high-definition TV.
their coming dreams. Only the dreams which incorporated game content were collected and for each dream presence questionnaires were filled out.

The various degrees of game content incorporation in dreams were assessed by test participants’ self-reports and the judges’ evaluations. The conclusion was that fidelity had most impact on dream presence, based on self-reported data. However, interactivity had more influence on dream presence according to the judges’ evaluations.

Test results showed that there were no overall significant differences in mediated and dream presence. Only 4 out of 12 questionnaire items showed significant differences. 1 out of these questionnaire items showed more presence in games than dreams, which was related to sensation of the body. 3 out of 4 questionnaire items indicated more presence in dreams than games: “experiencing real feelings, things happen to you and a sense of being there.” (Gackenbach & Rosie, 2011, p. 103). There are some interpretation problems here. The way the test participant understand a question is subject to subjective interpretation and this test seem to have suffered from the use of ambiguous terms. For instance, the latter questionnaire items basically cover the presence concept in its totality as the researchers claim themselves (Gackenbach & Rosie, 2011, p. 103).

What this complicated study case demonstrates is that the presence difference between dreams and games, under proper fidelity conditions, are not that different. This finding supports the initial game design idea about creating a game taking place in a dream simulation, which to a high degree both supports the practice of visualizing being in dream and affords for generating the simulated sensation of dreaming.

5.2 Presence Supporting a Mindful Design Approach

Successful application of lucid dreaming induction techniques typically rely on relaxation and imagination. Yet, they demand focus and undisturbed awareness, similar to meditation and mindfulness practice. According to the online Oxford Dictionaries, mindfulness can be defined in two ways:

1) “The quality or state of being conscious or aware of something” (Mindfulness, n.d.)
2) “A mental state achieved by focusing one’s awareness on the present moment, while calmly acknowledging and accepting one’s feelings, thoughts, and bodily sensations, used as a therapeutic technique” (Mindfulness, n.d.)
Gackenbach and Bown have associated immersion and presence with mindfulness in an empirical study (Gackenbach & Bown, 2011). Complex questionnaire data from 384 subjects were measured according to mindfulness scales, in relation to the measurement of immersion and presence. The findings, based on discovering that hardcore gamers scored high in immersion and presence, resulted in “tentative support for our [the researcher’s] major hypothesis that some types of mindfulness are associated with gaming” (Gackenbach & Bown, 2011, p. 121). From this perspective, presence is a metaphor for a mental state and is worth designing for because it is in line with mental practicing and may support relaxation.

Of course presence cannot be said to be synonymous with mindfulness and a relaxed attitude of play perse. Presence comes in many variations. However, the empirical study leads to inspiration and demonstrates that the video game medium has the potential to create a certain state of mind, reminiscent of a mindful state of mind, which is beneficial for lucid dreaming induction practice.

Moreover, meditation is associated with lucid dreaming. It has been shown that practicing meditation will increase the likelihood of having lucid dreams (Gackenbach & Bosveld, 1990). This may inspire to design for a sort of meditative gameplay. Although playing video games and meditating are very different activities, and meditative gameplay may not necessarily have a direct influence on lucid dreaming induction, a meditative kind of game experience is nevertheless in line with the meditative character of many lucid dreaming induction techniques.

5.3 Incorporation as an Alternative Term for Presence and Immersion

There are various views on whether presence is an illusion, a state of mind or a different phenomenon. Presence is sometimes conceptually mixed up with the term immersion and they are often used interchangeably. Disagreement between the definitions of presence and immersion make the phenomenological concept of being virtually present/immersed diffuse and hard to understand precisely when mentioned in various contexts (Calleja, 2011).

The terminological vagueness and confusion conceived by the plethora of meanings, associated with presence and immersion, and the identification of a number of related problems, motivated Gordon Calleja to bring the term incorporation into a new light. Calleja uses the term “as a more acute metaphor than presence and immersion” (2011, p. 4). This term will be presented next and the argumentation for why it is analytically constructive will follow.
Calleja describes incorporation as “the absorption of a virtual environment into consciousness, yielding a sense of habitation, which is supported by the systemically upheld embodiment of the player in a single location, as represented by the avatar.” (2011, p. 169). What this means is that incorporation takes place at two levels:

1) The virtual environment in question is incorporated into the player's consciousness.
2) The player is incorporated into a virtual environment and has a single location at any point in time, in the 3D space of graphical representation generated by the game system.

In regard to mediation of virtual environments, a mutual process goes on where both player and environment incorporates each other. Calleja emphasizes that this process takes place simultaneously and that the player's consciousness is incorporated into the virtual environment through the avatar.

Why is incorporation useful as a concept to base game design on?

Calleja's research, which led to the definition of incorporation, is based on 3D virtual environments and he points out that incorporation center around these types of environments. Parts of the conceptual confusion which surrounds presence and immersion are caused when various genres are referenced without properly taking context and the multifaceted nature of games into account. The kind of immersion experienced in Tetris (Alexey, 1984), immersion as absorption, is arguably different from the kind of immersion experienced in Half-life 2 (Valve Software, 2004) (Calleja, 2011). Therefore it may be problematic to apply the same term in two different genres and research contexts. This problem is non-existing by focusing specifically on game design in a 3D virtual environment.

Tetris is a good example for why the thesis game prototype will take place in a 3D environment and include an avatar. Although Stickgold et al. demonstrated that a simple game as Tetris can influence dreams (Stickgold, Malia, Maguire, Roddenberry & O'Connor, 2000), this game is definitely insufficient according to the design considerations as visualization techniques fundamentally rely on the practitioner imaginatively inhabiting a 3D space with an imagined self (similar to an avatar). Calleja’s comment on Tetris elaborates on the issue: “There is no avatar which allow virtual embodiment” and “the game environment is represented in it totality on one screen; there is no element of conscious spatial navigation” (Calleja, 2011, p. 27).

Another reason for finding Calleja’s concept of incorporation useful is that it is connected to a model, which is relevant for design inspiration and analysis. It will be examined next.
5.4 Formal Design Goal 2: Incorporation via Player Involvement

Calleja has developed a conceptual model through qualitative research: the player involvement model (2011). Six dimensions of involvement constitute this model, which are mentioned here along with corresponding key words:

- **Kinesthetic**: controls and movement
- **Spatial**: orientation, navigation and exploration of space
- **Shared**: competition, collaboration and “being virtually together” in the social sense
- **Narrative**: generation of storyline and interaction with scripted narratives
- **Affective**: the affect, sensation and emotional response
- **Ludic**: choices, goals, rewards, strategic and tactic engagement

Lombard and Ditton similarly fragmented presence into six conceptualizations, hinting at the multifaceted nature of presence and immersion, which can barely be reduced to a mono-dimensional definition (1997). The player involvement model is both conceptual and graphical/illustrative. The six dimensions are more interesting than the graphical part of this model in this research context. The latter part has been omitted from this research as it is first and foremost useful for analyzing the concept of incorporation in existing games. It is evaluated that it is not needed for designing.

Calleja has divided each dimension up into two temporal phases of involvement: macro and micro. The macro phase includes being involved in a game on various levels when not playing. It covers factors such as motivation for (re)play, engaging in associated game communities, thinking and reflecting about the game recently played, etc. The micro phase encompasses aspects of involvement when playing. All six dimensions can be engaged on a macro and micro level.

Involvement can simultaneously take place across multiple dimensions and the degree of involvement can vary for each dimension. The more intensified involvement the player experiences, the larger the degree of incorporation.

In the next chapter it will be evaluated which dimensions of player involvement, game design will focus on. The player involvement model is useful as a lens for deciding on which dimensions are most relevant to design for. When describing the design of the prototype, it will be elaborated how each dimension has
been taking into account on a micro level only. Designing for player involvement on a micro level is relevant because it can result in the player experiencing incorporation during play. It was discussed how presence and immersion, now terminologically covered by the term incorporation, can be associated with a relaxed, mindful and focused state of mind and can lead to a simulated sensation of dreaming in a play context, given that the game experience is about simulating dreaming. These two aspects are beneficial in terms of implementing lucid dreaming induction techniques. Because player involvement on the macro level is not related to these two aspects or to how games can be used for lucid dreaming induction practice from an in-game perspective in general, macro level player involvement will not be addressed in a design analysis context. The study case of Wamsley, Perry, Djonlogic, Reaven, and Stickgold (2010), where participants experienced dreaming about Alpine Racer 2 (Namco, 1996) in sleep, exemplifies kinesthetic involvement on the macro level. With that example in mind, player involvement on the macro level is also associated with the high level design goal. However, the way to reach this sort of macro level player involvement will be limited to an analysis of player involvement on a micro level.

Thus the second formal design goal has been chosen: incorporation via player involvement. In the next chapter, more goals will be described and the definitive approach to design will be formulated.
6 Design Goals and Design Approach

The high level design goal of this thesis, which is associated with the problem statement, is to create a game design experiment which affords for lucid dreaming induction practice in a creatively constructive way. Research so far has led to establishing an initial set of design goals.

6.1 Outlining the Formal Design Goals

In the last chapter the formal design goals were specified. They will be outlined here again.

1) Implementation of all four shared methods (among the analysed DILD techniques)
2) Incorporation via player involvement

Although a basis for game design is created with the formal design goals, it is somewhat difficult to imagine what kind of experience the game design aims for and how the player becomes involved. The player experience has to be in focus too. This is why a design approach, which also takes the player experience into account, is beneficial. A design approach will help guiding the design process in a creative way, while ensuring a coherent development structure with clearly defined goals.

6.2 The MDA Framework

The MDA framework is useable for designing games and game research and offers a formal iterative approach to game design (Hunicke, LeBlanc & Zubek, 2004). The iterative approach refers to designing, testing and evaluating results in a looping process. The MDA framework consists of three components: Mechanics, Dynamics and Aesthetics (to be examined next). These components influence each other and by modifying a certain component, the others are influenced by the change as well. This ensures a flexible framework where any components can be assessed at any time during the development process.

The iterative approach is one reason for choosing the MDA framework for assessing game design as this approach is quite useful for experimenting and prototyping. Confronting a design challenge of the unordinary kind by attempting to design a lucid dreaming training game and travelling uncharted design territory, iterative prototyping becomes especially desirable. There are several unknown factors in connection with figuring out how to adopt a lucid dreaming training dimension into the game, and with no other game with identical design goals to compare with, it makes iterative prototyping a comfortable choice.
Another reason to go for the MDA framework is that it benefits well for game design to be both viewed from the player's as well as the designer's perspective during the design process. Similar to Tracy Fullerton's notion of player-centric design (2008), the MDA framework allows for the designer to first and foremost be focused on which game experiences to aim for, instead of gameplay elements, during a very early stage of conceptualization.

A third reason for using the MDA framework is that it will be useful for evaluating which dimensions of player involvement that will be most relevant to design for in regard to the desired player experience.

The three components will be introduced below.

6.2.1 Mechanics
Mechanics refer to behaviours and actions associated with gameplay and what the player can do. They correspond with player agency and the possibility space of interactivity, which the game system allows. Contrary to other definitions of game mechanics (Miguel, 2008; Järvinen, 2008), according to the MDA model, mechanics are also somewhat confusingly expanded to also cover game elements, e.g. “weapons, ammunition and spawn points” (Hunicke, LeBlanc & Zubek, 2004, p. 4), in the case of shooter games. These mechanics can easily be mixed up with game content but the apparent difference, although not formally specified, is that they have systematic functions. Such, game elements or “props” with no gameplay value cannot be mechanics.

6.2.2 Dynamics
The function of dynamics is to create aesthetic experiences. One aim of designers is to design dynamics, which are the results from emergent behaviour. This is determined by the way the player uses mechanics resulting in interaction on a systemic run-time basis. Thus dynamics establish the link between mechanics and aesthetics.

6.2.3 Aesthetics
This component corresponds with the player experience which is designed for. The notion of fun has been criticized as an insufficient term for labelling the reason why people play (Calleja, 2012). The motivation for play is far more complex and not merely limited to the desire to experience fun, otherwise why would
World of Warcraft (Blizzard Entertainment, 2004) players spent hours on grinding for instance? In this context, aesthetics go beyond the notion of fun. A list of aesthetics, given in the paper on the MDA framework, covers: Sensation, fantasy, narrative, challenge, fellowship, discovery, expression and submission (Hunicke, LeBlanc & Zubek, 2004). The taxonomy is not limited to these examples of aesthetics.

It is time to describe the chosen aesthetic goals of the thesis game.

6.2.4 Chosen Aesthetic Goals

Research from the last chapters has helped defining the aesthetic goals below. It cannot be emphasized enough that especially the first two aesthetic goals are closely associated with incorporation and lucid dreaming induction techniques.

6.2.4.1 Sensation of Dreaming

The first aesthetic goal is inspired by the power of resolution technique (earlier described in chapter 4 and in appendix C). The goal is to make the player get the impression of dreaming. As pointed out, the task of visualizing that you are dreaming is part of many techniques. The goal therefore also corresponds to the process of mediated visualization of dreaming, where visualization becomes facilitated by digital means and incorporation supports this process. The point about aiming for sensation of dreaming is first and foremost to raise conscious awareness about dreaming. By engaging in a simulated dream world, the player will know that she inhabits a dream world, and if the game allows for lucid dreaming to occur in-game, she will be consciously aware about this while playing too. Also, if the game experience finds its way into the player’s night-time dreams, this kind of conscious awareness may hypothetically be transferred to, which can lead to lucid dreaming. However, this has not been specifically demonstrated in other studies, but the fact that game experiences can be transferred into dreams and reflective awareness is possible in dreams (as examined in depth in chapter 2) support this possibility. In fact, incorporation is a premise for reaching this aesthetic goal and that is why it is so important to design for player involvement.

7 Grinding is a term which covers performing the same seemingly boring task repeatedly during play. In World of Warcraft, this is often synonymous with repetitively killing the same type of monsters over and over to gain experience points.
6.2.4.2 Relaxation

In basically all lucid dreaming induction techniques the practitioner is supposed to relax. Relaxation is therefore a fundamental requirement for these practices - similar to mindfulness, meditation and hypnotherapy practices. However, relaxation is also related to the first aesthetic goal: a relaxed state of mind facilitates the process of engaging oneself into a world of make-believe and generally in becoming involved in it across multiple dimensions. The more disturbing and stressful factors there are present to influence the play experience, the more difficult the process of incorporation likely is. Relaxation is arguably also valid for susceptibility of verbal suggestions, which is a central part of the game as will be examined later.

6.2.4.3 Exploration

The third aesthetic goal is exploration. This is related to engaging the player in the game world and be observant. A typical way of performing reality testing is to direct your conscious attention outwards, looking for dream cues, and an attractive game world will motivate for this sort of practice. Besides, exploration will be centred on peaceful journeying, opposite typical challenge-based gameplay, which better afford for putting the player into a relaxing state of mind. In this way, the third goal is also related to the second aesthetic goal.

6.3 Favored Dimensions of Player Involvement

It is hardly possibly to design for involving the player on an equally high level across all six dimensions of the player involvement model and neither is it desired. Some dimensions are more beneficial to design for than others in accordance with the desired player experience. To get an idea about which dimensions that are preferred to design for, games of inspiration will be briefly referenced.

Games which have been inspiring for thesis game design include Cloud (USC EA Game Innovation Lab, 2005), Flower (ThatGameCompany, 2009), The Journey (ThatGameCompany, 2012), The Night Journey (USC EA Game Innovation Lab, 2011), and Dear Esther (thechineseroom, 2012). These games are 3D games and the all have simple gameplay and rich graphics in common. Another collectively appealing aspect is the peaceful play atmosphere and the emphasis on exploration and spatial progression. Moreover, none of these games have competitive gameplay aspects, any violence, nor any gameplay challenges to stress the player; winning is not what matters.
With the conducted research, the inspirational games, and the three aesthetic goals in mind, it can be evaluated which dimensions of player involvement that are most appropriate to design for. This evaluation is rooted in the overall design concept of creating a peaceful meditative and mindful-like experience, based on relaxation and exploration in a mediated dream world.

Affective involvement and spatial involvement appear to be the most apparent dimensions to design for. Affective involvement seems to fit very well with the concept of relaxation, expressed through a peaceful evocative atmosphere, which is designed to create the sensation of dreaming. For example, Flower may arguably lead to an aesthetically affective experience and its visually pleasing natural surroundings are inspiring as well as the playful use of colors. Spatial involvement associates to exploration and adventurous engagement in dream worlds. Journey, The Night Journey, and Dear Esther are all characteristic for their graphically seducing environments. Their artistic appeal may effectively affect the player to engage in spatial navigation; simply for the sake of indulging in beauty and mystery. Kinesthetic involvement and ludic involvement are of moderate priority design-wise. The former may correspond well with performative dream powers, for instance, and lucid involvement with the goal of becoming lucid. However, relaxation should not be overshadowed by the ecstatic pleasure of motion and high speed, nor of the anxiety arising about not reaching one’s goals or of a failing strategy. It is not intended to design for narrative and shared involvement, simply because they do not seem to fit so well into the overall design idea, compared with the other dimensions. This overall design idea can be seen in the high concept document to be found in appendix E.

The player involvement model has been useful as a lens for evaluating which dimensions that seem most suitable to design for in line with the aesthetic goals. In the next chapter, it will be thoroughly described how game elements fit into a solution with respect to both the formal goals and the aesthetic goals. The first things which will be examined are basic gameplay, dynamics, mechanics, and controls.
7 Game Design

Several game prototypes were developed using the game engine Unity during the iterative development process. The gameplay described here is representative for the gameplay in the latest handed-in game prototype. The work title of the game prototype is *Lucid Dreamscapes*.

7.1 Basic Gameplay and Dynamics

The game is set in a dream. In first-person perspective, the player explores foggy landscapes by night as a completely anonymous avatar. The landscapes shift around and the world appears infinite, inviting the player to explore. Light sources function as navigation cues and form pathways for the player to follow on the quest of becoming lucid. When moving into light sources, they will illuminate the surrounding local area. Light sources will help the player find her way in the dark and find dream cues. Dream cues are objects which are either placed at strange places or objects which behave in weird ways; for example, an oven which makes up a tombstone or a stone which hovers above ground. The player can perform reality tests by blinking with her eyes. If a dream cue is within point of view and a certain distance while performing a reality test, the player becomes lucid on a gameplay level.

While lucid, the player’s avatar can fly. The lucidity time period is limited (1 min. long). When time is up, the player becomes non-lucid. Thus, the objective is simply to become lucid by finding dream cues, where the reward is to achieve the dream control power of being able to fly. The player state can be non-lucid or lucid – it is non-lucid by default. The player is also capable of super climbing at any time (a performative control power). If a landscape surface is too steep to surmount by ordinary walking, for instance cliffs, she may be able to climb them instead.
Figure 7.1. The “double tree”, which has an inverted tree crown too, is a dream cue. Orange lights sources can be seen (and a white one hidden behind the tree)

The dynamics model below demonstrates the interplay between mechanics and the game system as well as the resultant dynamics. Mechanics are displayed in black and dynamics in red. It depicts a feedback system and the gameplay in a nutshell. The arrows display the simple interaction processes initiated by the use of mechanics. From where the player starts, a light source can be seen and when she touches it, the local area is lit up (local illumination). The possible outcomes are that she runs into more light sources or toward a newly found dream cue and performs a reality test, which results in her becoming lucid (metacognition). When lucid, night turns to day (global illumination). From that moment, the player can also fly and either hit a new light source again or find another dream cue.

The outer circle represents the world that moves accordingly to the movement of the player. From this dynamic model, the game seems a bit mechanical and dry, but it nevertheless manages to illustrate the core elements of gameplay from a procedural point of view. Technically, the run mechanic also covers super climbing.
7.2 Controls and Mechanics

In this part, the final two components of the MDA framework to be analyzed will be covered. From now on, it will be argued how various dimensions of player involvement relate to examined game mechanics and game elements.

In relation to kinesthetic and spatial involvement, Calleja states that when conscious attention focuses on learning controls in accordance with navigating space, it can be difficult to enter a state of incorporation (2011, p. 171). It makes sense that the more conscious attention you direct towards understanding how buttons are mapped with in-game movement, the less non-mediated the experience seems, which is counterproductive in terms of incorporation. It is intended that the thesis game controls should be easy to learn and easy to use, not only due to Calleja’s statement, but also in accordance with the design goal of creating a relaxing atmosphere. Such an atmosphere can only be created and upheld if the player is not frustrated with learning the controls.
The controls in the game are fairly straightforward. This means that the buttons used, and their functionality too, are easily recognizable by experienced players. W, A, S and D keys are used for movement and SPACE for jumping like in conventional first person games. In principal, this implies internalizing the keys quickly, which means they will become second nature. The unique mechanics of the game, reality testing, and super climbing, are activated exclusively by pressing mouse buttons to avoid using a plethora of keyboard keys.

To decrease the slope of the learning curve even more, the same controls account for ground and air movement. In an early flight prototype the “go up” and “go down” buttons (W and D) were inversed and rotation in air could occur around all three axes (yaw, roll and pitch). It felt more like flying a realistic aircraft with somewhat clumsy controls than flying uncomplicatedly as Superman. Aircraft movement realism was discarded in the favor of more simplified controls, as the sudden shift from ground to aircraft flight controls seemed somewhat counterintuitive. The flight controls have been modified a lot to ensure that the flying ability is a desirable reward in itself for successful reality testing.

The feel of movement was intended to be light and airy. There is generally little air resistance, which leads to the feeling of periodically hovering in air if moving fast enough. This contributes to a dreamy feel and symbolically expresses a carefree relaxing attitude in a virtual navigational way. Surfaces with relatively high slopes can only become surmounted by using the climb ability, which allows the player to move like an ant. It contributes to the sensation of dreaming in a kinesthetic sense and represents a performative dream control power.

The mechanic of jumping in-game may feel a bit unstable. Actually, it was a technical bug that caused this and made the jump height unpredictable. However, it was left in the handed-in game version, simply because it was evaluated that it somewhat contributed to the dreamy feel. It may be changed again, but as a prototype it is interesting to leave it that way.

The light sources help the player to follow a path in darkness and hint at where dream cues are. They are closely connected with exploration and finding dream cues via reality testing. An important note on the central reality testing mechanic: in respect to successful reality testing, it is not so much the success of finding dream cues in the game that matters; it is first and foremost important that the player gets into the mindset of staying keenly watchful about dream bizarreness. The in-game goal of looking for dream signs will thus contribute to raise awareness about dreaming and is in line with the aesthetic goal of generating the sensation of dreaming.


7.3 Sounds

The table below displays the diversity of sounds embedded in the game. Each sound category consists of one of more sound layers. It will next be analyzed what the functions of the various sound categories are.

<table>
<thead>
<tr>
<th>Sound category</th>
<th>Sound layers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Music</td>
<td>Main soundtrack</td>
</tr>
<tr>
<td></td>
<td>Lucid soundtrack</td>
</tr>
<tr>
<td>Nature sounds</td>
<td>Terrain atmosphere</td>
</tr>
<tr>
<td></td>
<td>Animal sounds</td>
</tr>
<tr>
<td></td>
<td>Random sounds (e.g. rain)</td>
</tr>
<tr>
<td>Sound effects</td>
<td>Various sound effects</td>
</tr>
<tr>
<td>Speech samples</td>
<td>Non-lucid speech</td>
</tr>
<tr>
<td></td>
<td>Lucid speech</td>
</tr>
<tr>
<td>Relaxation-inducing noise</td>
<td>Theta isochronic tones (4-8 Hertz frequency)</td>
</tr>
</tbody>
</table>

Table 7.1. Categories and layers of sound

7.3.1 Relaxing Soundscape

All dream cues in the game are visual. This is intended to leave room for sound to have multiple purposes. Sound plays a very important role in terms of lucid dreaming induction in the thesis game.

