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Abstract:

This project set out to explore continuation desire (CD) as an evaluation method for graphical style. The report seek to bring an overview and the research into continuation desire, suggest a range of modifications to the intrusive game ESQ framework (an iterative evaluation method for game development, using CD), in order to reduce intrusiveness

The project proposes a method for classifying and defines rules for how to describe different types of graphical styles. Describes the process of designing character concept with different style the and the process of creating them and implementing into a test environment.

A test was created, based on this process, and distributed online. 34 people participated, and this report finishes by presenting the find form the test and tried to give and evaluation about if, continuation desire id influenced by the graphical style

An Investigation of Graphical Style

using Continuation Desire as an Evaluation

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Master Thesis

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Contents

Pre-face

This project is based on research into Continuation Desire, and is an investigation into using Continuation Desire as an evaluating method for graphical style, and character design in particular. This report is written as a master thesis for 1oth semester in Medialogy at Aalborg University, Copenhagen 2014.

The structure of this report is pre-analysis which seek the give an overview of player experience and Continuation Desire research, followed by analysis which seeks to clearly define what is understand style to get a better understand if that is this we seek to evaluating, the design chapter focus heavily on designing an interactive experience, which can evaluated Continuation Desire. Implantation which describe the process of building the interactive experience. The Experimental design ended up being tied very closing together with test design and setup, and should be read as a combies of those. The report is wrapped up with discussion, conclusion and reflections sections.

Figures and tables are referred to using both page number and figure or table number, e.g. figure 2.1 on page 5. All figures and tables are referenced in the text. Lists of tables and figures can be found after the appendix. All links and references have been colored purposefully, to show interactive links in the digital .pdf file. Citation years are in red, cross reference numbers are in green, while URLs are in dark blue.

Sources are referenced following the APA (American Psychology Association) parentheses referencing style, which displays the author last name(s) together with the publishing year, in parentheses, e.g. (Schoenau-Fog, 2011a). Sometimes the source is referenced together with a page specification, in order to indicate exactly which page(s) in the source are referenced, e.g. (Schoenau-Fog, 2011a, pp. 1-2). In cases where multiple sources are referenced with only one page specification, those pages apply to all the sources,

e.g. (IJsselsteijn, de Kort, Poels, Jurgelionis, & Bellotti, 2007; Nacke & Drachen, 2011, pp. 1-2).

1. Introduction

This small section, describes the motivation for the master's project, both form and induvail point of view, but also seek to put the motivation into an academic and industrial context. and formulates a problem statement that will serve as the guideline through the duration of the project.

1.1. Motivation

The motivation for this project, besides trying to showcase all the areas of knowledge i have gain over the course of my educations as a medialogist. Are a combination of my interest of the visual and graphical aspect of making games, as well is curiosity and desire to know that. it is that makes user ad players interested in a game, and get them to keeping and well as coming back for more.

Therefor it would be interesting for me to trying a make a project that will investigate if the graphical style of an game have any influence on player willingness to try, keep playing and coming back to a game. and if it is possible to measure and quantify it

Other personal motivations are trying to make a fully functional game experience, having considered the user experience and the usability of the game, making a product that would seem overall thought through and complete.

The academic motivation is to examine how the graphical style of a game affects continuation desire (CD), as it seems there is a lack of research into how the graphical style of a game influence continuation desire, Another motivation is to reduce the effect of the intrusive method of continuation desire, by incorporate the questionnaire into the

game and make it seem as being part of the game, in order to allow the participants for focus more on the on the game and allowing them report a more clean or undisturbed continuation desire, as past experiences have shown that rawr intrusion can have an influence on CD. yet another motivation is to devise a test setup that can insure that each players would have the same experiences or at least as close to as possible, no matter which direction they would go, since i can argue that if the player have a fixed oath they have to follow, choose a different path either on purpose or be mistake would lead to a different experiences than those following the predefined path, coursing bias

The industry motivation for this project is to see if continuation desire framework can serve as an iterative evaluation method for testing graphical style of characters, allowing quick feedback of like and dislikes about the given graphical style and it's influence in the player's likelyness to keep playing or coming back to the game.

1.2. Problem Statement

based on the various motivations for the project, and problem statement was formulated. In hopes that it would help and guide the project through the process of making a test game. In order to see if the graphical style of a character would affect the player's' continuation desire while playing a game.

project's problem statement is :

Does the graphical style of a character affect the players' continuation desire?

2. Pre-Analysis

there are a wealth of methods and frameworks that can be using for testing games,in this section we will try and narrow that field down to one method which will be used in this project, we will briefly discuss the pros and cons of a few of the more established frameworks.

in this project we are interested in finding a method that can be used to measure how much an individual graphical style influences a player or in other words, if the graphical style of an character affect the overall user experience of the game.

user experience in the specific context of digital games, is often referred to as Player Experience, which is a rather nebulous term with no commonly accepted definition. Player experience differ from the normal user experience testing(usability testing),as in games the user experience comes first, usability second. (Nacke et al., 2009; Nacke & Drachen, 2011)In fact the actual controls and gameplay of an game might have been purposely been designed to be difficult and hard to learn, depending on the intention of the design. furthermore player experience is also a very individual size, that is effected form an array form different, more or less uncontrollable factors, such as player personas, game brand awareness, expectations based on past experiences and marketing campaigns are all factors contributing to the complexity of player experience. (Nacke & Drachen, 2011, p. 2).

2.1. Player Experience Evaluation

Immersion (McMahan, 2003), Engagement (Brown & Cairns, 2004), and Flow(Csikszentmihalyi, 1997; Chen, 2007) are some of the more common methods or terms, game researchers,

have used to try to more optimally describe the actual user experience of playing a game, or 'player experience', amongst others. although these are related player experience,this project will not go more in-depth with them here.

while these may make it a little easier to quantify the player experience or at least parts of it. there are also some disadvantages associated with them, e.g. immersion or flow are prone to simple distractors, such as bugs, noises, smells or even light changes. (Schoenau-Fog, 2011a, p. 2). Another possible downside is these method depending on a state of deep focus, are they are vulnerable to interruptions, according to Jennett et al have attempts to evaluate immersion with interruption during game play, broken the immersion for the player, greatly affecting the quality of data, when trying to establish the overall degree of immersion (Jennett et al., 2008, p. 8).

while some researchers points out, since were is no way to insure participants are be able to recollect their experiences 100

however,for this project, i have decided on a method that claims to be more robust and not suffer as greatly from simple distractions, furthermore it should be able to tell us something about if there are specific parts of a given graphical style that influences the players willingness to keep playing with the character, play the game again or use/watch the character in another context

2.1.1. Continuation Desire

For this project we will be using the Continuation Desire framework (CD) (Schoenau-Fog, 2011b, 2011a; Schoenau-Fog, Birke, & Reng, 2012; Schønau-Fog & Bjørner, 2012; Schoenau-Fog, Lim, & Soto-Sanfiel, 2013), in this section, we will take a little closer look at CD and how it can be used as a test framework for games.

The Continuation Desire framework is based around the Player Engagement Process (PEP) framework which identified and categorize four main components : objectives, activities, accomplishments and affects, (Schoenau-Fog, 2011b, pp. 7-12). these four categories support the desire to continue playing.

a short description and overview of the four components :

Objectives are goals that the player makes up for herself (intrinsic) or the game sets up for the player (extrinsic).

Activities are what the player wants to do to complete the goals. These activities can be carried out in-game or out of game.

Accomplishments are what happens when an objective is completed. This is also completing activities related to an objective.

Affects are the emotions that the player feels when carrying out activities and/or accomplishing something.

how the four components of (PEP) influences and related to each other can be visualised through the Objectives, Activity,Accomplishment and Affect (OA3) framework depicted. figure 2.1 on page 5.
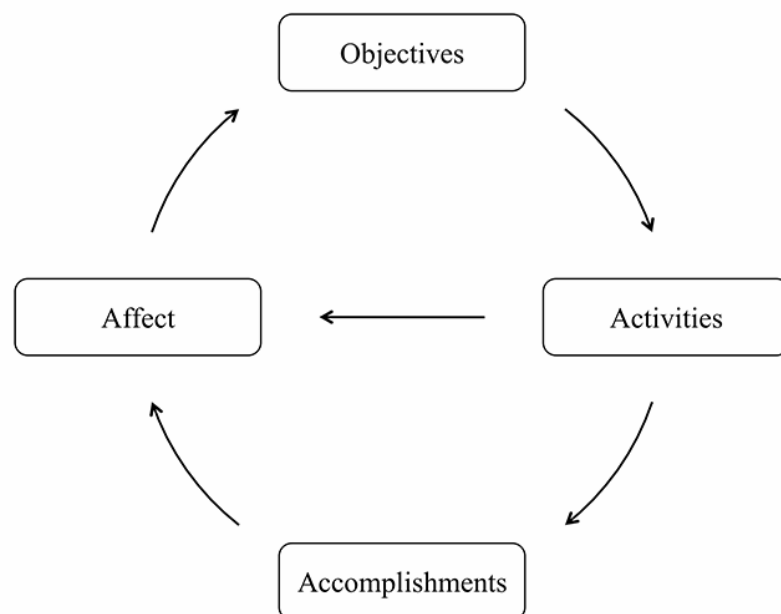

Figure 2.1. – *Relations between Objectives, Accomplishments, Activities and Affect. (Schoenau-Fog, 2011b, p. 6)..*

CD also claim to have a high correlation to the other other methods of measuring player experience,such as Engagement, immersion, flow etc. if it does not directly encompasses them.e.g if players have a high immersion or is flow, they are likely to want to continue,

likewise if a player have a low engagement or is not having "fun" they can be said to have a low or no Continuation desire

Continuation desire is designed so that should not be affected significantly by distractors or interruptions: "*(...) it can be argued that since the willingness to continue will remain, even if a user is interrupted, it would be possible to investigate his or her desire to continue during run time by pausing the experience and administering a self-report survey.*" (Schoenau-Fog, 2011a, p. 2).

The Continuation desire framework designed with a method called Engagement Sample Questionnaire (ESQ). witch use combination of quantitative self-reported and qualitative responses, to test the 'evolution' of a player's continuation desire during gameplay, by interrupting at certain 'events' or fixed time steps during gameplay, and possibly comparing with previous iterations (Schoenau-Fog et al., 2012, p. 2).

A modified basic version of the ESQ, for iterative game development, the game ESQ is designed to be provided before starting the game, during the game - ideally multiple times - and after the game (Schoenau-Fog, 2011a, 2011b; Schoenau-Fog et al., 2012). A case study demonstrated that the ESQ together with an instructive method can be a useful method of collecting information about usability, design and technical issues, or other things that might influence the player experience, by using a combination of quantitative self-reported continuation desire and a related qualitative responses, supplying an textual explanation to why the might want to continuing or otherwise. This combination provides clear indications as to which parts of the game influence the player negatively or positively and hope pinpoint which problems should be tackled in the development of the iterations (Schoenau-Fog et al., 2012).

wherefore, this method should be able to mausers if the given graphical style in the character affects the on the players willingness to continue or try again, provided that there are not other factors that influence Continuation desire more.

while Continuation desire is meant to not be affected by interruptions, in such a great degree and flow and immersion, studies by other researchers have indicate that self-report questionnaires presented intrusively, in general, can affect the player experience negatively. (Mandryk, Atkins, & Inkpen, 2006, p. 2) and (Jennett et al., 2008, p. 8),As well as past

experiences from unpublished student reports (Staal & Bock, 2013a, 2013b, 2014), using the Continuation desire framework, the game ESQ form. have shown that interruptions can affected on the user feedback, while it might not directly break continuation desire, as it could be for the immersion or flow. Considerations towards when and how often interrupts are made, should be taken in order to reduce the impact of the interruptions on the feedback.

during the course of the project , some modifications were made to the ESQ, in order use it in the context of the small game that was developed, we will describe these modifications further in the test design section 5.4.4 changes to the game ESQ on page 53.

3. Analysis: Defining Style

since this project is highly depended on styles and being able to variate between different styles. As one of the main goals of the project is to see if different styles affect players continuation desire or playing time in a test game.This section will try and discuss what styles is, as well as defined what it meant by style in the context of this project, form a character design perspective and in a game context.

Style is a words everyone all know, yet it can be hard to describe, as people tend to use it indiscriminately and without explain exactly what it is they mean by it.

if we look at the dictionary description of style it is described as : " *a particular manner or technique by which something is done, created, or performed...*"[1].

It also seems to makes sense to separate our definition of style form art, as art is an even more board concpet, that incompasses render, lighting, shading. and coloring amongst many other thing (Zagrobelna, 2014). While this project are purely interested is the different ways a character can be created,drawn and shaped in.

but then we search for a definition or taxonomy of different types of styles, used in a games or in character design context, it almost impossible to find a general agree on and accepted description of variations of styles. As style can be a very individual thing and differ on a per artist base.

To further deepen our understanding of style in a character or games context, this section reviews how some industri profesional explain and categories styles. In order to find a way to clearly cominicate what a certian styles incompasses and to create an understanding

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[1]See more: http://www.merriam-webster.com/dictionary/style.

about what exactly is meant when style is mentioned in this project.

Monika Zagrobelna have an interesting article on tuts+ [2] that desucces one way we can understand what style is.

she starts out by claiming that style is a term often used without being explained. But goes further and claims that when people use the word style, interchangeably and without explaining exactly what it is they mean by it; they are more often when not associated it with one particular style; realism. As people gives a drawing value based on how real it looks or at the very least if they can recognise what is is supposed to look like (Zagrobelna, 2014).

She defines realism as a styles as something our minds will identify as "real"or "close to real" and elaborates by saying there are many levels of realism, our brains are used to seeing and recognises in patterns in everything to look at, wherefore is relatively easy to achives a basic level of realism(meaning something recognizable , not photo-real), because our minds are forgiven and will fill in the blanks or lack so smaller details.

What is really interesting in the context of this project the way she discusses what it is that makes a style. basically she says the lines are the meaning of drawing, but it is the outlines the defines what is inside or outside, and we as humans are very good at seeing outlines, even tho they don't exist in the real world, they are fully arbitrary and each drawn object can be create using a different amount of outline,even if it the same object , depending on the artist. and this is the essence of that style is, the amount of details we used to represent an object or character, or how much we omit (Zagrobelna, 2014).

of case everything need to have be chosen or left out for a purpose. In order to know what to chose or or not to, we need rules that can make the style must be describable, therefore a style must have rules. because if your style is not based on any rules how would you describe it, "*The style of X is characterized by... the fact it was drawn by X". It doesn't make much more sense than "a characteristic feature of a car Y is that it looks like car Y". "Spontaneous", "random," or "crazy" aren't really good descriptions of a style either.* " (Zagrobelna, 2014).

