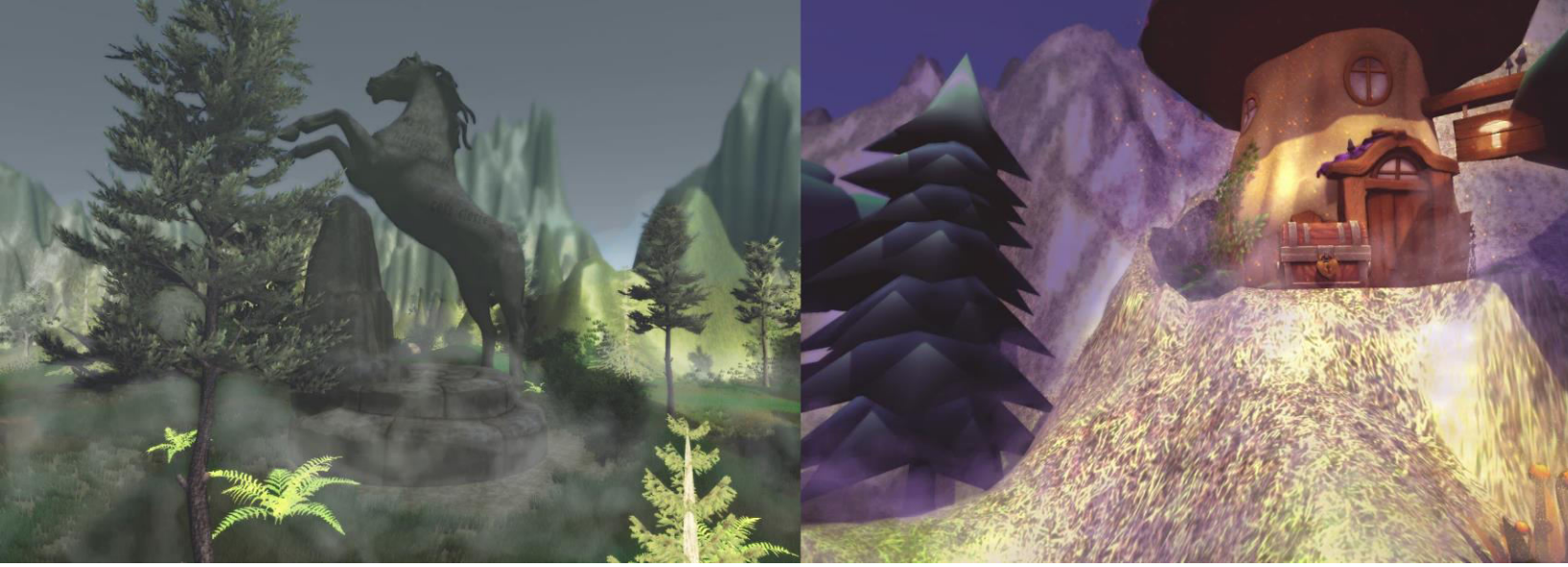

From Realism to Cartoons: the Feeling of Desire to Continue

Master Thesis

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Abstract:

This project is set out to develop an in-game method to evaluate a continuation desire that was influenced by the graphical style of the game. Therefore, author worked on the following Final Problem Statement:

"How the continuation desire, affected by the graphical style of the game, can be measured during the gameplay, and do graphical styles influence the continuation desire depending on the people's visual style preferences?"

To solve this problem were analysed the concept of continuation desire and related experiences, such as engagement, flow, immersion. Narrative was also reviewed to find out how the continuation desire could be influenced through it.
In the second theory section was made an analysis of the game aesthetics, Theory of Memories, graphical styles, atmosphere and colors. This information was used to create a media technological product.

Evaluation method was then conducted upon twenty participants, whose levels of continuation desire increased throughout the experience, It allows to conclude that graphical style of the game affects the continuation desire. However, the second part of the final problem statement was not proven by test results. At the moment it could be stated that continuation desire does not depend on

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Introduction

Video games, simulations, interactive narratives is a popular attraction that gives a lot of different experiences and emotions. Some of them are positive, like joy, fun, engagement, motivation; some of them are negative, like fear, sadness or lack of interest. For some people interactive media is even an art, and it is not difficult to perceive it this way when many games and interactive narratives have high-quality graphics, breathtaking atmosphere and exciting stories. Designers and game developers use different tricks, knowledge and visual - as well as performance - art techniques, like painting, sculpting or bokeh, to establish graphical style of the game and mood of every scene. It could be said for sure that game's visual design is not less important than narrative or game mechanics. All these game aspects have to be congruent to induce a motivation to start an experience, and later - a desire to keep playing again and again.

In this study will be concentrated on the fundamental aspect of player engagement - continuation desire, which is required if player wants to experience other kinds of emotions and conceptualizations, better known as enjoyment, flow, immersion, involvement [41]. Player needs to *want to keep playing* in order to achieve mentioned experiences. Continuation desire is a feeling of pleasure that is being gained from playing, and this pleasure motivates player to continue experience or try it again to achieve that pleasure. Game that can cause a continuation desire to appear will be more appreciated than game, which cannot show the same results.

A desire to continue was evaluated by few researchers, and it became a common practice to measure this concept by interrupting players and giving them questionnaire before, during and after the gameplay. Even though the willingness to continue still remains after the experience is being paused, for the player it may become irritating to be interrupted so many times. Literature review revealed that continuation desire was not evaluated during the gameplay before, so it motivated author to try to design an in-game evaluation method that could work without any interruptions.