The main soundtrack is soothing calming ambient music, which is related to a fluctuating feel of dreaming. There no shift of pace or remarkable transitions in the level of pitch, amplitude or volume, which could potentially excite or stress the player. The didgeridoo instrument may add to the sensation of strangeness, which is relevant for contributing to the sensation of travelling in a dream. When becoming lucid, another blissful soundtrack softly fades in: the lucid soundtrack. Both soundtracks are intended to create a relaxing atmosphere.

Nature sounds (wind, river, birds, rain, etc.) may also help establishing a relaxing game experience. Nature sounds are typically used in mindfulness, meditation, and hypnotherapy practices. It is not unusual that nature sounds accompany guided visualizations where the mental inner journey leads to peaceful natural
surroundings. When light sources are touched by the player, a sample of wind chimes is played, which may induce a feeling of relaxation and peacefulness.

Beneath the soundtracks, a more subtle sound layer exists. The author found out that there exist several audio files online, which are designed to induce a relaxing state of mind, in relation to lucid dreaming by the means of sound. One approach is to use Theta isochronic tones. Because it is very easy to implement such tones and they support the aesthetic goal of relaxation, Theta isochronic tones became a part of the prototype game. It has been difficult to found scientific studies, which empirically evaluate isochronic tones to be effective in terms of lucid dreaming induction but again, it helps inducing relaxation nevertheless.

7.3.2 Verbal Suggestions and Metacognitive Questions

In a psychological context, a suggestion can according to The Free Dictionary's Medical Dictionary be defined as:

1) “A psychological process by which an idea is induced in or adopted by another without argument, command, or coercion” (Suggestion, n.d.)
2) “The process whereby the mere presentation of an idea to a receptive individual leads to the acceptance of that idea” (Suggestion, n.d.)

In a simple explanation, autosuggestion is the process by which a person makes herself the target of her own suggestions.

These topics are relevant to look into as verbal suggestions and hypnosis have been inspirational to voice over implementation. No matter if the player is lucid or non-lucid, she will hear a voice talking to her, but the content of speech is different. It is clear that the player will not be doing autosuggestion directly while playing. She is not giving herself suggestions; the audio feedback system gives her suggestions instead.

In appendix F, transcript excerpts of audio recordings by LaBerge can be read, intended for auditory lucid dreaming induction. These audio recordings were inspirational for the sound design.
7.3.2.1 When Non-Lucid

Every now and then, one or more paraphrases will be spoken, which constitute a single speech sample. There are several suggestion purposes with this automated function:

1) Improve relaxation
2) Raise reflective questions
3) Improve conscious awareness about dreaming
4) Intention setting and recalling the intention

Notice that purpose 1 and 3 are in line with two aesthetic goals: relaxation and sensation of dreaming. Some verbal suggestions are given as examples where numbers indicate which purposes they cover. The first exemplified suggestion improves relaxation.

1) ...and now... you may be listening to the sounds of the night... and you go deeper... into the surroundings...

The expression of "you go deeper" is a simple metaphor for relaxation and a classical mantra in hypnosis. Almost all suggestions have multiple purposes:

2 & 3)...is this a dream? ...are you dreaming? ...is this a dreamscape you are in?...

4) ...while continuing on your quest... to find the signs... 1) you go deeper... into this peaceful setting for you to relax in...

Several ones even fulfill all four purposes - often the longer ones:

1) “...on this effortless journey... all so quiet... so calm and relaxing... 4) in your search for knowledge... about where you are... and you will know... 2 & 3) could you be traveling in a dream?…”

4) ...you know that this place holds signs... ...only meant for you... 3 & 4) to tell you if you are dreaming... 1) these signs guide you gently... into a sensation of relaxation...

Some suggestions are more poetic and may also manage to fulfill all purposes:

1) ...and in the stillness of nature... your mind is empty... yet aware... 3) and nature in its stillness still calls you... to unlock its second nature... of light and brightness... and full awareness...

There are also quotes taken from various celebrities, which may provide inspiration or lead to reflection:
2 & 3) ...If the dream is a translation of waking life, waking life is also a translation of the dream...

2 & 3) ...dreams are renewable. No matter what our age or condition, there are still untapped possibilities within us and new beauty waiting to be born...

The mixture of general, poetic, and quoted sentences is simply used to create variation and to allow for a more creatively poetic approach for mixing the four suggestion purposes. If the player was repeatedly asked if she is dreaming, she may very quickly feel annoyed by the voice – even counter-productive to the purpose of relaxation. In one of LaBerge’s audio recordings, the following sentences are played in a loop for over 7 min.: “The next time I’m dreaming, I will realize that I am dreaming... am I dreaming? ... is this a dream?” (found in appendix F). You may become disinterested due to rigorous repetition or it may even get on your nerves.

Although music is implemented to create relaxation, several paraphrases are scripted to improve relaxation. Relaxation is not only important because it is fundamental for basically all lucid dreaming induction techniques; it also seems to play a role in accordance with verbal suggestions. The degree of relaxation may influence the degree of how susceptible the listener is to suggestion. In contrast, if you are stressed or irritated, you will seemingly have a harder time being open to suggestions.

There exists a risk of players becoming indifferent to the verbal suggestions if the intervals between them stay the same. This is apparent from the manual of the electronic P.E.S.T. device (described in chapter 3): “Your brain learns to expect regular events, and if they have no great significance for your survival, it suppresses your perception of them.” (LaBerge, 1994, p. 3-4) The P.E.S.T. device gets around this problem by randomizing the timing of reality test reminders. For the same reason, verbal suggestions are played randomly too. For this reason the verbal suggestions are triggered with intervals randomly ranging from 30 to 60 seconds.

7.3.2.2 When Lucid

Whenever the player avatar becomes lucid, there are triggered two suggestions. The first one is triggered right after becoming lucid and verbally verifies that the player has become lucid. Below is an example of this:

3) ...and now... you may be aware of the change of music... like you are aware of dreaming... and the softness of the music...1) you integrate it into the way you feel...
3) ...and now... you see things have become illuminated... like you have... for you realize that you are dreaming... 1) it feels amazing realizing that you are dreaming... the dream is lit up... and you feel lit up...

As seen, purpose 3 and 1 are also related to the first suggestion triggered when lucid. Purpose 2 is not triggered, because it makes little sense to ask the player a metacognitive question (like “are you dreaming?”), because the game system has already verified that on the level of suspension of disbelief.

Around half of the suggestions of the first kind triggered also include quotes, again for variation’s sake and to provide inspiration or cause to the player to reflect:

1) ...as you move in the light of the sun... the sun enlightens your mind... 3) you are conscious of dreaming right now... (quote:8) they who dream by day are cognizant of many things which escape those who dream only by night...

The experience of becoming lucid in the game is very much identical with the steps of the intention technique (see appendix C):

1. Set up the intention of recognizing dreaming.
2. Visualize yourself recognizing dreaming. During visualization, incorporate your most commonly occurring or favorite dream signs.
3. Imagine yourself doing an intended dream action – preferably a dream sign (for instance, flying).

In the latter half of the lucidity period, the second suggestion is triggered. There are ten variations of this type of suggestion but they are all very similar in order to fulfill the same purpose of intention setting and recalling intention:

4 & 3) ...and in your coming dream ... you will realize that you are dreaming......and will remember to look for the signs that tell you are dreaming...

This kind of suggestion is inspired by hypnosis where posthypnotic suggestions are used when the subject is in trance – a state of mind which relaxation facilitates inducing. Posthypnotic suggestions take place when the subject is in trance and a psychological or behavioral chance, e.g. altered attitude or habit, is intended to take place after trance. They work most effectively if repeated several times. This will

8 Quote is by Edgar Allan Poe. Original literature source unknown. Found on http://thinkexist.com/quotes/edgar_allan_poe/
reinforce suggestions. Therefore the player is supposed to play for a longer period of time and become lucid several times, in order to have the best chances for experiencing lucid dreaming after play.

It was pointed out in chapter 4 that technology can be handy as it can help reminding us of something. The player does not have to rely on her memory in order for intension setting (of becoming lucid) to happen. Whenever the player finds a dream cue, the game system takes care of automated intension setting, which is a reward in itself as it increases lucid dreaming chances and may add to the value of extrinsic motivation for playing. Conversely, the reward of being able to fly during intention setting, likely improves the intrinsic motivation. The dream about flying is as old as mankind. In a promotional video about Remee (the mentioned dream mask), it was emphasized that the majority of the interviewed persons desired flying if they were lucid (Cole, 2012, April 7).

Although intension setting is systemically automated by auditory means, it is not something carried out automatically. Only due to player agency can intension setting be triggered. The player must actively engage herself in finding dream cues to trigger it. The aspect of interactivity allows for this. If intention setting was carried out automatically, the results would likely be less effective as there would be no connection between motivation and player agency. Similarly, one cannot expect to quit smoking by the aid of hypnosis alone, for instance. One must first will it and intention cannot be set by a game system alone - only suggested and reminded of.

It is Tholey's advice to not make use of effortful intentions, which may refer to using autosuggestions imperatively and in a more direct sense ("You will become lucid tonight!"). Tholey rather advocates doing autosuggestions in a relaxed state prior to sleep (1990, p. 67). This is in thread with designing a game which provides a relaxing experience.

Because verbal suggestions often refer to the task of following light sources and look for dream cues, they actually work both for intension setting, recalling the intention and as voice over with tutorial potential.
7.4 Game World and Navigation

7.4.1 Game World as a Dream World

It is worth emphasizing that the game world is a dream world. In other words, the game is a simulation of a dream. There are several reasons for this.

First, virtual simulation of a dream makes up the foundation for implementing lucid dreaming induction techniques based on visualization. In many mental techniques, the practitioner will visualize that she is dreaming, often involving visualizing becoming lucid and performing dream actions (see appendix C).

Second, it allows for reality testing to be practiced in a reward-motivation system.

Third, it contributes to raising conscious awareness about the phenomena of dreaming as long as the player recognizes the dream setting. Sounds and graphics affect the way a game world is perceptually represented. In the development process, it has been experimented with applying various image effects filters in Unity, which can be used in the same way as camera lenses to affect in-game perception. Among a range of tested image effects, fish eye filtering and motion blur were considered valid for potentially improving the dreamy game feel.

![Filtered vision with fish eye and motion blur image effects](image)

*Figure 7.3. Filtered vision with fish eye and motion blur image effects*
The use of fish eye view and motion blur filters are inspired by the dream sequences in *Max Payne* (2001, Remedy Entertainment), where camera perspective is slightly distorted, several sounds are applied low-pass filters or added echo effects, and imagery occasionally contain oversaturated colors. In *Lucid Dreamscapes*, the skybox can have several distinct colors, which changes according to the location of the player. These colors not only make each piece of terrain stand out but also hypothetically contribute to a dreamy feel.

It is rather the way the game world is perceived than the appearance of game content, which is intended to contribute to the sensation of dreaming. The game world is not designed to appear bizarre on first glance – quite the opposite. Actually, the majority of objects look relatively ordinary, apart from some dream cues, and most locations do not appear strange by default. The reason for this is make the endeavor of finding dream cues by reality testing a challenge. If the game world was utterly surreal, it would be likely be extremely easy to find dream cues as things would appear bizarre in general. Research actually suggests that dreams are more coherent, structured and less bizarre than we tend to perceive them (Domhoff, 2007). Also, there are more similarities between dreaming and waking cognition than suggested earlier (Kahan & LaBerge, 1994; Kahan, et al., 1997; Kahan, 2001). This may help explaining
why we so rarely realize we are dreaming while we dream. Other researchers even found that there is more bizarreness in waking fantasy in comparison to REM sleep (Reinsel, Antrobus & Wollman, 1992).

7.4.2 An Infinite Game World

Originally the thesis game prototype was considered to consist of levels in the traditional way. On each level there should only be a single dream cue, but it was quickly demonstrated that it would be too challenging and result in too little variation and replayability. In the final prototype, the game world consists of five terrains, each measuring 500 x 500 meters and collectively forming one big level. A unique feature of the game is that which is called the infinite game world feature. This involves that terrains work like square-sized tectonic plates, which move around in an ad hoc way according to player navigation. Their positioning will always take the player’s position into account and ensure that the player cannot move off the game map. Terrains will always stay close to the player.

One benefit of an infinite game world is the lack of navigational borders. In plenty of 3D games, there are very narrow pathways to walk in their virtual environments, and they mistakenly give the impression of being open when they instead are but closed labyrinths (Aarseth, 2005). Although a virtual environment may simulate a vast outdoor setting, a player may become irritated by realizing that the pathway, which in the distance appeared to be passable, is but a dead end. The super climb power allows for surmounting apparent impassable terrain, and that in combination with the infinite game world feature, which affords for open-ended landscapes to explore, will presumably reduce the risk of becoming annoyed by blockages across terrain. Conversely, this should increase the chances of prolonged relaxation and spatial involvement. To walk in nature is considered by many to be relaxing and likewise to behold the vastness of nature.

Open landscapes may be constructive for spatial involvement. Coupled with the infinite spatial structure, open landscapes afford for a very high degree of navigational freedom and exploration (remember, exploration is an aesthetic goal in the design). Only by exploring and scrutinizing the landscapes, the player can succeed in finding dream cues. Hypothetically, the incentive for close inspection of environmental elements, supported by graphically attractive landscapes, may increase the level of spatial involvement.

In fact, kinesthetic involvement is often overlapping with spatial involvement as movement takes place in space (Calleja, 2011). This becomes apparent when relating the fly mechanic to exploration of landscapes. Flying may afford for a most attractive kinesthetic appeal and offers virtual limitless investigation of
landscapes. It may even lead to beautiful sights in bird’s-eye view, which not only potentially stimulates the urge to continue exploring, but also increases affective involvement. The emotional lucid soundtrack also supports that hypothesis.

Despite there is no end or geographical border for the game world, the amount of content is far from infinite. Terrains will inevitably be revisited. However, this has the advantage of fitting into the fluctuating character of dream content. This may arguably also aid to enhance the sensation of dreaming and raise awareness about dreaming.

The openness of the game world theoretically means that the player can never really become stuck. No definitive dead ends and the fact that there are always light sources to guide the player, hinder annoyance or stress from potentially rising from not knowing where the game system wants you to go.

Figure 7.5. Bird view of terrains. Green dots are light sources which connect the terrains in North, South, East, and West. The terrains shuffle around according to the player position.
7.4.3 Graphics and Navigable Space

Terrains and color transitions of the skybox are inspired by Calleja’s aesthetical and environmental analysis of *World of Warcraft* (Blizzard Entertainment, 2004). He found that each region has a characteristic aesthetic style, uses distinct color palettes and that “The transitions from region to region tend to be unnaturally abrupt, with a clearly locatable few meters of land containing a dramatic blend of colors from the two regions’ patterns.” (Calleja, 2011, p. 188). In *Lucid Dreamscapes*, each terrain stands out by its color scheme and terrain type. The skybox color and the light sources’ color constitute the primary characteristic colors for each terrain. In the final prototype, the terrain types are meadows, desert, swamp, canyon, and conifer/dead forest. Similarly to *World of Warcraft*, traveling between terrains occurs relatively abruptly, indicated by the rapid change of skybox color, light sources’ color, and terrain type. Besides differentiation among areas, another benefit of these visual tricks is to make the world appear bigger than it is (Calleja, 2011). These tricks may enhance spatial involvement and the incentive for exploration. However, they are also related to affective involvement.

In continuation of the *World of Warcraft* analysis, Calleja’s research led him to claim that “There is a particular appeal to inhabiting beautiful landscapes where one can roam which allows for more involving experiences than viewing attractive images in non-ergodic media [that is non-video game media in this context]” (2011, p. 142). Calleja refers here to affective involvement. In principal, graphics can be the single cause of affective involvement but it is not always that mono-dimensional. What Calleja does not mention here is that it is because spatiality and affective involvement are mutually influential on each other that inhabiting beautiful landscapes in a virtually embodied sense have a greater degree of involvement potential, compared to non-ergodic media. Instead of being fixed to the same viewpoint, 3D games’ (often) afford for 360 degrees of POV freedom, which allow players to literally choose from which angle she will be involved with the setting – and some angles are more aesthetically appealing and involving than others. In other words, navigational freedom, but also spatial involvement, can be intertwined with affective involvement. In *Journey* (ThatGameCompany, 2012), the intended emotional effect of feeling small, is not solely conveyed by the beautiful dunes and open-ended landscapes alone. It is inasmuch that which is not there, the void in huge spaces, associated with spatiality, which leads to this kind of affective involvement. As such, spatial involvement may arguably be linked with being emotionally overwhelmed by the majesty of empty space, which influences affective involvement. In *Lucid Dreamscapes*, the open landscapes, vast at times, in combination with solitary journeying (you are the only
character in the game) and attractive graphics, are intended to result in affective involvement of a kind similar to *Journey*.

![Figure 7.6. A sight of wonder in Journey (ThatGameCompany, 2012)](image)

The game *Flower* (ThatGameCompany, 2009) “explicitly uses aesthetic beauty to reward players”, Calleja writes. “When a sequence of flowers is completed, the surroundings burst into color.” (2011, p. 165). A similar type of aesthetic reward is achieved when the player becomes lucid. Given that light is color and a usually dark landscape becomes illuminated when turning lucid, there is a resemblance. This is associated with affective involvement, in case the player is aesthetically moved by the scripted occurrence of dawn upon successful reality testing. The chances for affective involvement are further enhanced by the blissful music playing and by granting the momentary ability to fly when lucid.

### 7.4.4 The Internal Journey

AI-controlled characters, entities and animals could likely make the experience more interesting to some players, but it was prioritized to have little value compared to other design elements. Therefore it was evaluated that there was not resources for it. It should be pointed out that the author has been responsible for all design, including world creation, landscape design, sound design, setup of light sources,
dream cue creation and setup, animations, various scripting, etc. Other students assisted the author and contributed with programming tasks and the creation of 3D models. It nevertheless makes aesthetical sense travelling alone in-game in a game world without a big amount of content. Experiencing a dream is a very individual and personal experience, which the solitude conveyed in *Lucid Dreamscapes* expresses. There may also be sense of peacefulness and relaxing feel associated with solitude – although people have different attitudes towards experiencing it. In comparison with the inspirational games, the player is also completely alone in *Cloud, Flower, The Night’s Journey*, as well as most of the time in *Journey*. Fullerton says that *Cloud* and *Flower* create “playful worlds around the themes of peacefulness and wonder, loneliness and joy.” (2009, first section, para. 46-47). It is a sense of wonder, likened to curiosity, which *Lucid Dreamscapes* also wants to express through open landscapes and content of religious or spiritual character, across all terrains; e.g. Stonehenge-like rock formations, a graveyard, temple ruins, sphinx statuettes, mysterious towers, etc. Not only are such objects incorporated to potentially stimulate the curiosity of the player via a sense of mystery, they may also contribute to the sensation of dreaming in a somewhat spiritually archetypical light. In combination with the music and the reflective questions asked, these objects may also support creating an atmosphere of meditative reflection similar to *The Night Journey* (Fullerton, 2009).

The *internal journey* is a theme in *Lucid Dreamscapes*. The concept of travelling in a dream is closely tied with the metaphor of journeying inwards, in search for lucidity. The thesis game plays with the metaphor of darkness and light, corresponding with the subconscious and the consciousness mind allegorically and respectively. When the player becomes lucid, the setting becomes illuminated. The content of the game world is sometimes referenced to when verbal suggestions are triggered. Two examples are listed below:

...*the further you go... the more relaxed you become... as you become aware of your surroundings... the night is silent... as you are within...*

...*the lights around you... they make you more conscious... and want to enlighten you... tell you a thing about what this place really is... follow the lights... as their soft glow makes you go deeper... into this calming setting...*

The connection between graphical content and verbal suggestions work to enhance relaxation, but it should also hypothetically make the player become more focused on the dream sensation/visualization experience – and if this occurs in-game, it may also happen while dreaming.
It is hypothesized that this coupling, in extension with other aesthetics, will enhance affective involvement. Affective involvement is hardly related to a single category of elements, such as graphics or sounds, but rather likened to the sum of multiple factors. Emotional feedback can be difficult to predict in a design context, but the shared aesthetic trait of peacefulness among sounds, terrains, the fly mechanic, and the like, may lead to affective involvement. But individuals are different and this is true for all kinds of involvement.

### 7.5 Voluntary In-Game Objectives

*Lucid Dreamscapes* has not a winning condition and only one voluntary objective: to find dream cues. It has been crucial to not push the player to play according to objectives or playing to win.

It is no secret that ludic involvement has been undermined in the game, in favor of ensuring a relaxing sensation of play and to give the impression of a virtual training ground; basically devoid of rules and restrictions. However, there is nonetheless a voluntary element of competition in connection with ludic involvement. The player can see statistics of play whenever the game is paused (by pressing the ESC key). They display the number of reality tests performed, times being lucid, longest time period being lucid, total times being lucid, and the total amount of played time. These statistics allow the player to analyze how well she is doing in-game in terms of reality testing. This is inspired by the SuperNovaDreamer’s personal statistics log, which can be used for measuring the success rate of lucid dreaming induction (described in chapter 3). The player may use these statistics for motivating herself to beat her own records for instance. In terms of training, beating one’s own records is sometimes a major factor for repetitive practice. In a future game version, statistics could be considered to be stored as cookies, allowing the game system to update the highscore between play sessions. Yet, there is a risk with this element. Theoretically, this element may lead to stressing the player a bit. However, this does not seem like a big issue as it is a voluntary objective.
7.6 Illustrative Summary of Game Elements Used for
Reaching Formal and Aesthetic Goals

In this chapter, game design has been analyzed and evaluated in accordance with the formal goals and aesthetic goals. The tables below summarizes which elements help reaching which design goal and thereby an overview will be provided.