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[2]a web site, of online of online tutorials, which also features an array of blogs posts and articles from designers and developers

if you can not describe why you made your choices, it might as well have been random guesswork that can not be recreated, before something can belong to a certain style it needs to be able to be reproduced (at least to a somewhat similar extend). A single picture is not a style, there must be more than one, otherwise can not really be called a style. a style must have some kind of definition or "recipe" if you want, the you can follow again and again, to create picture in the same style, even if you are the only one who fully knows it (Zagrobelna, 2014).

to summarize on this, in her web article Zagrobelna present one way of understand style and what is necessary to defines a style. This seems to be a good way to describe style as a whole, especially if we would like make the treme style more quantifiable and discussable, as we seek here in this project. Wherefore, it would be a good idea to set up some rules and descriptions, of how much of reality we want include or omit in our drawing, so we can easilyer categories, and talk about the styles we choose, this should also allow us describe and pass it on to others, so they to are able to reproduce it at least to a reasonable extent.

3.1. Categorizing Styles

now that we have a idea about how to talk about styles, let look at some way that different artists uses to categorize different styles. with the purpose of creating an way to make our own categorize

Owen Demers [3], in his book - Digital Texturing & Painting, he explains what where are many styles and genres that can be used to illustrate an idea, while style in the overall feel and look of an paniting, move and so on, in which a piece is created in. while gerens is a way for art historians to categories styles with similar flavors, themes or techniques of the artists in an effort to organize the vast timeline of art.

owen describes the way he catagories style, by dividing it up in six different styles; realistic,hyper-real, stylized, simplified, graphic and fantastic, which each have their

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[3]Owen Demers is cg artist and texture painter currently working for dreamworks and have many years of experience working in the industry, and is known for his work on the movies Beowulf (2007), Watchmen (2009) and The Matrix Reloaded (2003)amongst others

own characteristics and rules, and affect the specifications of how a painting is painted greatly.

Realistic "*a realistic style is one that imitates the real world as a photograph does*" (Demers, Urszenyi, & Maestri, 2001, p. 167). additional he mentioned that the lines, brushstrokes and color palette should be precise, and the image should have an accurate depth of field, meaning that details should fade away with distance, not everything should be a focus, this styles tries to represent a way to mimic the way our eyes work.meaning the bumps, reflections and highlights should also be presented and the need to be realistic in their amount.

Hyper-real "*there is much more details then you would see in the a photography from the same distance.*" (Demers et al., 2001, p. 169) with the hyper real, not only is the amount of details, meaning a larger area can be in focus. but the level of details is exaggerated, small detail like bump's, folder and skin discoloration on the skin becomes visible, as if almost the picture was taken through a microscope

Stylized "*A personal interpretative journey, the stylized genre involves a personal signature and is either loved or hated because of this interpretation.*" (Demers et al., 2001, p. 171) the image is simplified or exaggerated in the artist's personal styles and according to his own rules, it is important to make sure to apply the rules to everything in the scene if they are to by harmonious, and if there is no rules, make sure to keep the wholes screen that way.the stylized may be easy to paint, but harder to implement

Simplified "*simplified is a further abstraction from reality and more than any other style, bags the question, what are the most important features to get across each element*" (Demers et al., 2001, p. 173)

Graphic "*the graphic style is largely 2d in nature, although it is more than an expression of 2d objects or shapes . It sometimes can allude to being a 3d flat world.*" (Demers et al., 2001, p. 174)

The graphic style is bold and stark, usually without shadows, and it is sometimes associated with the simplistic style. there is little concern with the correctness on the subject but more focus on color and sharp shapes, with no blending between the of color

from one to the next.

Fantastic "*the fantastic styles invokes images found in the Dungeons and Dragons, The Hobbit, Brazil, Blade Runner, Star Wars, Matrix and City of Lost children. All narratives of things otherworldly.* " (Demers et al., 2001, p. 174) this styles allows you the diverge from the reality, and combines sharp color and materials that wouldn't naturally occur

even tho he approaches styles form a more texting and painting perspective, the way he describes and categorises styles are still of interest to us, as it gives us a perspective of one way to organize different styles.

Another way to classify styles could be according to age, like bryan tillman [4]does in this book the reasoning behind his way of classifying, is form a aiming your art or styles towards a specific target group defined by age

Ages 0–4 Characters have really big heads and eyes, short bodies, bright colors, and simple shapes.

Ages 5–8 Characters still have big heads but less so than characters for the 0–4 age group. Their eyes are smaller, the colors are a bit more muted, and the shapes are more intricate.

Ages 9–13 Characters are pulling away from the simplistic. They resemble more believable proportions. The colors are more realistic and have a lot more details.

Ages 14–18 Characters resemble the real world. They are properly proportioned. The colors are more complicated, and they have the most amount of detail(Tillman, 2012, p. 104).

he mentioned that there of course is a fine balance between having too much detail, how realistic, and not having enough detail, going too simple. in the end it is your personal style along with the age group of audience will determine how much detail you need. but

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[4]Bryan Tillman is currently the academic director for Game Art and Design, Visual Effects and Motion Graphics, Media Arts and Animation and Visual Game Programming at the Art Institute of Washington DC. and is the owner and CEO of the Kaiser Studio Productions. an character designer and artist with many year in the industry

even if you target group is in the lowest of his categories, it should not be used as an excuse to draw oversimplified, lazy and unrecognizable characters or props.

"*style is how you perceive the world around you and are able to put it on paper. if we can't tell the difference between your drawing of a gun and a toaster with a handle, it isn't your style; you just don't know how to draw a gun.*" (Tillman, 2012, p. 120)

One of his main points is what you have to consider the preferences of the people who are going to see you work, and the you have to do research to see what the target age group likes and is spending time on watching, playing, reading and so on. While this is a good guideline then you are design characters for children and can help you to determine how much color, shading and level of details you should use. It don't really help us with design for peploe who no longer are kids or teenageers.

For one thing, even if you group people in groups of age, they will still have different taste, much like he mentioned himself, and some of those "tastes" goes across the classification and rules that he set up.

There are many examples of styles that have unrealistic or simplified bodies, like in describes for the 0 to 4 and th 4 to 8 years old, which don't necessarily have kids as the target group. Typically of a satirical nature, like cyanide and happiness, [5], or happy tree friends [6] or uses simplification as an mean to exaggeration expression or emotions, like the more broad chibi style, sub genre of manga, we talk more about chibi later in this paper. Theses are just a few examples of styles that used the same rules as tillman describes, without having the same target group, This shows that sometimes styles goes beyond age.

haitao su, another character designer [7] talks about how he classifies different types of style , in his book- Alive character design for game, animations and films. he dived style up into logo-style, simple-style, ordinary-style, complicated-style and realistic-styles

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[5] a web comic strip that often for its dark humor and sometimes surrealistic approach

[6] a cartoon series, the look very children friendly in on first glance, but the content is very far from being childlike, in fact no kids should probably watch it As indicated on the official site, the show is "not recommended for small children". Notwithstanding the cute appearance of its characters, the show is extremely violent, with almost every episode featuring blood, gore, and violent deaths.It is clearly made for a much older audience

[7] haitao is a chinese character design, cartoon artist and illustrator with nearly twenty years

"Logo-style this category of characters is mostly simplistic. most of them are cute, with big eyes,small noses or no nose at all, and are used as mascots for public welfare undertakings and commercial campaigns.

Simple-style this is more complicated than the logo-style, thought following the simplistic approach as well. it performs well in flash promotions and expanded application in newspapers, comics, internet or tv.

Ordinary-style as the most common category, it celebrates the animation or cartoon styles. this category is associated with a richer variety of expressions, and is suitable for media such as animation and cartoons which highlight sense of humor and exaggeration.

Complicated-style the proportion and expressions of the characters are closer to reality despite some exaggerated and comic elements. this category is commonly used in disney movies and those produced by other animation giants, because it will impress the audience more than the simpler-style in an easier way.

Realistic-style this category is the closest to reality and is commonly found in hollywood blockbusters and high-definition games. it is intended to amaze the audience or player with a sense of reality."(Su & Zhao, 2011)

This is a categorization he used in order to facilitate an better understand about the characters for himself. But also mentioned that generally speaking is there no definite boundary for any certain category. further explains that in games, comic, cartoons and films, characters used to be on an equal footing in terms of complexity or simplicity of style, because an disparity might result in a sense of incoherence. However in recent year even this boundary between his categorization have been blurred, by movies like "Shrek" which feature a realistic-style princess, a complicate-style sherk, an ordinary-style donkey and a logo-style cookie. (Su & Zhao, 2011, p. 18).

This might explain why can be hard to define a specific style, because the boundary between styles are blurred. but in general haitou arrange his categories after moving from realistic to simplistic.

Another way to look at how to define and categorise style could be as scott McCloud does, in his book understanding comics [8] have a more visual way of dividing styles, he pursues abif triangle realistic, iconic and abstraction at the vertices points, see figure 3.1 on page 15
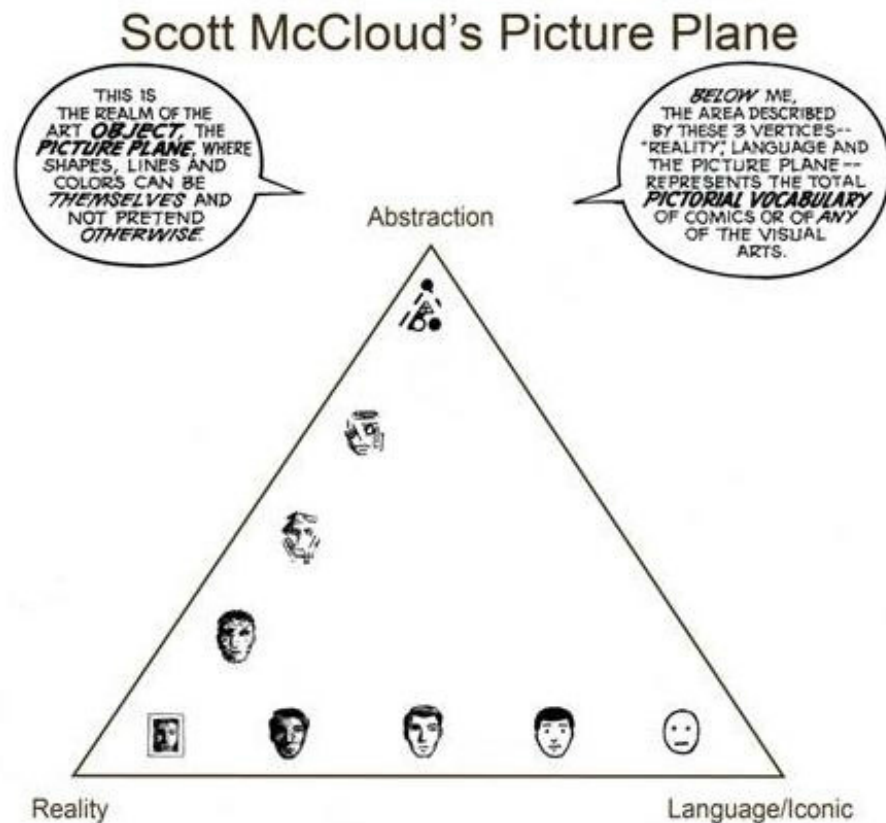
Figure 3.1. – *the image shows scott's picture plane, from his book understanding comics. shows how styles changes thought iconic abstraction(simplification) right to left and non- iconic abstraction ("pure" abstraction)towards the top .*

iconic abstraction moving from left to right, in other words simplification while still trying to keep the meaning or resemblance. According to scott the further an artist moves towards the iconic simplification, allows him to strip it down to its essential meaning. thus allows the artist to amplify the meaning of the picture in a way a realistic picture

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[8] Praised throughout the cartoon industry by people such as Art Spiegelman, Matt Groening, and Will Eisner, discusses the history, meaning, and art of comics and cartooning in great depth.

can't.

non-iconic (Pure abstraction) is moving up in the pyramid/triangle towards the picture plane , are closer to normal understanding of abstraction. Where no attempt is made to retain resemblance or meaning. Where at the top, the picture plane, the only meaning left are that of sharp, color and line. (McCloud, 1993, n.d.)

On his website scott writes the The Big Triangle isn't a particularly scientific or exact tool. but with it he tries the gives us a glense a the important aspects of artistes intended and viewers interpretation. while giving a fresh too at the relationship between different art and language

while scott's big triangle do not help us to fit styles into specific boxes or categories it helps us to understand some of the differences between different styles and genres, mainly the level of simplification and abstraction. and this can help us then we are trying to set more defined borders or indicators.

To summarize this section, we have looked at how a few artistes and professionals in the industry, defined and categories styles. while they all had different methods to express what styles is and defined different categories of styles. One thing they have in common is they all had a specific set of rules or guidelines that they uses to describe and defines each style with.

Therefore, will we setup some rules and guidelines, that can helps us to describe and differentiate the different styles from each other. as well as hopefull clearly expleaines what each styles incompasses and how to ahivece it look repeatedly, at least to a certain point,

Some other points they all also seemed to have in common was, they mainly categorized styles after varying levels of realism and moving towards simplification. In addition to that, abstraction also seemed to have a significant influence on how the styles are categorized. Furthermore, where also seemed to be a linked between levels of simplification and abstraction, which for many of them often means; the more simplified the styles of a category are, the more abstract can it also be, e.g then more exaggerating features, more distorted proportions can the character have, etc. both the simplification and abstraction

are generally thought of as tool or a way to empathize the remaining feature of the character, giving them a simpler but strong and more easy to read expresion.

Based on that, this project will use the amount of details, realistic verues simplified as a guideline to that our categories should be based and depend on, the rules should explain how much abstraction there is allow within each style. Thoughtout the rest of this report the word styles, should be understood as expression for the amount of details in a drawing, how much of reality to include or omit in our drawing, but also tell you if the drawing is exaggerated or not.

