Character description by the use of level design and game mechanics
A study on how to convey a character based narrative within a game

Faculty of Arts
Department of Game Design
Bachelor Degree in the main field of game design, 15 hp
Educational program: Degree Project in Game Design
Author: Joar Hedvall, Charlie Claesson
Supervisor: Stellan Sundh, Iwona Hrynczenko
Examiner: Steven Bachelder
July, 2015
Abstract

English
This study is an investigation of the possibilities to create levels that convey a character and its personal narrative with the use of three level design methods. The used methods are: the use of smaller objects and details to convey information, using the player's personal references and memories and having a clear goal for the player. The results are gathered through qualitative interviews with the participants in the study and examining how participants interpret the narrative in game levels that were designed by using these three level design methods. This study uses the game Project Rewind as test bed, which was partially developed for this thesis purpose.

The test result have shown that players took more notice of clusters of smaller visual objects, and memorized interactive objects much better than the stationary objects. They also used their own personal and cultural references, memories and stereotypes when analysing the objects in the levels to create an image of the character presented to them. Based on the results that we received from the interviews we found that having a clear demographic is important when designing a narrative level that needs be easy to understand. This is because of each player's own personal references, certain things can be perceived differently based on the player's references. The test results also show that the three level design methods mentioned can to a certain degree be used to convey a narrative when used to design a level.

Svenska
Denna studie är en utredning av möjligheterna att skapa spelnivåer som förmedlar en karaktär och dess personliga berättelse med användning av tre level design metoder. De använda metoderna är: användning av mindre objekt och detaljer, användning av spelarens personliga referenser och minnen samt att ha ett tydligt mål för spelaren. Resultaten samlas in genom kvalitativa intervjuer med deltagarna i studien och analysera hur deltagarna tolkar berättelsen i spelets nivåer som var designade med hjälp av dessa tre level design metoder. Denna studie använder spelet Project Rewind för testerna, detta spel var delvis utvecklat för denna studiens ändamål.

Test resultaten visar att spelaren tog upp mer information genom kluster av mindre visuella föremål, och memorerade interaktiva objekt mycket bättre än de stillastående objekten. De använde också sina egna personliga och kulturella referenser, minnen och stereotyper när de analyserade objekten i nivåerna för att skapa en bild av karaktären presenteras för dem. Baserat på de resultat som vi fått från undersökningen fann vi att det är viktigt att ha ett tydligt demografiskt mål, vilket är viktigt när man utformar en berättelse i en spel nivå som ska vara lätt att förstå. Detta är på grund av varje spelare har sina egna personliga referenser, vissa saker kan uppfattas på olika sätt beroende på vad för referenser man har. Test resultaten visar också att de tre level design metoderna som nämndes tidigare kan till en viss grad bli använda för att förmedla ett narrativ när man använder dem för att designa en nivå.

Key words: Narrative, Level Design, Character, Description, Non-textual
Table of contents

1 Introduction ........................................................................................................................................... 1
2 Purpose ................................................................................................................................................ 3
3 Previous work within the field ........................................................................................................... 4
   3.1 Smaller details ................................................................................................................................. 4
   3.2 Stereotypes and memories ............................................................................................................... 4
   3.3 Level design and goals .................................................................................................................... 5
   3.4 Familiarity ......................................................................................................................................... 5
   3.5 Explorers .......................................................................................................................................... 6
   3.6 Narrative .......................................................................................................................................... 6
   3.7 Emotioneering ................................................................................................................................. 6
   3.8 Observe or take part ......................................................................................................................... 7
4 Method and tools .................................................................................................................................. 8
   4.1 Project Rewind overview ............................................................................................................... 8
      4.1.1 Game description ...................................................................................................................... 8
      4.1.2 The character ............................................................................................................................ 9
   4.2 Tools ................................................................................................................................................. 10
   4.3 Rapid prototyping ........................................................................................................................... 10
   4.4 Testing ........................................................................................................................................... 11
      4.4.1 Survey questions ....................................................................................................................... 11
   4.5 Design work on the levels .............................................................................................................. 12
      4.5.1 House level .............................................................................................................................. 12
      4.5.2 Lighthouse level ....................................................................................................................... 16
5 Results and analysis ............................................................................................................................ 18
   5.1 Iteration 1 ....................................................................................................................................... 18
      5.1.1 Test results ............................................................................................................................... 18
      5.1.2 Analysis .................................................................................................................................... 18
   5.2 Iteration 2 ....................................................................................................................................... 19
      5.2.1 Test results ............................................................................................................................... 19
      5.2.2 Analysis .................................................................................................................................... 20
   5.3 Iteration 3 ....................................................................................................................................... 21
      5.3.1 Test results iteration 3 .............................................................................................................. 21
      5.3.2 Analysis .................................................................................................................................... 22
   5.4 Iteration 4 ....................................................................................................................................... 23
      5.4.1 Test results ............................................................................................................................... 23
      5.4.2 Analysis .................................................................................................................................... 23
6 Discussion ........................................................................................................................................ 25
  6.1 Design choices ......................................................................................................................... 25
  6.2 Successful methods .................................................................................................................. 26
  6.3 Miscellaneous .......................................................................................................................... 27
7 Conclusion ...................................................................................................................................... 29
References ......................................................................................................................................... 30
Appendices ....................................................................................................................................... 32

Table of figures
Fig. 1 Character's house .................................................................................................................. 12
Fig. 2 Character's kitchen ................................................................................................................ 13
Fig. 3 Character's office .................................................................................................................. 14
Fig. 4 House break-in ...................................................................................................................... 15
Fig. 5 House Chart .......................................................................................................................... 15
Fig. 6 Lighthouse level ................................................................................................................... 16
Fig. 7 Character belongings ............................................................................................................ 17
Fig. 8 Lighthouse Chart ................................................................................................................ 17
Definition of terms

The significant terms that are used in the study are the following:

Level design
Designing levels for games include but are not limited to designing the challenges, environment, player experience, resulting narrative, layout and various other aspects. In short, a level designer creates the world that the level is in and decides what the experience the player will have in that level.

Mechanics
Mechanics are rule based systems that form the interactions a player can do in the game. An example is the player’s ability to make Mario jump in Super Mario Bros. (1985). Sicart (2008) tries to define mechanics using different concepts from programming in the following quote.

I define game mechanics, using concepts from object-oriented programming, as methods invoked by agents, designed for interaction with the game state. With this formalized definition, I intend to:

Provide a tool to discover, describe, and interrelate game mechanics in any given game. Define mechanics also in relation to elements of the game system, game hardware and player experience, mapping mechanics to input procedures and player emotions. (Sicart, M. 2008)

Textual information
Textual information is when information presented to the player through text, usually given through text appearing on screen or through written material such as in game books. This requires the player to have to read in order to understand the information.

Player
A player is someone who plays a game. For this study we define player as a person, male or female that sits down and plays a game, not specifically this game. It does not refer to the people that participated in our testing.

Player Character
The player character is the in game character the participant is playing as. In the game the player character is a murder investigator that has to investigate a murder.

Participant
A participant is someone that we asked to test the game and then had an interview with.

Character
The term Character is commonly used to refer to the specific character that our game Project Rewind is trying to convey to the participant using level design and mechanics. This is the character that is found dead on a beach.