<table>
<thead>
<tr>
<th>Implemented game elements</th>
<th>IS</th>
<th>RT</th>
<th>R</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-lucid speech samples</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lucid speech samples</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reality testing mechanic</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Game world as dream world</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performative dream control powers</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>(fly mechanic &amp; super climb mechanic)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7.2. Solution for formal design goal 1: Implement all four common methods

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Implemented game elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kinesthetic involvement</td>
<td>Fly mechanic</td>
</tr>
<tr>
<td>Spatial involvement</td>
<td>Large beautiful landscapes</td>
</tr>
<tr>
<td></td>
<td>Infinite game world feature</td>
</tr>
<tr>
<td>Affective involvement</td>
<td>Large beautiful landscapes</td>
</tr>
<tr>
<td></td>
<td>Fly mechanic/becoming lucid</td>
</tr>
<tr>
<td></td>
<td>Atmosphere/mood (sum of sounds, graphics, fly feeling, etc.)</td>
</tr>
<tr>
<td>Ludic involvement</td>
<td>Fly ability reward (when becoming lucid)</td>
</tr>
<tr>
<td></td>
<td>Voluntary objective (statistics-based)</td>
</tr>
</tbody>
</table>

Table 7.3. Solution for formal design goal 2: Design for various dimensions of player involvement
<table>
<thead>
<tr>
<th>Aesthetic goals</th>
<th>Implemented game element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relaxation</td>
<td>Music</td>
</tr>
<tr>
<td></td>
<td>Speech samples</td>
</tr>
<tr>
<td></td>
<td>Nature sounds</td>
</tr>
<tr>
<td></td>
<td>Wind chimes SFX</td>
</tr>
<tr>
<td></td>
<td>Relaxation-inducing noise (Theta isochronic tones)</td>
</tr>
<tr>
<td></td>
<td>Silent nature landscapes</td>
</tr>
<tr>
<td></td>
<td>Infinite game world feature</td>
</tr>
<tr>
<td>Dream sensation</td>
<td>Fly mechanic</td>
</tr>
<tr>
<td></td>
<td>Climb mechanic</td>
</tr>
<tr>
<td></td>
<td>Dream cues</td>
</tr>
<tr>
<td></td>
<td>Speech samples</td>
</tr>
<tr>
<td></td>
<td>Infinite game world feature</td>
</tr>
<tr>
<td></td>
<td>Fish eye &amp; motion blur</td>
</tr>
<tr>
<td></td>
<td>Filtered speech samples</td>
</tr>
<tr>
<td>Exploration</td>
<td>Infinite game world feature</td>
</tr>
<tr>
<td></td>
<td>Silent nature landscapes</td>
</tr>
<tr>
<td></td>
<td>Reality testing</td>
</tr>
<tr>
<td></td>
<td>Dream cues</td>
</tr>
</tbody>
</table>

*Table 7.4. Solution for aesthetic goal 1,2, and 3: Sensation of dreaming, relaxation, and exploration*
8 Test Method and Results

8.1 Test Method

The optimal way to evaluate the thesis game would be to test if players experience lucid dreams after play. This would be in accordance with the high level goal. However, there are several implications concerning testing for this, as briefly touched upon in chapter 1. These implications will be covered here. First, players must have a relatively fair dream recall frequency, which far from all have. Second, they must be willing to spend a prolonged period on playing a particular video game and report dreams in order to verify if sessions of video game play have had an influential effect. In a realistic light, Lucid Dreamscapes is not expected to be a miraculous game, which induces lucidity during the first night per se. It is designed as a training tool and therefore valid testing is also expected to take place over days, if not weeks, for best results. Gackenbach and colleagues have provided insight into the experienced difficulties of testing. The author has been in contact with Gackenbach and discussed the possibilities of setting up a test with her. She was very helpful but the test had to be skipped due to its immense scope.

The referenced Mirror's Edge (EA Digital Illusions CE, 2008) study case (Gackenbach & Rosie, 2011; Gackenbach, Rosie, Bown & Sample, 2011) provides insight into the difficulty of getting testing done using data from recorded dreams. It ran from mid-fall 2009 to mid-winter 2010, in which 1169 persons were prescreened. Demands similar to those mentioned above were taken into account, but so were precaution rules of ethical importance; for instance, factors of “susceptibility to motion sickness in high immersive environments”, “fear of heights” and the “history of epilepsy or other conditions associated with increased sensitivity to simulation” would make the subject unusable (Gackenbach & Rosie, 2011, p. 100). The persons’ video game play backgrounds were also prescreened. Of the 1169 persons, only 40 ended up being used. The test participants had to play Mirror’s Edge only once but were also instructed in reporting their own dreams for 14 days. Interestingly, Murzyn analyzed dream reports of World of Warcraft (Blizzard Entertainment, 2004) players in another study case. Of the 907 prescreened participants, 347 players ended up with providing dream descriptions (Murzyn, in-press). A likely influencing factor on the comparatively high level of participation was that most of the players had a couple of years of play experience with this MMORPG. It is presumably far easier to expect prolonged involvement from players who participate in the testing process on the basis of playing (one of) their favorite game(s).
On a much more feasible scale, game design and concept have been evaluated according to the game design goals. The main test method is an expert subject matter evaluation test. As experts on usability and playability in games, Heather Desurvire and colleagues concluded in a game study where they compared expert evaluation with usability testing (Desurvire, Caplan & Toth, 2004, p. 4) that a heuristic evaluation for playability approach is apparently “…very useful for creating highly usable and playable game design, particularly in the preliminary design phase prior to expensive prototypes” (as cited in Laitinen, 2006). Instead of using the approach of heuristics like Desurvire and colleagues, which are used for evaluating a game’s playability in a scrutinizing manner, focus is directed more towards evaluating design in relation to design goals. It is of higher priority for this thesis to examine the game design’s relation to lucid dreaming training than on how much it resembles a game according to heuristic standards. Yet, this does not imply that “low level” goals such as proper playability or usability will be neglected. Desurvire and colleagues state that developers nonetheless “must rely on user testing since no matter how much we think we understand game players and humans, their behavior is still unpredictable.” (Desurvire, Caplan & Toth, 2004, p. 4).

In this thesis, a usability test has also been conducted, which explores the basics of play difficulty, controls, and various player preferences. The usability test is mostly related to gameplay, whereas the expert subject matter evaluation is related to the design goals and overall evaluation of the game’s potential as a training tool.

### 8.2 Usability Test Results

The usability test was practically conducted by posting Questionnaires online and test persons were mostly gamers besides a few lucid dreaming enthusiasts. The community website LD4all (see appendix A) was also used to get help from test participants and receive valuable feedback.

Appendix H shows charts from the usability test. Most charts are primarily relevant for fine-tuning the prototype in relation to movement pace, reality testing, navigation difficulties, etc., and will thus be omitted to be referenced in depth. Appendix I shows questionnaire data from all 13 test participants.
8.2.1 Light Sources, Difficulty Level and Reality Testing

The test participants had to playtest two versions of the final prototype. These versions are very much alike, except from differences given in the table below.

<table>
<thead>
<tr>
<th>Version A</th>
<th>Version B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filtered audio (when non-lucid only)</td>
<td>Non-filtered audio</td>
</tr>
<tr>
<td>Filtered vision (when non-lucid only)</td>
<td>Non-filtered vision</td>
</tr>
<tr>
<td>Only one type of light source (colored)</td>
<td>Various types of light sources (white, grey &amp; colored)</td>
</tr>
</tbody>
</table>

*Table 8.1. Differences between version A and B of the thesis game prototype*

Filtered audio covers speech samples, which together with filtered vision, create a somewhat sensorially trippy play experience. The difference between using filtered as well as non-filtered vision and audio has been investigated via testing. The different use of light source types was also tested.

In prototype version B, there are white, grey, and colored light sources. Dream cues only exist close to white light sources, which turn grey if a nearby dream cue is found or no more exist in the respective area. These are indicators which help informing the player where dream cues can be found. Colored light sources simply guide the player through the darkness. In version A, dream cues can exist next to any dream light sources and is expected to be the most challenging version to play in terms of successful reality testing. Version A is the earliest prototype of the two and early playtests resulted in questioning if it was too difficult to find dream cues.

The usability test was partially designed to examine the difficulty difference between the version, to check up on if players navigated after lights, and if they felt lost at any time. Test data showed that the multiple light sources in version B was mostly preferred and that the difficulty of finding dream cues in version A may have been set a bit too high. A certain degree of difficulty in finding dream cues is of course relevant to ensure that successful reality testing stays a sufficiently challenging core aspect of gameplay. The implementation of reality testing received predominantly positive feedback. All test participants seemed to grasp the minimalist gameplay connection between light sources, dream cues, and reality testing. The
fact that every test participant managed to find dream cues indicates that. However, there were mixed opinions on how obvious or subtle they were to find.

Due to limitation of space, not all feedback will be covered here; especially feedback dealing with minor technical issues, which seems to have less relevance for theoretical analysis.

8.2.2 Relaxing Sensation of Dreaming

It has been hypothesized that the movement feel of floating, or slightly hovering through air, is one way to kinesthetically enhance the sensation of being in a dream. Among the test data, there are some comments related to this hypothesis. Here follow two examples of opposite opinions on movement, first one connected to the climb ability: “[It is] very useful and reflects the feeling of hovering and moving around in dreams without having too many difficulties.” Another comment goes like this: “Make acceleration and deceleration a bit faster. That is just easier to control in general and people will get to the place they want to go to quicker (less floatiness).” A central design conflict can be analyzed from these comments. Movement can be expressive of the sensation of dreaming but its deviation from conventional standards of controls may lead to a trade-off in terms of usability reduction. One test participant suggests making climbing automatic. This would result in the climb mechanic being easier to use but the automated use of this performative dream control power will potentially also lose the effect of making the player “feel very much in control”, as a test participant commented on experiencing button-controlled climbing. It is an interesting design conflict and there is apparently no easy solution which is optimal for both usability and non-automated dream control.

Another conflict of a similar type is rooted in using perceptual filtering for stimulating the sensation of dreaming. One test person wrote:

I think the unfiltered voice felt best, as you did not have to use effort on understanding what was said, but instead were able to focus on the message. The filtered voice felt a bit like someone talking to you while you were dreaming, which was also an interesting approach but I enjoyed the unfiltered most.

Again usability may be an issue as deciphering the filtered voice requires a certain degree of conscious effort. On the other hand, it is pointed out that it fits well with the game’s aesthetical goal of making the player feel she is dreaming. As someone, for instance, put it briefly: “It gave a dream-like feeling.” Although the filtered voice quite possibly could enhance some test participants’ impression of being a dream, it
might also have the opposite effect as indicated by another test participant, who stated that the filtered voice seems a bit fake. Players who experienced the voice as sounding fake may become somewhat frustrated by the use of audio filter and therefore increase their focus on the voice, but for the wrong reasons which thereby may result in less incorporation.

In regard to filtered vision, there were also conflicting comments. Some expressed that filtered vision benefitted the dreamy feel. One wrote that the filtered vision “Almost lulled me to sleep”, in a positive light. This exemplifies that filtered vision might also support relaxation for some, but as most of the comments pointed in the opposite counterproductive direction, it seems that it is influenced by individual preferences.

Should filtered or non-filtered vision and audio be used? Turning to quantitative data, it is seen that the non-filtered voice was preferred by 62% of test participants and 54 % favored filtered vision. These data are not sufficient to make a sound judgment from, due to the relatively small percentage difference. Turning to another set of quantitative data, it is shown that 15% found it moderately difficult and another 15 % found it even more difficult to understand the filtered voice. This is a fairly high percentage, which appears as the definite reason for not using filtered voice. If players do not understand the messages, then verbal suggestions will of course not have any influence.

The primary argument for not applying filtered vision is that various test participants stated that it was detrimental to the play experience. Some of the comments about the filtered vision was that it is “uncomfortable”, “detract[s] from the game” and that “the fisheye [filter] was very disorienting and slightly headache inducing.” This is of course a significant problem. It is a core decision to make the play experience a relaxing one and the feelings of discomfort, even potentially bordering nausea, is very counterproductive. After all, the well-being of players is more important than aesthetically expressing sensation of dreaming.

8.3 Expert Subject Matter Evaluations

Four experts have been consulted. These are all very knowledgeable about lucid dreaming and their backgrounds qualify them as experts. Jayne Gackenbach is one of them. Another expert is Ryan Hurd, who has an MA degree in Consciousness Studies and received a Certificate of Dream Studies from John F. Kennedy University. He is also an author on several lucid dreaming books and the founder of the website Dream Studies (see appendix A). The third expert, PasQual Ourtane, has a MSc degree, is a cognitive
psychologist, and is the founder of the lucid dreaming community website LD4all (see appendix A). The fourth expert is Mert Akbal, who is a Ph.D candidate and his profession is a visual artist working with animation, painting, and interactive art. He is involved in a Fine Arts project related to dreams and games.

Appendix G show the input received from experts. The expert evaluation was guided by a questionnaire predominantly consisting of qualitative questions, allowing the expert in question to deepen answers.

8.3.1 Feedback on Solutions for Reaching Aesthetic Goals

The experts share the impression of the game offering a relaxing experience. All experts liked the implementation of Theta isochronic tones and the positive feedback emphasis was put on its influence on relaxation. In particular, various sounds were addressed as contributing to a relaxing atmosphere in a positive light. Relaxation was sometimes mentioned in association with other aspects of play. In regard to Theta isochronic tones, Akbal wrote that “I think this helps a lot to make the game immersive.” This is of course hard to verify but interesting that such a subtle and easily implementable effect received such positive feedback. Although post-play effects were not addressed, Hurd wrote that “I certainly felt relaxed after playing”. This feedback brings to mind a valuable side-effect of playing video games before going to sleep. After playing, the player is conditioned for continued lucid dreaming practice, should she prefer to train more. As pointed out, relaxation is fundamental for lucid dreaming practice. By playing, relaxation appears to come freely and in a larger training program, Lucid Dreamscapes could be used as a preliminary exercise preceding another set of exercises. This playful way of practicing is also compliant with WILD techniques performed in bed, where a relaxing state is paramount for “slipping into” dreaming while awake. In this regard, another beneficial post-play effect is the increased awareness about dreaming, which let the player be in a proper mindset before bedtime.

The simulated sensation of being in a dream was generally regarded successful. A “dreamy mood” was referenced by PasQual and Hurd. Akbal expressed that “I could feel being in a dreamlike stance” and Hurd replied that the speech samples “did put me in a very dream-like state, and encouraged me to relax into being in a dreamscape.” This is in line with the design hypothesis that relaxation makes it easier to become engaged in the make-believe sensation of a dream. It is also an example of how experiencing the two corresponding design goals can be influentially related. Other replies, which addressed if Lucid Dreamscapes has potential to create the sensation of dreaming, were: “The game is successful in imitating a dreamlike state” (Akbal), “kind of [succeeds]” (Gackenbach), and “It succeeds to create the sensation of being a dream. But the content must be extended.” (Akbal) Especially the opinion of the last sentence is
worth paying attention to because both several experts and usability test participants have expressed it. Gackenbach wrote: “I love exploration and was delighted when I could see things - but the terrain got boring very fast and I wanted more stuff to look at in the game”. In line with that, Akbal expressed a request about the amount of game content: “More indoor action. Random characters. Unlinked events/quests appearing.”

Admittedly, the landscapes are barren and maybe too empty? On one hand it is a question of aesthetic preference and taste, on the other hand it is question of psychological effect. As earlier described, the natural landscapes support the addressed feeling of solitude, expressive for the personal individual dream journey, peacefulness and relaxation. However, if the player starts to feel bored, or possible even irritated by the natural monotony, the psychological effect is unfavorable in regard to relaxation and the desire to continuing digital lucid dreaming practice. Although it is part of the game style to express a personal internal journey and emphasize on the introspective aspect of dreaming, this issue also concerns replayability, by the simple reason that novelty in game space may influence the incentive to keep on playing. In this light, an even larger open world with more things to look at and interact with is desired. Yet, production limitations did not allow for expanding the game world further. Again, it must be emphasized that the author was responsible for all game world design and it was prioritized higher to implement lucid dreaming induction techniques creatively and reach the formal and aesthetic design goals in best ways possible, than to ensure that the game had an extensive amount of game content.

The idea of using reality testing for metacognition and its implementation were also evaluated. The overall impression of using reality testing as a game mechanic was positive. The experts seem to like the idea. One expressed it was “well done”, another that “it was ok” but also complained about the limited amount of content in this regard. It is reasonably to say that a game world has to be extensively rich in contents in order to encourage players to observe the game world without losing interest too quickly. It is important to make the player interested in the visuals to improve the motivation for reality testing; especially when all prototyped dream cues are visual on purpose. However, keeping the player engaged is not only a matter of content but also of form – and it is in this regard that the Lucid Dreamscapes was highly praised (also among many usability test participants). The game’s graphics and atmosphere received very positive remarks overall.
8.4 Feedback on Verbal Suggestions

Feedback on verbal suggestions was mixed. Ryan and Akbal liked it a lot. Akbal pointed sound and speech out as the best parts of the game. Ryan commented on the use of suggestions as perfect and said they fit into the game. He also added: “I love the voice over, the lucid quotes, the timing.... all very well done and not repetitive.” On the other hand, Gackenbach and Pasqual were less fond of the voice. PasQual even claimed that “Voice should be silent. Or not talk too much. It gets too annoying.” These covered opinions are very contradicting. This is largely a matter of personal taste, which is not really an issue in itself. Comparatively, not all reviewers are fond of the voice over in *Dear Esther* (thesineseroom, 2012) either. What really matters here is how the functionality of the verbal suggestions is evaluated. Akbal associated the speech with that of the hypnotist and argues that this is appropriate when a person is in another state than awake (for instance in trance). With (post)hypnotic suggestions as an inspirational source, Akbal’s refers to the intended use of verbal suggestions in relation to game design. It has previously been argued that relaxation is good for hypothetically allowing the player to become more susceptible to verbal suggestions. Akbal added: “Since the game atmosphere is immersive in a sufficient degree, the verbal suggestions will succeed”, which confirms that the hypnotic approach was met with support. Ryan was impressed with the voice over and claims it supports the sensation of dreaming, but assures that he is not sure about the post-play effect of it. When commenting on whether verbal suggestions will succeed in a game, Gackenbach put forth: “Maybe for someone really wanting to be lucid it could work.” At the same time she admits that it is an empirical question, which is not easily answered. Expert evaluations can provide qualified assumptions but not empirically verify hypotheses, which of course is a limitation.

A surprising issue which was pointed out was the implementation of verbal suggestions. Gackenbach found the verbal suggestions distracting from looking for dream cues. PasQual was also dissatisfied with the way they were implemented. PasQual expressed her concern as:

The idea of RC [reality checking/testing] as a LD induction technique is to practice that whenever you think 'hey I might be dreaming'. That may be the case when seeing strange objects but right now for example when the voice says: do you think you may be dreaming, that’s a trigger to RC (should be one); but now nothing happens.

Gackenbach clearly summarized what she and PasQual found problematic: That the verbal suggestions were separate from gameplay although she added that “then again if you want to have lucid dreams maybe a good idea - hard to say”. PasQual here refers to a potential issue of non-diegetic elements not
being presented at the gameplay level. This type of problem will be referred to as a non-diegetic gameplay issue and will be discussed further in the next chapter.

8.5 Success as a Lucid Dream Induction Game

It is time to look into the final evaluations on how well the prototype implements lucid dreaming induction techniques, how it helps to enhance metacognition, and how well it is judged to work as an interactive lucid dreaming training tool.

It is Gackenbach’s conclusion that the combination of relaxation and reality testing is well done and that the game could work “only if played a lot and regularly as part of a training program”. This evaluation fits with the conceptual perception of the prototype as an alternative to non-interactive lucid dreaming induction techniques, which would optimally to be part of a training program. Because lucid dreaming is a learnable skill, but hard to learn, it makes sense that playing a lot is evaluated to be a premise for success (LaBerge, 1980b).

Hurd concludes that “I have never seen a game do as well as this one does in terms of reality checks, mantras and self-suggestion, dream-like imagery and joy of flying.” Thus he found great potential in the meditative nature of the game and the exploratory parts of gameplay. Hurd’s conclusive comment also indicates the validity of the game as an induction tool: “I really think this tool is excellent. I had a lucid dream the night after I played the second time, which is noteworthy as I have not had a lucid dream in over 6 weeks.” Hurd wrote that he played three times for a total of 70 min. It should be taken into account that Hurd has experience in lucid dreaming practice but it is nevertheless an encouraging remark.

PasQual’s conclusive feedback was less positive. Her conclusive remarks were centered on the declared issue of verbal suggestions, which are not diegetically connected with reality testing. She mentions another problem: that the game feels too dreamy. She suggests it should feel more real. She writes that the game “mood” is perhaps too dreamy “Since dreams tend to feel so real until you become lucid (and then they feel even more real). Now it’s already dreamy and you already ‘feel’ you are dreaming, yet you can’t become lucid since the game forces you to RC [perform a reality check/test] only on the moving / ‘strange’ things.” This issue is also related to the non-diegetic gameplay problem, which will be discussed in the next chapter.

Akbal concluded that reality testing is implemented in a good way. He declared that the game experience is “an artistic experience”. This is a fair statement when taken the following into account: the game’s lack
of goals, the creative implementation of lucid dreaming induction techniques, and the aesthetics of the game. Akbal is positive towards the use of verbal suggestions and evaluates that they can work if played regularly. Conclusively, he points out again that there should be more game content and more training methods included.

The next chapter will cover more feedback received from testing. This involves feedback which has resulted in new ideas on how to improve the game, and further discussion on these ideas and potential issues will follow.
9 Future Work & Discussion

9.1 Mnenomic Training

The variety of lucid dreaming techniques in appendix C illustrates that the Lucid Dreamscapes could be expanded to adopt more techniques in modified ways, including techniques not listed. It has been pointed out that it is not an aim to implement all the listed techniques in the game, but there is always room for improvement and the following thought experiment may possibly lead to that.

Akbal suggested incorporating one of LaBerge’s techniques to improve lucid dreaming training. He wrote: “You train yourself to make a reality check every time you see a certain object. For example a red car, a woman with a certain dress, a certain kind of dog, etc. If there was a possibility to make a game to train that kind of reality check it would be helpful.”\(^9\) This is an inspirational idea for how to involve memory tasks to a greater extent in a play context. The idea could fit into the current design for a couple of reasons.

According to the technique Akbal described, LaBerge mentions four categories which dream cues can belong to: action, form, context, and inner awareness (LaBerge & Rheingold, 1990). In-game examples of dream actions are a rotating tree and a skewing tower. In-game examples of dream cues fitting into the form category are the stone which enlarges and shrinks as well as the purple bush. Finally, in-game examples of dream cues related to the context category are the giant eyeball in the well or fire burning in the water fountain. This demonstrates that all categories, except inner awareness, are represented in the game. Inner awareness is related to thoughts and emotions, which occur to the player. An example would be to suddenly become excited by the sight of yellow balloons, which would be very weird, and therefore a dream cue in itself. Inner awareness is rather hard to fit in as it would demand that the game system can trace conscious and emotional feedback in the player and map it with game content. With 3 out of 4 categories covered, the game can be used to train the player to look for various types of dream cues, learn to discriminate between them, and become more observant about them in dreams. Besides enforcing recall training, this added practice could also further motivate the player to revisit visited locations.

The infinite game world feature allows for revisiting places randomly. This would also afford for the player practicing spotting differences in the surroundings based on memory. This would be in a similar

\(^9\) The technique referred to and exemplified is called prospective memory training (LaBerge & Rheingold, 1990). It can be used as a preliminary exercise for the MILD technique (see appendix C).
vein of *Find Errors* games, where the player compares two seemingly identical images while attempting to spot visual differences. In terms of this, the criticized limited amount of game world content might even turn into a benefit, in terms of lucid dreaming training, as revisiting places is essential to gameplay.

The recall method has so far only been implemented in a limited way. That is, it covers only remembering the intention to become lucid when verbal suggestions are triggered. The alternative technique described above will expand on the recall method and train the player to do reality testing based on memory also.

### 9.2 Goals and Rewards

Both test participants and experts have suggested to include goals in the game or some sort of reward system; primarily for increasing motivation and to enhance the impression of progression on a gameplay level. It is likely that players who are really extrinsically motivated for having lucid dreams, will not need more goals or rewards included. However, not all may be very motivated in this way. What will be addressed next is to imaginatively illustrate how easily feasible it will be to add more rewards to the thesis game.