3.2. Making Classifications

This section will present and describe the rules that will make up each of the chosen style, serving as a guideline to what should be the defining characteristics of each style, make it possible to create several pieces belonging to a style coherereat. This section will draw more upon book's form the industry then articles from academia. first we look at a few things that should be considered no matter which style is used. then we will try and define what our realistic, cartoony and chibi mena and encompasses

in the book;illusion of life, it is also mentioned that exaggeration can help to make the character more convincing and make a bigger contact with the viewer(Thomas, Johnston, & Thomas, 1995), so as our style move from realism to simplificate, and the more simplified the overall design of the character becomes, the more exaggerated of individual body parts or facial features are allowed. specifically then trying to empathize on showing emotions of the character by exaggeration of the facial features or features that will help to define and make the character more easy to read, e.g exaggerating he's overall shape towards simpler shapes such as circle, square and triangles.

as these simple shape often be associated with and help conveying a more conceptual meanings.

Squares are often associated with: stability,trust, honesty, order, conformity, security, equality, masculinity.

While triangles often hold the meaning of: action, aggression, energy, sneakiness, conflict, tension. Circles are often seen as representing: completeness, gracefulness, playfulness, comforting, unity, protection, childlike.

These are some of the most common things people will think about when they see these"simple" shape in a character design. It is important to keep this in mind when making characters or exaggerating features, otherwise you might end up give him another meaning than intended. (Tillman, 2012, pp. 68-72).

3.2.1. Appeal

Appeal is a word often associated with the quality of an dawning or animation, but it is a word that can be hard to define precisely that it means. it is often described as what draws the viewer attentions and keeps them interesting in the piece.

to the artists and animators at disney appeal was very important and one of disney 14 principles of animation and in the book, illusion of life it is describes as ""*To us, it meant anything that a person likes to see, a quality of charm, pleasing design, simplicity, communication, and magnetism. Your eye is drawn to the figure that has appeal, and once there, it is held while you appreciate what you are seeing.'*" (Thomas et al., 1995) they also later comment that is a drawing is weak; that's it is hard to read, overly complicated, using clumsy shapes or awkward moves it will have a low appeal. Appeal is to an animated drawing what charisma is to a live actor.

one way that can help the drawing to have appeal, is to make it a solid drawing, meaning a three-dimensional drawing with weight, depth and balance.therefore should parallel lines be avoided as they give no chance for solidity or dimension and then bent, don't have any weight or strength, but only shows a linear design.

"*In nature we see forms in balance, ready to move in any direction. few fluid forms are completely symmetrical and the contrast in form and shape makes an active type of balance. one side can be straight while the other bellies out with the relaxed weight, or they can both bend or stretch or twist or turn- it is always possible to make a dawning that is solid, round pliable and in balance*" (Thomas et al., 1995), much for the same reason should we avoid not just parallel lines but also straight line then are are dawning

organic form as these are rarely seen in nature, and straight lines. this naturally don't apply to the parts of the design that inorganic such as metals and other hard surfaces.

Another thing to be mindful of in both drawing and animations , if to avoid "twins" in the posing of the character, this have to do with symmetric, and if a phenome then two body are "mirroring" each other. e.g both arms or both legs in draen in the same angle etc.the result is a stiff and flat, "wooden" looking image, that do not look very natural and therefore lose appeal.

these are a few considering that hopefully can help make the design more appealing to other people overall. but then all is said and done, appeal is an individual quantity and there is no way to guarantee that your design is appealing to everyone, as peplos taste vary widely and everyone is drawn to look at different things. (Tillman, 2012, p. 103) and (Thomas et al., 1995).

originally three styles were defined with the wish to compared them against each other, realistic, cartoony and chibi. the reason to choose these three, were the they follow the realism to simplification, with the realistic being as close to realism as possible, cartoony being the midpoint, were a moderate amount of simplification and exaggeration. while the chibi is on the far end of hoe much a character can be simplification and exaggeration while still being recognizable.

the simple rules or guidelines the will make up for the classifications of our styles:

3.2.2. Realistic Style

The general defintion of realistic is : "*A style of art or literature that shows or describes people and things as they are in real life*"[9] which we will also be adhering to here.

A character made in the realistic style should adhering to realistic body and facial proportions. according to hai, men in real life features a body ratio between 7.5 to 8, even though different categories of characters are supposed to feature proportions (Su & Zhao, 2011, p. 50). wherefore a character made with the realistic style be around 7 to 8

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[9]Definition from Merriam-Webster: http://www.merriam-webster.com/dictionary/realistic.

heads high, his faces is about 5 eyes wide, his ear goes approximately from the top of his brows to the button of his nose. the realistic style do not allow any of his features to be overly exaggerated.

3.2.3. Cartoony Style

cartoon is often described as: "*A simple drawing showing the features of its subjects in a humorously exaggerated way, especially a satirical one in a newspaper or magazine*"[10].

The cartoon style are more simplified and have a moderate amount of exaggerated, the character in this style should be round 5 to 6 heads high, leaving him with a slightly bigger head and smaller body. His facial feature are moderately exaggerated, a bit more caricatured than the realistic version. meaning bigger mouth, nose and eyes.'

3.2.4. Chibi Style

Definition of chibi : "*Smaller and more cute (often endearing) version of something, mostly used for drawn comic or cartoon characters*"[11]

chibi is a Japanese word that means small or short. often used as an offensive comment. manga's and anime's (Japanese style comic and cartoons) sometimes show their characters as miniature versions called "chibi",which are more cute and more humorous, often use for invoices(good and bad conscience). As the popularity of manga and anime have risen in recent years the word "Chibi" is beginning to get widely used.

haitao su describes his Q-style (which i a word he used for small and cute characters before chibi became more widely known, but it basically chibi in it core), Q-style characters features a body ratio between two and three heads, character of this style have usually exaggerated some parts of evident features, while reduce or delete other part with no defining characteristics and their most recognizable parts of the character are basically concentrated in the facial features. (Su & Zhao, 2011)

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[10]Definition from Oxford Dictionaries http://www.oxforddictionaries.com/definition/english/cartoon
[11]Additional Information http://www.collinsdictionary.com/submission/6526/chibi.

For this project chibi style means the character is about 2 to 3 heads high, and is simplified as much as possible. However those feature that remains are strongly exaggerated, e.g. very big eyes and facial features, not many visible joints if any.furthermore eye/ear/nose don't have to follow the rules of a real face. e.g can have very small ears and big nose

In this section we have discussed how to define the rules used to categorize different types of style for the character we want to design. by following these rules or guidelines, we should hopefully be able to design characters other people also would be able to classify as belonger to the intended style.

4. Design

This section and following subsections will describe the design process, from idea to 2d concept of the character. concentrations for the character's purpose in the test game and general thought process behind the concept and reasoning for the design choices.

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4.1. Character Design - Closing in on the character

In this section we will go through the processes and discuss the steps that was taken in order to create the character concepts for the characters that later would be modeled as 3d models and implemented into the test game.

In order to come up with a character for this project, a few backstories or characteristics / demoreres and character traits : were written down for a few different characters before the sketching started, in order to guide the sketching, making the character more whole. As tillman in his book (Tillman, 2012, pp. 26-41), goes through great lengths to explain the meaning and usefulness of.

FENG ZHU from FZD SCHOOL OF DESIGN (which is a design school located in singapore, but which also provides a series on design tutorials online), also goes through great lengths of explained why it's important to keep the purpose of the character in mind while design a character in a video[1]

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[1] Design Cinema - EP 85 - Mythological Creatures : https://www.youtube.com/watch?v=

for this project the goal was to create a character the could be used or image having a purpose or more or less every imaginable environment possible, so he/she could be used in every test environment without seeming completely out of place. after a brainstorming it was decided on creating a traveling mage, as it could imagine for him having a purpose being in a forest, desert, mountains, or city landscape without seem completely out of place. Also imageable in any time period, meaning he alone don't set the time period, the people and environment around him would, he could theoretically be place and any times from medieval to present day or even a steampunk future. But one of the main points, was the he wouldn't be completely out of place in a relatively simple and unpopulated areas. because then thinking about the scope of the project that seemed to be the most likely virtual test environment..

so from a character design perspective, his backstory is : a traveling mage, that travels across the land in search of new knowledge and magics

Already from the start a had a few character common traits, i wanted to incorporate in each design sketch, or the this case some common gear, the often associated with a mage, one of the reason for choosing this gear to be part of all the sketch was to create a clear association with him being a mage.

the chosen common traits for all the sketches were : a rope, a big hat and a staff.

In order to create some variation into the sketching process, 3 different set of additional traits and demeanors were created to explore a greater range possibility for character, altho these traits and specification are little more than just keywords, and not a detailed descriptions of the character, spending several pages long, like brayan tilmans (Tillman, 2012). brayan also made a point of saying even a few, less detailed description can still help to guide the sketching process, making use it is taken in different directions, from sketch to stretch.

This process produced a range of different quick sketches, which help to flesh out two more finished concept sketches both somewhere between direction one and two.see figure 4.1 on page 25

BGHRyTeiX2k.

Direction	Key-words	Demeanor
The old man.	old,big round nose, long beard, old, slightly hunch backed, grumpy, worn by weather, bushy eye brows.	quiet yet intense
Middle aged man	middle aged, sharp beak like nose, piercing eyes, mustache beard, groomed, straight and prided back	stern and superior
The young mage	small nose curving a little up, goatee, thine	Clumsy and nervous

Table 4.1. – *table show the additional traits & Demeanor, drafted to help the sketching process .*
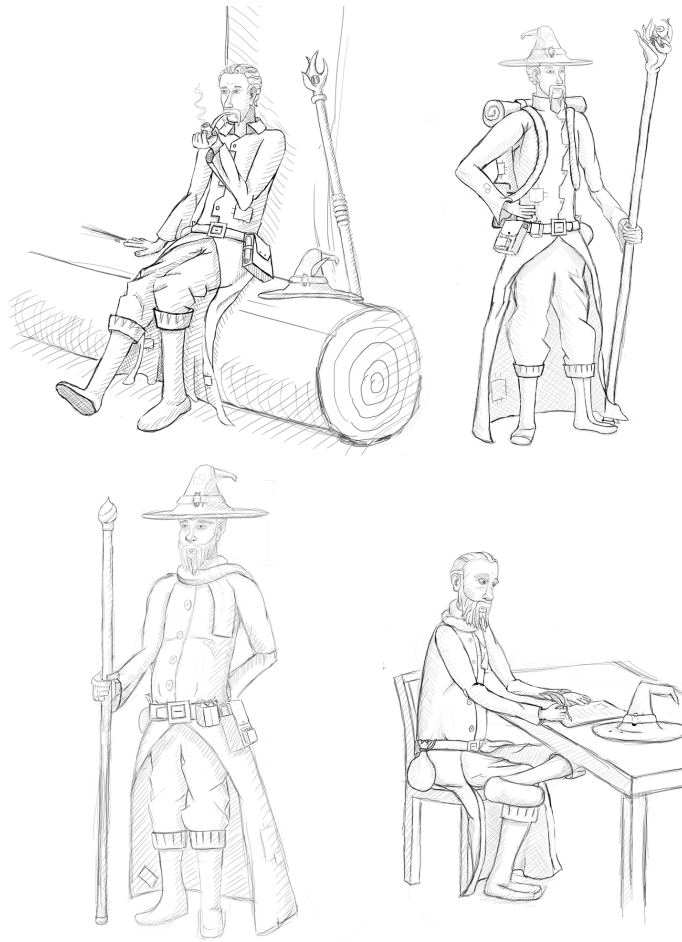
Figure 4.1. – *image showing the two final concept directions - on the top two version of the middle aged, groomed wizard, but still marked by his travels on the road. - on the bottom two version with a little older and more worn mage, but without being grumpy .*

The final decision landed on going with the concept of a slightly elder mage,but without the hunchback, but still worn by time and his travels. with a slight concerned and sleepy eyes he would have a big round nose and long uncut beard, as to put out he might have been away from civilization for some time. his cloths would be full have patchwork and have seen better times.

he was design which several accessories which would help to frame his personality. inkwell and quill in his hat, as well as the bookcase to add feeling of curiosity to his personality. trying to build an image from him always being ready to take note about his travel and the mystery he would encounter. A backpack and underlay to reinforce a sense of him always being on the move and having traveled the world for a long time. a staff to serve

as focus for his magic and well as a walking stick. he was also given a small pot bully in order incorporate some more rounds shape in accordance with the idea about meaning being associated with shapes 3.2 Making Classifications on page 17, which helpfull would make him seem a little more likeable or none threading.

the color palette was mainly kept in neutral earth and nature colors, as to present him as natural and more concerned about the world and nature at large, and the mystery it holds, rather than being allocated with civilization and the matters of the human populace. One final image of concept art were created of each of the three styles, see picture figure 4.2 on page 26.
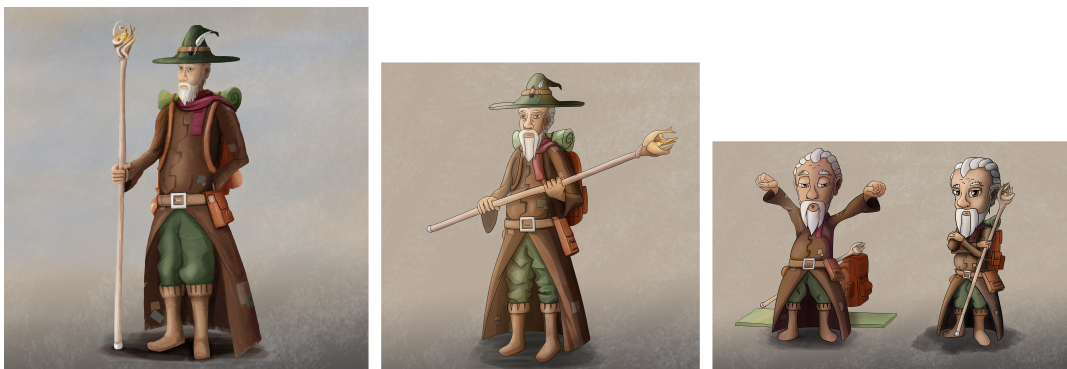

Figure 4.2. – *the image shows the finished concept art for each of the three styles - left the realistic- middle the cartoony - right the chibi, see the image in full size in the appendix A Appendix on page 72.*

Each piece of concept art went through a similar printing process, starting with a a sketching phase where several sketches were drafted, then one were chosen which was cleanup, then line art redrawn and inked to makes it more clear. then the sketch were blocked out as a silhouette to check the overall form and if it would read. then the piece were flat paint with the primary color palette, before a simple cell shading was put on and finally an additional layer of shading and light were add to create a more three dimensional feel, in the realistic the line art were also painted away, but kept on the cartoon and chibi, as the two style often are associated with having visible line art. and the line art helps the simplified shape keep the overall form, this was not going to have any effect on the 3d models then implemented into the final game, a image shown the painting process in step can be seen figure **??** on page **??**

After the concept art were done, the next step in order to bring our characters to live, were to create a turnarounds, also sometimes called a model sheet for each of the three
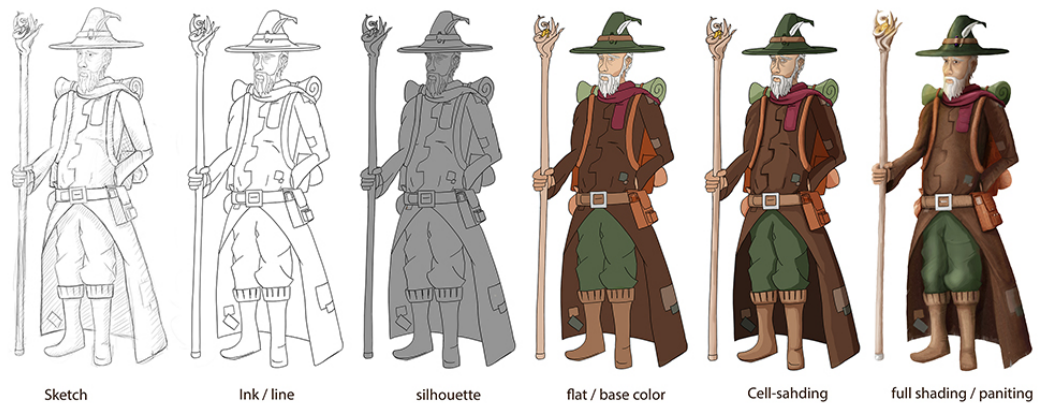
Figure 4.3. – *image showing the the proace the concept art went through from sketch to final render.*

characters. Turnarounds, must like the name suggests turns the character around in space which and are used as guidelines during the character's development process. Allowing him to been seen from other side than the concept art portras, which helps the 3d modeller and animators to know what the character should looks like from any angle (Kerlow, 2004, p. 318) & (Tillman, 2012, pp. 133-140).