Events
Events are something that happens in the game environment, either by a player action, or a trigger. These can be things such as doors opening or things falling over, or more complex things such as a generator starting up.
**Character’s narrative**
The character’s narrative is a series of connected events that the character is involved in. Narrative is a spoken or written account of connected events, a story.

**Emotioneering**
Emotioneering is a technique used to convey emotions to the player within the game. It is aimed at creating a real life emotional impact when something occurs in the game.
1 Introduction

This study focuses on how level design and game mechanics can be used to convey a character’s various traits and the character’s personal story within the game called Project Rewind, which was partly created for this study (see section 4.1 Project Rewind overview). The focus of this study is to convey the character’s traits and narrative by using three major level design methods and game mechanics. The intention of this approach is to avoid the use of text as media which is usually used in games to provide information about the character or the events that are related to the character.

The game created as a part of this study, is a first person investigation game where the player moves through five levels, which all provide to the player the possibility to interact with various visual objects. The character, about which the visual information is presented to the test participants, is not the main character but a secondary character in the game. According to the narrative of the game, this secondary character dies and the player takes the role of a detective who needs to find out what happened.

This study investigates the possibilities of describing a specific character through level design in an indirect way by creating visual objects for the levels. In this case, the various objects that are created are related to the previously mentioned character. By using the visual objects, the players need to use their own personal experiences and stereotypes as references to create in their mind a picture of the character that is related to the object. This approach is similar to how characters and various events in movies and pictures can be conveyed to the viewer through the various objects that are related to the character or the events. The viewer is then able to use these objects to create his own image of the characters or the events. This way of describing a character or a certain event i.e., without using text as information source, is an interesting way to provide knowledge to the player about the world that the game takes place in as well as about the various different characters that inhabit this world.

It is important to note that many types of games must keep the players immersed in the world in order for them to receive the intended experience that the game developers want the players to have. It is possible for players to lose their immersion in a game if they are often presented with a large amount of text or audio that is intended to explain the world. They are audio logs that cannot be skipped or texts that force the player to be stationary, which are often required for the player to continue with the game. These information sources sometimes force the player to stop the progression of the game which breaks the flow and the immersive feeling of player. It can be easier to keep the player immersed in the world if the information that is presented to the player is presented in a natural way. This approach is proposed in this study through the level design and the game mechanics of the game using various objects that the player can use as reference to create an understanding of the characteristics of a character. This approach can also help the player become even more immersed in the world that they are playing in since they are learning about the world and feel like they are a part of it. Mainly, the players become more immersed in the game world, as they are exploring it without having to read or listen to someone telling them about it.
Flynn (2010) states that level designers can design levels that focus much on gameplay and have the environments that the player explores telling the history and various events that occur in that world. All this without having anyone tell the player about it. A game with well-constructed gameplay and with a well written narrative might fail if the level design in the game is not well done. (Flynn, D. 2010:02)
2 Purpose

The purpose of this study is to provide valuable information and insight regarding how game developers can create the levels for their games, which is based on assumption that the levels themselves can provide necessary information about the characters. This assumption is investigated in this study by using specific level design methods. The major design methods used for this study are the use of smaller details and objects, using the player's personal references and having a clear goal set for the player. This study aims to answer the following question:

Can these three methods and game mechanics be used to convey a character's traits and narrative without using a large amount of text?

To answer this question we created a game using the previously mentioned level design techniques and then proceed to have different testing sessions with different versions of the game. The game will be tested by experienced gamers with a background in game development.
After the survey participants had played the game they participated in qualitative interviews based on a set of questions. These questions relate to how well the participants understood the narrative that the levels were set to convey to the participant.

In regard to the game creation, there is a selection of different methods that can be used when creating levels in order to properly describe a character and its personal story to the player. But for the sake of keeping the scope down on the game we created, for the testing we have chosen to work with a few selected methods when creating the levels for our game.
3 Previous work within the field

In this section we give some examples of work that has been done previously in the field, some of which we use as references when working on this study. Some of the work that is listed here does not directly relate to games, but to story telling in general.

3.1 Smaller details

Flynn (2010) suggests using what he calls environment clues to tell the narrative of the levels in his article where he discusses designing level for an enhanced narrative. These clues are small objects and small creatures that fill up the level that provides the player with information about the level that he/she is in. He also brings up points on how we as humans see the small details and make assumptions through them. How small creatures and minor objects are important to make an environment feel more alive and have a stronger narrative core. (Flynn, D. 2010:02)

3.2 Stereotypes and memories

Stereotypes are crucial to the players when they are put into a world that they need to understand. Basing interactions by the use stereotypes of personalities, a person has a base of understanding of this personality and can therefore respond through their experience.

There are many theories about why people use stereotypes, but one of the most certain explanations is that people use stereotypes as a means for dealing with the fact that the world is far more complex than they can deal with without some form of simplification and categorization. One of the ways in which stereotypes help to simplify the world is that they have a strong effect on what characteristics of a person are attended to and remembered. As a result, they will tend to be confirmed by experience since potentially disconfirmatory evidence will be ignored (Rich, E. 1979:332-333)

Carson (2001) explains how Disney uses environmental narrative to tell a story in their theme park rides; how the person experiences it and understands it through the use of their own memories. When you see something you often extract information from memories, if you’ve seen that object in question before. The information may vary from person to person, but some items have a set reference, example you see a chair and you conclude it is for sitting on.

[...]the story element is infused into the physical space a guest walks or rides through. In many respects, it is the physical space that does much of the work of conveying the story the designers are trying to tell. [...]Armed only with their own knowledge of the world, and those visions collected from movies and books, the audience is ripe to be dropped into your adventure. The trick is to play on those memories and expectations to heighten the thrill of venturing into your created universe. (Carson, D. 2000:1)

The memories used are the references; the viewer remembers a certain object and relates to its purpose through that memory. The personal memories play a crucial role to fill the
narrative of the environment. Having a clear reference allows the players understand the environment, and gives them the opportunity to draw a conclusion of where they are.

Although the concept of such a place may sound "cool," it does more to alienate the game player than draw them in. If you can periodically give them some reference point... such as, "Oh, I am in a spaceship" or "Hey, this must be the engine room" you will be doing them a great favor. Even something like "Wow! These look like alien toilets!?!" will bring your audience back to relating to the environment, and even lend a little humor. (Carson, D. 2000:2)

3.3 Level design and goals

The following citation explains why it’s beneficial for the player to set a goal in a game.

To define the role of architecture in level design in more detail, we must also understand that a game level is a dramatic unit. A game level is the equivalent of a scene in a movie. In other words, every level can be seen as a scene with a unique goal, often directly drawn from the goal of the player. A scene/level typically has a problem-solution arc and must deliver a feeling of dramatic progress (the so called climbing-ladder). (Isigan, A. 2008:No Pagination)

Giving a player a goal to achieve, they will more likely focus on achieving that goal in order to progress through the level. Get dynamite to explode a rock that is in their way, or find a button that opens the door are few of the many goals a player can be given in a level, which might cause them to go searching for the object they need. Setting goals can provide the player with the mind-set to search for information and clues to where the key to this goal is, and therefore they can sometimes be directed to find the narrative clues in order to progress in a story.