Another interesting thing that was planned to find out in this study - does the graphical style of the game somehow influences the continuation desire? Many players have commented on their interest in the computer games because of their amazing graphics; many studies have done in order to investigate the relations between visual elements and players' emotions and affects [27, 32, 44], but just a few researchers have investigated the relation between visuals and continuation desire. Amin et al. [3] have tried to find a connection between the continuation desire and such visual property as contrast, however, due to the small sample of participants and their subjective responses, they failed to find how contrast is influencing player's willingness to keep playing.
Moreover, author of current project have tried to catch any significant graphical style's influences on the continuation desire that were described in the project "The Merge of Cartoon and Reality" [12] and will be mentioned in the section "Continuation Desire Evaluation Approach". Unfortunately, many problems were

encountered during the test, so the results came out negative. Test had to be redone after all mistakes would be fixed.

As it can be seen from above, the topic of how visual style can influence a wish to continue the experience, motivated to begin an investigation and come up with the Final Problem Statement (FPS):

How the continuation desire, affected by the graphical style of the game, can be measured during the gameplay, and do graphical styles influence the continuation desire depending on the people's visual style preferences?

In the first section of this report will be presented a literature review of the continuation desire and it's relation to other concepts, like engagement, flow and immersion. Also, in this section will be analysed how continuation desire could be influenced (by using graphics) through engagement, flow, immersion and narrative.

In the next section will be analysed theory of game aesthetics, will be described graphical styles and presented differences between them. At the end of the section atmosphere will be defined and will be presented a brief review of how colors - as a part of atmosphere and graphical style can affect player's emotions.

Third section will be about continuation desire evaluation methods and techniques: the Engagement Sample Questionnaire, the example of use of the "Merge questionnaire", Engagement Mapping Method, System Tracking Real-Time User Experience (TRUE). After the analysis of mentioned methods and questionnaires, the evaluation method for this current project will be developed.

Fourth section will describe a creation of the media technological product: software that was used and steps that were made to design a game prototype.

The short section "Evaluation Procedure" consists of the description of the evaluation process and a test of the pre-evaluation questionnaire, which was changed before the real evaluation.

In the section "Test Results" are written participants' responses and summary of results. In the same section could be found bar graphs and line charts that were made to compare the results.

In the "Discussion" section evaluation results will be analysed.

Finally, report will finish with the conclusions that were based on the results and discussion.

Theory About Continuation Desire and Related Playing Experiences

Continuation Desire

In this section the concept of continuation desire will be reviewed: will be explained, what it is, what are similarities and differences between other concepts, like engagement, fun, motivation and flow.
After the overall review, in subsections will be given more detailed analysis of the relation between continuation desire, other experiences and game graphics.

Continuation desire is the concept, which is very important to understand in order to design a good game. It is not enough to make person want to start the game, it is also necessary to make game engaging and interesting, so the player could keep playing. **Continuation desire** is a feeling of being motivated to continue experience. It could be said that pleasure gained from playing is the feeling that drives players to continue playing to achieve that pleasure. It is clear that this feeling is related to other concepts like engagement, immersion, motivation, flow, fun [3, 40, 42]. All of them may *lead to* or *support* the willingness to continue while they at the same time might be the *result of* the desire to continue [43]. Player may feel fun during the gameplay or just be interested in the activity and this experience may lead to emergence of desire to continue that could be seen in the prolonged play. On the other hand, the concept of flow may occur as a result of the desire to continue. Aspiration to continue thus may be argued to be foundation of engagement in interactive media and digital games [40, 41, 43]. Researchers concluded that player first needs to have a wish to continue playing, before other aspects of playing experiences could be encountered [38, 42].

Some people may say that continuation desire is the same as engagement or fun, but studies show that these three feelings are not equal [38, 40]. Person can find his or her activity fun, but can perfectly live without possibility to continue after he or she finished. It also works the other way round - game can have a sad or scary story that makes it not fun, but still causes a desire to keep playing.
Also, objectives sometimes are needed to achieve engagement, the same as time, effort, attention and emotions have to be invested [38], but continuation desire is driven by pleasure deriving from the playing experience itself.

Fun and engagement are not the same as well: "*game does not necessarily need to be fun in order to be engaging, as a competitive game might, for example, not always be fun to play if one performs poorly*" [42].

Even though player may feel frustration and be annoyed at particular time about his scores in the game, he still might feel desire to continue to achieve better results.
The fact that makes engagement look the same as continuation desire is that both of them can appear from the very first minute of the play, whereas other aspects of gaming experience, like immersion or flow, may take more time to be encountered. Although willingness to continue is something that appears instantly, on the other hand, it will quickly disappear if the game is not engaging [41].

Interesting fact is that in some papers engagement is defined as a higher level of continuation desire experienced during gameplay or after some time of playing [38]. Henrik noted that player's engagement is initiated by his or her individual motivation to begin playing and is driven by continuation desire. Furthermore, engagement is related to range of different (mostly positive) emotions (fun, satisfaction, enjoyment) and experiences (immersion, flow, presence), which may or may not be the part of player's engagement.

Continuation desire differ from other concepts in the way it could be measured. For example, immersion and flow are complex concepts and the problem in catching and measuring them is that they can easily "break" if someone will try to investigate them by pausing the game and asking players about their experience [40, 42]. Therefore, many investigative methods to evaluate players' experience of mentioned concepts are often conducted after the activity is finished [42].
Henrik in his paper [40] argues that continuation desire can be encountered before, during and after interaction with the game.
More information about evaluation of continuation desire will be given in the section "Continuation Desire Evaluation Approach".

In the studies in [38] was found out that experiencing an engagement and willingness to continue (because it is a prerequisite for feeling engagement) is being caused by triggers, related to four dimensions of continuation desire: objectives, activities, accomplishments and affect experienced from the interaction with the system.

- **Objectives** to continue could be extrinsic (application-defined) and intrinsic (user-defined).
- **Activities** that make players feel the desire to continue can be very different: destroying environment or killing characters, solving problems, socializing with others, sensing game's audiovisual elements and even more. As this project is focused on the graphics' influence on the continuation desire, many activities will not be reviewed in this paper and will not be inbuilt in the game prototype, except the last mentioned activity. Some people may want to continue playing, because they want to take a look on visuals (graphics and
animated elements), aesthetics and an atmosphere of the game. As one respondent from Henrik's studies stated: "*[I keep playing] to see every part of a visually and audibly compelling game […]*" [38].
- The third dimension of continuation desire is an **accomplishment**. Person may want to finish a level or reach the end of the story, and this can motivate him to continue playing.