There are three types of turnarounds: three-point, "T," and five-point. The three-point show the character from the front, side and back. the "T" or T-pose turnarounds show the character with his arm straight out to the side forming a "T". From the side view the character arm are sometimes not shown or move to the side, so the details under the arm are becomes visible. In the video game industry three-point "T" pose is frequently used, because it makes it easier to model in 3D. (Tillman, 2012, pp. 133-140)

The five-point turnaround is the most advanced and also the most informative, but also the most difficult to draw because of the three quarter front and the three quarter back pose, which can hard to get correct. The five-point turnaround is primarily used in animation studios asas the characters are often seen from several angles, animators often need exactly what the character will look like in all positions.

for this project a three-point "T" pose were used. because not only as mentioned does it help the modelling in 3d, but also helps the rigging process after the modelling. An additional reason is that some game engines such as unity3d prefer humanoid characters to be imported in a T-pose, or even require it to be used with some systems like Mecanim

[2], and will even try to force the character into a T-pose . this in some case can break the character if it is not modelling or exported in a T-pose. see figure **??** on page **??** for an example of the turnaround create in this project.
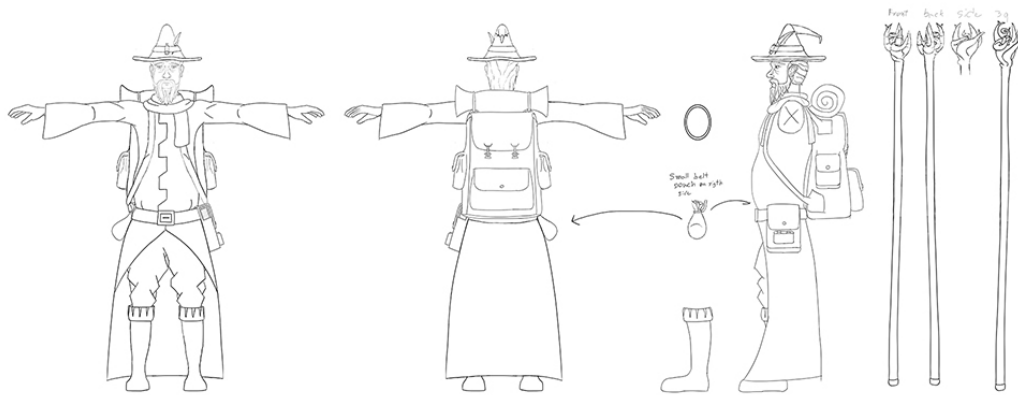

Figure 4.4. – *the image shows a Three-point turnaround of the realistic mage, which were used to help the 3d modelling process. see the other characters turnaround in the appendix A Appendix on page 72. .*

4.2. Checking Classifications

Before starting the 3d-modelling phase right away after creating the concept art and turnarounds, a small investigation was made, to see if other people in generally would agree to the classification different styles that were created earlier in the project, or if the classification or concept would have to be refined before continuing on with the next phase.

a small questionnaire were made and distributed online, through an random convenience sampling, meaning it was made public on several facebook pages, but no one was chosen to or prevented to participate in the questionnaire based on their, gender, age or occupation. it was simple available to everyone interested, but limited by the number of people know the author directly, people frequenting the same groups and the spread of word.

first a few demographic questions were gathered, about gender age and occupation. afterwards people were shown the concept art of in the three different styles and presented

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[2]Mecanim is a animation system inside of unity3d, which is really go at handling humanoid animations and blending between animations. seehttp://docs.unity3d.com/Manual/ConfiguringtheAvatar.html for more

with the same five questions to each of them:

the first question asked to each of the picture were :

Describe the image.

Please describe how you perceive the image below, in your own words.

the purpose of this question were to get some qualitative feedback on how them perceive the image, and in the design idea about him being a traveling mage came throught.

in the next question they were ask the select one or two word, form a dropdown list, this was do to see if the would classify the different images the same way as done in this project, or at least close too. The list had more keywords than just the three classifications, in order to camouflage the purpose of the question a little and make it a little harder to guess which were the "right" answers. as well as simple providing them with more options, which hopefully would lead to answers truthfully instead of trying to guess which answer the questionnaire were looked for. only one box was required to be filled.

the second question asked to each of the picture were :

Question	Please select one or two words that you think describes the style of the picture best.
keywords	Realistic, Cartoony, Stylized, Abstract, Exaggerated, Simplified, Appealing, Un-appealing, Ugly, Cute, Humorous, Chibi

Table 4.2. – *The dropdown random the order of the list contend..*

lastly they were asked to answer how realistic, abstract and simplified they found each picture on a likert scale from 1 to 10.

this was an attempt to get an overview over how close to the classifications present in 3.2.1 Appeal on page 19, the participants would place the images. If the realistic should helpfully receives the highest average on the realistic scale, and relatively low on the two

other, and the cartoony should get a middle average on all three scale, while the chibi helpful would receive rather low scores on the realistic and relatively high scores on the abstract and simplified. it was believed the classifications close to who other people also would have classified the images.

4.3. Questionnaire Results

28 participates participated in the questionnaire, 9 females and 19 males, the largest age group was 31-35 with 9 participates, the age group 18-25 and 26-30 both had 7 participates, 36-45 had 3 while 2 participates was in the age group 56-65. The majority of the participants were student.

the qualitative responses to the question about describing the pictures, showed that most of the participants didn't had any trouble associating the images is with that is a traveling mage or wizard, identified by feedback such as : "*The old man looks like a nomad wizard from a story book, Some ppl might mistake him for a beggar (dirty and patched clothing) but those who look closely they can see other signs (unique staff & book)... etc*" and "*A slightly concerned wizard with travelling atire.*" amongst others. see the attacthed CD or online at [3]

4.3.1. Image one - the "Realistic" image

then selecting keywords for the image one - the "realistic" image - the participant choose : the most chosen keywords were : cartoony with 11 selections, realistic and appealing with with 10 each, and Stylized with 7 selection, 7 participant only chose one key word.

while realistic only got selected 10 times, it could be argued that the 7 times stylized was selected,pointing more towards realistic than cartoony.

Stylized is often associated with western cartoon should as marvel and dc universes, with hold a larger degree of realism in their drawings , compared to the more "pure" cartoon styles. at least in regards to body propositions.
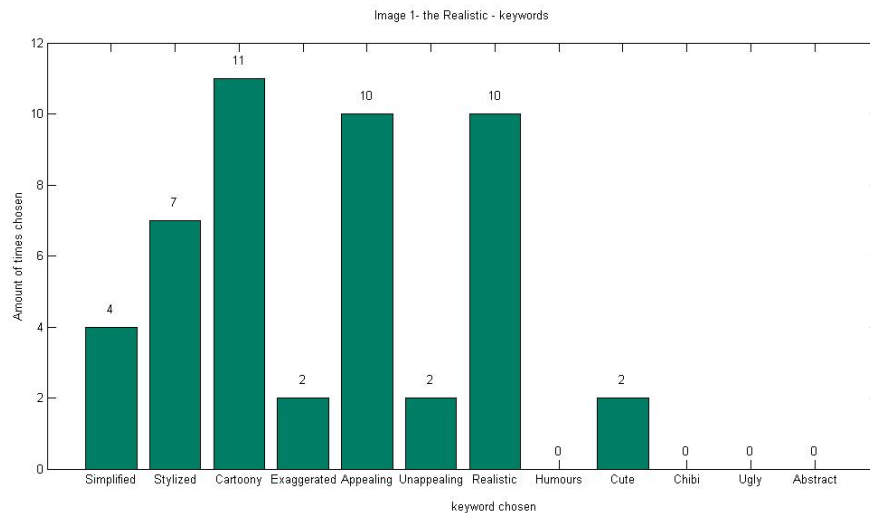
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[3]https://www.dropbox.com/sh/13jmneu20m3e902/AACN5KV0POTR2zmOdPigDWJCa?dl=0

Figure 4.5. – *the image shows the distribution of keyword chosen for image one, note that only one of the two boxes where required to be filled.*

however this indicate that the participants would not directly classify image one as a true realistic picture, but more as a cartoony or Stylized realism. it's however still the image with most keywords selected as realistic or Stylized

in regards to the likert scales the image one the "realistic" , scored 5.78 in average on the realistic, with a medina for 7 with 12 choosing seven as the answer. for abstract scale image one scored 2.64 average with a median 3 and for the simplified scale it received an 4.5 average with a median of 4.

This at least to some extent indicate the the participant saw the image as being most realistic of the three, and more realistic then simplified or abstract, tho still a little simplified and abstract. but it is definitely not spot on the classification, which say it should almost not be simplified or abstract(exaggerated).

4.3.2. Image two - the "Cartoony" image

then selecting keywords for the image two - the "Cartoony" image - the participant choose : the most chosen keywords were : cartoony with 22 selections, simplified with12 and Stylized with 8. only 5 did not chose a second key word.

judging by the keyword, one could say that image two hit the classification rather well
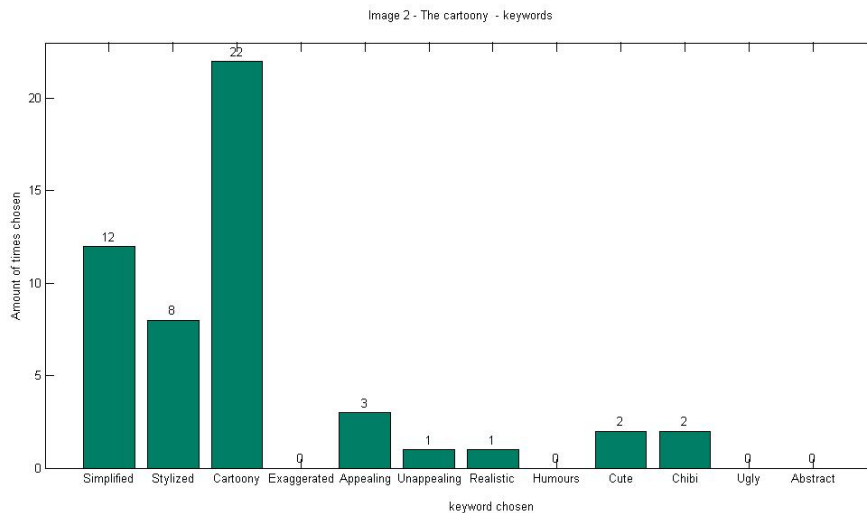
Figure 4.6. – *the image shows the distribution of keyword chosen for image two, note that only one of the two boxes where required to be filled.*

On the likert scale the image two received a 3.7 in average on the realistic scale, with a medina of 3, 3.5 average for abstract and a median of 3 and for the simplified scale it scored 6.32 average with the median being 7. While a little high on the simplified scale, this is reasonably close to the classification, which the cartoon style would be moderately simplified and abstract(exaggerated). it received the middle realistic average then compare the three image, which is also where it should be place then comparing the style according to the classification.

4.3.3. Image three- the "Chibi" image

then selecting keywords for the image three - the "Chibi" image - the participant choose : the most chosen keywords were : 16 selected cartoony, 12 chibi,9 Humorous and cute with 5. this distribution of keywords, also indicates the chibi concept to be fairly close the intended category.

for the likert scale image three got 2.7 in average on the realistic with a medina of 2. a score of 4.7 average with a median 4.5 for abstract and simplified 6.28 average with a median at 7.5 for the simplified scale. image three received the lowest average for realistic, which also fits well with our classification. and rather high on both simplified and abstract(exaggerated), which is what we would like to see.
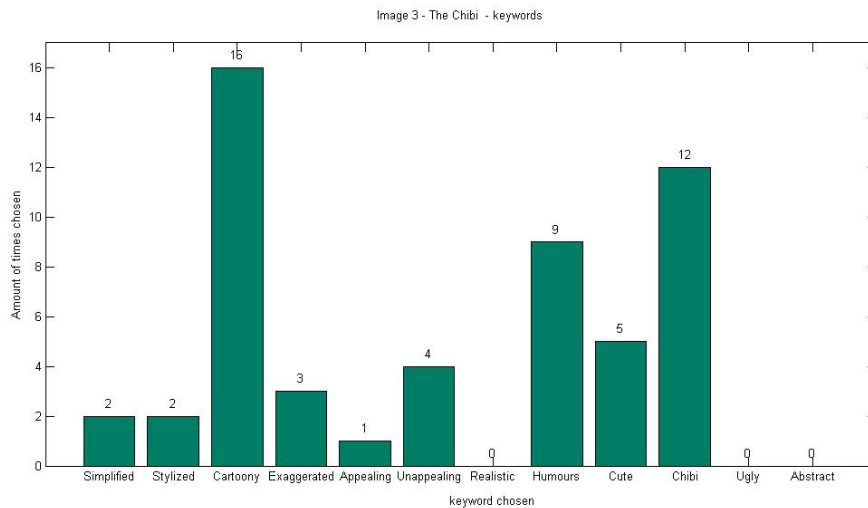
Figure 4.7. – *the image shows the distribution of keyword chosen for image three, note that only one of the two boxes where required to be filled.*

4.3.4. Questionnaire Conclusion

Both the cartoon and chibi concept art pictures, were perceived very close the the classification in 3.2.1 Appeal on page 19. and even tho the realistic image did not receive a very convincing or "spot on" review, it was still perceived as the most realistic of the three, as well as least simplified and abstract. It could be very likely to be an issue with the craftsmanship of the image one, landing it a little more towards cartoony and stylized the desired, rather than the classification being too strict or too loose., and in the end classification itself was seen as good enough.