3.4 Familiarity

By using the player's familiarity to certain objects and their function, levels can be created where some players can instantly understand the space he or she is placed into. Placing the player into a level with a lighthouse might give the players an understanding about the fact that they are close to the ocean.

Familiar locations offer cues to a place's function and the events that are likely to take place there. If we see a kitchen, we don't expect to find a blacksmith making horseshoes. (Adams, E. 2002:No Pagination).

As stated above by Adams, a player gets a new set of understanding when put in a scene they’re familiar or unfamiliar to. A player takes in the visual clues given to them in the scene to understand where they are and draw a conclusion what it is used for.
3.5 Explorers

Bartle (1996) concludes that there exists different types of players such as: Achievers, Explorers, Socializers and Killers. (Bartle, RA 1996:No Pagination) Our focus is on appealing to the explorer. Lindley (2005) further explains in his study about the explorer player, “- Explorers driven to find out as much as they can about the virtual world, including mapping its geography and understanding the game mechanics.” (Lindley A. 2005:02)

3.6 Narrative

While creating a narrative of a game, it is important to plan how the story is unfolded to the player. A linear narrative prevents the player from interrupting the unfolding of the story by making unintentional actions or not following the previously set path. Riedl and Young (2010) describe parallels between plans and narrative within games, and how events correlate to create the story of the game. “There are many parallels between plans and narrative at the level of fabula. In particular, a narrative is a sequence of events that describes how the story world changes over time.” (Riedl M O. Young R M. 2010:221)

To create an immersive world, it is beneficial to create several storylines so that the various characters in the game are more connected to each other and the world they are in. If the characters have a clear history, the immersive feeling of the game can increase the players' engagement in the game. The game narrative is the tree, and the character narratives are the branches that broaden the story. In their study, Aylett et al (2005) discusses how it improves and extends the game world and narrative, instead of having a single protagonist at the centre where the other characters conform to his or her story. (Aylett R, Louchart S, Dias J, Paiva A, Vala M, Woods S, Hall L. 2005:02)

3.7 Emotioneering

Freeman writes about how “Everyone wants his or her life to be meaningful” in his study. (Freeman D. 2004:11) In this study, he also writes about how experiences in games are improved when there is more meaning and emotions inside of it. How the player choices affect the overall world can create an impact on the player emotion and grant a superior experience.

Axelsson has conducted a study on the techniques of Emotioneering and how it can be applied to a game.

My conclusions is that you should attempt to wake emotions in the player in order to make the game experience have more interest and emotional depth but primarily in games with a long game time. This in order for the player to be satisfied before the game ends. (Our translation from Swedish to English) (Axelsson, P. 2010:17)

A longer game might have more impact on the player’s emotion, as they get more time to understand the story and characters within the game.
3.8 Observe or take part

While creating a story for a game, it is important that the creator visualize the narrative differently from a non-interactive experience. In a game, a player unfolds the story in their own rate and interacts the way they choose to, instead of just observing the story from an outsiders perspective. Aylett describes in her study the difficulty of moving characters from television to virtual reality, as the narrative approach different widely. On television the narrative is completely scripted and the events unfold in the rate the directors have set. But in virtual reality, the viewer can change their viewpoint and approach the story differently. (Aylett R. 1999:01)

It may be obvious that the more open a narrative is to interpretation, the more emphasis will be on the reader/viewer’s efforts now. The difference between the now in narratives and the now in games is that first now concerns the situation where the reader’s effort in interpreting obscures the story – the text becomes all discourse, and consequently the temporal tensions ease. (Juul J, 2004:09)

In the citation above, Juul describes the more open a narrative is to interpretation. The more it needs the reader or viewer’s efforts. We interpret how texts can be ignored if much tension is put onto the player from another source.
4 Method and tools

In this section of the study the various methods that were used during the course of this project are explained. This includes the game, Project Rewind, that was created for the testing purposes of the project. Similarly, this part includes the various tools that were used during the development of the levels for the game. In this section we also explain how the tests was proceeded, which includes description of the test participants, the survey procedure and included questions, as well as how the results was documented.

4.1 Project Rewind overview

Although two people did this study, there were five people that worked on the actual production of the game that was used to test how the visual objects can convey the information about the characters in the game. The people who worked on the game were Joakim Mäklin, Sebastian Lindblad, Tobias Carlsson, Joar Hedvall and Charlie Claesson. The team of five had a goal to create a game with a large narrative focus. The group of five split into smaller groups with their own research subjects to be able to work with the game during the follow up studies. There were three different groups of follow up studies, group A consisted of Charlie and Joar, group B consisted of Joakim and Sebastian and lastly group C consisted of Tobias. Each of these groups had their own research focus for the overall aim of the project.

To fulfil the study, a game called Project Rewind was created in order to test the level design methods. Project Rewind was not a large game, however, it contained five different levels. The game had a large focus on the narrative and the environment and less on the mechanics of the game. The game’s development started a few weeks before the work of this study and then continued during the ten weeks during study.

However, during the testing sessions for this study only the first four levels were used. The last fifth level was not in a playable state during the testing sessions. This however did not affect the test results greatly as the last level was not directly related to the character involved to answer the question of this study. In the game, there are two levels that hold the most importance for this study, these two levels are the Lighthouse level and the character's House level. These two are the most important since these two levels contain the majority of the information regarding the character that the game conveys to the player.

4.1.1 Game description

The game that was created was a first person investigation game with various elements of time travel. The player took the role of a murder investigator was investigating the death of a person. The player’s objective in the game was to find out how that character died. The player was able to go around in the level and interact with various objects to get a better understanding about the level and the events in it. The player also had some mechanics that he or she had to use in the game in order to progress. These mechanics were in place to make the levels into an actual game with various challenges for the player to overcome. The reason for this was that we intended to test with an actual game and not just let the player walk
around and look at the various objects in the levels. The mechanics the player could use was an investigation mode in which the player can pick up various items, rotate them and then interact with them. The player also had access to a time rewinder that he or she could use to rewind time for certain objects in the levels. In addition to these two main mechanics, the player could also interact with various buttons in the levels. The story of Project Rewind can be found under appendices 3.

There were intentionally low amounts of textual information presented to the player in the various levels of the game. There were elements of text in the levels, but these were mainly unrelated to the character we planned to describe. There were also some text elements on various objects in the level but these objects are types normally have texts on them, like signs, boxes or other items. There were few types of these objects in the game. The text that was presented was there to assist in leading the player through the level and explain various mechanics in the game so they can progress through the levels without much difficulty as this interfere with the experience the game set out to achieve.

Before the production started of the game Project Rewind a story was written for the game. This story can be found in Appendix 3. The story has a large focus on the player's character as this is the main character of the game.

4.1.2 The character

In order to keep track of who the character was that was being conveyed through the game for the sake of this study; a description of that character was written. This description can be found in Appendix 2. Below is presented a short summary of the key points of the character various traits.

To summarize her character:
- She had a modern furniture preference.
- She was wealthy because of a large inheritance.
- She was clean and hygienic.
- She works out multiple times a week.
- She had scientific interests and pursuit of knowledge.
- She ate healthy, organic food.
- She was very adventurous, diving, hiking and climbing.
- She works as a diving instructor and takes people diving to earn a living as well as a maritime researcher.
4.2 Tools

In this section, the tools that were used in the creation of the game are presented. Each are the following and described below application is divided into its own subheadings for easier navigation as well as a short description of their purpose.