*Lucid Dreamscapes* is centered on creating an aesthetically evocative and dreamy experience with emphasis on relaxation. Stressful elements to interfere with a calm play experience have been unwanted from the beginning. Yet Hurd nevertheless gives an expert advice on how to improve the game by designing for what he calls “positive stress”, which is based on the balance between “heightened awareness and relaxation.” He adds: “Increased motivation to find light sources (for status, or before time runs out to get to next level, etc) may help this balance.” Hurd also suggested the idea of adding “new abilities”.

Although several test participants have positively commented on the ability to fly, which is a reward itself, the amount of awards could be extended. An easy, yet seemingly motivating solution, in line with Hurd’s suggestion, is to achieve performative dream control powers when the player finds dream cues. For instance, instead of being able to climb by default, the climb ability could be the first dream power gained. The next power could be the ability to jump high, which the game prototype easily allows for (technically, it only takes changing a single parameter in a script). The third power could be flying, the fourth a teleport power, etc. At the current stage of the game, the first three exemplified powers have already been prototype, albeit the power to jump high was omitted for implementation. To exploit the potential of these powers, it would be considerable to expand the game world so that certain areas can only be reached with
specific powers (or while lucid as Ryan suggested). To expand on the dimension of possibility for goal-oriented ludic involvement, or Hard Fun as Lazzaro puts it (2004), *Lucid Dreamscapes* could be scripted in such a way that powers would gradually become more and more difficult to achieve, simply because the lucidity time period decreases (1st dream cue: 100 sec., 2nd dream cue: 90 sec, 3rd dream cue: 80 sec, etc.).

Another way of combining rewards with player involvement, would be to include additional rewards of aesthetic beauty when becoming lucid, associated with affective involvement. Besides experiencing dusk, various strangely beautiful or psychedelically enthralling effects could take place: sky becomes pixelated, sepia style image effect on camera, theremin music starts playing, etc. These effects could be random and purely aesthetical; they should not be mistaken for objects being dream cues.

It has been exemplified how the achievement of rewards can be a goal in itself and may enhance motivation for becoming lucid in-game further. The concept of the internal journey can be spiced up by kinesthetic and affective rewards as exemplified, but the metaphoric meditative journey as a basis for lucid dreaming training should remain the primary goal - and a reward in itself.

### 9.3 Non-Diegetic Verbal Suggestions

The problem with non-diegetic verbal suggestions introduced in the last chapter will be discussed. The use of voice over in games is commonly related to narration and connected to an unfolding storyline on an in-game level. However, the use of verbal suggestions in *Lucid Dreamscapes* is an experiment as it simultaneously targets two identities in the context of play: player and avatar. The use of first-person perspective and no background information about the avatar was deliberately decided on to ensure that players could easily identify with the avatar.

PasQual suggests that doing an in-game reality test, when hearing the voice asking if you are dreaming, should make you lucid and a reward should be offered to you. PasQual's idea has been considered but there is a problem with it. If the player can become lucid whenever a metacognitive question is asked, the challenge will be radically reduced and becoming lucid would demand no interactive engagement in exploration. Metacognitive questions are asked often. In fact, the player would then just be able to wait for verbal suggestions in order to turn lucid. A solution would be to ask these metacognitive questions less often but that would result in weakening the steady flow of reflective questions, which increase awareness about dreaming hypothetically. It seems to be even more problematic to follow PasQual's
suggestion of completely removing the verbal suggestions. The implemented methods of intention-setting and recall would be removed as a consequence.

Nevertheless, the experts’ suggestions should be taken into consideration. If the non-diegetic verbal suggestions pose a problem for the player’s play experience, implementation should be reconsidered. A usability test participant suggested that for example game characters or radios could do the voicing on a diegetic level. This might work but the limitation of adding a lot of objects into the game world, with the author being responsible for world creation, has not made this option feasible.

9.4 Scary Game Elements

Another suggestion on how to improve Lucid Dreamscapes is to include scary game elements. During the expert evaluation process, Gackenbach wrote that “in our research we found that 1/3 of triggers [of lucidity] in the dreams were caused by something which was scary” (see appendix G). Also Ryan points out the possibility of adopting elements of fear into the game and even using nightmare settings. This is an interesting perspective. In the thesis game, it is night when the player is non-lucid and day when lucid. This feature could lead to nightmarish entities lurking in the shadows of the night and a way to banish them would be to become lucid.

However, there are critical points to examine with this idea. In theory, fear may be counterproductive in sustaining a relaxing play experience, which is a central part of the thesis game. Also, if nightmarish elements are transferred into a dream, it may pose an ethical problem should the dreamer not become lucid and experience a real nightmare instead. Yet, as covered in chapter 3, test results demonstrate that hardcore gamers tend to experience relatively little aggression and few threatening situations in dreams (Gackenbach & Kuruvilla, 2008b), although the played games may be rather violent and contain hostile play situations.10 Adding scary elements would indeed be feasible without having to totally redo game design. In Dear Esther (thechineseroom, 2012), shadowy figures occasionally appear in subtle ways and is an example of how potentially scary elements do not per se have to be related to gameplay but can be

---

10 Test results support a theory by Finnish neuroscientist Antti Revonsuo (2006), the threat simulation theory, which suggests that dreams allow us to prepare for threats in the real-world without any risk of harm. It has been hypothesized that due to frequent threat resolution rehearsal during video game play, hardcore gamers tend to experience fewer nightmares in periods with video game play (Gackenbach & Kuruvilla, 2008). Thus hardcore gamers can be said to rehearse for threats in advance of dreaming by playing conflict-based video games.
entirely cosmetic or aesthetic. Conclusively, implementation of scary elements is an interesting design approach and because non-radical changes to game design could afford it to take place, it is worth considering for future work.

9.5 The Role of the Body during Play

In continuation of the discussion of dreams and games as virtual realities, a key difference between them is that dreams are biologically generated whereas games are digitally generated. Yet, both dreams and games allow for physiological feedback according to sensory stimuli. However, it is likely that there is less physiological feedback when playing games compared to dreams. If hit by a car in a dream, you can feel real physical pain and even wake up in sweat but if the same event occurs in a game, the same effect will very unlikely occur. In relation to the Mirror’s Edge (EA Digital Illusions CE, 2008) study case (Gackenbach & Rosie, 2011), it was previously mentioned that according to one of the questionnaire items, game experiences averagely scored higher than dream experiences in terms of presence. This questionnaire item concerns the sensation of the body and the finding indicates that the body may be less involved in the mediated experience of incorporation, compared to dreaming. Visual and auditory stimuli are still the dominating kinds of stimuli in the majority of video games and tactile input has had less emphasis during the video game history of technological progression. Thomas Sheridan puts it interestingly: “In nature, creatures with haptic capability (feelers, touch sense) appeared long before those with sense organs for vision and hearing. However evolution of technology has been the reverse.” (Sheridan, 2000, p. 5). Just recently have kinesthetically sophisticated control systems begun to emerge in the video game industry, which allow for full-body interaction - for instance Microsoft’s Kinect.

An early study (Dement & Wolpert, 1958) indicated that tactile stimuli are possibly even more effective than visual and auditory stimuli in regard to influence on dream content. This is a good indication for considering the beneficial involvement of tactile input in future design experiments on lucid dreaming induction video games. Is it possible that full-body incorporation would allow for more effective lucid dreaming induction? Would this make the sensation of dreaming more convincing and enhance the effectiveness of lucid dreaming induction practice? Two virtual reality researcher, David Anderson and

---

11 In regard to the addressed questionnaire item, it consisted of two questions. The dream-related question was: “How often did you feel “My body was in bed, but my mind was inside my dream”?”. The game-related question was: “How often did you feel “My body was in this room, but my mind was inside the environment I saw/heard”?“ (Gackenbach & Rosie, 2011, p. 103).
Michael Casey, point out that the more senses that are involved in a virtual experience, the greater the degree of presence (or incorporation) (as cited in Gackenbach & Rosie, 2011, p. 99). This may be an argument for involving the body more in lucid dreaming induction game experiments.\footnote{Far into the development process, the author figured out that Mert Akbal has developed what he calls the \textit{Avian Flight Simulator}. This simulator is a webcam-based body tracking system, where the flapping of arms results in simulated virtual flying. The project is inspired by and investigates art, games and (lucid) dreams. (Re)Implementing the fly mechanic in \textit{Lucid Dreamscapes} in a similar way could be interesting. Website showing the simulator in action: http://vimeo.com/34193738}

Yet another question emerges: Can we become too virtually embodied and experience too much incorporation in a mediated context, which involves lucid dreaming induction practice? It is at least theoretically possible that we can become so engaged in a mediated experience that we forget that we are part of a virtual environment. Analogically speaking, we fall asleep again and become non-lucid. It is also questionable why full-body incorporation alone should train one in becoming more reflective about dreaming and the like. While dreaming, most of the time, our bodies are to a large degree passive. This is also usually true for our bodies when playing video games with a conventional monitor-keyboard interface. Taken a step further, this comparison illustrates the player as representing the sleeping self, whereas the avatar represents the dreaming self. This analogy poses a difficult question: is it favorable for the player to keep a certain distance to the avatar, in terms of incorporation, in order to maintain a degree of meta awareness about playing a game and avoid the risk of being incorporated, to the extent that she becomes unaware of the play context?
10 Conclusion

The creation of a lucid dreaming induction video game is a tough challenge as there has been developed no games of that kind before. Nevertheless, there was inspiration to gain from study cases both involving dreaming and video game play. In addition, help could be found among lucid dreaming literature and electronic devices designed for lucid dreaming. A noticeable challenge was how to implement existing techniques in a modified way and draw on the potential of the video game medium. Looking into other study cases and research, it was found that the concept of incorporation, associated with presence and immersion, along with the implementation of modified techniques, would form an interesting conceptual basis with certain formal design goals. The core idea of the game design was to create a game world which is a dream world where lucid dreaming practicing can take place. The conceptual basis, afford for the player to have a play experience which in regard to lucid dreaming practice benefits from various potential outcomes: 1) the sensation of dreaming, 2) relaxation, and 3) exploration, which involves reality testing training. A number of dimensions of player involvement were evaluated to be more fitting into the game design than others, especially affective and spatial involvement.

Overall, the design experiment aimed at creating a relaxing meditative mindful-like experience as an alternative to existing lucid dreaming techniques. Lucid Dreamscapes offers a mediated visualization experience, which the player may find rewarding for practicing in various ways: enhance general awareness about dreaming, become asked reflective questions frequently, become reminded about setting the intention of becoming lucid, etc. – benefits which the verbal suggestions play a crucial role in offering.

Usability feedback has been useful for input on how to optimize the game but has also shed light on problems of using filtered vision and audio. Feedback helped posing a new design question: Is it possible to exaggerate the sensation of dreaming with counterproductive consequences? Usability test data showed that filtering sounds and vision could have negative effects. The possibly biggest problem addressed during testing was the implementation of non-diegetic verbal suggestions.

In an experiment, it was demonstrated that using both DreamLight and another lucid dreaming induction technique (the MILD technique, see appendix A) resulted in five times as many lucid dreams compared to those not using any technique (LaBerge, 1988). This indicates that using existing lucid dreaming induction techniques, in combination with playing Lucid Dreamscapes, chances of becoming lucid would improve.
Bibliography


Ludography


Appendix A: Ludic Dreaming Communities and Online Resources

The Lucidity Institute
http://www.lucidity.com
The institute of Stephen LaBerge and colleagues. Dream lab experiments have been centered on scientifically proving lucid dreaming, developing electronic devices, evaluating lucid dreaming induction techniques, and much more. The institute arranges retreats in beautiful natural settings with focus on teaching lucid dreaming.

Spiritwatch - Jayne Isabel Gackenbach’s website
http://www.spiritwatch.ca
An online archive which contains Gackenbach’s written material. Covered topics are lucid dreaming, video games, virtual worlds, internet, technology, etc. Back issues of Lucidity Letter/Lucidity can be found here too.

International Association for the Study of Dreams
http://www.asdreams.org
A non-profit multidisciplinary organization dedicated to investigation and research on dreams. It publishes the scholarly journal Dreaming and IASD Dream Time Magazine. The organization is involved in arranging many international events and conferences.

The Lucid Dream Exchange – Robert Waggoner’s Website
http://www.dreaminglucid.com
An E-zine used for teaching and inspiring readers about lucid dreaming.

Lucidipedia – Tim Post’s Website
http://www.lucidipedia.com
A website which offers online classes, information, and video tutorials on lucid dream induction techniques. Dream journals can be shared there too. Has a forum too.
Dream Studies – Ryan Hurd’s Website

http://www.dreamstudies.org

A website delivering expert information on lucid dreaming. It is up-to-date with recent research and bringing lucid dreaming news.

LD4all – pasQual’s Website

http://www.ld4all.com

A community website which has information on lucid dreaming and a forum.

Dreamviews

http://www.dreamviews.com

A Website which offers resources on sleep, dreams, and lucid dreaming. Supports online classes, video tutorials, articles, and dream journal sharing.
# Appendix B: Electronic Lucid Dreaming Devices

<table>
<thead>
<tr>
<th>Electronic device</th>
<th>Official and commercial info</th>
<th>Test results/reviews</th>
</tr>
</thead>
</table>
|                   |                             | http://library.macewan.ca/lucidity/Issue7_2/LL7_2_LaBerge.htm  
|                   |                             | http://www.sawka.com/spiritwatch/inductionoflucid.htm |
|                   |                             | http://rickcw50.tripod.com/ed4-2nov.htm  
| SuperNovaDreamer  | http://www.lucidity.com/supernovadreamer.html | N/A  
<p>| DreamSpeaker      | <a href="http://www.lucidity.com/DreamSpeakerMan.pdf">http://www.lucidity.com/DreamSpeakerMan.pdf</a> | N/A  |</p>
<table>
<thead>
<tr>
<th>Tool</th>
<th>Website</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>P.E.S.T. (PEST)</td>
<td>[<a href="http://www.lucidity.com/PEST">http://www.lucidity.com/PEST</a> Man.pdf](<a href="http://www.lucidity.com/PEST">http://www.lucidity.com/PEST</a> Man.pdf)</td>
<td>N/A</td>
</tr>
<tr>
<td>DreamStalker Pro</td>
<td><a href="http://www.yugzone.ru/dreamstalkert.htm">http://www.yugzone.ru/dreamstalkert.htm</a></td>
<td>N/A</td>
</tr>
</tbody>
</table>
## Appendix C: Mental Techniques for Having Dream-Initiated Lucid Dreams

<table>
<thead>
<tr>
<th>Techniques</th>
<th>Steps</th>
<th>Original source</th>
<th>Referencing source(s)</th>
</tr>
</thead>
</table>
| Power of resolution | 1. During day: Try to think and imagine that “everything is of the substance of dreams” (a construction in your mind).  
2. During night: When about to go to bed, make it clear that you will realize that the dream is not real. | (Evans-Wentz, 1964)                                                             | (LaBerge & Rheingold, 1990)                  |
| Critical state-testing | 1. Pick 5 – 10 occasions to do reality testing. These should be similar to circumstances or situations found in your dreams.  
2. Do a reality test whenever you experience situations resembling the chosen occasions. Also, do the test whenever something strange or improbable occurs or when strong emotions arise. Try to recall events which recently took place. | (Tholey, 1983)                                                                | (LaBerge & Rheingold, 1990)                  |
| Intention           | 1. Set up the intention of recognizing dreaming.  
2. Visualize yourself recognizing dreaming. During visualization, incorporate your most frequently occurring or favorite dream signs.  
3. Imagine yourself doing an intended dream action – preferably a dream sign (flying for instance). | (LaBerge & Rheingold, 1990)                                                       |                                               |
### Reflection-intention

(LaBerge’s modified version)

1. Pick any number of occasions to do a reality test. Use mental imagery for enhancing memory, by visualizing yourself remember your intention at desired occasions.

2. Do a reality test at the chosen occasions. Try to recall events which recently took place.

3. Begin an imagination journey with imagining yourself dreaming. Probe the environment for personal dream signs. Imagine the experience of finding a dream sign. Last, tell yourself: “The next time, I’m dreaming, I will remember to recognize that I’m dreaming.”

4. Imagine yourself doing what you intent to do when lucid. Continue the imagination journey and imagine yourself carrying out the intended action. Resolve that you will remember to recognize that you are dreaming and carry out the intended action in your next lucid dream.

---

### Mnemonic induction of lucid dreams (MILD)

LaBerge and Rheingold (1990) also point out an optional preliminary exercise for the MILD technique: Prospective memory training. As the name suggests, it is about focusing on memory tasks but also creating familiarity with your chosen dream signs.

1. Before sleep, resolve to wake up and recall dreams during whatever dream period(s) throughout the night, you find most preferable.
2. When awakening from a dream, try to recall as much as you can from the dream and vividly remember it.

3. While going back to sleep, focus on the intention to remember recognizing that you are dreaming.

4. Image that you are back in the dream you just awakened from. Imagine that you recognize you are dreaming and find a dream sign. Continue the imagination journey.

5. Repeat step 3 & 4, until your intention is set. Then allow yourself to fall asleep again.

| Auto-suggestion | In simplified form (LaBerge & Rheingold, 1990):
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Enter a relaxing state of body and mind by letting go of all tension in muscles, breathe slowly, and free your mind from worries, thoughts, etc.</td>
</tr>
<tr>
<td></td>
<td>2. Tell yourself that you will have a lucid dream whenever you find most convenient. Avoid strongly insisting this.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wake back to bed (WBTB)</th>
<th>Prior to sleep, plan to awaken app. 2-3 hours earlier than usual. Go to bed.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. Get out of bed when you have awakened at the planned time. Try to remember your dream. App. half an hour before returning do bed, think about and imagine what you want to do in your following dream.</td>
</tr>
</tbody>
</table>

| (Garfield, 1974)         | (LaBerge & Rheingold, 1990)                                                 |
| (LaBerge & Rheingold, 1990) | (Waggoner, 2009)                                                               |
| (Waggoner, 2009)         |                                                                               |
3. When in bed again, practice whatever lucid dreaming induction technique you want to do. Continue sleeping for 2+ hours.

| Hypnosis | Sources do not explicitly describe the steps of this technique but rather the empirical findings about the influential effects of hypnosis in regard to lucid dreaming induction. However, below is provided typical steps for hypnotherapeutic work, although not all steps are necessarily required for induction. This technique can also be used for self-hypnosis.

Hypnosis principally always involves strengthening intension and relies on visualization. But hypnosis can be used for many purposes; for instance to remember that the subject will remember to know that she is dreaming or to do reality tests in coming dreams.

1. Induction

2. Deepening (commonly counting down or visualizing walking down a staircase)

3. Suggestions

4. Post-hypnotic suggestions (may for instance include a personal dream sign that the subject is suggested to find in the forthcoming dream, which will assist her in becoming lucid (Dane, 1984))

5. Awakening (typically counting up) |

(Dane, 1984) | (LaBerge & Rheingold, 1990)
(Gackenbach & Bosweld, 1990) | (Waggoner, 2009)
| Look at your hands | 1. Simply look at your hands and question if you dream. If done often and with interest, this action may eventually become a dream action and the association with lucid dreaming arising by the sight of one’s dream hands may lead to lucidity. Waggoner’s approach also involves repeatedly telling oneself “Tonight while I dream, I will see my hands and realize I’m dreaming.” and one should resume the intention when waking up during night (2009). | (Castaneda, 1972) | (Waggoner, 2009) |
Appendix D: Reality Testing

The Dream Argument

The philosophical foundation for reality testing is the dream argument. In a nutshell, this argument is the claim that we cannot take it for granted whether we are awake or not at any time. This is based on the empirical evidence that our senses can fool us into believing that we are awake while dreaming. The premise of the argument is thus that sensorial input cannot exclusively be a guarantee for allowing us to properly distinguish between waking reality and the illusory experiences of dreams. The dream argument can be traced back to the philosophy of Plato, Aristotle, René Descartes, and Zhuangzi’s famous butterfly dream allegory.

Methodological Variations

The basic idea for reality testing is that if we are metacognitive about whether we are dreaming or not while awake, we can also be metacognitive while dreaming. LaBerge refers to a technique, which he calls reality testing (LaBerge & Rheingold, 1990). In practice, the lucid dream practitioner is supposed to question whether he is awake or not while awake, relating to the dream argument. LaBerge admits that his version of reality testing is inspired by English writer Oliver Fox’s concept of “the critical faculty”, which Fox saw fundamental for eliciting lucid dreaming (LaBerge & Rheingold, 1990, p. 50-51). Moreover, LaBerge acknowledges that German psychologist Paul Tholey has been methodologically influential (LaBerge & Rheingold, 1990, p. 51-52). Fundamentally, Fox and Tholey’s key to lucid dreaming is to develop a critical reflective way of thinking, where one learns to analyze the external cues in the waken reality through practice. The goal is, through frequent practice, to transfer this way of thinking into dreaming, which will enhance the chances of spotting bizarre, incongruent or illogical elements and thus become lucid. So if done often, this method can potentially turn into a habit while dreaming. Tholey’s reflection technique also suggests that it is a good idea to be critically reflective, particularly in situations which are similar to recurrent dream scenarios (1983). At least this will increase the testing frequency. In addition, it is effective to try to recall what you have experienced lately; if the dream world elements are rather transformative and the memories drifty, the likelihood of being aware about dreaming is higher. A fundamental metacognitive question, which Tholey suggests asking frequently, is: “Am I dreaming or not?” (LaBerge & Rheingold, 1990, p. 51).
Appendix E: High Concept Document

High Concept
While dreaming, you explore fascinating landscapes in search for lights and bizarre elements, which will make you realize that you are in a dream. You can change gravity, stretch objects and fly.

Features

- Adventuring the landscapes, will be no ordinary walk in nature. There are mystical inspiring things to encounter and beautiful surroundings to behold, containing bizarre elements which seem out of place.

- You will look for lights in darkness. By touching them, a new part of the landscape level will be illuminated.

- Your perception is distorted by varying degrees of motion blur and a fisheye filter, affecting the sensation of being in a dream.

- By being in a dream, you have certain super powers available. You can control gravity, stretch certain objects (technically: mesh-bending), and even fly sometimes. [Notice, there were problems implementing mesh-bending as part of the player's dream control abilities. However, certain dream cues' meshes bend in the game prototype.]

- Searching for bizarre elements in an otherwise ordinary natural environment is part of the game. You must find strangeness/"glitches" in objects and events, which logically indicate that you are dreaming. This is called reality testing. The flying ability can only be achieved by doing so successfully.

- The sounds will have a hypnotic character and both help creating a fascinating game experience but also help suggestively convince you that you are dreaming.

Player Motivation
Besides exploration and an aesthetically pleasurable experience, the player may be driven by the desire to possibly experience lucid-control dreams after play in real life.

Genre
Exploratory adventure. It is a 3D game with first person perspective.
Target Customer

Both for players who appreciate exploratory adventure and persons who want to practice lucid-control dreaming or mindfulness in a gaming context.

Competition

None

Unique Selling Points

- The meta goal: to realize one is dreaming and experience lucid dreaming after play. It is a unique game in the sense that the play experience can possibly transfer into dreams and thus you can continue dreaming/playing after play.

- The feel: You are in a dream where the setting is attractive. You can experience the feel of becoming lucid in a dream – and possibly even after playing

- The power-ups: There are dream control powers available: gravity control, stretch object control, and the ability to fly.

[Gravity control corresponds to super climbing and stretch object control was not implemented due to technical problems.]

- Relaxing experience: a play session leads to a joyful and relaxing experience. You are guaranteed not to be frustrated during or after play.