It should be noted the some participant gave all the images the same low score on realistic, this could possibly be connected to the concept art being a fantasy type image. and thus they did not see character as being realistic or being possible to exist, as you would not expect to see a mage in the real world. and gave realistic a low score, base whatever or not he could be real rather than if his body and facial proportions were similar to a real person. which were the real intention with the questions and it hindsight should have been more clear.

In the end, even if the concept image of the realistic mage, was a little less realistic the desire, it was accepted was being the realistic concept for this project, as it seemed unlikely then creating a new image with the intention to make it more realistic would

yield a result that would be perceived as such.

5. Implementation

This section will go over the process of build the 3d models in blender 3d and Implementation them into unity3d, trying to give an overview of the methods used and the reasoning behind why those were used.

Doing the Implementation phase, it was realized that the design phase and one iteration of the Implementation phase had taken to long time to finish,and there would not be enough time to fully create all three character, envisioned in the design chapter. it was decided to only created two characters. In the end it was decided to implement the realistic and the cartoony concepts, as these were perceived to be the more common, by the author, and thus easier for the test participant to relate to and evaluate doing the testing.

in order to test the problem statement 1.2 Problem Statement on page 2, the game would be design to randomly selected one of the two characters for the player upon started the game. depending on which character the player was given, they would be grouped into one of two character scenario. scenario_C if given the cartoony character and scenario_R for the realistic character. in order to measure in if the different character or rather the style of the character had an effect in the player continuation desire, while playing the game

5.1. 3D Modelling

after the model sheets or turn around where done the modelling process could start. the model sheets were imported into blender 3d, and the 3d model were created with a low to high modeling technique, meaning that first were the model blocked out by using

simple shapes. and the gradually modelled out more details.

Another approach would be the high to low polygon model, which usually involve using a sculpting toolbox such as zbrush or mudbox amongst others. To create a high poly model,which is then retopologize the model to get your low poly model. Then you use normal maps from the highpoly model to transfer it detail to the low poly model. however we will not dive deeper into that subject in this project.

The low to high approach was primarily chosen, as it have been the "standard" for modelling approach for games for many years, as games can have a strict polycount they must adhere too, and since the gaol was to create a some game, and to insure it the would run on most computer fluently, this approach was appropriate.

A polygon is multi sided shape made of for connecting vertices, and usually then talking about polycount there is referred to the amount of triangles that make up a 3D model. the fewer polygons there is in a model the less does the computer have to work in order to render it. game engines have to constantly draw and redraw theses models, so fewer the polygons, the faster the game will potentially run. As opposite to films and animations which one the to render each screen once, and are therefore free to use as many high-ploy as they wish (Creighton, 2010, p. 63).

The reason the game developers usually are interested in keeping a low poly count and it has have been considered standard for a long time is, because the human eye geraranly stop seeing flickering in a stream of images then shown with a frame rate or frames per second(fps) higher than 60fps and a low polycount helps to insure that (Watson & Luebke, 2005, p. 55) & (Akenine-Möller, Haines, & Hoffman, 2008, p. 18).

The obviously trade off with a low-poly model is that it looks more crude and "edgy" than a high.polygon model. As hardware are getting better and faster, the models are likewise starting to featuring higher-polygon counts.(Creighton, 2010, p. 64).

Other reason for chosen the low to high methods, besides trying to keep a low polycount, was the this allowed, dummies to be created, which could be used to test and work on animations ideas, without having to complete the entire model , only to find out that the model would work with the intended animations idea, and the dummies, also allow

for quick exports to unity to see if the different parts would work on the intended end platform, this again meant the changes could be made in small iteration, rather than have to remakes the entire model if it didn't work.

As mentioned above,as computers are becoming strong and faster, a super strict poly count are not always needed, and seeing that our test game primarily would only have the character to render and no other or very few other polygons in the scene. the polycount were gradually increased, primarily by the use of Subdivision Surface Modifier (Subsurf in short), which is a method of subdividing the faces(dividing each existing face up into 4 faces) of a mesh to give a smooth appearance, which makes it possible to work with a higher detailed surfaces model, while keeping the original mesh, as a low vertex mesh. The smoothness of the subsurf give a more organic look to the object. the subsurf Modifier is non-destructive and creates virtual geometry, but it can be converted to real geometry by Applying the Modifier[1]. additionally some extra geometry was created in deformation area, by manually instrearding edge loops, to insure that the deformation area would have enough geometry to deform probably.

While where is a number of other factors besides polycount that also influences how faster your games runs. as unity is hardware-accelerated, it often considered a good idea to decide on a minimum system spec, to ensure that your game actually runs and don't drop to low on fps, by testing early and often on a system with the minimum system spec (Creighton, 2010, pp. 64-65).

In this project the models were exported as an fbx and tested on an older laptop [2] to ensure the models did not coures the fps to drop under 60, before finalized the Surface Modifier and applying it, and sculpting out a few minor details.

5.1.1. UV Unwrapping

In order to make the models ready for texturing, the models there unwrapped and Uv mapped.

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[1]See Blender manual page: https://www.blender.org/manual/modeling/modifiers/generate/subsurf. html.

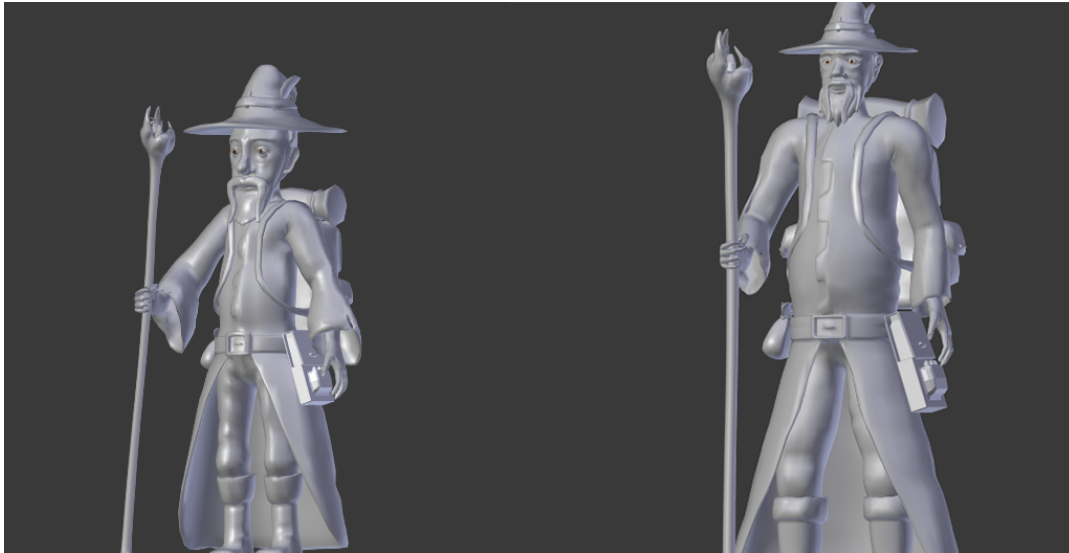[2]a 5 years old msi laptop, Intel Core i5 450M / 2.4 GHz, 2 x 2 GB ram

Figure 5.1. – *image showing the to final meshes for the characters without texture,in their idle pose. the cartoony to the left and the "realistic" to the right.*

A UV map is a way to represent how the texture should be attached to each polygon in the model, by assigning each polygon's vertex to a 2d coordinate, called UV's. and the operation of creating UV maps are called "unwrap", as it can be compared to unfolded a mesh onto a 2D plane.

One analogy to understanding UV mapping is cutting up a cardboard box. There the box represent the 3D object in your scene. imaged you cut seam or fold of the box, so you would be able to lay it flat on a tabletop, so you are able to look straight down on it as a flat 2d image. so it can be represented in normal 2d coordinate system, the left-right direction is U and the up-down direction is V. also referred to as "texture-space coordinates" in order to distinguish them from the 3d coordinate X,Y and Z [3]

Then imaged the box being folded back into its original shape, now each uv location would be transferred to a location in 3d space, which is what the computer does then it wrap the 2d texture image to an 3d object. Uv texture are used to provide more realism and details to the object then procedural materials or Vertex Painting can, and allows the artists full control over how the texture should look footnoteSee Blender manual page: https://www.blender.org/manual/editors/uv_image/texturing/unwrapping.html

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[3]See Blender manual page: https://www.blender.org/manual/editors/uv_image/texturing/uv_mapping.html.

Blender has a range of automatic unwrapping algorithms, such as, regular Cubic, Cylindrical or Spherical mapping, but for more complex 3D models is usually not sufficient. for this project, none for the automatic unwrapping algorithms were effective, therefore severely seam there marked, before unwrapping. mark sean is a why to tell blender to cut out uv's form each others. after unwrapping the uvs islands(an uv island is a group of uv connected together) were organized to make it easier to overview how to paint the texture in photoshop, and well as trying to limit as much dead space(space in the uv map without any uv's) as possible and trying to insure that the uv's had the same amount of texture space, see picture figure 5.2 on page 39. generally it considered best to have as few seams as possible then creating uv maps, as seam can create texture bleed(overlapping colors or no colors at all), and create visalabelseam on the model which is undesirable.
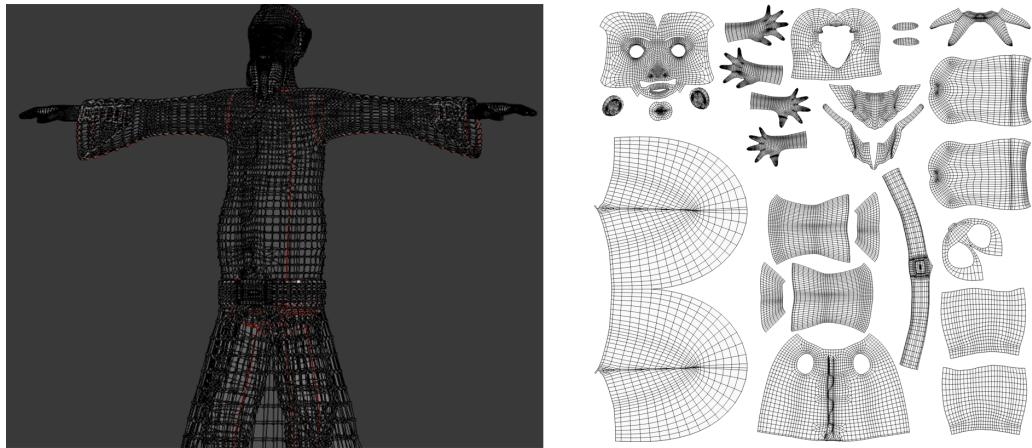
Figure 5.2. – the image to the left shows the realistic character in edit mode and as a wireframe, the red lines are seams tell the UV-unwrapper were to divide the uv's. - the image to the right shows the unwrapped UV's layout in the UV- editor.

5.1.2. Texturing

The texturing process for this project, was a combination of photoshop and painting on the model directly inside blender.

The UV maps for each model were export to photoshop, where they were first paint a flat base color layer, then give several layer of details starting with general texture such as cloth, leather or skin textures etc. then lastly a layer with smaller details like patches and freckles etc.

After the basic texture were done it was reimported back into blender, were cravies and fold were giving a light touch of shadow and highlight, to enforce an illusion of more depth in the folds(mainly on the backpack). lasty any visible seam were feathered away with the blend tool.

The texture for the two characters were created to be as similar as possible, while still trying to take their different proposition into account.

The textures for the hat,staff, bookcase and moneybag were reused on both characters, the those model only had been scaled and thus retained the same UV coordinates.

Figure 5.3. – *image showing the body texture for the cartoony styled mage.*

5.2. Rigging

This section will cover some of the most common terms within the field of rigging and explain how the rig for this project were created. In order to create and controller animations for the characters, one rig were created and later retarget to fit both characters.

A 'rig' refers to an animation rig, which as a control structure of deformation objects and controls that allows a mesh to be deformed and manipulated, Kerlow describes a rig as "*An animation rig is [a] hierarchical control structure that is custom-designed to*

animate characters; all joints and all motion logic of the character are contained in the rig. Very complex rigs require significantly more computation and when manipulated by animators they take longer to update" (Kerlow, 2004, p. 160).

The process of building an rig is called rigging and involves setting up a structure of deformation objects, animation controls and restraints, which will allow an animator to take control over the character or object and creating animations, without breaking the rig or mesh controlled by the rig.

Joints or bones are an essential part of a rig and are the object which are used to deform and manipulate other objects or parts of an object (including polygons). Joints are usually placed within the polygon mesh they are intended to manipulate. A collection of joints are often referred to as a skeleton, however in blender it is called an armature. The root joint is the parent joint which of all the other joints are hierarchically sorted under it and it is common to place the root joint in the middle of an model and mirror the sub joints across the middle, in humanoid rigs, to insure the both side are the same (Watkins, 2011, pp. 281-282).

There are normally two ways, joints are used to animation and deform object with forward & Inverse Kinematics. Forward kinematics (FK) is the process of animating each joint in a chain manually, starting with the parent joint and then rotating each joint down the chain.

One of the benefits with FK animations is that it offers complete control of the characters moves and pose. The downside of using FKs is that it is time consuming process having to rotate each joint manually (Watkins, 2011, p. 284) & (Kerlow, 2004, p. 338).

Inverse kinematics (IK), which is this the opposite of FK, works by moving a child joint (translating, not rotating), and then automatically rotate the joints in the hierarchy above it, to allow the movement of the moved child joint. e.g. if a foot is moved, the knee and pelvis are rotate respectively to allow the foot to move to the desired location, instead of having to rotate the knee and pelvis manually to get the foot to the desired location. Using IK can speed up the animation process considerably (Watkins, 2011, p. 284). the downside with Iks are it can result in some unpredictable rotations along the joints higher in the hierarchy if the constraints for each joint are not set up correctly.