**Unreal Engine 4**
Unreal Engine 4 by Epic Games was the game development engine that the game was built in. The Unreal Engine provides inbuilt tools to develop levels and mechanics for games.

**Visual Studio 2013**
Visual Studio is a code development environment that was used during the course of the project to develop the code that was used in the game. Unreal Engine 4 has inbuilt integration with the Visual Studio application. Visual Studios was an application developed by Microsoft.

**Photoshop CS6**
Photoshop is a picture-editing program that was used to create textures and concept art for the game. Photoshop was developed by Adobe.

**3DS Max and Blender**
Basic programs were used for the 3D modelling of the assets needed for the game. Blender was developed by Blender Foundation and 3DS Max by Autodesk.

**XNormal**
This application was used to create normal maps to use within the game. A normal map is a technique used for faking the lighting of bumps and dents and is used to add detail without creating more detailed 3D models. This application was created by S.Orgaz & Co.

**Motionbuilder**
Motionbuilder is an animation software for 3D models, using a skeleton to animate characters and objects. Motionbuilder was developed by Autodesk.

**ZBrush**
Zbrush is a digital sculpting and painting 3D software that was used to create details on the models created in previously mentioned 3D software. This tool is developed by Pixologic.

4.3 Rapid prototyping

When creating the game levels we used a rapid prototyping approach of first creating a first iteration of the levels, after the first prototype we had a testing session of these levels with an accompanying interview with the test participants as explained below. In the next step, the feedback received from the participants was analysed. By using a check list system we could see what the test participants did not understand of the game narrative. We took what we learned from this first test session and then continued the development on the levels having in mind the feedback that we received, which proceeded until the next testing session. The game
building project had four different iterations. All of these four iterations had an accompanying testing sessions.

Brian van Bruggen (2011) describes in his article how rapid prototyping can be used to great effect and why it should be used when developing video games in a quick way. (Bruggen, B. 2011: No Pagination)

4.4 Testing

The data gathering was done through interviews with participants that had tested the game that we created. The participant was first told that he or she should play through the game and then after they finished the play-through they would be interviewed regarding the character. The participants then played through the game and after the participant was done they were asked the questions listed in Appendix 1 to see what they managed to understand and what they did not. They were also asked why they understood a certain aspect of the character which we later analysed and drew conclusions from.

The people that were chosen to test with were people who had some previous experience with playing games as they required less time to learn the game and the various gameplay mechanics so that they could immediately focus on the levels and the story in the game. For this study we had 17 different participants spread out over the different iterations of the game that we tested with. For each of the iterations we had around three to five participants. We did not test with the same person twice even if it was for a new iteration of the game. The results that we received from the different sessions are summarized in the result section of this study.

4.4.1 Survey questions

The questions that the participants were asked after they played through the game can be found in Appendix 1. We first started with asking two general questions regarding the character and the characters narrative. This was to have the participants talk about what they understood without having the questions hint towards something or directly ask about a certain element that we were interested in. After the general questions if we did not already receive the answer to the upcoming questions we asked the more specific questions regarding certain aspects of the character and the various levels. If there were enough answers from the tester during the first general question, asking more questions was not needed. During the interview the answers were noted down in a document specific for that tester, the interview was also recorded for later reviewing. As the participants that we tested with were Swedish, but could answer in English, the questions were asked in English.

The survey questions were constructed so that the first question could fill the rest of the questions. If the all the questions was not answered in the first question, we used the follow up questions as recall cues, to remind them of the scene. In their study, Schwarz and Oyserman (2001) mention how recall cues works in questions. Recall cues can be used to get the interviewee to remember what they have seen from their short term memory.
Yet, recall cues share many of the characteristics of closed-response formats and can constrain the inferred question meaning. Respondents may therefore limit their memory search to behaviors that are closely related to the recall cues and may omit behaviors that provide a poor match.” (Schwarz, N. Oyserman, D. 2001:138)

4.5 Design work on the levels

In the coming two sections the design work produced for the two most important levels, the Lighthouse level and the character's House Level, is be explained. The other levels in the game did not undergo the same amount of design work and are not significant for this study as they do not provide the same amount of information to the player compared to the two most important two levels. The things that we list were provided to help the player understand the character and her narrative.

4.5.1 House level

The House Level was the third level in the game. The player arrives here after he/she has inspected the dead body and the personal belongings of the character on the beach in the previous level. This was the most important level in the game regarding the description of the character since the details provide most of the information regarding who the character actually was. Figure 1 shows the layout of the kitchen as well as the living room in the apartment. The figure also shows various knocked over objects as well as a puddle of blood.
on the kitchen floor. On the table in the figure there is a small cluster of objects that attempts to convey to the player that the character is adventurous and reads frequently. Upon entering the level the player was immediately presented with a goal to complete in this level. This goal was to understand what happened in the house and this was presented through a short dialogue the player character has where he wonders what happened in the house. The goal was added to the level according to one of the methods presented in the purpose section.

In order to properly describe the various things that are in the character biography, see appendix 2, that the player should be able to understand by playing through the game quite a few different objects were created for this level. Since most of the information about the character and the characters narrative was conveyed through this level, much of development time was spent creating this level.

In order to convey to the player that the character was wealthy and had a preference to modern furniture the house was made to look very clean and with a clear theme to the furniture in the house, as seen in figure 1. The roof was also made to go very high to give a lot of room in the living room as to make the house look larger than it actually is as to indicate wealth. The level was made like this by looking at various different expensive houses and apartments and seeing the clean style of the furniture and the often very spacious areas. The house also has a small gym in one of the rooms.

Some of the objects that were added to the kitchen area were different kind of objects like cooking equipment as well as organic foods, these were added there to convey to the player that the character cooks and eats healthy food. As seen in figure 2.
In order to convey to the player that the character was very adventurous a few different types of items were added. The items that were put into the level were the small earth globes, the different maps as well as diving and skiing equipment as seen in figure 3. The diving equipment also served the purpose of conveying the profession and hobby of diving to the player, the large amount of diving equipment were to further help the player understand this.

These objects were added using the method of having smaller details to convey information. They also used the player's familiarity and references in order to create an understanding of what the objects were used for to the player.

Other objects also using the player’s familiarity was all the different objects that were knocked over in the level. These objects were all knocked over because of the break in of the murderer. The player will be able to relate all the knocked over items to the fact that the person that broke in knocked them over as if the intruder moved quickly or because there
were a struggle between them. This also includes the blood on the floor and the knife lying next to it.

Chart of important objects in the House level.