Target Hardware

PC and Mac.

Design Goals

Experience relaxation:

Keywords: mindful, meditative, hypnotic.

Experience the sensation of dreaming:

Keywords: strangeness, mystical, “soothing”

Experience exploration:

Keywords: curiosity, navigation, quest/examination for dream cues.
Appendix F: Transcripts of LaBerge’s Audio Recordings

Lucid Dream Trance Induction Transcript (Later Part)

[A basic induction comes before the part below]

...and now... in a moment... look around your dream... and find something special... a dream sign... for tonight... something in your dream... that will tell you... you are dreaming... that will help you remember to become lucid in your dreams tonight... dream now for a few minutes more and find a dream sign for tonight...

...and now... see how easy it is to know that you are dreaming now... and dream whatever you wish... feel how easy it is to know that you are dreaming now... how effortless... how easy it is to see dream signs... and become aware that you are dreaming... as easy as becoming aware of your breathing now again... as easy as becoming aware that you are dreaming now... and while you are here in this relaxed and dreamy place there is something else that I want you to know... it is just as easy and effortless to dream what you wish tonight and know that you are dreaming while you dream... just as easy to do tonight as it is to do it now...

...now as you know... you dream several times during each night... and so I wonder when tonight... or which other night... you will find yourself aware that you are dreaming... and dreaming what you wish... perhaps it will be in your first dream of the night... or in your last dream... or the second or the third dream... I do not know... and although perhaps you cannot say... yet still... maybe... your unconscious mind knows... when... and how... you will realize... you are dreaming... and remember... to remind you... of dreams signs... or any other cue... to remember... that you are dreaming... and to dream... what you wish...

...and when you awake... from your dreams later tonight... you will find it just as easy to remember your dreams... as it is to recall... any other event... that just happened a few moments ago...

...and when you awake... to the morning light... you will arise from tonight’s adventures... refreshed... rested... and full of life... and now... good night... may your dreams be filled... with love and light...

[Total duration: 17:44 min.]
REFLECTIVE LUCID INDUCTION MANTRA 1

[This quote is played constantly:]

...the next time I’m dreaming... I will realize that I am dreaming... am I dreaming?... is this a dream?...

[Total duration: 7:47 min.]

REFLECTIVE LUCID INDUCTION MANTRA 2

[This quote is played once every second minute or so, with minor interval variations:]

...the next time I’m dreaming... I will realize that I am dreaming... am I dreaming? ...is this a dream? ...am I dreaming right now?

[Total length: 9:02 min.]
Appendix G: Subject Matter Expert Evaluations

Ryan Hurd’s Evaluation

* Requires an answer

1) Gameplay

1.1 How challenging do you think the game is? *

Moderate. Unlike many games, the challenge is to go slowly and pay attention at those key spots.

1.2. Do you find the gameplay meaningful to you? *

[Yes] [No] (Put an underscore (_) beneath your answer)

1.2.1 Please explain your answer above. *

I was definitely motivated to explore the landscape and look for the lucidity cues. I love the landscape, especially exploring the ruins and structures.

1.3 Do you think the gameplay will generally be meaningful to players with no knowledge about lucid dreaming? *

[Yes] [No] (Put an underscore (_) beneath your answer)

1.3.1 Please explain your answer above. *

I do. the task is in line with usual RPG.

1.4 What do you think about the lack of formal goals in the game? *

I feel that the lack of goals, levels, and accumulation of points or status does create a limitation -- people will play as long as they are motivated to explore. for me this was between 10-30 minutes. My guess is
that goals may elongate this time and then stretch players’ attention span, therefore aiding in another level of consciousness development.

1.5 What do you think about the non-violent experimental gameplay based on exploration? *

love it! I play Minecraft so I am used to this sort of thing. For commercial uses, a version with some kind of natural threat (or nightmare setting!) might be beneficial -- after all, threats increase awareness levels. it could be a night/day thing like Minecraft, for example.

1.6 Any suggestions for how to improve gameplay?

1. when lucid, I flew to tower windows and houses that were otherwise off-limits. but I got stuck once lucidity was over, having to reset. lighting and treasure would be a nice addition for these things.

2. when lucid, it would be cool if new landscapes opened up. for example, ruins transformed into complete structures, or stone arches became portals to new levels of game play.

3. accumulation of lights into a status bar would increase motivation. the status bar could, for example, increase time spent in lucid dream, or allow for other powers.

2) Lucid dreaming induction techniques

2.1 What do you think about having implemented a reality testing technique in the game? *

great. the decision to reality test in the game really encourages careful observation.

2.2 How well do you think reality testing is implemented as a game mechanic? *

also well done. love the eyelid closing. I did wonder if I would be penalized for reality testing too much, as it is a metric. I wonder how it would effect game play if you only had, for example, RC to operate within a timed window of 10 minutes of game play. that could a more intense version of the game.

2.3 How well do you think the speech samples work in regard to lucid dreaming training? *
I love the voice over, the lucid quotes, the timing... all very well done and not repetitive. I'm not sure if they actually "work" but they did put me in a very dream-like state, and encouraged me to relax into being in a dreamscape.

2.4 To which degree do you think the speech samples succeed as verbal suggestions in a game experience context specifically? *

I found it to be perfect. I didn't feel like it was too intrusive, and the shift during lucid was a nice touch

2.5 What do you think specifically about the verbal suggestions you get when you are lucid? (When you are lucid, you are told that next time you dream, you will realize you are dreaming and remember to look for dream signs) *

these are perfect, I would not change these for testing with a larger audience.

2.6 What do you think about the subtle use of Theta isochronic tones (4 -8 Hertz frequency) implemented in the ambient soundtrack, intended to help inducing a relaxing state of mind? *

I didn’t know this was in use, so well done! I certainly felt relaxed after playing (I played three times, always before bed, for a total of 70 minutes)

2.7 Other lucid dreaming induction techniques which you think would fit the game and how could they improve lucid dreaming training?

more proprioception/balance challenges -- such as navigating a narrow walkway on a cliff, or bounding from rock to rock to get to a place of interest.

concentration development -- I think a timed game, or a game with levels or more formal goals could increase concentration through desire to push through natural concentration cycles to complete a goal.

multi-tasking development -- not sure how to fit this in, but there’s research suggesting that those who multi-task better (Stroop Task) also have more lucid dreams.

emotional risk taking -- behaviors and goals that have some kind of threat (even if its the loss of accumulated light-points or leveling, for example) will involve emotional levels and may develop this skill of taking risks, which is also associated with those who have more lucid dreams.
3) Game experience

3.1 Can you describe your impression of the overall mood in the game, generated by the sum of all sounds and imagery, and how well does it fit into a lucid dreaming training experiment? *

dreamy and also spooky. I was expecting monsters for the first time because the mood is somber and eerie. I like this! also the wonderful texturing (of swaying grass, of the water) creates a meditative space, encouraging slow movement and looking around.

3.2 How well do you think the game succeeds in creating the sensation of being in a dream? *

well done. the flying especially is really fun and gorgeous.

3.3 How well do you think the game succeeds in having the player relax? *

worked very well for me.

3.4 Any suggestions for how to improve any of the aspects addressed in the last 3 questions (mood/dreaming sensation/relaxation), in order to facilitate lucid dreaming training?

More challenge embedded in this relaxing atmosphere would be better, for myself anyways. Lucid dreaming is about positive stress -- heightened awareness and relaxation. increased motivation to find lights (for status, or before time runs out to get to next level, etc) may help this balance. a nightmare option could be effective for some -- (as research suggests that some gamers of violent games don't have more nightmares -- and monsters make excellent reality checks!). I think a puzzle feature -- investigation, finding certain treasures to get new abilities, etc -- would make this game a commercial hit as well. this game is poised to be Myst for a new generation!!

4) General

4.1 Overall, how well do you think the game works as an interactive lucid dreaming training tool? *

[1] [2] [3] [4] [5] (1 = very bad, 5 = very good, put an underscore (_) beneath your answer)
4.1.1 Please explain your rating above. *

Wonderful BETA project. As stated above, I think increased risk and/or challenge will even better facilitate LD training as it will target increased concentration, emotional risk taking, and field independence/proprioception.

4.2 Overall, to which degree do you think the game has successfully incorporated existing lucid dreaming induction techniques? (Not by the amount, but by the quality of incorporation) *

[1] [2] [3] [4] [5] (1 = very bad, 5 = very good, put an underscore ( _ ) beneath your answer)

4.2.1 Please explain your rating above. *

I have never seen a game do as well as this one does in terms of reality checks, mantras and self-suggestion, dream-like imagery and joy of flying.

4.3 Overall, to which degree does the game help creating a critical reflective attitude toward one's state of consciousness (Sometimes addressed by a question like: "Are you awake or dreaming?") *

[1] [2] [3] [4] [5] (1 = very bad, 5 = very good, put an underscore ( _ ) beneath your answer)

4.3.1 Please explain your rating above. *

This game is a meditation... creative and effective.

4.4 What do you think are the best parts of the game? *

I love the use of texture. Also, the esthetics of the winter trees, spooky ruins, and structures. the lights are incredible too. it's really gorgeous.

4.5 What do you think are the worst parts of the game? *

definitely some rough spots. I got stuck several times, generally on the edges of staircases, and when I flew to towers and houses and landed in window sills.

game play is directly limited to the primary motivation of exploring and finding new reality checks. my attention span for this wavered between 10 - 20 minutes, and I know l can play a game for longer than that, leading me to think some way to develop attention span through a leveling/status/new abilities system would really suit this game well.
4.6 How do you think the game can be improved to facilitate lucid dreaming training?

Errant thought -- incorporation of abstract geometric imagery (mandalas, spirals, vortices) may increase the likelihood of seeing this imagery in the dreamstate. Basically, trippy visuals at key moments, such as when walking through a stone archway that is secretly a portal...

4.7 Feel free to come with suggestions or comments about anything you find relevant to add. Thank you very much for your participation and interest in reviewing the game – highly appreciated!

I had to run the game on the fastest setting because my MAC laptop only has 2GB of memory. -- it's very thirsty! I also played it on a gaming PC with more working memory and it was very smooth. I like the settings, but you may want to find a way to recommend settings so as to not frustrate the average player who does not have a gaming computer.

I really think this tool is excellent. I had a lucid dream the night after I played the second time, which is noteworthy as I have not had a lucid dream in over 6 weeks.
Jayne Gackenbach’s Evaluation

* Requires an answer

1) Gameplay

1.2 How challenging do you think the game is? *

not at all

1.2. Do you find the gameplay meaningful to you? *

[Yes] [No] (Put an underscore (_) beneath your answer)

1.2.1 Please explain your answer above. *

while the concept is meaningful the game play was not - I mean it likely offers practice to the really motivated person if they played it say several times a day or for 30 minutes or so just before bed - but only if they believe it will help –

1.3 Do you think the gameplay will generally be meaningful to players with no knowledge about lucid dreaming? *

[Yes] [No] (Put an underscore (_) beneath your answer)

1.3.1 Please explain your answer above. *

you need a maybe category - which is where my reaction and thinking is - if never done a reality test yes this could help but finding the oddities was time consuming without sufficient immediate reward to continue

1.4 What do you think about the lack of formal goals in the game? *

makes it hard to keep going - i mean one could always do a find the maximum reality tests in such and such a time frame and that can be self defined - but the motivation is missing - now that said i've had people write me who are amazingly motivated so that may not be needed for the eager beavers
1.5 What do you think about the non-violent experimental gameplay based on exploration?

I love exploration and was delighted when I could see things - but the terrain got boring very fast and I wanted more stuff to look at in the game.

1.6 Any suggestions for how to improve gameplay?

Set goals, the whole voice over I did not like and found it distracting - seems like you confounding autosuggestion with gameplay - then again if you want to have lucid dreams maybe a good idea - hard to say =- I would have preferred soothing music although the nature sounds were good –

2) Lucid dreaming induction techniques

2.1 What do you think about having implemented a reality testing technique in the game?

Good idea.

2.2 How well do you think reality testing is implemented as a game mechanic?

It's ok just so few places that were odd - or hard to find (I'm not sure) that I found myself just doing it a lot - again needs more stuff in the world.

2.3 How well do you think the speech samples work in regard to lucid dreaming training?

As above, I don't like it.

2.4 To which degree do you think the speech samples succeed as verbal suggestions in a game experience context specifically?

Well they are transparently verbal suggestions and maybe for someone really wanting to be lucid it could work but I don't know - it's an empirical question.

2.5 What do you think specifically about the verbal suggestions you get when you are lucid? (When you are lucid, you are told that next time you dream, you will realize you are dreaming and remember to look for dream signs)

Don't like the verbal part, found it distracting from the looking for oddities.
2.6 What do you think about the subtle use of Theta isochronic tones (4-8 Hertz frequency) implemented in the ambient soundtrack, intended to help inducing a relaxing state of mind? *

great, well done - was very relaxing play

2.7 Other lucid dreaming induction techniques which you think would fit the game and how could they improve lucid dreaming training?

nightmare scenes? In our research we found that 1/3 of triggers [of lucidity] in the dreams were caused by something which was scary”.

3) Game experience

3.1 Can you describe your impression of the overall mood in the game, generated by the sum of all sounds and imagery, and how well does it fit into a lucid dreaming training experiment? *

mood very relaxing, seems to fit

3.2 How well do you think the game succeeds in creating the sensation of being in a dream? *

kind of -

3.3 How well do you think the game succeeds in having the player relax? *

very well

3.4 Any suggestions for how to improve any of the aspects addressed in the last 3 questions (mood/dreaming sensation/relaxation), in order to facilitate lucid dreaming training?

this is redundant with earlier questions

4) General

4.1 Overall, how well do you think the game works as an interactive lucid dreaming training tool? *

[1] [2] [3] [4] [5] (1 = very bad, 5 = very good, put an underscore ( _ ) beneath your answer)
4.1.1 Please explain your rating above. *

there are problems but there are also some nice ideas being played out

4.2 Overall, to which degree do you think the game has successfully incorporated existing lucid dreaming induction techniques? (Not by the amount, but by the quality of incorporation) *

[1] [2] [3] [4] [5] (1 = very bad, 5 = very good, put an underscore (_) beneath your answer)

4.2.1 Please explain your rating above. *

did combine relaxation with reality checks - nicely done

4.3 Overall, to which degree does the game help creating a critical reflective attitude toward one's state of consciousness (Sometimes addressed by a question like: "Are you awake or dreaming?") *

[1] [2] [3] [4] [5] (1 = very bad, 5 = very good, put an underscore (_) beneath your answer)

4.3.1 Please explain your rating above. *

only if played a lot and regularly as part of a training program

4.4 What do you think are the best parts of the game? *

when the landscape lights up when you track over a light source

4.5 What do you think are the worst parts of the game? *

when I take my finger off the "w" key I'm still moving - not good

4.6 How do you think the game can be improved to facilitate lucid dreaming training?

redundant question see earlier answers

4.7 Feel free to come with suggestions or comments about anything you find relevant to add. Thank you very much for your participation and interest in reviewing the game – highly appreciated!

Sune you've done a great job and I was impressed with the concept and the look of the game - my concerns are listed above - let me know how your thesis continues and what you plan to do with the game
Mert Akbal’s Evaluation

* Requires an answer

1) Gameplay

1.1 How challenging do you think the game is? *

The game is quite challenging. I could find only 3 lucidity clues.

1.2. Do you find the gameplay meaningful to you? *

[Yes] [No] (Put an underscore (_) beneath your answer)

1.2.1 Please explain your answer above. *

Although the dream scenery is not very similar to my own dream world, I could feel being in a dreamlike stance. Furthermore becoming aware of dreaming with reality check is meaningful.

1.3 Do you think the gameplay will generally be meaningful to players with no knowledge about lucid dreaming? *

[Yes] [No] (Put an underscore (_) beneath your answer)

1.3.1 Please explain your answer above. *

Yes, BUT...

Players with any experience of lucid dream will very easy understand and somehow remember the stance. But it is still hard for people to understand the game without knowing the concepts of reality check and sleep introduced lucid dreaming. Maybe you can add an intro (maybe even an animated intro) to introduce these concepts.
1.4 What do you think about the lack of formal goals in the game? *

I think it is a tricky problem. There are many dreams without real goals. Where the dreamer is only an observer. Yet there are also a lot of dreams where the dreamer tries to solve a mystery or a problem, communicate with others, search or follow a person or looking for a lost object (unlike in this game, where you are looking for clues which are there to initiate an awareness of being in a dream). You can maybe add a list of objectives randomly appearing in game. But in general you should avoid having a storyline of course.

1.5 What do you think about the non-violent experimental gameplay based on exploration? *

Thumbs up! Dream violence is very common in games, even it is made by game makers unknowingly.

1.6 Any suggestions for how to improve gameplay?

More indoor action. Random characters. Unlinked events/quests appearing. You can keep the "one minute memory" for these quests. After the expiration the scenery changes or the player is simply brought forward by events. Quests which can not be solved will bring the player in a nightmarelike stance and probably disturb the dream-game stance.

2) Lucid dreaming induction techniques

2.1 What do you think about having implemented a reality testing technique in the game? *

It is a very good concept to train the reality testing for lucid dream training.

2.2 How well do you think reality testing is implemented as a game mechanic? *

I dont know, if there is a study about how the mouse gestures are linked to brain. But in general right click is for options i.e. for more control. And in the game right click is used to choose being in control, choosing the option "hey I am dreaming!"

2.3 How well do you think the speech samples work in regard to lucid dreaming training? *

The speech remembers me of a hypnotician and the voice from the meditation CD. And in this manner it is the right person who can talk to a person even he/she is in a state of consciousness, other than awake.
2.4 To which degree do you think the speech samples succeed as verbal suggestions in a game experience context specifically? *

Since the game atmosphere is immersive in a sufficient degree, the verbal suggestions will succeed.

2.5 What do you think specifically about the verbal suggestions you get when you are lucid? (When you are lucid, you are told that next time you dream, you will realize you are dreaming and remember to look for dream signs) *

I think that can work, if the game is played regularly.

2.6 What do you think about the subtle use of Theta isochronic tones (4-8 Hertz frequency) implemented in the ambient soundtrack, intended to help inducing a relaxing state of mind? *

I think this helps a lot to make the game immersive.

2.7 Other lucid dreaming induction techniques which you think would fit the game and how could they improve lucid dreaming training?

There is one of the techniques of LaBerge. You train yourself to make a reality check every time you see a certain object. For example a red car, a woman with a certain dress, a certain kind of dog, etc.

If there was a possibility to make a game to train that kind of reality check it would be helpful.

3) Game experience

3.1 Can you describe your impression of the overall mood in the game, generated by the sum of all sounds and imagery, and how well does it fit into a lucid dreaming training experiment? *

The game is successful in imitating a dreamlike state. I think it can be developed further to become a useful lucid dreaming training tool.

3.2 How well do you think the game succeeds in creating the sensation of being in a dream? *

It succeeds to create the sensation of being a dream. But the content must be extended.
3.3 *How well do you think the game succeeds in having the player relax?*

Yes it is relaxing.

3.4 *Any suggestions for how to improve any of the aspects addressed in the last 3 questions (mood/dreaming sensation/relaxation), in order to facilitate lucid dreaming training?*

I would add more content including urban locations, persons, animals etc.

And also include other lucid dreaming training tools.

4) **General**

4.1 *Overall, how well do you think the game works as an interactive lucid dreaming training tool?*

[1] [2] [3] [4] [5] (*1 = very bad, 5 = very good, put an underscore ( _ ) beneath your answer)*

4.1.1 *Please explain your rating above.*

It needs to include other training methods.

4.2 *Overall, to which degree do you think the game has successfully incorporated existing lucid dreaming induction techniques? (Not by the amount, but by the quality of incorporation)*

[1] [2] [3] [4] [5] (*1 = very bad, 5 = very good, put an underscore ( _ ) beneath your answer)*

4.2.1 *Please explain your rating above.*

A good way to adapt reality check. But again needs more random content.

4.3 *Overall, to which degree does the game help creating a critical reflective attitude toward one’s state of consciousness (Sometimes addressed by a question like: "Are you awake or dreaming?")*

[1] [2] [3] [4] [5] (*1 = very bad, 5 = very good, put an underscore ( _ ) beneath your answer)*

4.3.1 *Please explain your rating above.*

It is an artistic experience.
4.4 What do you think are the best parts of the game? *

The sound and speech.

4.5 What do you think are the worst parts of the game? *

No indoor action.

4.6 How do you think the game can be improved to facilitate lucid dreaming training?

Adding more content.

4.7 Feel free to come with suggestions or comments about anything you find relevant to add. Thank you very much for your participation and interest in reviewing the game – highly appreciated!
PasQual’s Evaluation

* Requires an answer

1) Gameplay

1.1 How challenging do you think the game is? *

I found it to get boring after a while.

1.2. Do you find the gameplay meaningful to you? *

[Yes] [No] (Put an underscore (_) beneath your answer)

1.2.1 Please explain your answer above. *

there is no clear connection in going into the lights, finding 'objects' and doing RC's.

1.3 Do you think the gameplay will generally be meaningful to players with no knowledge about lucid dreaming? *

[Yes] [No] (Put an underscore (_) beneath your answer)

1.3.1 Please explain your answer above. *

I think non lucid dreamers may be very confused about it since the point of doing reality checks is doing them whenever you think ‘hey this might be a dream’, and this is triggered also by the voice saying things like ‘may you be dreaming?’ that should be a trigger to RC but in the game nothing happens when you do it.

1.4 What do you think about the lack of formal goals in the game? *

well there is a goal, becoming lucid and finding the dream cues. I like the exploration part and the dreamy music but I would like to be rewarded with finding dreamsigns or something like that.
1.5 What do you think about the non-violent experimental gameplay based on exploration? *

I like exploring but there should be more rewards in exploring. (I realize that that is a lot of work to make and I'm already very impressed by the game how it is right now, but there could be more interaction, perhaps dream characters, animals, etc? it is now a very lonely place with a voice over.)

1.6 Any suggestions for how to improve gameplay?

More rewards 'finding' stuff, interaction with dream characters or animals or something like that. Make the traveling smoother, I found the controls by mouse annoying, it works better by keyboard, but the reality check should have a keyboard shortcut too, it is very non ergonomic (and annoying) to have to use the left mouse for that.

2) Lucid dreaming induction techniques

2.1 What do you think about having implemented a reality testing technique in the game? *

The idea of RC as a LD induction technique is to practice that whenever you think 'hey I might be dreaming'. That may be the case when seeing strange objects but right now for example when the voice says: do you think you may be dreaming, that's a trigger to RC (should be one); but now nothing happens.

2.2 How well do you think reality testing is implemented as a game mechanic? *

It's not very clear that something happens and it should react better on the dreamsigns instead of having to move back and forth to have it clearly in your vision. Also maybe there should also be a response when you do it and nothing happens.

2.3 How well do you think the speech samples work in regard to lucid dreaming training? *

A voice like that may work when you drift to sleep and want to induce that feeling in a dream but not in the game where the voice tells you 'this might be a dream' and you RC and nothing happens. It may work better if you have that voice and reward the player when they do a RC everytime the voice says something like 'are you dreaming'. Since this is what triggers the LD 'in real life' – and in dreams you may even have voices or people telling you or asking you if you are dreaming and if the voice in the game works like that it may be beneficial.
2.4 To which degree do you think the speech samples succeed as verbal suggestions in a game experience context specifically? *

if it says are you dreaming, a RC should be rewarded.