Therefore it takes some planning and consideration regarding constraints and limitations then setting up the IKs, which makes the rigging process a little longer (Kerlow, 2004, p. 363).

5.2.1. Skinning

In order to make the model deform, the mesh needs to be connected to the skeleton or armature, this is often called skinning. Once the the mesh and the polygons have be "skinned", each polygon will move and rotate along with the joint which the are skin to, as they are rotated or manipulated (Watkins, 2011, p. 280). this process also have several other names, such vertex blending, developing and skeleton-subspace deformation(Akenine-Möller et al., 2008, pp. 80-85). The simplest form of skinning in linear, meaning that each vertex is only bound to one bones, this can however result in some unwanted folding and deformations such as "candy wrapper" twists. Therefore is recommended and common use to skin each vertex to several bones at once, which helps the model to keep its rigidity and appearance while deforming (Akenine-Möller et al., 2008, pp. 80-85).This is done by weight painting, which specify how much the bones such influence each vertex, even though this process can be time consuming, it is very important to make sure that the skin is weighted as desired, in order to avoid unwanted or unexpected deformations later in the process (Watkins, 2011, p. 302).

The rig for this project was originally created as a humanoid rig, with the intention to export it to unity and use it with Mecanim humanoid rig set up, as Mecanim provides as number of nice features for humanoid rig. however since the charaters coat was ultimately joined with the body mesh, and there was need desire to also add animation to the coat, it also need bones to be able to deform. this in turn meant the rig was no longer suited to be used with Mecanim humanoid rig set up. and instead a Generic avatar were used to handle the animation in unity [4]. Since the this meant the humanoid rif couldn't be, all the additional armatures for the other objects. such as the hat,backpack and staff etc., were parented to the characters armature, created one collected armature figure 5.4 on page 43, and more thoughts on this in 9 Reflections on page 68 each bone were given custom bones shapes and color coded, in order to make it easier to recognize which bones was selected, and thus helping the animation process being more transparent.

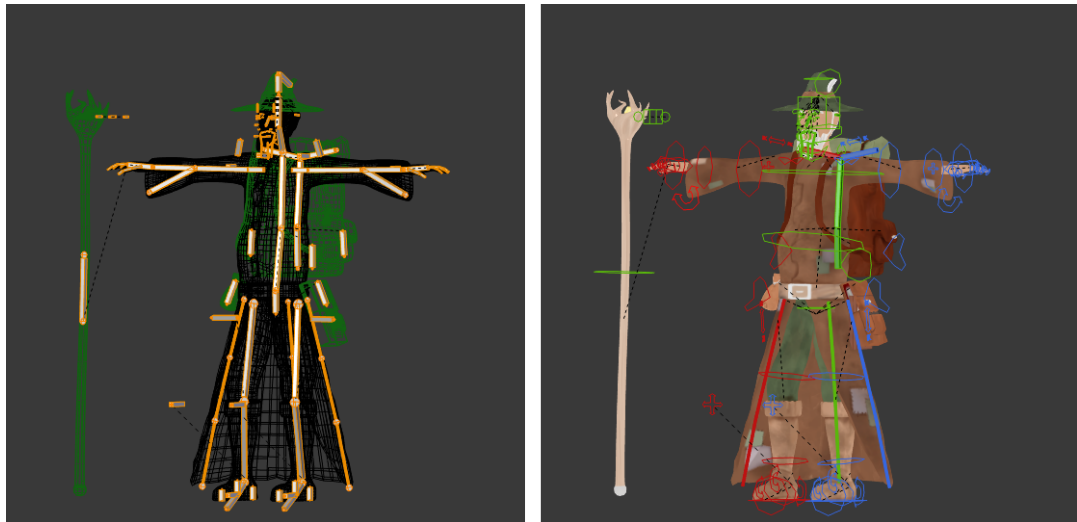[4]see more http://docs.unity3d.com/Manual/class-Avatar.html

Figure 5.4. – *Image to the left, shows the the characters full armature in edit mode, the model itself in wireframed. the image to the right show the characters in pose mode, where the custom bones shapes and color coded gives a better overview of the rig..*

5.3. Animation

Animations were a big part of this project, a range of animation were created for this project, in order to make the characters more alive and complet. for the sake of transparency they are divided up into three categories; idle animations, movement animations and event animations.

Each character had a set of animations with consisted of :

The idle animation were created to make him feel more whole, strengthening the illusion of him being alive, so then no user input were given he would stand still, but not completely still like a statue, but be stand on the same spot breathing and blink his eyes, and once in awhile he would do one of the extra idle animation. e.g looking around, fixes his hat or yawn.

Movement animations were playing depending on the user's inputs, allthe priamir atacion the use you do were visualized by looping cycles of animations for as long and input stayed the same.in all the movement is as atamed to add a sense of anticipation(Thomas et al., 1995, p. 52) in order to make the action more clear as well as follow through and overlapping actions (Thomas et al., 1995, p. 60) to make him seem like he had real

Idle animations	Movement animations	Event animations
Idle - the default idle animation - looping	**Walk** - the characters basic walk cycle - looping	**Event One** - small animation of the character bracing against the wind
Look right - extra idle animation, the mage looking to the right , while fiddling with his bread	**Run** - the characters run cycle - looping	**Event Two** - small animation of the character almost losing his hat, but jumps and get it back
Look left - extra idle animation, the mage looking to the left, while fiddling/fixing with his hat	**Backing** - the characters run cycle - looping	**Event Three** - small animation of the character losing his hat and it flying away from him
Yawn start - extra idle animation, showing the mage yawning and moving his back pack	**Turning** - the characters run cycle - looping	**Event Four** - small animation of the character look around and searching for something
Yawn end - extra idle animation. showing the mage yawning and stretching	**Idle To Walk** - transitions animation between idle and walk	**Pick Up** - small animation of the character picking up his hat.
Yawn - extra idle animation, the original yean animation, both the previous combine one one long animation	**Walk To Run** - transitions animation between walk and run	**Open Book** - small animation of the character opening the travel journal
	Run To Walk - transitions animation between run and walk	**Close Book** - small animation of the character opening the travel journal
	Walk To Stand - transitions animation between walk and idle	

Table 5.1. – *The table show a description of all the animations each character have, divided up into three categories; idle animations, movement animations and event or action animations.*

weight, hopefully making him more life like.

Event animations are animated that are played then certain requirements are meet. e.g the player have traveled far enough the reach the next stage in the game or esc is pressed etc. the event animation were mainly created to add some more visual interest to the game. making the characters able to reacting and interact a little with his surrounding, creating a deep sense of him being part of the virtual world.

After the first set of animation were created for the first character, all the animation were retarget and adjusted to fit the other character, while this turned out not to save as much times as originally intended, as compare to make an entirely new set of animation for the second character. it did insure that the character animations were as close as possible, which was desirable because the only thing intended to change between the secanoi wit the two characters, were the style in which they were created.

In unity animations clip are controlled by a much appropriated named animation controller, which can hold a range of animations and decides then and how to transitions between the different animation clips. [5]

In this project each character had three animation controllers, one to handle all the characters own animations, and one for each of the moving book and flying hat. the character animation controller were and relatively big and complex asset, with many animation and possible transitions. figure 5.5 on page 46, while the two other were reasonably small and easy to overview. One of the feature the animation controller handle is if a transition had exit-time, which mean the animation have to play all the way to the end, before a new animations can be played. all the event animations had exit-time and characters movement were likewise disable doing the eventaniamtion, menaing then the player triggered and event he would have to wait until the the animation was over , before he would be able to move again. The idle and movement animations did not have exit-time, allowing them to reacting more or less instantly to the change in input.e.g if the player stopped moving it would be undesirable if it had to play the walk animation all the way to the end, before transitioning to the idle.

While the in-between animation or transitions animation as walkToRun are not strictly needed, they allowed greater control over how the animation transitions would look. For this project they were created as a result of a few of the movement animation having minor cases of the characters leg clipper through his coat.

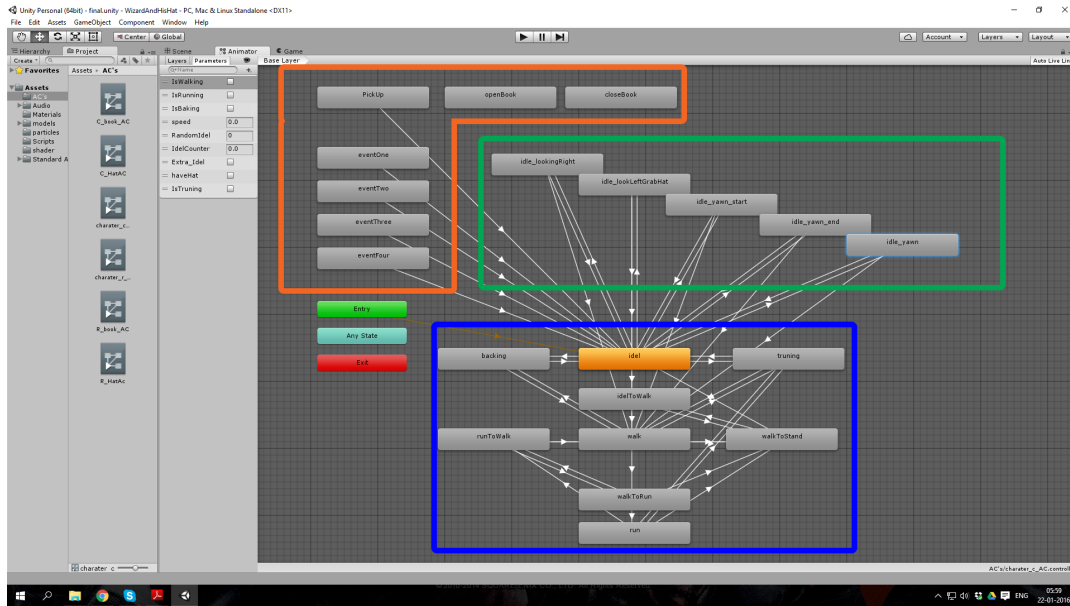[5]see more http://docs.unity3d.com/Manual/class-AnimatorController.html

Figure 5.5. – *the image show the full animation controller for the characters and all it possible transitions. -highlight by red - the event animations and thiers transitions. hightlight by green - the idle animations and their transitions. highlighted by blue - the movement animations and their transitions.*

5.3.1. Game area & Controls

In the order to have a view to present the characters to the players and ultimately test if the style of the character would affect player continuation desire. A small game area where created in unity. the game area where created with unitye terrain editor, the design of the terrain ended up being that of a dearest, as it were believe it could be made relatively fast, and would not distract the player form the characters too much. but almost any locations would have sufficed for the purpose. small elevations were created with the terrain editors sculpting tool, add several patterns of different sand textures were painted onto the terrain in order to create some visual diversity. and lastly as little bit foliage where add to the terrain , in form of small billboards with the texture on dried grass. the game area were limited by invisible walls to prevent the character form failing of the edge should the player go that far.

A common control scheme, often seen in pc games, namely movement on W,A,S and D. where W is forward movement, S is backwards movement , A is rotating left and D is rotting right. were implemented to allow the player to navigate around in the environment and explore. the camera were set up to follow the character around in a

46

3rd person perspective, and design to rotate the viewpoint of the camera around the character, by holding left mouse button and moving the mouse. This camera control can seem a little simple compare to modern games, which usually also allow the player to change the direction the character is facing blick clicking or holding the right mouse button. Some games also allows character movements by holding both mouse buttons. While it was considered to implement this "normal" camera control in this project to. it was decided against it in the end, with the reasoning to the keeping the simple camera control, player would be more likely to rotate the viewpoint. meaning the character were more likely to be seen from all angles, and since the goal of the test was to evaluate the style of the character, this was given priority over more mouse usability.

5.4. Experimental Design

In this section we will present some theory and ideas to how insure a similar experience for players in an open world sandbox experience, discuss some of the limiting design to prevent the user form breaking the test, and finally, we describe and argue for the modifications made to the game ESQ.

The purpose of the project is to devise a test, which would allow the participant to have a full experience of what the character would be like in the finished game, as well as experiencing the character from all angles to gain full overview of the characters design. In order for the to fair and fully evaluate if they liked or disliked the design style of the character, and whatever or not style had an effect on how willing participant would be to continue playing or coming back at a later point.

Since it was the style of the character that was in focus, it it could be argued that the game itself didn't need to have a strong story or gameplay elements. Wherefore it was decided to present the character in a open world experience, where the user would be free to explore the the character and the surrounding environment. Making the primary goal of the game exploration. in an effort to make the experience more whole and meaningful, and series of small event animation were created, which was also an opportunity to show more of the character's personality. these animation were then meant to be played and the player progress through the experience, partly was a reward for exploring the environment.

But having fixed locations, which would trigger these event, could been seen as a bias. as this means players can skip some or maybe even not see any event at all, depending on the path the chose to travel. So in order to insure the each player would have an experience, which would be as close to the other participants experience. even if they decided to go a different paths, an idea were planed out.

This idea evolved triggering the events based on how far the player had move, no matter which directions, by using an event Sphere or time if the player did not move that far from his starting point.

5.4.1. Time-Space Continuum

In his article (Schoenau-Fog, 2015) schoenau explain that the problem about having "fixed" event in an open world is called The Narrative Paradox, " *The Narrative Paradox can also be used to describe the problem of implementing an application with an open sandbox-like 3D storyworld, where the user may navigate "freely", while the application at the same time aims to maintain control over the order of events and mediate the story.* " (Schoenau-Fog, 2015, p. 1).

Schoenau propose a framework called Space-Time Interactive Narrative framework (SPATIN), in order to organizing events in an open storyworld. The framework consists of Event capsules, which are placeholders for the possible events, and holds all the information need to create the events. Events may be positioned in any space-time storyworld according to [four] different categories:

Events that are not locked in time and space – e.g. random events which may occur anytime and anywhere.(Schoenau-Fog, 2015, p. 5)

Events that are locked in time but not in space – e.g. specific events which may occur anywhere, but only at a certain time. For example a lightning bolt strike.(Schoenau-Fog, 2015, p. 5)

Events that are locked in space but not in time – e.g. a character, who always approaches the user at a certain location.(Schoenau-Fog, 2015, p. 5)

Events that are locked in both time and space – e.g. an event which takes place at a certain place and at a certain time. For example a volcanic eruption.(Schoenau-Fog, 2015, p. 5)

another component of the SPATIN is the Space-Time Drama Manager (STDM), which organizes the events, which do not just rely on the event capsules, to check if the use is at specific locations, but also with "Time-colliders" in order to tracks time, which allow the STDM keep track of upcoming events and place them in front of the user, should the user change direction, the event can be move to a new location, until the user encounters the event. (Schoenau-Fog, 2015, p. 6) schoenau present a range of temporal orders, in which Events may be planned by the author and experienced by the user :

Chronological – as in a linear story. Events are encountered as a sequence one by one. The user may experience this as participating in a film, where the order of events is fixed (Schoenau-Fog, 2015, p. 6).