- The last dimension is an **affect** experienced while interacting with the application, e.g. flow, immersion, incorporation. This is one of the reasons why in this project was analysed the relation of these conceptualizations with continuation desire and game graphics.

So it is possible to conclude that this investigation will therefore concentrate on describing and trying to explain moments when players are willing to continue playing and/or want to come back to the game and play again, and how graphics are influencing this desire.

Detailed analysis of differences between engagement and continuation desire, and how the last one is related with the graphical style of interactive media, will be given in the subsection below.

Graphics' Affection on the Continuation Desire Through Engagement

First of all, in order to dig deeper into the relation between continuation desire, engagement and visual design of the media, it is needed to give more concrete definition of engagement and describe a difference between engagement and motivation.

The concept of **motivation** in one Schoenau-Fog's paper "*is related to the reasons why people begin to play and why players are "lured into" a game and start playing*" [38]. On the other hand, the concept of **engagement** is concerned with experience occurred during gameplay and is focused on aspects that make people want to *continue playing*; "*that "hooks" players so much that they want to keep playing*" [38]. For example, person may be bored and this can motivate him or her to start the game, but engagement begins when person becomes excited and wish to continue playing. Continuation desire is just one additional aspect of multifaceted concept of engagement [40].

As it was mentioned before, the desire to continue is a prerequisite for the appearance of other conceptualizations, such as engagement. Furthermore, Schoenau-Fog argues that engagement is needed to achieve flow, immersion, pleasure and enjoyment [39]. Engagement could be imagined as a stronger desire to continue playing than continuation desire itself, therefore it could be illustrated as the middle step between the continuation desire and other experiences (Figure 1). Looking from this angle, it is possible to come to the conclusion that analysis of reasons that engage players and review of engagement types could help to understand how the continuation desire could be affected.
Schønau-Fog & Bjørner [41] in their studies classified the causes of engagement into six broad categories: intellectual, physical, sensory, social, narrative, and emotional engagement. These engagement types cover all game genres and they could be dependent on each other, for example, social interaction can evoke emotional engagement. Also, some engagement types can occur after playing several times, thus making player want to play a game again.

Now it is time to find out, which causes of the desire to continue are related to games' graphics.
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- Intellectual engagement is concerned with intellectual activity or mental skills, needed to complete the task. Creative tasks and challenges, e.g. puzzle solving, strategic thinking, planning, may be a result of player's desire to continue playing. This kind of engagement may result in "challenge-based immersion", described in Ermi and Mäyrä's work [17].
- Physical engagement causes are based on experience gained from physical interaction with the media. The desire to continue in this case may appear due to possibility of moving the body. Examples of such activity are: finger tapping, free movements with the full body, interaction with touch-based interfaces.
- **Sensory engagement** causes are related to stimulating the senses during the gameplay. "*This form of engagement can become the outcome when sensory inputs mediated by the game support a player's game experience in such a way that he or she wants to continue because they want to experience sensations and explore the sensory elements of the game*" [42]. This engagement type may lead to the "sensory immersion" [17], which can be experienced when player becomes immersed and drawn into a game world through the audiovisual stimuli.
  Similar concept - "spatial immersion" - was described by Ryan [37]: during this immersion, player has a sense of being present on the stage of the game world and represented events.
  This type of engagement is related to the topic of the project, because audiovisual effects of the media include graphical style and atmosphere, conveyed by it.
- Social engagement is based on the interaction with other people, both in game and real life. Causes of social engagement can be a wish to feel fame, belonging, acceptance from others; it can also appear when people have to work together to solve puzzles and challenges, share experiences, etc.
- **Narrative engagement** causes are related to the experience of story and may result in "imaginative immersion" [17], "narrative involvement" [11] and "narrative immersion" [1]. Aspiration to know what will happen and how the story will finish may create anticipation, curiosity and excitement, thus making player want to keep playing.
  This type of engagement is also related to the visual design of the game. One - if not the main - purpose of graphics in games is to help person understand what is going on; to help player get the idea of the story; to navigate him by using objects, light, contrast [3], by showing what is going to happen and what is expected from player. It is also related to the question of the origin of environmental objects that is mentioned in subsection "Atmosphere".
  More information about relation of visual design of the game, narrative engagement and continuation desire is given in the subsection "Narrative, graphics and continuation desire".
- **Emotional engagement** is based on player's emotions and cognitions, experienced during the gameplay, for example, "when the player's own emotions during gameplay - feelings toward other players or empathy toward non-player characters - make the player want to continue" [41].
  Emotional is the third kind of engagement, which could be caused by visual design of the game:
    - person's emotional state can be changed by in-game assets [41], which could be environmental objects, light or an atmosphere;

- emotions can be triggered by graphical style's similarity with previously liked games or movies that player watched and that conveyed positive feelings. Graphical style can give player the feeling of nostalgia;
- emotional engagement could be caused by other engagement types. for example, narrative engagement, when player starts feeling strong tie to the story and empathy to the characters.

Sensory, narrative and emotional engagement types have causes, which could be based on the visual design of the game. It means that during designing and evaluation processes, it may have sense to use testing methods, which were applied in Schønau-Fog & Bjørner's work [41] in order to categorise engagement types: they used reaction cards with words that describe different engagement causes, such as "intellectual challenges", "anger", "visual", and letting participants choose reaction cards, which best describe the reason of their engagement. This method can be used in evaluation of continuation desire, for example, by asking people to choose few cards, explaining their feelings at the current moment, or explaining their motivation to continue playing.
Detailed review of this testing method could be found in section "Continuation Desire Evaluation Approach".