2.5 What do you think specifically about the verbal suggestions you get when you are lucid? (When you are lucid, you are told that next time you dream, you will realize you are dreaming and remember to look for dream signs) *

a bit missing the point since the being lucid should be a reward in itself so let the player enjoy that.

2.6 What do you think about the subtle use of Theta isochronic tones (4-8 Hertz frequency) implemented in the ambient soundtrack, intended to help inducing a relaxing state of mind? *

great idea and seems to do the trick since I found the music relaxing.

2.7 Other lucid dreaming induction techniques which you think would fit the game and how could they improve lucid dreaming training?

None that come to mind right now.

3) Game experience

3.1 Can you describe your impression of the overall mood in the game, generated by the sum of all sounds and imagery, and how well does it fit into a lucid dreaming training experiment? *

mood was dreamy, inviting to explore, mystical. Perhaps too dreamy. Since dreams tend to feel so real until you become lucid (and then they feel even more real). Now its already dreamy and you already ‘feel’ you are dreaming, yet you can’t become lucid since the game forces you to RC only on the moving / ‘strange’ things.

3.2 How well do you think the game succeeds in creating the sensation of being in a dream? *

like I said, perhaps too well since you want to ‘not know’ you are dreaming until you do the RC
3.3 How well do you think the game succeeds in having the player relax? *

I think that works very well 😊

3.4 Any suggestions for how to improve any of the aspects addressed in the last 3 questions (mood/dreaming sensation/relaxation), in order to facilitate lucid dreaming training?

Less ‘dreamy’... make it more ‘real’...

4) General

4.1 Overall, how well do you think the game works as an interactive lucid dreaming training tool? *

[1] [2] [3] [4] [5] (1 = very bad, 5 = very good, put an underscore (_) beneath your answer)

4.1.1 Please explain your rating above. *

I can't judge that since I think the best proof for that would be to have a LD after playing it.

4.2 Overall, to which degree do you think the game has successfully incorporated existing lucid dreaming induction techniques? (Not by the amount, but by the quality of incorporation) *

[1] [2] [3] [4] [5] (1 = very bad, 5 = very good, put an underscore (_) beneath your answer)

4.2.1 Please explain your rating above. *

The RC should work differently.

4.3 Overall, to which degree does the game help creating a critical reflective attitude toward one's state of consciousness (Sometimes addressed by a question like: "Are you awake or dreaming?") *

[1] [2] [3] [4] [5] (1 = very bad, 5 = very good, put an underscore (_) beneath your answer)

4.3.1 Please explain your rating above. *

when voice says things like that an RC should be rewarded.

4.4 What do you think are the best parts of the game? *

graphics, music
4.5 What do you think are the worst parts of the game? *

controls, (you should be able to do everything on the keyboard), the fact that the RC only works when really focused in a specific way on a ‘strange’ thing. And the voice – it tends to really get annoying.

4.6 How do you think the game can be improved to facilitate lucid dreaming training?

Voice should be silent. Or not talk too much. It gets too annoying. If the voice is kept, then reward an RC when it says the ‘are you dreaming’ stuff.

4.7 Feel free to come with suggestions or comments about anything you find relevant to add. Thank you very much for your participation and interest in reviewing the game – highly appreciated!

Good luck with your thesis!
Appendix H: Statistics of Quantitative Data from Usability Test

1) Demographics

1.1 Your age?
Values = 26 26 32 15 31 28 22 19 22 17 17 28 27
Average = 24 (rounded up)

1.2 Your gender?
Male 11 85%
Female 2 15%

1.3 How many years have you played video games?
Values = 16 12 28 10 20 20 12 14 10 13 11 18 19
Average = 16 (rounded up)

Note: Some playtesters stated that they probably had played more than the typed in value used for calculating average.

1.4 How many hours do you averagely play per week?
0 hours 0 0%
1 - 5 hours 4 31%
5 - 10 hours 5 38%
11 - 15 hours 1 8%
16 - 20 hours 2 15%
21 - 25 hours 0 0%
26 - 30 hours 0 0%
31 or more hours 1 8%

2) Controls

2.1 What do you think about the pace of walking/climbing?
2.2 What do you think about the pace of flying?

<table>
<thead>
<tr>
<th></th>
<th>Too slow</th>
<th>Too fast</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 - Too slow  1  8%
2  6  46%
3  4  31%
4  2  15%
5 - Too fast  0  0%

3) Dream signs

3.1 Did you find any dream signs?

Yes [13]  100%
No [0]  0%

3.2 In version A: How difficult was it to find dream signs?

<table>
<thead>
<tr>
<th></th>
<th>Very easy</th>
<th>Very difficult</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 - Very easy  0  0%
2  0  0%
3  3  23%
4  7  54%
5 - Very difficult  3  23%
3.3 In version B: How difficult was it to find dream signs?

<table>
<thead>
<tr>
<th>Difficulty Level</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very easy</td>
<td>1</td>
<td>100%</td>
</tr>
<tr>
<td>Very difficult</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

4) Light sources

4.1 What do you think worked best?

The single light source type in version A

The multiple light source types in version B

4.2 In version A: How often did you navigate after the light sources when lucid?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>5</td>
<td>38%</td>
</tr>
<tr>
<td>Often</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Sometimes</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Rarely</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Never</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Cannot remember</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

4.3 In version B: How often did you navigate after the light sources when lucid?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>5</td>
<td>38%</td>
</tr>
<tr>
<td>Often</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Sometimes</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Rarely</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Never</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Cannot remember</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>
4.4 Did you at any time feel lost or did not know where to go?

- No: 5 (38%)
- Yes: 8 (62%)

5) Audio

5.1 How difficult was it to understand what was said with filtered voice?

- Very difficult: 0 (0%)
- 2: 2 (15%)
- 3: 2 (15%)
- 4: 7 (54%)
- Very easy: 2 (15%)

5.2 What do you think worked best aesthetically?

- Filtered voice: 5 (38%)
- Non-filtered voice: 8 (62%)

6) Vision

6.1 What do you think worked best aesthetically?

- Filtered vision (fish eye view and motion blur): 7 (54%)
- Non-filtered vision: 6 (46%)
and motion blur [7]
# Appendix I: Questionnaire Data from Usability Test

**Test person # 1/13**

<table>
<thead>
<tr>
<th>1) Demographics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Your age? *</td>
<td>26</td>
</tr>
<tr>
<td>1.2 Your gender? *</td>
<td>Male Female</td>
</tr>
<tr>
<td>1.3 How many years have you played video games? *</td>
<td>16? Probably more.</td>
</tr>
<tr>
<td>1.4 How many hours do you averagely play per week? *</td>
<td>16-20 hours</td>
</tr>
<tr>
<td>1.5 Your favorite video game genres?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2) Controls</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 What do you think about the pace of walking/climbing? (Choosing 3 means &quot;pace is fine&quot;)*</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td></td>
<td>Too slow Too fast</td>
</tr>
<tr>
<td>2.2 What do you think about the pace of flying? (Choosing 3 means &quot;pace is fine&quot;)*</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td></td>
<td>Too slow Too fast</td>
</tr>
<tr>
<td>2.3 What do you think about the way reality testing works? *</td>
<td>I thought it worked pretty well. If you able to see a foreign (for lack of better word) object, you blink you eyes and puff! Lucid Dreaming!</td>
</tr>
<tr>
<td>2.4 What do you think about the climb ability and the way of using it? *</td>
<td>Using the climb ability was easy enough, but some environments provide some problems, such as rocky ground etc. Furthermore did a couple of areas give the expression that you could walk up them normally although this was impossible, such as a path up a hill. Here the climb ability came in handy, although possibly not in the way it originally was intended.</td>
</tr>
</tbody>
</table>
2.5 Any suggestions or comments in relation to controls? Whereas the climb ability let you feel very much in control (I'm sticking to the ground!), the movement controls at times felt a bit unresponsive (especially the jump, but also to a minor degree air movement and ground movement). When flying it felt move like you were floating and it took some time to turn and move in a new direction. This was somewhat the same when moving on the ground, a where it felt like you continued moving a bit after you had released the designated movement key.

3) Dream signs/cues

3.1 Did you find any dream signs? *

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

3.2 In version A: How difficult was it to find dream signs? *

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very easy</td>
<td></td>
<td></td>
<td></td>
<td>Very difficult</td>
</tr>
</tbody>
</table>

3.3 In version B: How difficult was it to find dream signs? *

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very easy</td>
<td></td>
<td></td>
<td></td>
<td>Very difficult</td>
</tr>
</tbody>
</table>

3.4 If you found that some dream signs were easier to find than others, please point out which ones and why you think so? The one with the tree under the bridge, possibly because I expected that there would be something under a bridge, although I had hoped for a troll, hehe.

3.5 If you found that some dream signs made little or no sense at all, please point out which ones and why you think so? Those I found made perfect sense. But had to admit that there was at least a couple that I could not figure out.

3.6 Any suggestions or comments in relation to dream signs? Hmm, well some of them could possibly be more obvious, but if there were to easy to find the game would loose its apparel and I would turn it off pretty quickly. A certain amount of challenge made me stick to it and try to figure it out, whereas more easily spotted signs would destroyed any feeling of achievement. If something should be done to make it slightly easier, it could be some clear audio indicators, such as a slight humming when you where within a certain range of the dream sign.
### 4) Light sources

#### 4.1 What do you think worked best?
(In version A, light sources are only colored. In version B, they are white, grey and colored) *
- The single light source type in version A
- The multiple light source types in version B

#### 4.2 In version A: How often did you navigate after the light sources when lucid? *
- Always
- Often
- Sometimes
- Rarely
- Never
- Cannot remember

#### 4.3 In version B: How often did you navigate after the light sources when lucid? *
- Always
- Often
- Sometimes
- Rarely
- Never
- Cannot remember

#### 4.4 Did you at any time feel lost or did not know where to go? *
- No
- Yes

#### 4.5 If yes, how could this be avoided?
Well the problem wasn't that I could not find a new light source and thereby move to another area, the problem was figuring out whether I was moving back to an area I had already been in. I'm not sure but it felt like the light sources respawned after returning to the dream state. If this is so, it could be change so they simply did not.

#### 4.6 Any suggestions or comments in relation to light sources?
Stick to version B, as version A was very difficult to figure out and felt more confusing and disorientating than version B.

### 5) Audio

#### 5.1 How difficult was it to understand what was said with filtered voice? *
- Very difficult
- Very easy

#### 5.2 What do you think worked best aesthetically? *
- Filtered voice
- Non-filtered voice

#### 5.3 Any suggestions or comments in relation to audio?
I felt the monologue worked pretty well. I liked the soothing tone of voice and the simple repeating hints and thoughts provided a very strong atmosphere. The music provided the same type of dreaming mellowness as the voice and the simple background sounds (running water etc.) added to the dreamlike feeling.

I think the unfiltered voice felt best, as you did not have to use effort on understanding what was said, but instead were able to focus on the
message. The filtered voice felt a bit like someone talking to you while you were dreaming, which was also an interesting approach but I enjoyed the unfiltered most.

### 6) Vision

**6.1 What do you think worked best aesthetically?**

- Filtered vision (fish eye view & motion blur)
- Non-filtered vision

**6.2 Any suggestions or comments in relation to vision?**

Although I enjoyed the aesthetics that the fish eye provided, I found it a bit uncomfortable and I did not enjoy playing that version as much as the version B. I don't think it the fish eye and motion blur was necessary to add to the dream setting, as most dreams I have had never included either.

### 7. General

**7.1 Feel free to write anything problematic or frustrating you may have experienced during the playtest session?**

I was able to interact with the same dream signs multiple times, which did not feel like it was the intention. The previously mentioned rocky areas was pretty annoying, but not to the point of frustration.

**7.2 Any final suggestions or comments? Thanks a lot for your participation!**

I really enjoyed the game and especially the monologue gave me something to think about in terms of how both reality and dream are experienced. Can't wait to go to sleep and see whether I'll have lucid dreams!

#### Test person # 2/13

1) **Demographics**

| 1.1 Your age? * | 26 |
| 1.2 Your gender? * | Male |
| 1.3 How many years have you played video games? * | 12 |
| 1.4 How many hours do you averagely play per week? * | 0 hours |
| 1.5 Your favorite video game genres? | |
2) Controls

<table>
<thead>
<tr>
<th>2.1 What do you think about the pace of walking/climbing? (Choosing 3 means &quot;pace is fine&quot;) *</th>
<th>1 2 3 4 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too slow</td>
<td>Too fast</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.2 What do you think about the pace of flying? (Choosing 3 means &quot;pace is fine&quot;) *</th>
<th>1 2 3 4 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too slow</td>
<td>Too fast</td>
</tr>
</tbody>
</table>

| 2.3 What do you think about the way reality testing works? * | Fine. |

| 2.4 What do you think about the climb ability and the way of using it? * | A little jarring. |

| 2.5 Any suggestions or comments in relation to controls? | Climbing was a little bit awkward. |

3) Dream signs/cues

<table>
<thead>
<tr>
<th>3.2 Did you find any dream signs? *</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>3.2 In version A: How difficult was it to find dream signs? *</th>
<th>1 2 3 4 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very easy</td>
<td>Very difficult</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3.3 In version B: How difficult was it to find dream signs? *</th>
<th>1 2 3 4 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very easy</td>
<td>Very difficult</td>
</tr>
</tbody>
</table>

| 3.4 If you found that some dream signs were easier to find than others, please point out which ones and why you think so? | It's easier when there is a colour difference because the contrast makes it easier to perceive the dream signs. For example, the red light in the water fountain. |

| 3.5 If you found that some dream signs made little or no sense at all, please point out which ones and why you think so? | I'm not sure that the fish eye lens makes sense because it distorts everything. Therefore, certain objects appear to be dream signs. |

| 3.6 Any suggestions or comments in relation to dream signs? | I'm not sure if I could make a connection between the various dream signs. Is there a common thread that links them together? |

4) Light sources

<table>
<thead>
<tr>
<th>4.1 What do you think worked best? (In version A, light sources are only colored. In version B, they are white, grey and colored) *</th>
<th>The single light source type in version A The multiple light source types in version B</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>4.2 In version A: How often did you navigate after the light sources when lucid? *</th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
<th>Cannot remember</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>4.3 In version B: How often did you navigate after the light sources when lucid? *</th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
<th>Cannot remember</th>
</tr>
</thead>
</table>
4.4 Did you at any time feel lost or did not know where to go? *
- No
- Yes

4.5 If yes, how could this be avoided?
I thought that this was part of the intended effects of the game.

4.6 Any suggestions or comments in relation to light sources?
That the light sources become the object of pursuit in the game and it makes the player less aware that they are looking for aberrations in reality. Perhaps, when one light source is activated other light sources could dissipate or become less prominent so that 'reality' becomes more prominent.

5) Audio
5.1 How difficult was it to understand what was said with filtered voice? *

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very difficult</td>
<td></td>
<td></td>
<td></td>
<td>Very easy</td>
</tr>
</tbody>
</table>

5.2 What do you think worked best aesthetically? *
- Filtered voice
- Non-filtered voice

5.3 Any suggestions or comments in relation to audio?
No. I liked the music and the ambient noises.

6) Vision
6.1 What do you think worked best aesthetically? *
- Filtered vision (fish eye view & motion blur)
- Non-filtered vision

6.2 Any suggestions or comments in relation to vision?
Too much fish eye and motion blur detract from the game.

7) General
7.1 Feel free to write anything problematic or frustrating you may have experienced during the playtest session?
Climbing was occasionally difficult. And, sometimes I got annoyed at the blurry vision. Didn't realize that I shouldn't be checking for dream cues all the time.

7.2 Any final suggestions or comments? Thanks a lot for your participation!
The landscapes and colour transitions were beautiful. However, I expected an evolution of lucid dreams and it would have been interesting to be able to gain more control in the dreams the more they occurred.

Thank you! Congratulations on a very beautiful and interesting concept.

Test person # 3/13

1) Demographics
1.1 Your age? *
32

1.2 Your gender? *
- Male
- Female

1.3 How many years have you played video games? *
28

1.4 How many hours do you averagely play per week? *
- 0 hours
- 1-5 hours
- 5-10 hours
- 11-15 hours
- 16-20 hours
- 21-25 hours
- 26-30 hours
- 31+ hours

1.5 Your favorite video game genres?

2) Controls
2.1 What do you think about the pace of

| 1 | 2 | 3 | 4 | 5 |
## walking/climbing? (Choosing 3 means "pace is fine")

<table>
<thead>
<tr>
<th>Too slow</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Too fast</th>
</tr>
</thead>
</table>

### 2.2 What do you think about the pace of flying? (Choosing 3 means "pace is fine")

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

Too slow | 1 | 2 | 3 | 4 | 5 | Too fast |

### 2.3 What do you think about the way reality testing works?

good solution. mimicking closing and opening eyes with mouse click.

### 2.4 What do you think about the climb ability and the way of using it? *

very useful and reflects the feeling of hovering and moving around in dreams without having too many difficulties.

### 2.5 Any suggestions or comments in relation to controls?

maybe some interaction with doors and objects.

## 3) Dream signs/cues

### 3.1 Did you find any dream signs? *

- Yes
- No

### 3.2 In version A: How difficult was it to find dream signs? *

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

Very easy | 1 | 2 | 3 | 4 | 5 | Very difficult |

### 3.3 In version B: How difficult was it to find dream signs? *

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

Very easy | 1 | 2 | 3 | 4 | 5 | Very difficult |

### 3.4 If you found that some dream signs were easier to find than others, please point out which ones and why you think so?

almost equal..
I found 4 signs:
- Moving Tree in the circle of trees: easy
- Tree under the bridge: easy
- Rising and sinking wall in ruins: easy
- and an uncertain place where it was raining and the building was distorted moving: medium

### 3.5 If you found that some dream signs made little or no sense at all, please point out which ones and why you think so?

### 3.6 Any suggestions or comments in relation to dream signs?

maybe more signs, but harder to find. for example hidden in details.

## 4) Light sources

### 4.1 What do think worked best? (In version A, light sources are only colored. In

- The single light source type in version A
Master's Thesis in Media, Technology and Games  
Sune Weber Pedersen

<table>
<thead>
<tr>
<th>4.2 In version A: How often did you navigate after the light sources when lucid? *</th>
<th>Always □</th>
<th>Often □</th>
<th>Sometimes □</th>
<th>Rarely □</th>
<th>Never □</th>
<th>Cannot remember □</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3 In version B: How often did you navigate after the light sources when lucid? ?</td>
<td>Always □</td>
<td>Often □</td>
<td>Sometimes □</td>
<td>Rarely □</td>
<td>Never □</td>
<td>Cannot remember □</td>
</tr>
<tr>
<td>4.4 Did you at any time feel lost or did not know where to go? *</td>
<td>□ No</td>
<td>□ Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.5 If yes, how could this be avoided?</td>
<td>I came again and again to the same place. I felt like running in circle and thought maybe I am moving on a sphere or the places are repeated.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.6 Any suggestions or comments in relation to light sources?</td>
<td>After losing the lucidity sometimes I found myself in darkness. Especially on the bridge by the two towers and as I flew into the tower room and couldn't go out. (Stuck around the stairs. Climbing and jumping didn't help, unlike other temporary stick between rocks or on the fountain, where I could easily jump/climb out)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5) Audio

| 5.1 How difficult was it to understand what was said with filtered voice? * | Very difficult □ | Very easy □ |
|---|---|
| 5.2 What do you think worked best aesthetically? * | Filtered voice □ | Non-filtered voice □ |
| 5.3 Any suggestions or comments in relation to audio? | It gave a dream-like feeling. I don't know how to do it better. Maybe with strange but simple melodies. |

6) Vision

| 6.1 What do you think worked best aesthetically? * | Filtered vision (fish eye view & motion blur) □ | Non-filtered vision □ |
| 6.2 Any suggestions or comments in relation to vision? | Could be even a bit more exaggerated with fish-eye filtering. Maybe unevenly or motion guided distortion in the fish eye. |

7. General

| 7.1 Feel free to write anything problematic or frustrating you may have experienced during the playtest session? | Maybe you should ask how many dream signs the testing person have found. |
| 7.2 Any final suggestions or comments? Thanks a lot for your participation! | It was a good experience. It did work well for me. I wish more content in different scenes and settings. (like usual dream places: city, ship, home, school...) I enjoyed it very much. |
# Test person # 4/13

## 1) Demographics

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Your age?</td>
<td>15</td>
</tr>
<tr>
<td>1.2 Your gender?</td>
<td>Male</td>
</tr>
<tr>
<td>1.3 How many years have you played video games?</td>
<td>10, probably more</td>
</tr>
<tr>
<td>1.4 How many hours do you averagely play per week?</td>
<td>0 hours</td>
</tr>
<tr>
<td>1.5 Your favorite video game genres?</td>
<td></td>
</tr>
</tbody>
</table>

## 2) Controls

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 What do you think about the pace of walking/climbing? (Choosing 3 means &quot;pace is fine&quot;)</td>
<td>1</td>
</tr>
<tr>
<td>2.2 What do you think about the pace of flying? (Choosing 3 means &quot;pace is fine&quot;)</td>
<td>1</td>
</tr>
<tr>
<td>2.3 What do you think about the way reality testing works?</td>
<td>1</td>
</tr>
<tr>
<td>2.4 What do you think about the climb ability and the way of using it?</td>
<td>1</td>
</tr>
<tr>
<td>2.5 Any suggestions or comments in relation to controls?</td>
<td></td>
</tr>
</tbody>
</table>

## 3) Dream signs/cues

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2 Did you find any dream signs?</td>
<td>Yes</td>
</tr>
<tr>
<td>3.2 In version A: How difficult was it to find dream signs?</td>
<td>1</td>
</tr>
<tr>
<td>3.3 In version B: How difficult was it to find dream signs?</td>
<td>1</td>
</tr>
<tr>
<td>Question</td>
<td>Option</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>3.4 If you found that some dream signs were easier to find than others, please point out which ones and why you think so?</td>
<td>Very easy (•)</td>
</tr>
<tr>
<td>3.5 If you found that some dream signs made little or no sense at all, please point out which ones and why you think so?</td>
<td></td>
</tr>
<tr>
<td>3.6 Any suggestions or comments in relation to dream signs?</td>
<td></td>
</tr>
<tr>
<td><strong>4) Light sources</strong></td>
<td></td>
</tr>
<tr>
<td>4.1 What do you think worked best? (In version A, light sources are only colored. In version B, they are white, grey and colored)</td>
<td>The single light source type in version A (•) The multiple light source types in version B</td>
</tr>
<tr>
<td>4.2 In version A: How often did you navigate after the light sources when lucid?</td>
<td>Always (•) Often Sometimes Rarely Never Cannot remember</td>
</tr>
<tr>
<td>4.3 In version B: How often did you navigate after the light sources when lucid?</td>
<td>Always (•) Often Sometimes Rarely Never Cannot remember</td>
</tr>
<tr>
<td>4.4 Did you at any time feel lost or did not know where to go?</td>
<td>Always (•) Often Sometimes Rarely Never Cannot remember</td>
</tr>
<tr>
<td>4.5 If yes, how could this be avoided?</td>
<td></td>
</tr>
<tr>
<td>4.6 Any suggestions or comments in relation to light sources?</td>
<td></td>
</tr>
<tr>
<td><strong>5) Audio</strong></td>
<td></td>
</tr>
<tr>
<td>5.1 How difficult was it to understand what was said with filtered voice?</td>
<td>1 2 3 4 5 (•) Very difficult Very easy</td>
</tr>
<tr>
<td>5.2 What do you think worked best aesthetically?</td>
<td>Filtered voice (•) Non-filtered voice</td>
</tr>
<tr>
<td>5.3 Any suggestions or comments in relation to audio?</td>
<td></td>
</tr>
<tr>
<td><strong>6) Vision</strong></td>
<td></td>
</tr>
<tr>
<td>6.1 What do you think worked best aesthetically?</td>
<td>Filtered vision (fish eye view &amp; motion blur) Non-filtered vision</td>
</tr>
<tr>
<td>6.2 Any suggestions or comments in relation to vision?</td>
<td></td>
</tr>
<tr>
<td><strong>7. General</strong></td>
<td></td>
</tr>
<tr>
<td>7.1 Feel free to write anything problematic or frustrating you may have experienced during the playtest session?</td>
<td>I was stuck in the table in one of the houses in pink forest. I also find a lot of bugged stones, like that half of stone is missing (it wasn't cue)</td>
</tr>
<tr>
<td>7.2 Any final suggestions or comments? Thanks a lot for your participation!</td>
<td></td>
</tr>
<tr>
<td><strong>1) Demographics</strong></td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>--</td>
</tr>
<tr>
<td>1.1 Your age? *</td>
<td>31</td>
</tr>
<tr>
<td>1.2 Your gender? *</td>
<td>Male</td>
</tr>
<tr>
<td>1.3 How many years have you played video games? *</td>
<td>20</td>
</tr>
<tr>
<td>1.4 How many hours do you averagely play per week? *</td>
<td>0 hours</td>
</tr>
<tr>
<td>1.5 Your favorite video game genres?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>2) Controls</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 What do you think about the pace of walking/climbing? (Choosing 3 means &quot;pace is fine&quot;) *</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>2.2 What do you think about the pace of flying? (Choosing 3 means &quot;pace is fine&quot;) *</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>2.3 What do you think about the way reality testing works? *</td>
<td>It works well, I think. It's pretty clever actually, feels like actually blinking.</td>
</tr>
<tr>
<td>2.4 What do you think about the climb ability and the way of using it? *</td>
<td>I like the ability to climb around. I found it a bit weird to be able to do the climb feature while not facing vertical challenges. It seems that the climbing feature makes the camera turn exactly to the tangent angles of the ground. This feels a bit off, I don't think my head would turn like that. Even though I realize it is a dream, the setting mimics reality, and thus makes me set certain expectations for the presentation to adhere to reality, and when those expectations are not met, I think there is an issue. The severity of the issue, however, is determined, for example, by how greatly an issue hampers my ability to act in the place. Perhaps by some other things as well, but I can't come up with anything else right now. Of course, if a non-realistic feature would allow me to act more optimally in a way that benefits me, it would not be a problem.</td>
</tr>
</tbody>
</table>
I guess the thing here also with the head turning like that being weird is that my logic makes a presupposition that in the place where I am right now, the virtual place, if no other information of what is the state of my being in the place, I am there as myself, with my physical abilities, including not having to turn my head in such manner when climbing.