Causal – as in a cause-effect sequence of events. As an example, the user may experience the effect of an earlier event before experiencing the cause (e.g. a murder mystery revealed by a detective in an embedded narrative). Or vice-versa, where the event that caused the effect is encountered before experiencing the effect (e.g. witnessing a flood submerging a village) (Schoenau-Fog, 2015, p. 6).

Associative – lyric structures, e.g. as in a dream. Events may be encountered based on associative relations between events. For example, the user may experience an event with a black cat, and the next possible events may include an event including darkness or tigers (Schoenau-Fog, 2015, p. 6).

Thematic – as in an episodic film. Here events have no immediate relation and order, however they all support the communication of a theme. (Schoenau-Fog, 2015, p. 6).

Random – as in a chaotic world. Users may encounter events, which seemingly lack logical order. However through the user's own personal construction of the story, an emergent narrative may be experienced. (Schoenau-Fog, 2015, p. 6).

Synchronous – as in a world where all events are happening in sync with the users'
   actions (e.g. a snowboarding experience which trigger an avalanche).(Schoenau-Fog,
   2015, p. 6).

A-synchronous – as when events are happening out of sync with the users' actions (e.g.
   a delayed effect such as a wildfire caused on the user forgetting to extinguish a
   bonfire) (Schoenau-Fog, 2015, p. 6).

The story world designer can use the temporal orders,mentioned above, to prioritize
some events over others based on the various strategies, or use combinations.

The STDM keeps track of event during runtime, by having a sack of past event and a
stack of possible event to be placed next, simple storyworld, might only need one stack
of events, while more complicated storyworlds, would likely need more stacks to organize
sub-stories or themes.

5.4.2. Event System

Here we will describe how the event system used in this project were design and both
how it relates to SPATIN but also how it differs from it.

The event system for this project were design to use spheres or event Spheres to trigger
event, then the player would reach or exit them, much like the Event capsules described
in SPATIN. these eventSphere were design to also have a time component, much STDM.
However the the eventsphere did not used "Time-colliders" to take track for time and
events. but rather a simple method simply used timers, to track then the had last been
archived and if to was possible for the to trigger a new event, this could be say to be a
simplification compared to the STDM, but still similar in nature.

These timer were intended to control the flow of events, both by insuring that the event
were not played or trigger to often. But just as much to insure that something would
happen e.g triggering an event if to long time past without the player manually triggering
an event, by reaching or leaving an event sphere.

In this project three different event spheres were designed : the eventSphere, windSphere

and point of interest sphere.

The eventSphere are the main event handler, taking care of trigger all the characters event related animations, in themes of SPATIN it locked in space. as it placed where the player is starting, and don't move before the player reaches the edge for it and triggers an event, or an event is force to trigger by the internal timer. once the eventSphere triggers an event, it's location is update and it is move the the player locations. The eventSphere's temporal order could be said to be, Chronological at first and then random later on. As it follows the order of the animation event in order until it have played them all once, then it becomes random, allow any of its event to be triggered, unless certain restriction are in effect, such as animation event two, can only be trigger while the player have the hat. Since the animations shows the wizard almost losing the hat, but jumps and catches it.

The windSphere are responsible for moving the hat, after the mage have lost it, but also handling then the hat can be picked up again. windSphere are locked in time but not in space, meaning the windsphere do not appear in the game, before the eventSphere have trigger event that makes the mage lose his hat. As well as it is only in the game as long and the hat is flying free. But it not locked in space as it move anywhere within the game area. it's temporal order could be said to be random, meaning it's random to which location the windsphere makes the hat fly to, and also moves it the too. But Chronological as it only makes the hat move a fixed amount of time, before enabling it to be picked up.

The Point of interest sphere (Pois), is very simple and all it do is moving itself if the player get into contact with it, or if it stays to long time in one place. The Pois is part of the Guidance system, which we will discuss in the little bit. it is locked in time but not in space, meaning it do not appear before a number of other event have been triggered. but it is able to be place anywhere within the game area.

Through this section we have tried to describe how the event system and it event sphere design for this project can be related to the SPATIN framework.

5.4.3. Guidance & limits

In this section, we will describe the Guidance system which was designed, to guide and keep the player inside the game area, as well as the countermeasure design to prevent the game from breaking should the player ignore the guildes system

One of the main reason to make the mage lose his hat, in addition to create some visual interest. Was to create a little bit of gameplay elements to the test, in form of a goal(objective) to retrieve the hat, by having the player by having the player chase it (activity). Originally it wasn't invision to be a long activity, but since testing show that time between questionnaire were too short , see . While some player are will feel desire to get the hat back, motivating them to keep going, others might likely feel negative affect, the hat being elusive to catch, and seeing the activity as tedious. but also negative affect, can be a motivator for some people, making them wanting to continue even through tedious tasks.

Additionally the hat was also designed to lead the player away from the edge on the map, by flying towards the center of the map if the player got to close to the outer limits of the game. in order to help the player finding the hat should it fly too far away, as well as emphasizing the goal to retrieve the hat, some visual guidance design and added to the hat. by adding a glow the would change intensity over time, making it easier to spot as well as clearly indicate to the player that the hat could be interactable, possible increasing the likelihood of him chasing it. An additional visual guide were added in the form of particles slowly rising from the hat then the player was beyond a certain distance away from the hat, the particle were designed to scale it size the further the player got form the hat, into the reached a fixed maximum size, and slowly fade away as the player moved close to the hat. this was believed to make it easy to spot which direction to go, in order to find the hat, and the it would promote chasing the hat.

The point of interest were also emitting particle, in order to both guide and lure the player towards them, but would fade away and change location as the player got close to them. the point of add the "fake" point of interest, the to add a little bit of deviance to the game, giving the player and additional goal to explore. A similar particle system as used on the hat where add to the to the final object in the game, a floating crystal which would trigger the final questionnaire and end the test.

In the option menu shows as a travel journal, small text masges were add as progress statute, give the player hint what to do next. e.g he the mage had lost his hat, the travel log add a small message about the he wanted to get id back before continuing etc.

If the player got very far from the hat, and small message were design to as a speech bubble saying; i should look for my hat would appear. Likewise if the player were getting close to the outer limit of the game area, and small message would likewise appear and telling to turn around. the final limits were an invisible wall, with would prevent the character from falling of the plan, if the plan had ignored all the guidance.

5.4.4. changes to the game ESQ

as mentioned in 2.1.1 Continuation Desire on page 4, a few modifications were made to the game ESQ. In order to used it in the context of this test design.

the biggest modifications to the game ESQ, is that the game ESQ starts by asking a question about the the participants starting desire. But since this project and test don't offer any promotional material or story before starting, any answer given at start would be completely arbitrary and not related to the graphical styles, which is the purpose of the test. Therefore it was decided to move the starting desire question, to an early during question, after the participant have gotten a small preview of the style, and thus have something to base his continuation desire on and make it related to the graphical style of the character.

A minor change were made to the likert scale, while the scale was kept to form -3 to +3, since this makes it easier for the participant place his continuation desire as well as make more transplants if the participant was positive or negative towards the experience. however the scale was changed from a 7 point, to a 6 point scale, forcing the participant to take a stand point about if the were positive or negative

since the main focus of this project is related to the graphical style on the characters, as few questions were added to the after questionnaire. in the first additional questionnaire participants were asked to describe the graphical style on the character they had seen, the purpose of the was to seen of the the character they had use matched the classification it aimed to fit.

then the were asked to rate how much they liked the graphic style of the character on a 6 point scale from -3 to +3 and a follow question about why the liked or disliked the character. in order to see in there was a correlations between if they like or dislike the style and conscientious desire.

5.4.5. Timing of Intrusiveness

as mentioned in the section about CD.**?? ??** on page **??** past experience have shown that even tho the continuation desire framework are designed not to break by using the intrusive method , it can still be influenced negatively if just interrupting abruptly and so the presenting of the intrusion can have an influence.

carefull consideration should be take when deciding when to interrupt. interrupting right then or right after an objective2.1.1 Continuation Desire on page 4 is given, is likely to distract the player form the objective, be experienced as intrusive. e.g if we were to interrupt and show the questionaire right when or right after the player lost his hat. players would be likely to find it more intrusive. Likewise is it also likely to increase intrusiveness of the interruption takes place just before the player reaches an Accomplishments2.1.1 Continuation Desire on page 4, e.g if we were to interrupt right before the player are able to reach the hat or crystal.

The "best" time time to interrupt, present itself after the player are familiar with the objectives, knows the Activity he must undertake in order to to reach the Accomplishments, but before he is close to reaching the Accomplishments. that is at least an untested postulate in this project.

This means for this project the first interruptionduring questionnaire one, were place after the player had lost his hat, chased and made it jump a few times. Since he had been given the objective, get the hat back, and knew the activities involved in accomplishing that, chase the hat.

Another thing that can increase the preceed the intrusiveness is if the questionnaires pop up to frequent. Therefore the the amount the jump or moves the hat had to make for it could be picked up adjusted, some it would take somewhere between one to three minutes of runtime(meaning not counting time spent in the questionnaire) form finishing the first

during questionnaire until the hat could be picked up. The during two questionnaire would be trigger by the first random event after the hat was picked up. even at the risk of make the task of catching the hat more tedious, this adjustment where deemed necessary.

In addition to the timing of when to intrude and present the questionnaire to the participants, the method of too how, were also carefully considered. the the solutions turned out to be, to utilize part of the character's design, namely the small bookcase hanging on the mages side. this gave the opportunity to have the an small animation of the mage reaching of and opening a book or journal, as well as having the questionnaire presented as a journal to give the feeling and look of being an integrated part of the game. Thereby hopefully reducing the perceived intrusiveness of the ingame questionnaire.

As a final modification to the game ESQ, a question about perceived intrusiveness were added to the after questionnaire. In order to measured if these considerations or precautions have succeeded to keep the intrusiveness low.

5.5. testing

This chapter formulated project's hypotheses and describe the tests methods, setting, sampling and other relevant aspects.

In order to test the problem statement, as stated in 1.2 Problem Statement on page 2,

a hypotheses was formulated :

H_0 There is no significant difference in players' continuation desire, depending in which graphical style the character have.

5.5.1. Sampling & Setting

The sampling method was based on non-probability convenience sampling. meaning, participants were found based on availability and willingness, no rewards were promised

for participating either. the only bennerfit for the particles were to quiche curiosity, simple distraction from daily routines, and a virtual cookie upon completing the questionnaire. the game was distributed online on several forums and facebook pages, people encourage to spread the word to other friends or other people who might be interested in games or just plain willing to lend a helping hand. Most of the participants in the testing were colleagues, acquaintances or friends.

Since the test were distributed online, the setting for the test were that of the comfort of the participants own home, or workplace. Which comes with a range of benefits and issues, one bennerfit could be argued to be that this situations closely resembles that of one in which the user would likely normal play a game, which is desireable, as we are interested in measuring the effect of the graphical style on participants desire to continue playing, in their natural environment.

The downside to this is likely hood of a range of uncontrolled bias, such as time of the day, hungry, mood and distractions, might influence the participants answers and perception of the game

5.5.2. Methods

The testing method utilized final game was modelled after the game ESQ sample framework, in conjunction with an intrusive approach,but with the modifications mentioned in 5.4.4 changes to the game ESQ on page 53. meaning the question about starting CD , was change to be an early during CD. the other changes the inclusion of questions about style and intrusiveness in the after questionnaire.

The test was designed as a double-blind experiment. therefore neither the developer nor the participants, knew or had any control over which character scenario of the game they would be playing.This was believed to reduce the experimental bias. As mentioned in settings, the game was distributed online which also meant, the only data gathered from the game was through in-game means. Since some of the participants were friends of the developer, to verbal feedback was given regards, tho it was not recorded or included in the results.The aim was to have at least 30 participants, preferable divided equally between the two scenarios, in order to provide the data with some reliability, although more participants would be preferable.

5.5.3. data-collection

in addition to the modified game ESQ, some more in game data was collected, it the hope we could bring some useful insight about the game experience. the game data which was logged was, mainly timers and key presses:

Total time - storing the total amount of time since the player started the game

Questionnaire Time storing the amount of time the player used answering the questionnaires,(including demographics, during one during two and after.)

Run time - storing the amount of time the player used playing the game.

Pause Time - storing the amount of time the player used in the option (pause).

During1 triggered - storing then the player triggered during one questionnaire, in amount of run time

During2 triggered - storing then the player triggered during one questionnaire, in amount of run time

Times moved - how many times W or S was clicked to move the character

Times rotated - how many times right mouse button was clicked

Times sprinted - how many times the sprint button was clicked

Times pressed Esc how many times the Esc was clicked (open/close menu/log).

The timers were generally, expected to tell if the experience of the game took approximately the amount time time it was designed to last. but also how the distribution of the players time spend to look like. the key press data was intended to give a quick overview of how the player interacted with the game.

6. Results

For the the final test of this project 34 participants tasted the game, devied 17 of each scenario. five females and 29 males. , the largest age group was 21-26 with 14 participants, while 13 of the participants were between 27-32, 4 were 33-38 and one participant were 38 or older. The complete data can be found on the attacthed CD or online at [1]

6.0.1. Continuation Desire Results

Upon closer inspection of the data set, since the two during CD values showed remarkably equal result in the initial data analysis. It revealed that they were in fact, completely identical, this is a huge flaw and dramatically reduced the usefulness of the remaining gathered CD values, as it would be impossible to analysis the evolution of Continuation desire over the three reported values. After some quick debugging, the issue there identified as the during 1 values being store twice, meaning to data about during 2 was collected.

in order to test the hypothesis :

H_0 There is no significant difference in players' continuation desire, depending in which graphical style the character have.