Narrative, Graphics and Continuation Desire

Narrative is one of the most interesting and expected part of the interactive media, which can motivate person to continue his or her activity.
According to Herman [21], many people understand narrative as a synonym of story. Technically, narrative is more than a story: it is a representation of structured time-course of events that introduces a conflict into a storyworld from different perspectives, with different details, different words or emotional inflections. The same story can be told in a different ways, and the way player understands a story in a game, would depend on many factors, including visual information.
Aporia - an interactive narrative, made by Bevensee et al. [5] - is a good example, showing how narrative can be conveyed solely through the environment (i.e through the graphics and atmosphere of the game), where are no characters, dialogues, windows with texts or narrators, telling story on the background.
It is difficult to imagine an engaging and immersive game without a narrative. Even if game originally does not have a story, it still can be created by players, who see different places, colors, styles and combinations of game objects and interpret all of it in their own way. To support the narrative - created by a player or embedded in an interactive media and then evoked by a player - in Aporia were used three categories of pictorial clues: drawings, photos and cave paintings. Each category was able to reveal a concealed and abstract narrative layers. To be sure that players explore all locations in the interactive narrative, were hidden five orbs, which had to be collected to unlock hidden places with pictorial clues in their locations. This trick could also be used in order to design a method to evaluate continuation desire inside the game.

Possibility to construct a narrative during the gameplay may result in arised narrative engagement or even (narrative) immersion.
Perceived realism of the game world might enhance the narrative engagement. Realism of the game world relates to sensory attributes, such as visuals, settings, pacing and sounds [43]. Graphics of the game might interest players in connection with the story behind them and it can increase game's capability to make players have high emotional investment in the game. This investment creates a chance to become engrossed or even immersed [10], thus making players want to continue playing [39].

The Flow Theory and Its Relation to Continuation Desire

In this section will be explained what the flow means, would be given examples of activities when this feeling appears. Also, differences and similarities between flow and continuation desire would be analysed.

Csikszentmihalyi [15] was the first person, who described flow. He conducted an extensive research in order to discover what makes different experiences so enjoyable. He used questionnaires, interviews and other data to find out how people felt when they spent a lot of time and effort on activities that are difficult, but not providing external rewards, like money or status. Such activities are rock climbing, reading, playing chess or computer games. People described their feelings the same way, which let Csikszentmihalyi define the flow: it is an experience "*so gratifying that people are willing to do it for its own sake, with little concern for what they will get out of it, even when it is difficult or dangerous*" [15].
Sweetser and Wyeth [45] made a review of the literature on user experiences in games and analysed Csikszentmihalyi's work to determine how flow elements manifest in interactive media, especially in computer games. The result of this review was the GameFlow model, which is divided into eight core elements:

1. a task that can be completed;
2. ability to focus on a task;
3. task has clear goals, so it makes possible to concentrate on the task;
4. task provides immediate feedback;
5. player's perceived skills have to match challenges, so the game would not be too difficult or too easy;
6. feel a sense of control over actions and task;
7. Immersion or absorption in the game, which makes players lose concern for themselves, stop thinking about everyday life and alters their sense of time;
8. social interaction.

Literature review shows that flow feeling is linked with continuation desire, because flow can make continuation desire stronger. On the other hand, by virtue of logical thinking it could be noted that flow is related with visual design of the game through some of mentioned core elements: concentration, feedback

and immersion. It makes sense to analyse, how flow experience could be evoked by using visual elements, thus affecting the continuation desire.

To meet the criteria of concentration, game designers have to remember how visual attention works in video games. "*Games can captivate player attention by providing something worth attending to, such as detailed game worlds that draw the player into the game*" [45]. It was proved by evaluation made on the Warcraft 3 game, which meets the concentration criteria: "*the world, units, buildings, and characters in Warcraft 3 are all intricately detailed, with unique animation, sound, speech, and appearance. Stimuli are always in multiple forms (e.g., sound, animation, graphics, speech), there is no repetition in the stimuli, and every stimulus in the game has a purpose and fits into the game. Each race (i.e., Human Alliance, Orcish Horde, Night Elf Sentinels, Undead Scourge) has a different theme, which affects the appearance of the interface, terrain, units, and buildings*" [45].
Unfortunately, it is common trend in video games to show a lot of actions and visual information on the screen simultaneously: explosions, other players' characters, non-player characters, moving objects, flashing buttons, life bars and signs, visual effects that represent magic and much more. When so many things are happening at the same time, visual attention becomes really important in navigating player within the game world and helping him or her to concentrate on tasks. Good way to guide player is by providing multiple visual cues, for example: contrasting colors that could show the way or safe and dangerous places, objects that have different sizes with the reason to be different (not just randomly different), avoid repetition of the stimulus.
In the Anjin Anhut's article about generating and guiding visual interest [4] is stated that exist plenty methods how to generate visual interest and enhance concentration. If applied properly, these methods, listed below, can create a possibility to guide player's visual attention in game.

- It is better to use clearly distinct or clearly similar design elements and avoid elements that are kind of different or kind of alike.
- Avoid noise of game elements. Noise in the context of game graphics is a collection of game elements that are expected to be alike, but have different sizes, shapes, colors, shades, style with no reason.
- Place game elements in a structured way.
- Similar design elements allow to establish patterns and make environment predictable.
- In order to make patterns distinguishable from each other, similar elements of each pattern could be created exclusive to that pattern.
- Contrasting elements let to establish deviations within a pattern or to separate entities from the pattern.
- In order to create sub-patterns or merge patterns into larger groups, could be created additional distinguishing elements or shared elements.
- To help player recognise unique game objects, groups of game elements, changes in environment, relations between elements, priorities and sequences, could be used patterns, deviations and separation of some objects.