<table>
<thead>
<tr>
<th><strong>Object</strong></th>
<th><strong>Description</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diving equipment and themed paintings.</td>
<td>Multiple diving tubes, goggles and sea themed paintings. Used to convey diving profession.</td>
</tr>
<tr>
<td>Blood and knife.</td>
<td>Blood on floor with a bloody knife. Used to convey that there was a fight and that the murder was stabbed.</td>
</tr>
<tr>
<td>Books, maps, world globes.</td>
<td>Multiple maps, books and globes that are used to convey that the character is adventurous and educated.</td>
</tr>
<tr>
<td>Broken glass, knocked over furniture.</td>
<td>Large hole in a window with various furniture knocked over to convey that there was a break-in.</td>
</tr>
<tr>
<td>Dress (added later).</td>
<td>Dress with flower pattern. To convey the gender of the character.</td>
</tr>
<tr>
<td>Gym and healthy food.</td>
<td>A gym in a separate room and various healthy food on the kitchen counter that is used to convey the character healthy lifestyle.</td>
</tr>
<tr>
<td>Clean style of furniture and large spaces.</td>
<td>Clean and bright coloured style of furniture and large spaces in the house is used to convey that the character is wealthy.</td>
</tr>
<tr>
<td>Time rewinder.</td>
<td>The object that the player can use to manipulate time. The object the character found that the murderer killed her for.</td>
</tr>
</tbody>
</table>

Fig.5 House Chart. Important objects in the House level. Project Rewind. (Joar Hedvall et al.). 2015
4.5.2 Lighthouse level

This level was the second level in the game, the player arrives at this level after leaving the police headquarters. This was the level that the player will find the characters dead body on the beach, this level does not provide much information about who the character was. It provides more information about the story of the character. Figure 2 shows an aerial view of part of the lighthouse level. In the middle of the figure there is a large gate that leads down to the beach where the dead body could be found. To the left outside the figure was a large rune stone where the player found the key that lead to the large gate. To the left outside the figure is the large lighthouse that the player saw when they entered the level.

Similar to how the previously explained level provided a goal for the player this level also provided this. In this level the player character will have a short dialogue that says that apparently the body was down at the beach and the player will have to get down there to continue through the game. There was a locked gate which leads down to the beach where the body was and the player had to find a key in order to get down there.
In order to get the key the player had to find the shrine where the key was. When approaching the shrine some effects will appear. These were there to give the effect of something supernatural happening, although not directly related to the character there was a focus on the supernatural in the overall story of the game.

The dead body of the character could be found on the beach past the locked gate in the level. To help the player understand that the character was drowned the body was placed close to the water. The personal objects that are close to the dead body give the indication that the character’s purse was looked through for something. These objects can be seen in figure 6. Among the personal belongings there is an ID card inside of a wallet, this card cannot however be read and the picture is too dark to get any information from. There is also a journal page that can be read, this page tells that the character had found something of importance. Also among the belongings is keys to the character's house.

Chart of important objects in the Lighthouse level.

<table>
<thead>
<tr>
<th><strong>Object</strong></th>
<th><strong>Description</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rune stone.</td>
<td>Where the character found the time rewinder. To convey that there is supernatural going on.</td>
</tr>
<tr>
<td>Gate key.</td>
<td>The gate key is found at the rune stone and leads to the beach.</td>
</tr>
<tr>
<td>Body.</td>
<td>The body is in a body bag due to time constraints. To convey that the character is dead.</td>
</tr>
<tr>
<td>Personal belongings.</td>
<td>These items can be found at the beach near the dead body. Keys are used to open the character house. Wallet is where the player character knows where to go next. Journal tells of something that the character found.</td>
</tr>
<tr>
<td>Journal page, wallet, keys.</td>
<td></td>
</tr>
</tbody>
</table>
5 Results and analysis

In this section the test results received from the survey are summarized. Each of the survey iterations has its own section. In addition to the test result, this section also lists what changes were made to the levels between the different iterations to better convey to the test participant the character and her story. Similarly, in addition to the test result, the analysis for the specific iterations of the results is provided.

5.1 Iteration 1

The iteration 1 testing session is the first testing session that was done. During this session there were three different participants that tested the game and answered the survey questions. There were a few things that were incomplete with this iteration, for instance some 3D models were missing. The test was done even though the game was not complete as the feedback was still useful for further develop the levels.

5.1.1 Test results

During the first test session there were some problems that were interfering with how the session went. Firstly the questions were not specific enough and the participants did not fully understand the questions. Secondly, the second level and the third level were quite hard for the participants to figure out how to solve which caused some issues.

Two of the three participants had trouble understanding most of what the game was trying to convey to the player, mainly because of the lack of finished 3D models in the game. One of the participants managed to understand some aspects of the character correctly, the tester understood that the character was female, that she trained actively and that she was wealthy. None of the participants understood why the character was murdered, although they did understand that she has been attacked in her house and then killed by the attacker. Two of the participants thought she was murdered either because the killer was a serial killer or that it was a competition about a treasure and that they knew each other. One of the participants understands that the character was a diving instructor and that she was an explorer.

Overall the participants did not fully understand what the game was trying to convey. They have some clue to what had happened and who the character is but they did not understand why the murder has happened.

5.1.2 Analysis

This first testing session was mainly done to see if there was something major that had accidentally been left out and to see if the tests would work the way that we had planned. We knew that there were a few important objects that was either missing 3D models or textures, which we had taken into the consideration when analysing the results for the first iteration. We did notice that the questions needed to be changed for the next sessions as the participants had some trouble to understand which character we were asking about. Some of the
participants believed that we were asking about the player character, the detective, which caused some major confusion. The word “character” was changed to “victim” in the questions as this will make it much clearer for the participants to know to whom we are referring to.

Overall the participants did not fully understand what happened in the game. They understood that the character was murdered by the person that broke into her house but they did not understand why the character was killed. We believe that this is because some of the objects that were missing textures. These were items such as the rune stone and some of the character belongings in the lighthouse level. The completed textures would help convey why the character was murdered.

Some of the participants managed to understand a bit about the character, some of them understood that she was wealthy and an adventurous person. This was mainly thanks to the House level which provided much if not all of this information. The technique described by Flynn is discussed in section 3.1 Smaller Details. He argues that smaller objects can be used to convey a story or narrative, which seemed to work very well in the House level as one of the test participants managed to pick up some of the character’s traits. There are still some aspects of the character that they did not fully understand. The test participants had different opinions about what the character had as a profession and only one of them guessed right.

We decided to change the questions and add in the missing textures and 3D models and test with new participants to see what more was needed to be changed to improve the levels in order to convey the character narrative and traits to the player.

5.2 Iteration 2

The second iteration had some changes from the previous iteration of the game which is described in the previous section. In the iteration 2 of the game the levels are in a more complete state to what they were for the previous iteration in terms of the objects and graphics. During the test session of the second iteration of the game four participants was testing the game with more complete graphics.

5.2.1 Test results

After the second test session we realised that we accidentally presented to the player who the character was by letting the player during the game to look at the character ID card.

From the results that we got from the second testing session, two of the participants understood why the character was killed, which is because she found out something she should not. The other two did not understand why the character was killed as they did not answer the question correctly. None of the participants understood that the character is not killed in the house but that she was drowned at the lighthouse. Two of the participants understood that the character was a diver while others did not fully understand what the character’s profession was. Three of the participants understood that the character is a person that likes exploring and that she is an adventurer. Three of the
participants also understood that she is a healthy person, since she was eating healthy food and that she was exercising often. Three of the participants also could understand that the character likes to read.

The test participants could see that there were several diving tubes in her house and associate this with something she uses frequently but some of them still do not think that she has diving as a profession.

In summary, during the second test session, we could observe that the test participants get a better understanding of who the character was and her lifestyle, although, her profession was still quite unclear to some of the participants. However, we could see that there was a better understanding among the participants of to why the character was killed.