When "climbing" on a horizontal surface, I got the illusion that I was actually going faster than when walking.

I myself as a designer might make climbing automatic, and just take a bit more time to cross some climbable obstacle, depending on the angle and level of challenge. The extra clicking to activate the control is just limiting my certain feeling of reactivity in this setting. I guess it is likewise in any contemporary man-and-computerscreen-and-mouse control configurations, where many times, like supposedly here, the act of humanoid-physiologically walking in an environment, which is normally happening through sending signals from your brain to your legs, is afforded through and enacted by sending signals from your brain to your fingers to click buttons on a plastic keyboard or mouse. Some things in such mapping, despite us as players being quite used to first person keyboard and mouse controls, do not always feel quite right, because in real life you don't have to put the extra thought of pressing a button into climbing an obstacle, because the action of subconsciously planning the movement and executing it simply flows and is not in a particular way launched at a point of time that delimits a time before the act and time of committing the act.

<table>
<thead>
<tr>
<th>2.5 Any suggestions or comments in relation to controls?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make the climbing happen without pressing an extra key, just slow the avatar down.</td>
</tr>
<tr>
<td>Keep the camera more steady when climbing.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3) Dream signs/cues</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3 Did you find any dream signs? *</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>3.2 In version A: How difficult was it to find dream signs? *</td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>
3.3 In version B: How difficult was it to find dream signs? *

| Very easy | | | | | Very difficult |
|-----------|---|---|---|---|
|           | 1 | 2 | 3 | 4 |

3.4 If you found that some dream signs were easier to find than others, please point out which ones and why you think so?

I found the turned tree, the fountain thing, some fire that was higher than others, a pipe on a stone.

The pipe was easy to find because it stuck out. The fountain was an interesting place so I took a look at it and blinked. The turned tree I could understand as such thing and not a usual bug in a contemporary 3d environment was only due to the hint in the manual.

If there were others, I probably missed a lot of them. They were well hidden, I thought. Some times I got a bit frustrated trying to find more and I couldn't.

3.5 If you found that some dream signs made little or no sense at all, please point out which ones and why you think so?

I don't think any of them made any "sense". If the purpose of the question is to find out if this was an issue, I can tell it wasn't, because things in dreams do not have to make sense.

3.6 Any suggestions or comments in relation to dream signs?

I would like there to be more of them, to be found more often.

I respect the sense of having an open world. Sometimes, however, I long for experiences that are neatly packaged and digestible and induce a certain feeling that I will be able to realize or experience the thoughts or emotions that the designer(s) (usually, and for me, hopefully) intended with the presentation within a fair amount of time that feels reasonable to invest in the experience. Thus it might have been better to have these areas, for example, to be these limited, smaller areas, and in each, perhaps one such thing to be found. Perhaps tips could be given and etc if too much time passes.

On the other hand, such open area and the relaxing atmosphere might be intended to get the player to a certain lull with the experience. However, if this was the
Intention, in the experience there was something conflicting for me to fully get to experience such emotions. Despite the presentation being so soothing and otherworldly as it was. I have difficulty pinpointing it right now, but as I think and analyze and "munch" my experience, it could have something to do with getting the feeling of there being something in the environment that is intended me to find through exploration. This feeling is, of course, induced by the textual content presented along with the test, giving guidelines as to how the experience is meant to be had pertaining to the testing. This feeling then drives me to find those elements in the background, and explore. This then becomes a "game" to find those elements. The game that it turns out into makes me feel anxious about performing in the environment and frustrated if I don't seem to be "progressing" in the "game". The vast environment and the scatterance of the elements then becomes a hindrance, a source of frustration to me, where the experience of getting to fly for a while is perhaps not rewarding enough. Then, as mentioned, it comes to the question of the "game" being rewarding, and for me, such rewards are best when they represent, for example, the development of something, or the progress in something. And preferably in something that I can see in the UI or in the environment or as my being's capability or capacity within the experience.

A suitable progress then, and a solution for me to the lull vs gameplay problem, I would see as the one I mentioned in the beginning of this text, to present small, graspable environments. Those environments could have lots of interesting things, perhaps interactible things. All of them could have some different feel and visual filters and etc in them. Music as well. It is often the change for me, the "what is behind the next corner", that keeps me playing and coming back. Perhaps not in the replayability sense unless there are diferent solutions, but at least most definitely in the I-want-to-do-this-now sense.

4) Light sources

4.1 What do think worked best?
(In version A, light sources are only colored. In version B, they are white, grey and colored) *

- The single light source type in version A
- The multiple light source types in version B

4.2 In version A: How often did you navigate after the light sources when lucid? *

- Always
- Often
- Sometimes
- Rarely
- Never
- Cannot remember
4.3 In version B: How often did you navigate after the light sources when lucid? *

- Always
- Often
- Sometimes
- Rarely
- Never
- Cannot remember

4.4 Did you at any time feel lost or did not know where to go? *

- No
- Yes

4.5 If yes, how could this be avoided?

Well, for one is the question of if the aim of the game is to collect all the light sources? If that is, perhaps introduce a little less of them, that light up a larger area. Now it feels like a “pixel-hunt” (to exaggerate) at times because there are lots and lots of lights and most of them are not related to a surreal element. Perhaps have, as said, larger lighting areas for one source and have every fifth or seventh light to be attached to a surreal element to increase “rewardingness” of the experience.

If that is not the purpose, then perhaps it could be, because it seems that there are only a certain amount of the light sources, and it seems like a meaningful event or prospect in the future to have all the lights collected, perhaps one inducing hopes or some rewards of, at least a change of setting or some new art or experience. Also, currently right now due to the speed of advance, which seems reasonable and actually the correctly suitable for such a lull-experience, the environment is very vast, and there are a huge number of light sources, and a feeling of not gaining enough from the experience to spend the time to collect all of them. This causes a certain feeling of not wanting to commit the time it would take to collect them all, and makes you quit at some point where you think you have spent enough time on the experience. You get this prospect that to collect all the lights it would take an unreasonable time for what the experience, which is otherwise nice, has probably to offer. You definitely also think that this test setting only has this one environment, and there will be nothing more for using an hour to collect all the lights. So that makes you kind of quit before, I think, you have seen a reasonable amount of the environment, because there seems to be lots there. Perhaps one thing is the invariability of the experience of only collecting in such a vast place as well that makes the initial big interest weaken along with time.

I could spend some time on it, yes, but as an action, I would not prefer to put all the needed time to collect each and every of those light sources. At some
moment it appears to you like you feel like quitting the experience. You feel a bit like you have perhaps yourself let down the designer or other people who have enjoyed the experience, and you get a slight experience of not having "what it takes", perhaps patience or etc, to carry through an experience. And this would not have to be so. It could be a more doable-prospective experience that could give you a sense of passage and, perhaps transcendence, in the end. Dear Eshter for example, a lull experience, was certainly like this. On the other hand, I am not an expert or a culinarist, as I would like to be, on the lull experiences, as I miss the experience of playing, for example, Journey and other great games.

So, perhaps reduce the number of light sources, increase radius, increase number of surreal elements and make them to be more wild and imaginative, make the area smaller or have, as I suggested before, a number of smaller, controllable, easily "munchable" and digestible, delicious areas to explore, that the experience would consist of.

4.6 Any suggestions or comments in relation to light sources?

5) Audio

5.1 How difficult was it to understand what was said with filtered voice? *

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very difficult</td>
<td></td>
<td></td>
<td></td>
<td>Very easy</td>
</tr>
</tbody>
</table>

5.2 What do you think worked best aesthetically? *

- Filtered voice
- Non-filtered voice

5.3 Any suggestions or comments in relation to audio?

Filtered voice in A was good.

6) Vision

6.1 What do you think worked best aesthetically? *

- Filtered vision (fish eye view & motion blur)
- Non-filtered vision

6.2 Any suggestions or comments in relation to vision?

I liked the A version. And the thing that the experience got lighter, more "lucid", as is said (even thought this is not directly what is meant by the term, but perhaps the game also artistically induces the impression, in the literal sense of something more "lucid=light/shining" to come up).
Well, perhaps there is something that the dream actually becomes bright when having the experience. I am not super expert on the matter. I have perhaps had some lucid dreams, yes. But yeah, it is not necessarily that the lighting setting itself changes when having such episode in the dream. :) But I guess it is a nice metaphor, and it kind of tickles the tongue of the mind to experience.

The fish-eye effect was good, and felt very dreamy. I played B first, and A felt better after that. And of course, the "lucid" experience clears it out.

<table>
<thead>
<tr>
<th>7. General</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>7.1 Feel free to write anything problematic or frustrating you may have experienced during the playtest session?</strong></td>
</tr>
<tr>
<td>Think about how to induce the emotions, deductions and experiences by means of procedural rhetoric, that pertain to lucid dreaming. I can’t come up with an example right now, it would be, naturally, a game design challenge to tackle!</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7.2 Any final suggestions or comments? Thanks a lot for your participation!</th>
</tr>
</thead>
<tbody>
<tr>
<td>Think about the tips I gave. All in all the environment was pretty impressive for a unity game, and I liked the atmosphere. I like what is the point of the game, as it occurs to me, despite me not being sure if it is the designed point of the game, to teach the player how to dream lucidly. I think that is a great thing. I do feel good about thinking the experience afterwards.</td>
</tr>
</tbody>
</table>

As I pointed out, there were some frustrations attached to the experience, that I speak in my comments. The comments would be how the experience would be "perfect" for me myself, of course, I cannot speak for any other person! They represent how I would mold this particular experience to my own tastes according to my previous experience of soothing spaces. I do enjoy experiences like Dear Esther, and other laid back indie games. To make the game adhere to my specific tastes might change the aim of the design to somewhere else, which could be unwanted.
### 1) Demographics

<p>| | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Your age? **</td>
<td>28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2 Your gender? **</td>
<td>Male</td>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.3 How many years have you played video games? **</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.4 How many hours do you averagely play per week? **</td>
<td>0 hours</td>
<td>1-5 hours</td>
<td>5-10 hours</td>
<td>11-15 hours</td>
<td>16-20 hours</td>
<td>21-25 hours</td>
<td>26-30 hours</td>
<td>31+ hours</td>
<td></td>
</tr>
<tr>
<td>1.5 Your favorite video game genres?</td>
<td>Role Playing Games, FPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 2) Controls

<p>| | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 What do you think about the pace of walking/climbing? (Choosing 3 means &quot;pace is fine&quot;) *</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Too slow</td>
<td>Too fast</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2 What do you think about the pace of flying? (Choosing 3 means &quot;pace is fine&quot;) *</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Too slow</td>
<td>Too fast</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.3 What do you think about the way reality testing works? *</td>
<td>Pretty good, seemed natural.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.4 What do you think about the climb ability and the way of using it? *</td>
<td>It was a little weird at first, but I got used to it. It was weird the way the camera followed the terrain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5 Any suggestions or comments in relation to controls?</td>
<td>Maybe make climbing look more straight ahead but panning up, rather than coasting along the terrain. Being able to climb fences would be nice.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 3) Dream signs/cues

<p>| | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Did you find any dream signs? *</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.2 In version A: How difficult was it to find dream signs? *</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very easy</td>
<td>Very difficult</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.3 In version B: How difficult was it to find dream signs? *</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very easy</td>
<td>Very difficult</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.4 If you found that some dream signs were easier</td>
<td>The moving trees were quite obvious compared to a lot of the other dream signs, as</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
to find than others, please point out which ones and why you think so?

<table>
<thead>
<tr>
<th>3.5 If you found that some dream signs made little or no sense at all, please point out which ones and why you think so?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chimney in the rock was a bit obscure, in the sense that it was very well hidden. I wouldn't say it didn't make sense because the point of dream signs is that they are weird and non-sensical.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3.6 Any suggestions or comments in relation to dream signs?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some were very hard to find (or I didn't know what to look for).</td>
</tr>
</tbody>
</table>

### 4) Light sources

<table>
<thead>
<tr>
<th>4.1 What do you think worked best? (In version A, light sources are only colored. In version B, they are white, grey and colored)</th>
</tr>
</thead>
<tbody>
<tr>
<td>* The single light source type in version A</td>
</tr>
<tr>
<td>* The multiple light source types in version B</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4.2 In version A: How often did you navigate after the light sources when lucid?</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Always * Often * Sometimes * Rarely * Never * Cannot remember</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4.3 In version B: How often did you navigate after the light sources when lucid?</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Always * Often * Sometimes * Rarely * Never * Cannot remember</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4.4 Did you at any time feel lost or did not know where to go?</th>
</tr>
</thead>
<tbody>
<tr>
<td>* No * Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4.5 If yes, how could this be avoided?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make the area where the white lights are narrower around the dream sign, maybe. Though I did like you had to really search for it, but 6/10 times I couldn't find it and moved on.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4.6 Any suggestions or comments in relation to light sources?</th>
</tr>
</thead>
<tbody>
<tr>
<td>The fisheye was very disorienting and slightly headache inducing.</td>
</tr>
</tbody>
</table>

### 5) Audio

<table>
<thead>
<tr>
<th>5.1 How difficult was it to understand what was said with filtered voice?</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Very difficult * Very easy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5.2 What do you think worked best aesthetically?</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Filtered voice * Non-filtered voice</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5.3 Any suggestions or comments in relation to audio?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fade out non-lucid voice quicker when going lucid.</td>
</tr>
</tbody>
</table>

### 6) Vision

<table>
<thead>
<tr>
<th>6.1 What do you think worked best aesthetically?</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Filtered vision (fish eye view &amp; motion blur) * Non-filtered vision</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6.2 Any suggestions or comments in relation to vision?</th>
</tr>
</thead>
<tbody>
<tr>
<td>The fisheye was very disorienting and slightly headache inducing.</td>
</tr>
</tbody>
</table>
### 7. General

7.1 Feel free to write anything problematic or frustrating you may have experienced during the playtest session?

| Just that I had a hard time finding the dream signs. |

7.2 Any final suggestions or comments? Thanks a lot for your participation!

| Maybe make the dream signs more obvious the more of the white lights you activate. Other than that, I loved it! Really great feel of the game, and you nailed the feeling of flying when dreaming (I've yet to be truly lucid, but I do sometimes float/fly in my dreams). Great looking game too! |

---

### Test person # 7/13

#### 1) Demographics

1.1 Your age?  

22

1.2 Your gender?  

- Male  
- Female

1.3 How many years have you played video games?  

12

1.4 How many hours do you averagely play per week?  

- 0 hours  
- 1-5 hours  
- 5-10 hours  
- 11-15 hours  
- 16-20 hours  
- 21-25 hours  
- 26-30 hours  
- 31+ hours

1.5 Your favorite video game genres?  

- Strategy  
- RPG

#### 2) Controls

2.1 What do you think about the pace of walking/climbing? (Choosing 3 means "pace is fine")  

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too slow</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.2 What do you think about the pace of flying? (Choosing 3 means "pace is fine")  

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too slow</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.3 What do you think about the way reality testing works?  

I think it works fine :)

2.4 What do you think about the climb ability and the way of using it?  

I never used the climbing ability, I didn't see any need for it.

2.5 Any suggestions or comments in relation to controls?  

I felt bogged down sometimes while walking, not only on hilly terrain, but also on flat terrain. It felt like walking through mud.
3) Dream signs/cues

3.5 Did you find any dream signs? *
- Yes ☐ No ☐

3.2 In version A: How difficult was it to find dream signs? *
- Very easy ☐ ☐ ☐ ☐ ☑ Very difficult

3.3 In version B: How difficult was it to find dream signs? *
- Very easy ☐ ☐ ☐ ☐ ☑ Very difficult

3.4 If you found that some dream signs were easier to find than others, please point out which ones and why you think so?
- The fire/water was hard to spot. I found 4 in total. One was a dancing tree, the other was a dancing bush, a dancing rock, and the fire/water combination.

3.5 If you found that some dream signs made little or no sense at all, please point out which ones and why you think so?
- I think they made sense, and perhaps were a little too obvious.

3.6 Any suggestions or comments in relation to dream signs?
- From the top of my head, and not out of personal experience since I've never gone lucid, I think 2 dream signs are checking out your reflection in the mirror, and reading a book. Maybe these could also be incorporated in some way?

4) Light sources

4.1 What do you think worked best?
(Version A, light sources are only colored. In version B, they are white, grey, and colored) *
- The single light source type in version A ☐
- The multiple light source types in version B ☐

4.2 In version A: How often did you navigate after the light sources when lucid? *
- Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐ Cannot remember

4.3 In version B: How often did you navigate after the light sources when lucid? *
- Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never ☐ Cannot remember

4.4 Did you at any time feel lost or did not know where to go? *
- No ☐ Yes ☐

4.5 If yes, how could this be avoided?
- I felt the world was a bit too open, but then again, I'm personally not a big fan of huge open worlds.

4.6 Any suggestions or comments in relation to light sources?

5) Audio

5.1 How difficult was it to understand what was said with filtered voice? *
- Very difficult ☐ ☐ ☐ ☐ ☑ Very easy

143
5.2 What do you think worked best aesthetically? *

- Filtered voice
- Non-filtered voice

5.3 Any suggestions or comments in relation to audio?

I feel that the non-filtered voice works best. I first played version B and the experience gave me goosebumps. Version A did not give me the same experience, I felt the filtered voice was a little fake, and the camera view made me slightly dizzy.

6) Vision

6.1 What do you think worked best aesthetically? *

- Filtered vision (fish eye view & motion blur)
- Non-filtered vision

6.2 Any suggestions or comments in relation to vision?

Similar to 5.3, I feel that the non-filtered vision works best.

7. General

7.1 Feel free to write anything problematic or frustrating you may have experienced during the playtest session?

7.2 Any final suggestions or comments? Thanks a lot for your participation!

I really enjoyed the detail put into the whole experience; the different music played in the background, the audio almost never looped, different mystical monuments such as the Sphinx or menhir symbols. Version B gave me frisson, and the first 10 minutes were amazing.

Test person # 8/13

<table>
<thead>
<tr>
<th>1) Demographics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Your age? *</td>
</tr>
<tr>
<td>19</td>
</tr>
</tbody>
</table>
| 1.2 Your gender? *
| Male             |
| Female           |
| 1.3 How many years have you played video games? * |
| 14               |
| 1.4 How many hours do you averagely play per week? * |
| 0 hours          |
| 1-5 hours        |
| 5-10 hours       |
| 11-15 hours      |
| 16-20 hours      |
| 21-25 hours      |
| 26-30 hours      |
| 31+ hours        |
| 1.5 Your favorite video game genres? |
| Role-playing games (ex. Diablo, World of Warcraft, Fallout) |
| Sandbox games (Grand Theft Auto: San Andreas, Minecraft, Terraria, Burning Sand Game) |
| Sidescrollers (King Arthur's Gold, Unepic, Castlevania)- Metroidvanias |
## 2) Controls

### 2.1 What do you think about the pace of walking/climbing? (Choosing 3 means "pace is fine")

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too slow</td>
<td></td>
<td></td>
<td></td>
<td>Too fast</td>
</tr>
</tbody>
</table>

### 2.2 What do you think about the pace of flying? (Choosing 3 means "pace is fine")

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too slow</td>
<td></td>
<td></td>
<td></td>
<td>Too fast</td>
</tr>
</tbody>
</table>

### 2.3 What do you think about the way reality testing works?

Reality checking could have some variety, sometimes pinching your nose, sometimes doing the finger-through-hand, etc.

### 2.4 What do you think about the climb ability and the way of using it?

Climbing is a nice feature, although a leftclick feels a little unintuitive.

### 2.5 Any suggestions or comments in relation to controls?

Movement feels too slippery sometimes.

## 3) Dream signs/cues

### 3.6 Did you find any dream signs?

- Yes
- No

### 3.2 In version A: How difficult was it to find dream signs?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very easy</td>
<td></td>
<td></td>
<td></td>
<td>Very difficult</td>
</tr>
</tbody>
</table>

### 3.3 In version B: How difficult was it to find dream signs?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very easy</td>
<td></td>
<td></td>
<td></td>
<td>Very difficult</td>
</tr>
</tbody>
</table>

### 3.4 If you found that some dream signs were easier to find than others, please point out which ones and why you think so?

I only found one due to technical difficulties and the impatience resulting.

### 3.5 If you found that some dream signs made little or no sense at all, please point out which ones and why you think so?

The one I found (chimney out of a rock) makes sense in a dreamscape (sense, as in makes sense to do a reality check at the sight of it).