A Two-sample t-test [2] was performed on the remaining CD values, no significant differences were found then comparing the two scenarios to each other. meaning we failed to be rejected the null hypothesis. boxplots showing two scenarios reported CD values can be

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[1] https://www.dropbox.com/sh/13jmneu20m3e902/AACN5KV0POTR2zmOdPigDWJCa?dl=0
[2] the Two-sample t-test was done with matlab using the matlab function ttest2

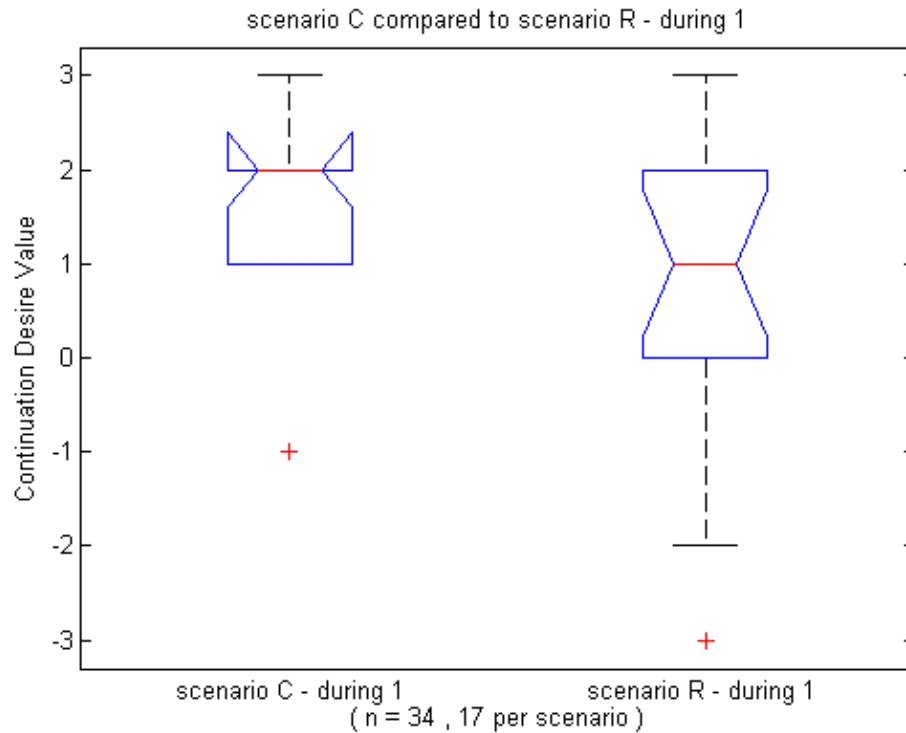scenario C compared to scenario R - during 1

Figure 6.1. – *boxplot showing the comparison between two scenario's during 1 Continuation Desire values, the boxplot reveals no significant differences of the two scenarios medina. indicated with the notch overlapping each other. (and confirmed with a A Two-sample t-test) .*

A Two-sample t-test was also performed between the combined scenario's during1 and after CD value were significant different, with a 5

scenario_C during1 had an average of 1.5 scenario_C after had an average of 0.1875, which is a difference of 1.3125 between during1 and after. while scenario_R's during1 had an average of 0.8 and it had an average of -0.0625 after, difference of 0.8625 between during1 and after. This means the cartoony character had a higher initial positive CD value, tho no significant different from the realistic character initial CD value. but both of them land on a almost neural CD values in the after questionnaire.

during 1 qualitative responses

The most reported reason for giving the during 1 a high CD value. were related to the desire to get the hat back, as indicate by these responses "*Wanna see what happens when*
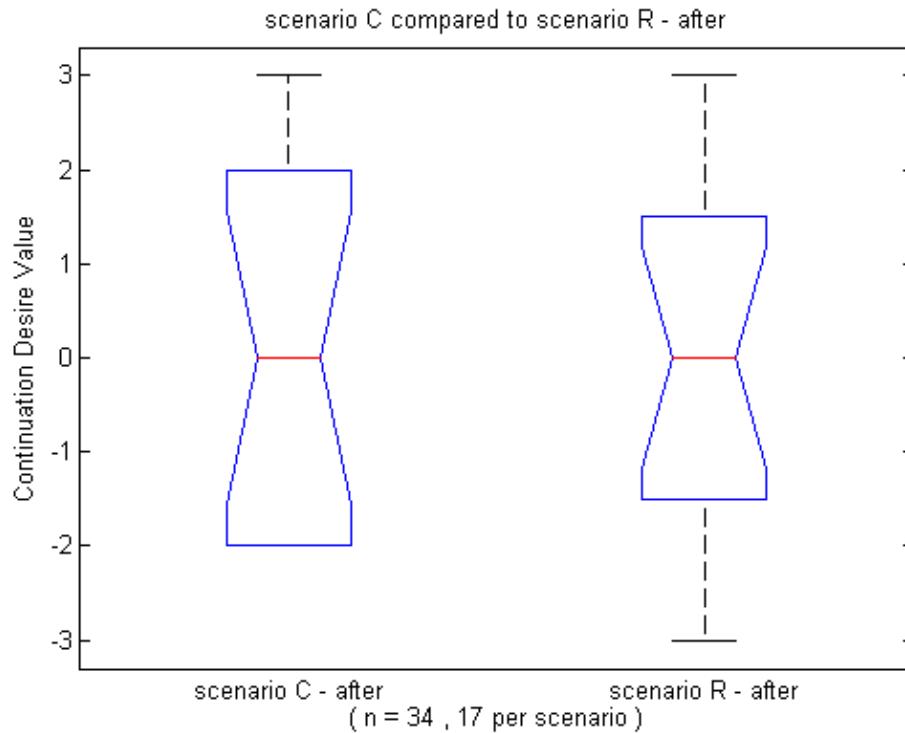
Figure 6.2. – *boxplot showing the comparison between two scenario's after Continuation Desire values, the boxplot reveals no significant differences of the two scenarios medina. indicated with the notch overlapping each other. (and confirmed with a A Two-sample t-test) .*

I get that hat back", "*The hat - I need to get the hat !*" and "*I wanna catch that damn hat XD*". which all reported a CD values of +3.

While the most common reason given for reporting a low CD value, was connected to unclear instructions or goals "*I don't know what the game was about and I'm supposed to do... :/*" with a CD of -2 and "*The goal is unclear*" with a CD of -1 or like " *no goal or meaning [3]*" with a -3

All the qualitative responses to the to the during 1 question were related to game-play, story or controls.

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[3]translated from danish to english : ingen mål eller mening

during 2 qualitative responses

Since the issue with the game meant the that to during 1 CD value got saved over the during 2 CD values. there are no way of knowing if the participant report a positive or negative CD values at the during 2 questionnaire. However the qualitative responses to the question do indicate either a positive or negative CD. As few responses believed to indicate a positive CD are responses like "*I want to see what happens next*" and "*It's a fun little game so I wan't to explore more*".Responses that could indicate a positive CD, mentions reason like "*Lack of variety in the environment, being tasked with getting hat back isn't fun game design.*" or "*chasing stuff by itself isnt that exciting*". also all the answers to the during 2 were related to game-play, story or controls.

after qualitative responses

Just like with the two during questions, the after question about continuation desire, were all related or connected to either game-play, story or controls. positive response related to curiosity about what would happen next or the will to explore or both. indicated by answers like "*I liked the idea of searching for thing and exploring an area*", "*What happens now?*" both reporting a $+3$ and "*wanted to know what those orange and white floaty things were*" with a $+2$.The most given reason for negative CD to the after question, was unclear goals or finding the gameplay tedious. Shown by answers like "*chasing stuff by itself isnt that exciting*" reporting -2 and "*I didn't feel like I was playing a game, there were no challenges or clear goals.*" with a -3.

6.0.2. Graphical Style results

The likert scale questions about if the like the graphical style or not, had an average of 1.9 for both groups together, the cartoony character scored 2.1875 average while the realistic character reviewed an 1.937 average. This indicate the participant were almost equally positive towards the two different styles of the character, altho in a little favor to the cartoony character.

in order to examine if there were a correlation between the graphical style of the character and the reported CD values. an correlation was calculated between the report CD values

and the reported liking style values [4].

the Correlation result between style and during 1 R= 0.3945 p= 0.0231 [5], which means we can say there is moderate positive (negative) linear relationship with a reasonable significance level, between style and CD in the during 1 question.

Correlation between style and after R= 0.4570 p= 0.0075 which means we can say there is moderate positive (negative) linear relationship with a high significance level, between style and CD in the after question.

many of the Qualitative responses to why they liked the style were connected to attention to details and animations, as shown by replaies like "*fantasy is brilliant, the design and detail is deffenietely above average*","*I like the small details. It wasn't too much either. I also really liked the small gestures I felt like was there when he was about too drop his hat.*" and "*The wizard is really nicely made and animated and there is a nice correlation between the look and feel of the character and how he moves*" all rating the style as a +3. And for the only negative with a -2 the reason why was given by "*he is generic*".

6.0.3. Intrusiveness Results

The likert scale questions about intrusiveness reviewed an average of -1.3 for both groups together, the cartoony character scored -1.750 average, while the realistic character had an -0.8750 average , this indicate the participant overall did not see the during questionnaire as very intrusive. however the reported a high intrusiveness while playing with the realistic character. Correlation was also calculated between style Intrusiveness, but showed no sign of any Correlation.

as few participant add some use full remarks about Intrusiveness in the additional box, such as "*The last question about the in-game questions, I thought more of them like checkpoints, so I felt like I was getting closer to something when they poped up. The game itself seamed fine becouse it was a small simpel game that everyone can join in on.*" and "*The travelbook stile of the questionare gave it a feel of being part of the game.*".

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[4] by using matlabs corrcoef function, with pearson as default

[5] R is the correlation and p gives the significance of R

6.0.4. Game Data Results & other Replies

the game data, showed what the participants use an average of 943 seconds or around 15min, in the test in total, which was spot on the intended duration of the test. In arange they used 477 seconds or almost 8 minutes answering questions. and 500 seconds or a little over 8 minutes playing the game. this were also close to the expected distribution of time between plating time and question time. The participants reach the first questionnaire around 104 seconds or after one and a half minute into the game, and the second ingame questionnaire around 281 seconds which equals around four and a half minute, or about 3 minutes of playing time after the finished the first during questionnaire. which show that the game in average processed and trigger the event more or less as it was design to.

The majority of the participant never pressed esc, meaning they never saw the travel log, which had the only story-like element in the game or textual description of that to how in the game.

A few answers indicated that the controls had some influence on their reported Continuation desire, such as "*-1 Only because the controls were difficult when I'm used to mouse based movement. I feel like I would get frustrated with directional control pretty quickly. Otherwise, maybe a +1 or +2? I'd like to see what he's going to do.* " and "*It's difficult for me to navigate and control*". while other simply had a wish to eable to move faster and for a longer duration "*It's all right, but needs a bit more stamina :)* "and "*I wish the guy would walk faster* "

7. Discussion

Obviously a new testing round should be made, after fixing the bug the coursed the two Continuation desire scales to store the same values, in order to be able to say anything about evolution of continuation desire.

Even tho extensive initiate testing was performed by the developer, only a few pilot test were performed by other people, friends of the developer. Since it is not unheard off that people report the same starting and during Continuation desire, or in this case during 1 and during 2. thereof nothing was thought of it and it made it past the pilot test and into the final game.

The bug have been found and fixed. a fixed version of the game is add on to the attached CD. the bug is believed to have been made, while trying to fix another bug. which was after the player had selected a continuation desire value in the during 1 questionnaire. the game would remember which value that had been selected, and then the player reach the during2 questionnaire continuation desire value previously chosen in during 1 would be preselected. this was believed to created bias and make the player more likely simply chose the same values again, instead of evaluating his current CD and reporting that. and thus in order to counteract or reduce the believed bias, a miss click or typos create the new and undetected bug instead.

By examining the qualitative replays it became apparent the one of the main reasons for low starting CD seemed to be the lack of instructing or a goal, which possibly could have be done with a small pop up text, saying he was searching for something.etc. by reusing the system that that already handling the message about turning around then reaching the limit, had instruct the player to look for the hat, if he gets to far from it, while it's flying freely. while for others exploring in itself was a strong enough goal to

motivate them the play the game and explor.

8. Conclusion

Since the data collected with the modified game ESQ, were incomplete due to a technical issue in the questionnaire set up for the game, it is hard to truly conclude, if the graphical style of the character had any direct effect on the reported continuation desire values.

Likewise did the qualitative responses gathered throughout the test, not show any indication of the graphical style having any influence on the continuation desire values. They however, showed a strong qualitative indication of gameplay mechanics, story and game control having a direct influence on the reported continuation desire values.

The result for the correlation calculation between how much the the participant like the graphical style of the character the had seen, and the reported continuation desire values. Showed a moderate correlation. but where is nothing to indicate that this correlation was cursed by the particular style, as both scenarios also showed a similar level of correlation to their respective CD values.

Therefore i am unable to conclude if graphical style have any effect on continuation desire or not, however i will conclude graphic it sleve do seem to have an effect on the continuation desire. But it probably more to do with, how close the level of detail and completeness, as well as the participants overall impression of the graphic. And how close it resembles and can compete with modern day games graphic. that have an effect on the players levels of continuation desire.

based on the qualitative answers and the relatively low overall Intrusiveness score, i conclude that it is possible to reduce the Intrusiveness of the intrusive approach used in combination with the game ESQ, if if careful considerate towards where then and how the intrusions are made, and as by making an effort to make the questionnaire itself fell

like a part of the game.

9. Reflections

The the body of the characters were created as one hole mesh, e.g the body and his cloth were part of the same mesh. This was done because in the earlier versions of unity, a model could make it crash in some cases if the model had holes or if parts, to two different mesh would collide and intrude into each other. those no longer seems to be the case, and it would probably have been beneficial for the rigging, skin weighting and animation process if the mesh had been separated into small groups. e.g. the body as one and the upper and lower coat as their own meshes. i feel like that would have add more controlled and made the process easier.

In my personal opinion the the realistic character would probably have benefitted from an high to low approach, which you have allow for a more detailed 3d model. also more time and effect should have be used on retargeting the animations. or better yet, created the animation with a humanoid rig, which would allow unity to handle the retargeting of the animations.

if the last few days have shown me anything, it is something i already knew, and thought i had been doing through the development process : test early, test often and keep testing. but also keep testing the stuff you think is working and to see any issues with on the surface.

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A. Appendix

Figure A.1. – *the image shows the finished concept art for the realistic styled charcter.*

Figure A.2. – *the image shows the finished concept art for the cartoony styled charcter.*

Figure A.3. – *the image shows the finished concept art for the chibi styled charcter.*

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