5.2.2 Analysis

This is the analysis of the second testing session of the game, which was in Iteration 2. After doing the second session we noticed that we accidentally told the player who the character was by the use of text in the game, which was immediately removed. It was important that we noticed this mistake early as it could have interfered with the upcoming tests.

The results of the second test shows that overall most of the participants understood whom the character was at this point. For the game development, it was very important that many of the participants understood what the character’s lifestyle was. There was still the issue where many of the participants did not understand what the characters profession was. There were a lot of diving equipment in the level but some participants did not associate this to being more than a hobby. We were unsure how to correct this problem at this point, therefore, we intended to do one more test and then try to analyse the additional feedback to see if there is anything that could be done to convey the characters profession.

After we added the missing 3D models and textures to the levels that were there to help explain why the character was killed we had two of the four participants understand why the character was killed which is a good step forward from the previous iteration where none of the participants understood why the character was killed. There still needed to be some improvements of the visual assets of the game, since there were some participants that did not understand why the character was killed.

Using the theory, which states that having a set goal for the player to accomplish will help lead the player in a certain direction, brought up in section 3.3 Level design and goals, we could more efficiently convey information to the player. This was because we can place important objects that are needed for the game to progress next to the objects that help convey the character. We have placed these objects close to each other to have the player automatically see both of the objects at the same time. This was a very helpful method since important objects that describe the character can be placed locations close to other important objects, which greatly increases the chance that the player would see these objects and connect these to the character.
During the game design process, there were more changes made in the third level, the House level, than the Lighthouse level. The reason for those was that we observe that one of the test participants did not realise that the killing came in through the window. Therefore, there was a rock added in to the floor inside the house as well as we added fragments of glass leading from the window to the rock. These supplements symbolised that the killer threw a rock through the window to get inside the house. In addition, some key objects were moved around a bit to make them easier to find and easier to inspect.

5.3 Iteration 3

The third iteration of the game went through a few changes from the previous iteration of the game, these changes can be found in the previous section. The testing session of this new iteration had five different participants.

5.3.1 Test results iteration 3

Looking at the results, all of the participants of the third test session believed that the character was a healthy person that likes adventuring and training. Two of the participants also believe that the character was a wealthy person that has a highly educated. Most of the test participants understood who the character was and what she did, except for her profession, which was still not fully understood. All the participants could guess that her profession was something that has to do with either computers or that she was some kind of scientist or archaeologist. The gender was yet not fully understood by the participants, as two of the testers were unsure of the gender of the character.

Similarly, as during the previous session the test participants understanding of what happened to the character has increased. All of the participants that tested this game iteration understand that the character was killed because she found something that she should not have found. However, they could not figure out who killed her since this is never explained to the player. The test participants also still do not understand that the murderer is the one that got stabbed in the house and not the character.

In summary, during the third session, there was clearly a better understanding what has happen to the character in the game, although, there was still some parts of the narrative which was not clearly understood. Many of the participants also guessed right when it comes to who the character was, however, regarding the narrative part there are some things that were not fully conveyed by the level design. These things that are not properly conveyed relating to the narrative is that the murderer is the one that gets stabbed in the house. The participants are also unsure of why the body of the character is down at the beach.
5.3.2 Analysis

The testing sessions for iteration 3 showed some improvements of the game design as the amount of participants that believed that the character was killed because she found something she should not has greatly increased. We can conclude, that this has happened because the participants could relate to journal page, which they could find at the dead body. It is also thanks to the large rune stone that the player could visit in the same level. Similarly, the test participants could figure out that the character found the object that caused her death at this specific place.

The two major things about the character were that the test participants do not fully understand were both the character profession and the gender of the character. In order to convey the gender better to the player, we decided that we could add in some more minor objects into the House level, which will help the player figure out the gender of the character. The object that were added could be very easily associated to the female gender of the character. The reason to these additions was that we had noticed that the player does not focus much on the key objects in the level, as these were not required for the game to continue. The object that was added to convey the character's gender was a dress with a flower pattern.

What to do in order to convey to the player what the character works as was at this point of design still unclear, as we previously decide not to use the text information approach.

However, having the box where the player finds the time rewinder, which was move to be partially hidden, forces the player to walk around searching for it which is very beneficial to the goal of this game project. This was because by having the player walking around and looking for the box causes the player to see more of the key objects connected to the character, which was a beneficial circumstance for this study.

Something that we noticed during the test session was that the recall cues used for the interview questions were very helpful when having the participants answer the questions. These recall cues are described and discussed in section 4.4 Testing. In short, since the participants does not need to know anything regarding who the character was to complete the game, it can be easy for the tester to forget about what he or she learned about the character. This is where the recall cue questions came in handy, as they were helpful by reminding the participant about certain things about the character.
5.4 Iteration 4

This was the last game iteration we tested with for this study. The last test session had five participants.

5.4.1 Test results

The result provided by this last test session has shown some similarity to the previous session. The participants almost have the same level of understanding of who the character was. However, the profession of the character as well as the gender was still hard for some of the participants to recognise. Three of the participants believed that the character was female whereas two of the participants that believed that she was female directly connected the gender issue to the dress that was added into the House level. One of the participants guessed that the character was a scientist which is close to what the narrative story of the game and the character were meant to be according to the character biography. Other than the mentioned participants that guessed right, the rest of the participants for this test sessions guessed the gender and profession of the character wrong.

For example, one of the participants did not seem to understand at all who the game was trying to convey, he did not either seem to understand what happened to the character in the game.

As for what happened to the character in the game, three of the participants understood that the character was killed because that she had found something that she should not. One of the participants guessed correctly that the character is not killed in the House level and that the character managed to flee to the Lighthouse level before she died. The other participants were either uncertain or guessed that the character did not do something that the murderer wanted her to do. There is still the uncertainty of how the character died, as none of the participants guessed that she was drowned at the beach in the Lighthouse level. Interestingly, one of the participants thought that the character was killed because of the device, which had created some kind of monster or because she went insane and killed herself.

Overall the level of understanding seemed to stay roughly the same comparing to the previous iteration. This test session show that some of the participants seem to understand most of what is happening while other participants seem to struggle to grasp certain aspects of either the character herself or the character’s narrative.

5.4.2 Analysis

The last test session that was evaluating the iteration 4 of the game had some mixed results. Some of the participants managed to understand almost everything of the character narrative conveyed by the level design, while other participants was unclear on some parts or seemed to not understand anything at all about the character.

Generally, most of the participants understood who the character was although there was still the issue with the character profession, which has to do that it was not properly presented in
the game. We conclude, that there was one of the participants who either guesses that the
character was a diver or a scientific person which was the correct guess. However, the correct
guess belong to minority of received answers during this survey. In regard to the gender of
the character, the dress that was added into the House level seemed to help a lot to convey the
gender. This object helped the participants understand her gender as people generally do not
associate males with dresses, this was an ideal object to add into the level to convey the
gender. Although we could recognise that since the dress was the only item that sticks out as
female, if the test participants miss the object, they might have problem with finding out the
gender of the character.

It was still split on how many of the participants understood what happen to the character in
the game. Some of the participants understood that she was killed because she found
something that she should not, while others do not. How she was killed was still not apparent
to many of the test participants, as there was only one tester that managed to guess it right,
i.e. that the character managed to flee from her house to the lighthouse and that she died
there.