### 3.6 Any suggestions or comments in relation to dream signs?

I have not playtested it enough to make a suggestion.

## 4) Light sources

### 4.1 What do think worked best?

(In version A, light sources are only colored. In version B, they are white, grey and colored)

- The single light source type in version A
- The multiple light source types in version B
4.2 In version A: How often did you navigate after the light sources when lucid? *

4.3 In version B: How often did you navigate after the light sources when lucid? *

4.4 Did you at any time feel lost or did not know where to go? *

4.5 If yes, how could this be avoided?

4.6 Any suggestions or comments in relation to light sources?

5) Audio

5.1 How difficult was it to understand what was said with filtered voice? *

5.2 What do you think worked best aesthetically? *

5.3 Any suggestions or comments in relation to audio?

6) Vision

6.1 What do you think worked best aesthetically? *

6.2 Any suggestions or comments in relation to vision?

7. General

7.1 Feel free to write anything problematic or frustrating you may have experienced during the playtest session?

---

The game feels very unoptimized (understandable) and uses a lot of postprocessing effects and particle effects. I understand that postprocessing gives it a surreal vibe, but the particle effects (especially on the flames) are overused and cause excessive fps drops on my machine (which is as rock-bottom as one can be when it
7.2 Any final suggestions or comments? Thanks a lot for your participation!

I'm not sure what you may have planned or not, but here are some ideas that may benefit the game:

- Ambient, harmless wildlife with ambient noises (squirrels, bugs, frogs, birds and the like)
- Weather (possibly somehow bizarre? like weather falling towards the sky)
- Different sky layouts (planets, various colors, constellations)
- Interactable items in the game (pianos, tops, screens, radios)

You're welcome :)
- Fate

Test person # 9/13

1) Demographics

1.1 Your age? *
22

1.2 Your gender? *
- Male

1.3 How many years have you played video games? *
10

1.4 How many hours do you averagely play per week? *
- 0 hours
- 1-5 hours
- 5-10 hours
- 11-15 hours
- 16-20 hours
- 21-25 hours
- 26-30 hours
- 31+ hours

1.5 Your favorite video game genres?
RTS, RPG

2) Controls

2.1 What do you think about the pace of walking/climbing? (Choosing 3 means "pace is fine") *

1 2 3 4 5
Too slow Too fast

2.2 What do you think about the pace of flying? (Choosing 3 means "pace is fine") *

1 2 3 4 5
Too slow Too fast
<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3 What do you think about the way reality testing works? *</td>
<td>Usually it works very reliably so that is good. Once though I RCed and succeeded (=lucid), but I didn't know what I actually hit.</td>
</tr>
<tr>
<td>2.4 What do you think about the climb ability and the way of using it? *</td>
<td>Nice feature, seems to work well. In Version A though I had the problem once or twice that due to the distorted vision I couldn't see where I was actually going in climb-mode.</td>
</tr>
<tr>
<td>2.5 Any suggestions or comments in relation to controls?</td>
<td>Make acceleration and deceleration a bit faster. That is just easier to control in general and people will get to the place they want to go to quicker (less floatiness).</td>
</tr>
</tbody>
</table>

### Dream signs/cues

3.1 Did you find any dream signs? *

3.2 In Version A: How difficult was it to find dream signs? *

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very easy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.3 In Version B: How difficult was it to find dream signs? *

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very easy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.4 If you found that some dream signs were easier to find than others, please point out which ones and why you think so?

Moving items (e.g. a rock or tree) among an otherwise non-moving environment is very easy to spot. Also, for example the fire in the fountain was very easy because the fountain sort of screamed "there is something to discover right here".

3.5 If you found that some dream signs made little or no sense at all, please point out which ones and why you think so?

One dreamsign I found overly obvious was the tree underneath the bridge because it was

a) big
b) moving

This could be tweaked into something more subtly (e.g. by removing either of the aforementioned properties).

3.6 Any suggestions or comments in relation to dream signs?

Being able to walk on water should be recognizable as a dreamsign the first time you step on water (or rather, the first time you RC to it, by looking down at water).
The same goes for taking big falls unscathed.

### 4) Light sources

<table>
<thead>
<tr>
<th>4.1 What do you think worked best? (In version A, light sources are only colored. In version B, they are white, grey and colored) *</th>
<th>The single light source type in version A</th>
<th>The multiple light source types in version B</th>
</tr>
</thead>
</table>

- Always
- Often
- Sometimes
- Rarely
- Never
- Cannot remember

<table>
<thead>
<tr>
<th>4.2 In version A: How often did you navigate after the light sources when lucid? *</th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
<th>Cannot remember</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>4.3 In version B: How often did you navigate after the light sources when lucid? ? *</th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
<th>Cannot remember</th>
</tr>
</thead>
</table>

| 4.4 Did you at any time feel lost or did not know where to go? * | No | Yes |
|---|---|

<table>
<thead>
<tr>
<th>4.5 If yes, how could this be avoided?</th>
<th>The sound when touching light sources is always the same iirc. Maybe adding 3-4 different samples for a slight variety would be nice. Or tuning the length and/or volume of the sound effect depending on the radius of the light that is generating after touching.</th>
</tr>
</thead>
</table>

### 5) Audio

<table>
<thead>
<tr>
<th>5.1 How difficult was it to understand what was said with filtered voice? *</th>
<th>Very difficult</th>
<th>1 2 3 4 5</th>
<th>Very easy</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>5.2 What do you think worked best aesthetically? *</th>
<th>Filtered voice</th>
<th>Non-filtered voice</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>5.3 Any suggestions or comments in relation to audio?</th>
<th>I turned my laptop audio up all the way to 100% in order to understand anything really. My normal level is at about 15-20%. So it should be louder overall. Also, in the manual it might be good to mention that a silent atmosphere around the computer is helpful. I am living in a city and have my windows open so there was lots of additional noise which disturbed the desired atmosphere a bit.</th>
</tr>
</thead>
</table>

### 6) Vision

<table>
<thead>
<tr>
<th>6.1 What do you think worked best aesthetically? *</th>
<th>Filtered vision (fish eye view &amp; motion blur)</th>
<th>Non-filtered vision</th>
</tr>
</thead>
</table>

| 6.2 Any suggestions or comments in relation to vision? | Fish-eye might work better than non-filtered vision if the distortion factor was less. This way, it was much harder to discern actual movements of objects or if it's just because the field of view is warped. |---|---|
## 7. General

### 7.1 Feel free to write anything problematic or frustrating you may have experienced during the playtest session?

I experienced 2-3 graphical bugs, that sort of ruin the DS effect because they look even less believable than an actual DS. One treestunk wasn't long enough and due to backfaceculling could be looked into from below. At one point the grass had a texture bug. More often, objects zapped in and out for fractions of a second.

In fact, I had dreams about worlds that contain typical “bugs” as they would appear in some games every now and then.

### 7.2 Any final suggestions or comments? Thanks a lot for your participation!

I am very much impressed by the game so far. I also liked the phrases of the background voice. Some of the sounded very familiar (quotes?).

After playing a couple of minutes (maybe 20-30) I found that the game was a bit too focused on finding dreamsigns though. Every lucid dream I had so far (only a handful or so) I became aware just by questioning my presence in the current situation, never actually by seeing a dreamsign. But this can of course hardly be implemented into a game (and by the time we could, we might as well be able to simulate LDs at a waking level all together).

When lucid, it would be nicer to have more options beyond flying. Maybe putting different options on random keys would be a feasible solution. Then the player can find out himself what is possible in a dream. As for ideas, I'm not as much of a help though. But maybe flip the world around? Maybe achieve that by flying up very far? Or greatly boost movement for a couple of seconds? Freeze every other motion? Invert colors? Being able to fly through things? And maybe end up in a different part of the world after that? Cause complete darkness?

There are of course a lot more things. I'm talking about things that people like to do in real lucid dreams: summon things, fight cool battles, transform into something, ...

However, I can see that it is very hard to implement something like that :p
Test person # 10/13

1) Demographics

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Your age?</td>
<td>13</td>
</tr>
<tr>
<td>1.2 Your gender?</td>
<td>Male</td>
</tr>
<tr>
<td>1.3 How many years have you played video games?</td>
<td></td>
</tr>
<tr>
<td>1.4 How many hours do you averagely play per week?</td>
<td></td>
</tr>
<tr>
<td>1.5 Your favorite video game genres?</td>
<td></td>
</tr>
</tbody>
</table>

   Anything, really... except shooter games; I don't really care for those. I do really like puzzle games, though, as well as action/adventure-type games, particularly those with a large, open world to explore.

2) Controls

<table>
<thead>
<tr>
<th>Question</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 What do you think about the pace of walking/climbing? (Choosing 3 means &quot;pace is fine&quot;)</td>
<td></td>
</tr>
<tr>
<td>2.2 What do you think about the pace of flying? (Choosing 3 means &quot;pace is fine&quot;)</td>
<td></td>
</tr>
<tr>
<td>2.3 What do you think about the way reality testing works?</td>
<td></td>
</tr>
<tr>
<td>It seemed a bit simple, but it was at least easy to use. It would be cool if there were actual reality checks like those used for becoming lucid in actual dreams, though I guess that wouldn't be the best idea, since you can only become lucid in-game by reality checking after seeing a dream sign, whereas a proper reality check would normally fail regardless of the presence of a dream sign.</td>
<td></td>
</tr>
<tr>
<td>2.4 What do you think about the climb ability and the way of using it?</td>
<td></td>
</tr>
<tr>
<td>It was okay.</td>
<td></td>
</tr>
<tr>
<td>2.5 Any suggestions or comments in relation to controls?</td>
<td></td>
</tr>
</tbody>
</table>

3) Dream signs/cues

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.8 Did you find any dream signs?</td>
<td></td>
</tr>
<tr>
<td>3.2 In version A: How difficult was it to find dream signs?</td>
<td></td>
</tr>
</tbody>
</table>

   Yes  No  1  2  3  4  5
### 3.3 In version B: How difficult was it to find dream signs? *

<table>
<thead>
<tr>
<th>Very easy</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Very difficult</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

3.4 If you found that some dream signs were easier to find than others, please point out which ones and why you think so?

3.5 If you found that some dream signs made little or no sense at all, please point out which ones and why you think so?

3.6 Any suggestions or comments in relation to dream signs?

### 4) Light sources

4.1 What do you think worked best? (In version A, light sources are only colored. In version B, they are white, grey and colored) *

- The single light source type in version A
- The multiple light source types in version B

4.2 In version A: How often did you navigate after the light sources when lucid? *

- Always
- Often
- Sometimes
- Rarely
- Never
- Cannot remember

4.3 In version B: How often did you navigate after the light sources when lucid? *

- Always
- Often
- Sometimes
- Rarely
- Never
- Cannot remember

4.4 Did you at any time feel lost or did not know where to go? *

- No
- Yes

4.5 If yes, how could this be avoided?

4.6 Any suggestions or comments in relation to light sources?

### 5) Audio

5.1 How difficult was it to understand what was said with filtered voice? *

<table>
<thead>
<tr>
<th>Very difficult</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Very easy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

5.2 What do you think worked best aesthetically? *

- Filtered voice
- Non-filtered voice

5.3 Any suggestions or comments in relation to audio?

### 6) Vision

6.1 What do you think worked best aesthetically? *

- Filtered vision (fish eye view & motion blur)
- Non-filtered vision

6.2 Any suggestions or comments in relation to vision?

The filtered vision took a little while to get used to at first, but I think it really helps add to the more dream-like feel of Version A. I definitely preferred it once I got used to it.
### 7. General

7.1 Feel free to write anything problematic or frustrating you may have experienced during the playtest session?

7.2 Any final suggestions or comments? Thanks a lot for your participation!

---

**Test person # 11/13**

### 1) Demographics

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Your age?</td>
<td>17</td>
</tr>
<tr>
<td>1.2 Your gender?</td>
<td>Male</td>
</tr>
<tr>
<td>1.3 How many years have you played video games?</td>
<td>11</td>
</tr>
<tr>
<td>1.4 How many hours do you averagely play per week?</td>
<td>0 hours</td>
</tr>
<tr>
<td>1.5 Your favorite video game genres?</td>
<td>RTS, sandbox games</td>
</tr>
</tbody>
</table>

### 2) Controls

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 What do you think about the pace of walking/climbing? (Choosing 3 means &quot;pace is fine&quot;)</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td></td>
<td>Too slow</td>
</tr>
<tr>
<td>2.2 What do you think about the pace of flying? (Choosing 3 means &quot;pace is fine&quot;)</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td></td>
<td>Too slow</td>
</tr>
<tr>
<td>2.3 What do you think about the way reality testing works?</td>
<td>It is fairly difficult to find things that justify a reality check.</td>
</tr>
<tr>
<td>2.4 What do you think about the climb ability and the way of using it?</td>
<td>It works fairly well.</td>
</tr>
<tr>
<td>2.5 Any suggestions or comments in relation to controls?</td>
<td></td>
</tr>
</tbody>
</table>

### 3) Dream signs/cues

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.9 Did you find any dream signs?</td>
<td>Yes</td>
</tr>
<tr>
<td>3.2 In version A: How difficult was it to find dream signs?</td>
<td>Very easy</td>
</tr>
</tbody>
</table>
### 3.3 In version B: How difficult was it to find dream signs?

1  2  3  4  5  
Very easy ✗  ✗  ✗  ✗  Very difficult

### 3.4 If you found that some dream signs were easier to find than others, please point out which ones and why you think so?

### 3.5 If you found that some dream signs made little or no sense at all, please point out which ones and why you think so?

### 3.6 Any suggestions or comments in relation to dream signs?

#### 4) Light sources

**4.1 What do you think worked best?**
(In version A, light sources are only colored. In version B, they are white, grey and colored)

- The single light source type in version A
- The multiple light source types in version B

**4.2 In version A: How often did you navigate after the light sources when lucid?**

- Always ✗  Often ✗  Sometimes ✗  Rarely ✗  Never ✗  Cannot remember

**4.3 In version B: How often did you navigate after the light sources when lucid?**

- Always ✗  Often ✗  Sometimes ✗  Rarely ✗  Never ✗  Cannot remember

**4.4 Did you at any time feel lost or did not know where to go?**

- No ✗  Yes ✗

**4.5 If yes, how could this be avoided?**

Give a clear goal; becoming lucid can be accomplished on the way. Without a goal it seems like there isn’t anything to do, and dreams almost always have goals to them.

**4.6 Any suggestions or comments in relation to light sources?**

I would enjoy it if the light sources were just white; I liked the white ones much more than the colored ones because they showed the actual colors of the scene.

#### 5) Audio

**5.1 How difficult was it to understand what was said with filtered voice?**

1  2  3  4  5  
Very difficult ✗  ✗  ✗  ✗  Very easy

**5.2 What do you think worked best aesthetically?**

- Filtered voice ✗  Non-filtered voice

**5.3 Any suggestions or comments in relation to audio?**

#### 6) Vision

**6.1 What do you think worked best aesthetically?**

- Filtered vision (fish eye view & motion blur) ✗  Non-filtered vision
6.2 Any suggestions or comments in relation to vision?

7. General

7.1 Feel free to write anything problematic or frustrating you may have experienced during the playtest session?

The game did not run very well on my machine, even at the very lowest graphics option. It would be nice if you could find a way to lower the minimum further.

7.2 Any final suggestions or comments? Thanks a lot for your participation!

Test person # 12/13

<table>
<thead>
<tr>
<th>1) Demographics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Your age? *</td>
<td>28</td>
</tr>
<tr>
<td>1.2 Your gender? *</td>
<td>Male Female</td>
</tr>
<tr>
<td>1.3 How many years have you played video games? *</td>
<td>18</td>
</tr>
<tr>
<td>1.4 How many hours do you average play per week? *</td>
<td>0 hours 1-5 hours 5-10 hours 11-15 hours 16-20 hours 21-25 hours 26-30 hours 31+ hours</td>
</tr>
<tr>
<td>1.5 Your favorite video game genres?</td>
<td>ARPG, platformers, FPS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2) Controls</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 What do you think about the pace of walking/climbing? (Choosing 3 means &quot;pace is fine&quot;) *</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td></td>
<td>Too slow</td>
</tr>
<tr>
<td>2.2 What do you think about the pace of flying? (Choosing 3 means &quot;pace is fine&quot;) *</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td></td>
<td>Too slow</td>
</tr>
<tr>
<td>2.3 What do you think about the way reality testing works? *</td>
<td>Nice, but a little confusing at first. I wasn't sure what I was checking for, so I just clicked a bunch of stuff, including what seemed to be graphics (texture) glitches :). After I found the first cue I kinda got the hang of it, though. Alternatively you could make it work automatically, so no action is required by the user. Cause a bunch of things might have gone unnoticed.</td>
</tr>
<tr>
<td>2.4 What do you think about the climb ability and the way of using it? *</td>
<td>After I opened up the game, I had forgotten what the left mouse was for. The loading time was reeeeally long on my machine :( Tried it some times, but didn't really get it. Had a lot of problems walking up steep slopes, so it would probably</td>
</tr>
</tbody>
</table>
2.5 Any suggestions or comments in relation to controls?

WASD and mouse look work fine - tried and true control scheme. Biggest issue was that of coming to a halt when trying to walk up slopes, see 2.4. Flying was nice :D

3) Dream signs/cues

3.10 Did you find any dream signs? *

Yes No

3.2 In version A: How difficult was it to find dream signs? *

Very easy Very difficult

3.3 In version B: How difficult was it to find dream signs? *

Very easy Very difficult

3.4 If you found that some dream signs were easier to find than others, please point out which ones and why you think so?

I played version B first, so the ones in version A seemed a bit easier - or, I had a better idea of what to look for in that version. I mostly looked for them around clusters or lights, with some kinda distinct structures or landmarks nearby. That seemed to be most effective.

3.5 If you found that some dream signs made little or no sense at all, please point out which ones and why you think so?

None of them made sense, really. Very weird and surreal stuff. I dig :D

3.6 Any suggestions or comments in relation to dream signs?

The moving tree was spooky. Especially with version A's distorted vision. I wasn't sure if I saw something move or not, until I moved closer. Good synergetic effect.

4) Light sources

4.1 What do think worked best?

(In version A, light sources are only colored. In version B, they are white, grey and colored) *

The single light source type in version A
The multiple light source types in version B

4.2 In version A: How often did you navigate after the light sources when lucid? *

Always Often Sometimes Rarely Never Cannot remember

4.3 In version B: How often did you navigate after the light sources when lucid? *

Always Often Sometimes Rarely Never Cannot remember

4.4 Did you at any time feel lost or did not know where to go? *

No Yes

4.5 If yes, how could this be avoided?

Mostly in the beginning I had no clue where to go. Lights all around, but didn't
Know which ones to go for. A simple, casual game style, ingame tutorial could have helped; "arrow: go here, then here..."

Was confused by the multicolored light sources.

### 5) Audio

5.1 How difficult was it to understand what was said with filtered voice? *

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very difficult</td>
<td></td>
<td></td>
<td></td>
<td>Very easy</td>
</tr>
</tbody>
</table>

5.2 What do you think worked best aesthetically? *

- Filtered voice
- Non-filtered voice

5.3 Any suggestions or comments in relation to audio?

Nice with the variety in speaks. I’d have expected a lot more repetition. Very hypnotic.

### 6) Vision

6.1 What do you think worked best aesthetically? *

- Filtered vision (fish eye view & motion blur)
- Non-filtered vision

6.2 Any suggestions or comments in relation to vision?

The filtered vision fucked me up. But in a good way. Almost lulled me to sleep.

### 7) General

7.1 Feel free to write anything problematic or frustrating you may have experienced during the playtest session?

The slopes! ... And performance was pretty bad. Game started out really laggy, and just got slower and slower. Seemed like it could’ve been a memory leak - or my poor RAM just couldn’t take it all.

7.2 Any final suggestions or comments? Thanks a lot for your participation!

Looking forward to the lucid dreams tonight, after playing this!

---

### Test person # 13/13

<table>
<thead>
<tr>
<th>1] Demographics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Your age?</td>
</tr>
<tr>
<td>1.2 Your gender?</td>
</tr>
<tr>
<td>1.3 How many years have you played video games?</td>
</tr>
<tr>
<td>1.4 How many hours do you averagely play per week?</td>
</tr>
<tr>
<td>1.5 Your favorite video game genres?</td>
</tr>
</tbody>
</table>
2) Controls

2.1 What do you think about the pace of walking/climbing? (Choosing 3 means "pace is fine")

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too slow</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.2 What do you think about the pace of flying? (Choosing 3 means "pace is fine")

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too slow</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.3 What do you think about the way reality testing works? *

I had to read it up in the manual before finding out how it works. But when finding it out, it was a huge thrill once it worked. The sudden flash of lucidity is hugely rewarding.

2.4 What do you think about the climb ability and the way of using it? *

It is nice, it makes the camera go very shakey.

2.5 Any suggestions or comments in relation to controls?

The walking around seems very variable; sometimes it goes fast, sometimes it goes quite slowly.

3) Dream signs/cues

3.1 Did you find any dream signs? *

- Yes
- No

3.2 In version A: How difficult was it to find dream signs? *

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very easy</td>
<td></td>
<td></td>
<td></td>
<td>Very difficult</td>
</tr>
</tbody>
</table>

3.3 In version B: How difficult was it to find dream signs? *

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very easy</td>
<td></td>
<td></td>
<td></td>
<td>Very difficult</td>
</tr>
</tbody>
</table>

3.4 If you found that some dream signs were easier to find than others, please point out which ones and why you think so?

3.5 If you found that some dream signs made little or no sense at all, please point out which ones and why you think so?

I probably do not know, since I could not find those.

3.6 Any suggestions or comments in relation to dream signs?

The dream signs were much easier to find in version B, where they were surrounded with white lights, so it was easier to track down.

4) Light sources

4.1 What do you think worked best? *(In version A, light sources are only colored. In version B, they are white, grey and colored)*

- The single light source type in version A
- The multiple light source types in version B

4.2 In version A: How often did you navigate after the light sources when lucid? *

- Always
- Often
- Sometimes
- Rarely
- Never
- Cannot remember

4.3 In version B: How often did you navigate after the light sources when lucid? *

- Always
- Often
- Sometimes
- Rarely
- Never
- Cannot remember
4.4 Did you at any time feel lost or did not know where to go? *  
- No  - Yes

4.5 If yes, how could this be avoided?
- use less light sources, so the ones that are there stand out more, and are more indicative of something special being there

4.6 Any suggestions or comments in relation to light sources?
- I like the way that they light the area up, it feels very pleasant, flower-esque

5) Audio

5.1 How difficult was it to understand what was said with filtered voice? *

- 1 Very difficult  - 2  - 3  - 4  - 5 Very easy

5.2 What do you think worked best aesthetically? *
- Filtered voice  - Non-filtered voice

5.3 Any suggestions or comments in relation to audio?
- the talking about dreams became a bit repetitive after a while (±45 mins)

6) Vision

6.1 What do you think worked best aesthetically? *
- Filtered vision (fish eye view & motion blur)  - Non-filtered vision

6.2 Any suggestions or comments in relation to vision?
- although it also made it quite a bit more scary, the non-filtered vision is more pleasant and peaceful

7. General

7.1 Feel free to write anything problematic or frustrating you may have experienced during the playtest session?
- once I got stuck, near the house on the hill.

7.2 Any final suggestions or comments? Thanks a lot for your participation!
- I am duly impressed.