Second criteria that is related to visual design of the game is feedback. According to Csikszentmihalyi [15], concentration on the task possible when game provides immediate and appropriate feedback, which, in many cases, has visual form. It can be changes in life and mana bars, flashing objects in the game world that could be interacted with, achievements, a mini-map that shows remaining path to the goal or flickering items and mobs when they were damaged.

Third aspect that is related to graphical part of the game and continuation desire itself is immersion. Immersion is a difficult concept, because it has different definitions. One of them states that it is a feeling of being *included into* and *enveloped by* the multisensory representation of the virtual world [17, 49]. When players can become involved in a game; when he or she start feeling themselves as being characters in a game, it increases the willingness to continue playing [38]. This deep but effortless involvement often result in altered sense of time and loss of concern for everyday life and self [15].
On the other hand, Lombard [30] describes immersion as an occurrence when a player do not perceive the existence of the medium in his or her gameplay and acts in the way like medium would not be there.
Those two definitions let to conclude that immersion occurs during the gameplay and is based not only on the narrative or game mechanics, but on the visual design and interface of the game as well.

It should be pointed out that it is the harmony of graphical elements, atmosphere, idea and narrative that lets player to become immersed during the gameplay. It was noted by several researchers. For example, Masuch & Röber came to the conclusion that the "*quality of immersion directly depends on consistency in graphical presentations and behaviour of game world objects*" [31]. Aporia creators also agree with the statement that immersion is being influenced by visual design's congruence with the narrative: "*to increase the level of immersion and to overcome the barrier of construction, it is important to obtain congruency between the objects, environments, atmosphere and narrative*" [5].
This fact was also confirmed by Amin et al. in their paper, where was written that "*consistency and continuity of the visual design and artistic principle to be a necessity in order to avoid breaking immersion*" [3].

One of the things that should be done in order to create an immersion is to achieve an experience when players forget that they are interacting with and participating through the medium. The best thing to do so is to make interface invisible or unnoticed by the player [18]: remove buttons, texts, maps, achievements that are not being used most of the time. "*Immersion in the game is promoted when all distractions are removed*" [26], but in the case when visual information is necessary to guide the player, it is better to give a possibility to show everything on the screen by clicking specific buttons.

When analysing immersion more deeply, it becomes clear that this concept used to "*describe the degree of involvement with a game*" [10], which depends on invested time, effort and attention, as well as on construction of the game - on a higher level of involvement. Regarding Brown and Cairns [10], were found three levels of involvement: engagement, engrossment and immersion. They were shown on the Figure 1.

Each level of immersion is available only when all barriers (some of them were just mentioned) to achieve this immersion are removed. However, it only allows for the feeling to appear, but does not guarantee it.
First stage of immersion is engagement, and it was reviewed in the subsection “How graphics can affect the continuation desire through engagement?”
Second stage is engrossment, and the barrier to become engrossed is a game construction - person feels engrossment when game features are combined in such way that it directly affects person’s emotions. Some of the features that were important for the participants in Brown and Cairns’s analysis [10] are plot, interesting tasks and visuals.
Third level of immersion is called total immersion or presence [10] - a feeling of being cut off from the reality, forgetting about the things around the player and being focused on what player is doing in the game. Barriers to experience presence are empathy and atmosphere. Because atmosphere is related to the topic of this project, it will be defined and reviewed in the subsection “Atmosphere”.

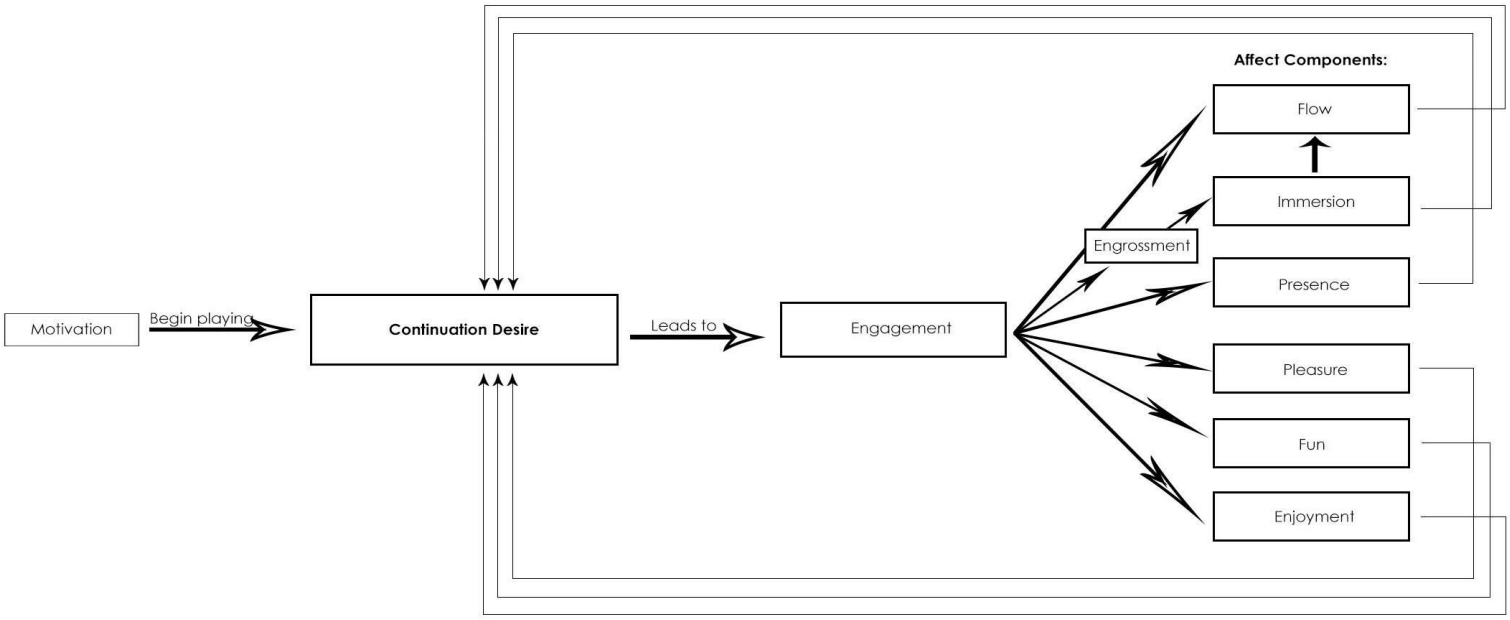

Figure 1. Diagram that shows how continuation desire could be influenced by other experiences.