It seemed that one of the participants did not take time to explore the levels but instead only
focused on getting through them and finishing the game. Having these kinds of participants
was to be expected as not everyone likes to explore while playing games. What we could
have done to force the player to explore was to have more different things that the player
needs to interact with around the levels to force the important objects that convey the
character into the player's view.
6 Discussion

There were some aspects of the character and the character’s narrative that we did not manage to convey through the level design for the game that we created. The three major aspects of the character that the levels did not properly convey to the tester were the character’s profession, how the character died in the game and the gender of the character. In summary, based on the results from the test sessions we can conclude, that there were only a few participants that managed to guess the right profession, or was very close to guess the right profession of the character. Regarding the second major aspect of the character, only one participant guessed right about how the character died in the game. The gender of the character was also quite hard for some participants to understand. The reason why the participants did not understand these three major aspects of the character and various other smaller aspects will be discussed in this section.

6.1 Design choices

Analysing the design choices, we can assume that each participants had different references and memories to go by when analysing the objects in the levels. This might have affected the perception of how the character appeared to the participant. We also believe that this was one of the reasons that the different participants had different opinions of who the character was. Level designers will have to keep this in mind when designing levels for the purpose of conveying narratives to the player when relying only on a player's personal memories and cultural references. Generally, a game has a target audience during development and the designer should make sure to not use too many references that that target audience might not understand. This conclusion is based on the result from our tests, since we realised that the players might get confused as visible in the result from our tests. We also recognise another possible technical reason of participants confusion, such as that we initially had two computer screens in the character’s office which caused some participants to believe the character worked with something technical.

The fact that the different participants each have their own references and memories to go by when analysing various objects might also be the cause why all of the participants did not understand what gender the character was.

We assume, that one of the major reasons why the participants did not understand how the character died was because of the lack of visual objects related to that specific event in the game. We also realise that the complexity of the actual event was very difficult to explain in terms of what happened to the character.

We also realise that the victim’s 3D model can be one of the reasons that the participants drawing the conclusion that the murder has occurred in the kitchen, rather than by drowning. No visual clues were given that the victim drowned in the sea, and the obvious blood in the kitchen leading out gave the impression that the victim was stabbed in her house.

In context of the game design, an important thing to remember when designing levels that could convey a character is that often the character traits is not needed in order to complete the game. This conclusion becomes obvious when looking at the test results, since some of
the participants focused mostly on getting through the game rather than exploring the levels. A small workaround for this is to have the important objects and events that tell a lot about the character nearby objects necessary for the game to progress and to place these objects in the game environment so that player is forced to see them. However, this approach is not always a feasible thing to do as this might cause clutter in the levels which might give the player too much information at once.

Looking at the design of the game used for the tests, during the test sessions, the amount of interactive objects in the levels that were required to complete the game were not enough for the player to spend more time to study the environment. If the player had been given more interactive objects that they needed to use in order to complete the level these could have made the players memorize more visual details about the character.

A person’s profession is not always visible through that person's home; we believe that in our case of our group of test participants they may separate their professional life from their home. Our results give some basis to this conclusion, as the test participants did not find it easy to figure out the correct profession of the character. Even when presented with multiple objects that relate to the specific profession, some of them concluded the character profession to be related to the time rewinder/artefact. Nevertheless, an explorer was the most common assumption received from the test participants, thanks to the artefacts such as the frequent maps and diving equipment which is not completely an incorrect answer.

6.2 Successful methods

One of the most successful methods we used to convey the character through level design was Flynn’s technique brought up in section 3.1 Smaller Details, which proposes to use small objects in the levels to help convey the narrative of the world or a specific person within that world. Looking at the results, many of the participants managed to understand who the character is by looking at all the minor objects that were placed all around in the character house. However, we learned that it is important to have more than just one object to convey a specific trait or situation. If the player does not see the object for some reason, whether it is too hidden or not near any important objects or events for the game to progress the player will not understand anything about the narrative the specific item is set to convey.

We also found that when small objects were placed in a cluster of other objects that were made to help the player understand who the character is, the participant was more inclined to look closer at the various objects in the cluster. We believe that this is because it is easier to see that there are objects that might be interesting for the player when they are in the cluster. Having a large amount of a certain object may also help the player understand certain aspects of the character, as an example we had a large amount of books in the character’s house which made many of the participants believe that the character was an avid reader.

Using the cultural references connected to the personal memories of the participants, as described in section 3.2 Stereotypes and memories and 3.4 Familiarity, we could convey to the tester that the character is an explorer. We did this by using multiple visual artefacts such as; maps, paintings, small world globes and other objects that people often associate with exploration in the character’s house. This method was also used to explain other aspects of the character such as that the character was an active person that eats healthy food. By
implementing the gym and the various fruits and cooking utensils in the kitchen these conveyed the personal characteristics of the character to the test participants.

We found that setting a clear goal for the player should be initially done in the start of the level, which can be a helpful approach that leads the player towards important objects that the level designer wants them to see. In the House level the player needs to find out what happened to the character, therefore, the player needs to explore the level in order to find the visual clues as well as the important objects that will progress the game. This forces the player to look around at the various objects that tell who the character that lives there was.

One of the most successful methods that we used during this project is the rapid prototyping approach used during the development of the levels. Using this method we first created the base levels that were used for the tests and after each session we used the feedback from the test participants to redesign and to further develop the levels. This method was very helpful as we could quickly see what was missing or what was needed to be adjusted for the next test session. Based on this experience of an iterative design model, we could realise that it can be quite easy to forget to include certain things or it can be easy to accidentally include something that does not fit into the game. For example we had two computer screens in the character’s office, the consequences of this was not something we thought about when we added it into the game. After the session it turned out that the additional computer screen confused the participants as it made them believe that the character worked with something connected to a technical profession.

6.3 Miscellaneous

Looking broadly on this study, as we had limited time to work on the game and to do the tests, we could not do the work that was necessary to have the player fully understand what happens to the character in the game. But if we extend the time beyond this study, we could continue to iterate the levels in order to gain the answers from the survey that could have led us further to the completed design. Another issue that could be more explored beyond the scope of this study is to try out new methods used to convey the narrative through level design.

An additional approach would be to add more events that play out, so the player gains a more interactive experience, as we did notice that the players memorized the interactive objects more narrowly than the objects present in the scene.

We had previously done a smaller study using an much earlier version of the House level, where we had the participants walk around in the level and after they had walked around a short while we would ask questions regarding who the character living there was. What we learned after doing this current study and comparing it to the previous study that we did, we saw that the difference between the studies was the directions the player were given when they were put into the game. During the first study we asked test participants to go around and study the environment, and once finished, we asked them similar questions to the ones from this study. However, the current study focuses more on giving the test subjects a goal other than studying the environment, and the results displays this approach. Less information
about the victim was memorized, and more about the simple goals the players had to complete.
7 Conclusion

In conclusion, after conducting this study we found that developers can create small objects that relate to the character or its narrative and have these objects convey the characteristics to the player according to the pre-designed narrative manuscript and level design. These objects should be placed in strategic position that has a high chance that the player noticing them.