Based on these findings, conclusions from all section could be collected to further use in order to develop a method of continuation desire evaluation during the gameplay:

- Continuation desire is the feeling that motivates players keep playing or play a game again. It appears during the gameplay (sometimes from the very first minutes of play), but also can quickly disappear if the game is not engaging. This fact highlights the importance of information collecting before and during the gameplay.

- Continuation desire will keep present if gameplay will be paused or finished in order to investigate the experience. It means that players' feelings about the activity have to be collected after the gameplay or, at least, at the end of the activity.
- Continuation desire is a prerequisite for the appearance of the engagement and other playing experiences, so it would make sense to evaluate specific aspects of engagement, flow or positive emotions and desires during the gameplay. If engagement or flow would be encountered during the testing process, it would be possible to conclude that continuation desire appeared and was the foundation for experiencing engagement or flow.
- Narrative, sensory and emotional engagement types are related to graphics of the game and continuation desire, so evaluation of these types of engagement could be used to form questions and tasks for the evaluation of continuation desire during the gameplay. Evaluation of narrative, sensory and emotional engagement types was described in the Schønau-Fog & Bjørner's paper [41] and will be additionally reviewed in the section "Continuation Desire Evaluation Approach".
- Questions or tasks, oriented to get to know if player understand the story through graphics or if player is able to create a story based on the visual information, could be used in game prototype building process.
- In order to make players explore all locations, could be used pictorial clues, which also help players to create their own story, thus self-motivating to keep playing.
- Make game world as detailed and "real" in the way it feels as possible.
- To achieve flow feeling, game prototype should provide three core elements related to graphics: concentration, feedback and immersion.
- To ensure concentration:
    - should be removed all unnecessary animation, enemies and tasks, so the player could focus on the visual design of the game and not on the narrative, animation or mechanics;
    - game elements should have structure and do not be repetitive without a reason;
    - visual clues should be clear and highlighted by using contrasting colors or effects;
    - should be used patterns that help player distinguish important visual information from unimportant;
    - player should not be bored during the gameplay - it means that environment have to provide something worth attending to: interesting objects, made in different style, changes in the terrain, atmosphere.
- To ensure feedback, game has to provide a visual reaction to the player's actions: flashing objects that have to be collected, mini-map that shows where player is, changes in the environment if player completes the task, etc.
- To ensure immersion:
    - create and atmosphere;
    - remove interface elements that are not needed during the gameplay;
    - obtain congruency between graphical elements;
    - be sure that game objects are linked with the idea and story of the game.

- Use questions and tasks oriented to evaluate concentration, feedback and immersion, based on graphics.

Theory About the Game Graphics

In this section artistic terms, methods, theories and concepts, such as ‘game aesthetics’, atmosphere, style, will be defined and explained to gain better understanding of what artistic aspects are commonly used within game development. Moreover, a basis will be established for which visual and artistic aspects to focus on and which of them have to be ignored.

Review of Game Aesthetics and Theory of Memories

Games can be engaging, can give enjoyment and aesthetic pleasure or even make person dive into virtual reality through audiovisual stimuli and atmosphere. The concept of ‘game aesthetics’ can be understood differently: it can be a beauty of game mechanics or unique idea, but in this paper will be focused on another definition, which is being used to discuss visual design of the game [33]. ‘Game aesthetics’ is a term, related to the way game looks and is presented to the player.

In psychology, aesthetics is an empirical discipline of visual perception and beauty, which clearly focuses on visual properties of artworks and objects all around the world. Perception of beauty is subjective and always changing [23], it is based on the feeling of pleasure or displeasure, so it is difficult to determine what is beautiful and aesthetically pleasing in game’s visual design for many people. Person’s taste and appreciation of beauty is relative and personal, in many aspects it is based on culture, i.e. culturally determined [23], so Zangwill [51] claimed that value of beauty cannot be universal. The same as Zangwill, in the twentieth century philosophers focused on the theory that the way art will be perceived and interpreted depends on the cultural and historical context of the time and place where artwork was produced. “*Aesthetic values were regarded as whatever culture taught was aesthetically valuable; aesthetic values and meanings were considered without residue constructed by culture, and works of art were both created and appreciated within the norms and conventions of culture*” [16].

On the other hand, it was argued that people have some general principles of taste, for example, people perceive objects as eye-pleasing if they portray symmetry and golden ratio. Philosophers say that human nature is uniform across ages and cultures, and it is the reason why art lovers are able to enjoy artworks from the past ages.
Time is considered to be one of the most important factors in the perception of beauty. It means not only the fact that aesthetics are being judged in relation to events, happening in life when artwork was born, but also in relation to events that happened before and are stored in memory. Jacobsen has stated that “*our attitude towards a work of art, an object or an event, as it is stored in memory, may determine its evaluation. This is*

also often the case for aesthetic evaluations" [23]. In other words, something (objects, characters, places, events, etc.) could possibly be perceived as more aesthetically pleasing or likeable if they would mimic specific characteristics of something that person has fond memories of. Person's aesthetic evaluation will be affected by previous experiences. Even if person will experience something completely new that does not resemble any previous encounters, it still will be unconsciously seen in the context of the gathered experiences. This happens because brain automatically creates associative links between different events and objects with similar properties. This principle works with shape, color, size, texture characteristics. For example, when showing a red small object, which person has never seen before, this object is being automatically categorised as similar object encountered before, for instance a red apple. Advertising companies, designers, artists and writers are used to practice this mechanism while creating their work. Probably many people have seen the red color to be associated with blood, danger, roses and heart, or a circle is being told to remind ball, egg, sun and safety, thus making it friendly. This mechanism was described by Sørensen [44] in "The Theory of Memories", which in relation to games means that, while designing new games, could be used colors, details, elements, style or atmosphere similar to those in well-known games or movies. Emotions can be triggered by graphical style's or atmosphere's similarity with previously liked games or movies that person played or watched and that conveyed positive feelings. For example, graphical style can give the feeling of nostalgia, so it can attach person to specific game and motivate him or her to continue playing.

Apart from this, the concept of 'game aesthetics' includes graphical style, color choices and atmosphere. Visual information that can be made, changed and evaluated is the part of aesthetics and can in one or another way influence the willingness to continue playing. Amin et al. [3] in their paper presented an example how one of visual properties - contrast - creates visual attention that influences an atmosphere of the game and helps player to achieve concentration, thus affecting the continuation desire.

Other aspects of aesthetics - graphical styles and atmosphere - will be reviewed in following sections.

Graphical Styles

Games nowadays are presented in different graphical styles: there still exist pixelated games, like "Undertale" [20], are popular stylized and cartoon-like games, such as "World of Warcraft" [7] and are even made photorealistic games, such as "Crysis" [14]. Screenshot examples of these games made in different styles could be seen in a Figure 2.
Advanced technologies and well-known artistic techniques let game designers and developers create very realistic environments, present games that look like interactive animated movies with a fantastic atmosphere or develop surrealistic horrifying projects. Graphical style (or just style) is a property that makes games different, unique and memorable. But how 'style' could be defined?

In art history the concept of ‘style’ characterises dominant techniques in architecture, sculpture and painting. However, in this paper will not be analysed tools (e.g. software) and technical aspects (modeling and rendering methods) by which visual styles are being realized. In this paper will be focused on the perception of games’ visual design and aesthetic organisation of artistic elements, such as lines and colors, that create a ‘style’. Names, given for styles, are based on the art styles that appear in other mediums.

Within games, movies and interactive media, styles are being defined as variations of visual details and elements that are combined together and constitute its distinguishing appearance. To make definition easier to understand, it could be argued that style is a specific mixture of visual elements, such as shapes, colors, textures, patterns, sizes, etc, that makes it possible to distinguish one design from another. Aki Järvinen [24] clarifies that style consists of three main game design elements: 1) surroundings or location where scenario takes place; 2) objects within game world, including characters, and 3) symbols (health and mana bars, buttons, point counters, icons, texts, GUI itself). Based on his highlighted criteria, Aki Järvinen classified graphical styles into three groups: photorealism, caricaturism and abstractionism.
Photorealism is a graphical style that simulates realistic environments and objects. Everything in photorealistic games look very much like in the real world. Sometimes it is even difficult to distinguish the screenshot of game world from the photo.
Caricaturistic style looks like animated movies (cartoons) and comics.
Abstractionism as a graphical style is based on basic visual forms, it has no details.
Both caricaturistic and abstractionistic styles often are called ‘stylized’.
Moreover, styles can be mixed: for example, cartoonish characters in realistically looking environment or a character’s figure cut out from the photo and placed in a stylized location.

Figure 2. First example - “Undertale”, second example - “World of Warcraft” and third example - “Crysis”.

This project requires to find out what are possible style distinguishing criteria and identify several graphical styles that will be presented in media technological product.

One of the styles that was thought to be interesting to recreate is realistic graphical style. Even though before was mentioned only photorealistic style, it would be a mistake to call a chosen style this way. In art and game industry exist a lot of “levels of realism” where the highest level is photorealism. The “goal” of the photorealism is to reproduce game world objects and scenes as realistically as possible. Process of creation of photorealistic game requires very much time and processing power, because game objects and their textures have to be very detailed, they should not be repeated and animation has to be correct as moves of the real people are.
Instead, the realistic - or naturalistic - graphical style was chosen, which still tries to mimic the reality [35], but do not requires so many details and correctness. Games made in realistic style have more detailed objects and textures than other graphical styles. In such games are being used shadows and reflections, various materials differently react to the light and temperature, shapes and sizes of objects are adequate within the scene they are placed, color choices and combinations are the same as in nature. Example of the game made in realistic style is “Prince of Persia: The Sands of Time” [47], which is demonstrated in Figure 3.

Figure 3. Screenshot from the game "Prince of Persia: The Sands of Time"

In order to investigate if graphical styles are actually influencing the continuation desire and which of them are influencing the continuation desire more than other, in the media technological product should be used more than one style. At least two styles are needed to compare changes (if they will be) in the desire to continue based on the game locations where players are.

Second style that was chosen is a cartoonish style. Ari Feldman states that this style "*tends to mimic the general look and feel of popular television cartoons. Because the graphics in such games contain flat, basic shapes, they often make liberal use of bright and simple colors, such as reds, oranges, and yellows*" [19]. The most noticeable aspects of cartoonish style are bright colors, sometimes unreal color choices and simplicity of shapes with exaggerated characteristics that are typical for traditional animated movies [19], e.g. big eyes and head of the character. Cartoonish style was also described by Sørensen [44], who analysed a design of humanoid characters from Disney movies. He agrees that basic shapes and bright colors are common for traditional animation and adds that in this style "*exaggerated features and shading is done with 2 tones. The contour lines are mostly black or dark unless the areas the contour lines are affecting are black*" [44]. It should be noted that contour lines mostly appear in movies and 2D games to make it easier to notice different objects and distinguish characters from their surroundings. In 3D games this technique is less likely to be applied.
Additionally, Sørensen mentions that "*cartoons often have fewer levels of colour*" and "*surfaces and textures are often the same color and shade for every body part*" [44], which makes this style easy to recognise and distinguish from realistic graphical style. Many fantasy-themed games are done in cartoonish style. One of the newest examples of games made in such style is Blizzard's "Overwatch" [8] (Figure 4).