We also found that creating objects that stands out in a scene leads the players towards it, but not having the level goal relate to said object might make them forget about it. Making the objects interactive could strengthen the use of long-term memories, we observe that the players was more likely to remember objects after they interacted with them. We also noticed that when placing the objects in small clusters the players are more inclined to look at the items there.

One insight taken into consideration during this study is that it is important to be very obvious with certain character traits, as it can be easy for the player to miss what the level is trying to convey. When being too cryptic trying to describe the character through the level design might cause confusion for the player. Creating an environment where the player has to examine certain objects will give them more time to theorise who this character might be. Therefore, it is important that the placement of the objects is organic and that it’s not uniform in their rotation and placement. For example if the objects are placed to neatly a player will interpret that a character might not live there, as it is too tidy.

A developer can create objects based on the player’s own personal references and memories to have the player create her or his own assumptions to what that object might be used for. Although having certain objects in a scene does only do a certain level of interpretation and it needs to be clear who the target demographic is for the game, so that the objects in the scene are adapted to the cultural references of the target group. Having references that the player might not understand will only lead to confusion and might make it harder for the player to understand other things that the level might be trying to convey.

While having goals in the level sets the player on a path, that path might cause them to be misled out of the narrative understanding. If the player is presented with very simple goals to complete, they most likely will not examine the environment and therefore, will not understand the narrative. For example, if the players just need to find the key to the door, they will look for a key in the scene, rather than carefully looking at the environment.

Minor details can be used to strengthen the narrative of the character, but it was not enough to give the player a full understanding of the narrative. In addition to this setting a goal in the levels caused the players to memorize the interactive objects better than the static objects. It is also beneficial to note that we were using stereotypes in the development of the objects in all levels, which we find necessary in order for the player to create a image of the character.
References

Published work


http://www.lynnehall.co.uk/pubs/UnscriptedNarrativeforAffectivelyDrivenCharacters.pdf

Freeman D. 2004 Creating emotion in games: The craft and art of emotioneering (Retrieved 15-05-21)
http://www.skynet.ie/~ogami/notes/year%204/writing/Freeman_emotioneering04.pdf


Lindley A. 2005 Story and Narrative Structures in Computer Games (Retrieved 15-05-20)


Riedl M O, Young R M. 2010 Narrative Planning: Balancing Plot and Character (Retrieved 15-05-20)

Schwarz, N. Oyserman, D, 2001 Asking Questions About Behavior (Retrieved 15-03-20)
http://aje.sagepub.com/content/22/2/127.full.pdf

Websites


Bruggen, B. 2011. Rapid Prototyping (Retrieved 15-03-08)
http://www.brianvanbruggen.com/?page=rapid_prototyping


Games


Tools


Autodesk, 2013. 3DS Max Studio 2014


Xnormal, 2014. XNormal 3.18.10 http://www.xnormal.net/


Appendices

Appendix 1. Testing questions
These are the questions that the participants were asked after they played the game.

1. Who do you think the victim is? What can you tell us about the victim?
   1.1 What do you think is the victim's profession?
   1.2 Does the victim have any hobbies?
   1.3 What do you think is the victim's lifestyle?

2. What happened to the victim in the game? Walk us through what happened.
   2.1 What events occurred in the Lighthouse crime scene level?
   2.2 What events occurred in the character's house?
   2.3 Why do you think this happened to the person?

Appendix 2. Character Biography

- General Information
  The character was a 23 year-old female named Sara Bengtsson that lives alone in her house. She was a healthy person who works out multiple times per week to keep up with her very active lifestyle. She works as a diving instructor and a maritime researcher which you can see in her house from her diving gear and office space. She was also quite wealthy having inherited a very large amount of money from her parents. Her preference in furniture aimed more towards the modern kind, inspired by square geometry using softened edges with sterile colours, common in “modern” furniture.

  Most of her house was tidy with an occasional book lying around, but her work and research station was the opposite. She had a scientific pursuit in her daily life, and she wanted to expand her knowledge. Her well-being and health were in focus, eating healthy and organic food, and regularly worked out to keep her in shape.

  Her interest was in the more adventurous direction, with a focus on diving, hiking, climbing and generally being outdoors. To sum up her character:

- What happened to her?
  The character was murdered, drowned by someone. She was found down on the beach by the lighthouse.

  The fight started in the character’s house where there was a struggle after a person broke into the house through the window. The attacker was stabbed with a kitchen knife and then chased the character outside.

  The character was murdered because she was researching something she should not have done, because she had found the time rewinder which relates to what she was researching.

Appendix 3. The Story of Project Rewind
The story of this game had a focus on unknown and alien objects, although there was not a very large focus on them until the last level with the exception of the time rewinder which relates to what was found in the last level.

The game starts out with the player character, a murder investigator, sitting by his desk at the headquarters when he gets a call regarding a dead body that has been found on the beach by the lighthouse (which was the character that this study was trying to convey through level design). The player character stands up and walks to the elevator where the screen will fade to black, the game will then fade back after the level has switched to the lighthouse level.

In this level there is a lighthouse on a hill and a large gate with stairs leading down to the beach. This gate is locked and will require a key to open. The player character now has to walk around searching for the key. The key can be found at a shrine in the forest in one of the sides of the level, when approaching the shrine it will light up for a brief period of time and then go back to normal. The player can now unlock the gate leading down to the body. After walking down to the body on the beach the player character can see that the character has her hands and feet bound and that the character was drowned. In the near vicinity of the body the player can find some personal objects of the character. Here the player will find a torn out journal page that says “I have found an interesting object near the old rune stone. I have taken it to my home to do further studies on it. The object I found has astounding capabilities, I had a hard time believing what I was seeing but I am convinced that it…” here it ends abruptly.

After looking around a bit more and taking the keys to the character's house and the player character starts to move towards the large gate the game will fade to black again.

Next, the game fades in and the player character finds himself in the character's house where the player character can clearly see that there has been a struggle. A large window has been broken as if someone broke into the house through there. The player character can also see some knocked over furniture and in the kitchen there is a kitchen knife in a pool of blood as if one of them was stabbed (the attacker). The blood leads out the front door. In the house the player character will have to look around for clues, and when doing so will find a locked box with a note underneath that tells the player where the key is. When the player character has found the key and unlocked the box the he will find a time rewinder with a note that explains it shortly. The player character will also find a map that tells about a place called Stormsö 11 which is the next location the game will go.

After arriving outside what seems to be Stormsö 11, the player can see that it is an underground bunker of some sort. But the player character cannot seem to enter as the lever to open the large steel doors is not powered. The player character follows the cable leading from the buttons to see a small house with a power generator but it has been crushed by a large rock. The time rewinder will start acting up here as if to hint the player character, using the time rewinder the time for the house will be rewinded until the large rock has not crushed it. The player character can now start the generator to be able to open the large steel doors and enter the bunker.

After entering the bunker the player character will see that it was some sort of abandoned military facility. The player character now has to power up the facility; he will do this by starting the generators and finding the activation code. Both of these objectives require the completion of two small puzzles. After these are complete the player character goes back to the main central console and after interacting with it the facility will power up and in a glass
sealed room in front of the player character there is a large object with a hooded figure on top of it. The hooded figure climbs into the large object and it starts to hover. The player character can now see that it is some sort of spaceship, there is a large shock wave that smashes the windows and everything goes dark.