Figure 4. Screenshots from the game "Overwatch"

Based on the description of graphical styles, it becomes possible to collect artistic elements that define the style:

Artistic element or object property	**Style**	
	Realistic	**Cartoonish**
Shapes	Detailed, the same as in the real world or adequate to the local world's rules. Proportional and anatomically correct. Weak silhouettes.	Simple, exaggerated. Can be unrealistic, often have playful proportions. Shapes can change in time. Strong silhouettes.
Sizes of objects	Sizes are mostly adequate, the same as would be in a real world. Do not change in time if they were not manipulated by characters, physics or magic forces.	Can be inadequately big or small. Sizes can change in time without reason.
Colors	Many levels of color. Smooth transitions between colors and shadows. Exist reflections. Mostly not contrasting. "True" white (#ffffff) and black (#000000) are not being used.	Mostly bright, can be contrasting. Fewer levels of color than in realistic style (in animated movies objects often are colored in two tones). Visible edges from color to shadow.

	Many objects are colored the same as in the real world.	Can be no reflections. Objects can have unrealistic and difficult color palettes. Can be used “true” white (#ffffff) and black (#000000) colors.
Textures	Detailed. Convey texture of material. Mostly not repetitive, but difficult patterns still could be found. Objects that should not be transparent in the real world often are not transparent in realistic style.	Without many details. Rarely and partly convey texture of material. Objects can be (partly) transparent.
Lines, contour	Have no contour lines.	Movies and 2D games often have contour lines. 3D games can have contour lines, but often they do not. Lineweight can be different .

Table 1. Table of artistic elements and object properties that are common for different graphical styles.

Except of artistic elements, collected in a table, there still are few visual elements and aspects left that do not directly define the style. They will not be considered in the building of media technological product and evaluation process.

Light - various lighting options can be applied in a game that was made in different graphical styles. In realistic and cartoonish games can be one or more light sources, it depends not on the visual style, but on the concept of game.
Based on the graphical style, colors of light rays and light sources can be different and not natural, but, first of all, it also depends on the concept of game, and, secondly, the aspect of color was mentioned in the table (Table 1). It is the color (unrealistic, too contrasting, not harmonious, etc.) that can help to define and distinguish different styles, but not the light itself.
Shape of the light source can be different in realistic and cartoonish games, but this property of object was mentioned in the table above (Table 1).

Dimension (2D, 3D or combinations) - dimension of the game do not depend on the style and style does not depend on the game dimension. Many artworks perfectly show that realistic style can be portrayed on

the 2D space (e.g. on a sheet of paper or canvas) and many games demonstrate that 3D space is not an obstacle for usage of cartoonish style (examples could be seen in Figures 2 and 4).

Camera view or perspective - games, created in described graphical styles, have different camera options. It is the way to look at game's environment, but it does not affect the graphical style.

Animation and **effects** - even though this visual aspect can be made the way that lets to distinguish different graphical styles, e.g. in realistic game animation would simulate the reality; in cartoon-like media movements can be exaggerated or objects can morph into something they could not be in the real world, animation and effects are not the requirement to achieve one or another graphical style. Static images, such as paintings, digital illustrations or concept arts, vary in the level of stylization, which means that they either can be drawn very realistically or look like traditional cartoons.
Second argument for not relying on animation and effects in the evaluation of graphical style's influence on continuation desire is that the biggest part of game designers still realistically animate objects and characters. In real-life simulations, in fantasy or sci-fi games, in adventures or strategy games, made in realistic or cartoonish graphical style, characters are moving the way real people or animals would and game objects are animated in accordance with physical laws (e.g. gravitation or inertia). Many game object animations are made without the usage of twelve principles of animation [29], which mostly appear in animated movies. For this reason game can be presented in different graphical styles and have realistic animation, which do not contradict with game's graphical style.
And thirdly, specifics of animation and effects, such as inverted gravity, transformations, fusions that could be found in fantasy-themed games, depend on the concept of the game, but game itself could have realistic or cartoonish design.

Atmosphere - only one artistic technique that will be partly considered in the designing and testing processes, because it can help players to reach immersion and understand the narrative, thus influencing the continuation desire.
Atmosphere - the mood of the place or scene that can be created by manipulating different visual and aural elements. Atmosphere cannot be a style element, because the same mood can be given to a scene that was created in all mentioned styles.
More information about the atmosphere could be found in the next subsection.

Atmosphere

As Brown & Cairns claimed [10], the barrier to achieve total immersion, thus increasing the continuation desire, is consisted of empathy and atmosphere. Empathy is not related to the topic of this project, so it will not be analysed further.
Atmosphere, on the other hand, is the part of the 'graphics' and is defined as an omnipresent mood of the place, situation or creative work [34]. It means that atmospheric elements can be everything that creates and

changes the tone of the place, scenario or game itself, which leads to the conclusion that atmosphere is being made by combination of game objects, light, textures, animation, sounds, effects, interface elements and plot.

The plot in relation to the atmosphere was mentioned not without the reason. Important to emphasize the thing that makes atmosphere distinct from the game construction - it is a context or relevance. Graphics and sounds of the game must be relevant to the story, characters, locations and actions, because audiovisual elements require the use of attention. If payers have to focus on visual elements, if they have to recognise and remember them, then much more effort is needed to be placed into a game [10].
Even if game does not have a story, game objects do not have to mislead player in the sense of game objects' origin. For example, if boxes would be placed in the forest, player may question the reason for boxes to be there and what is inside, whereas if they would be placed near the merchant stand, player would identify them as supplies. The same works with textures, color choices, light and sounds. If player will not find answers for his or her questions, it will break the atmosphere and immersion.

Colors and Emotions

Color is an atmospheric element that should also be reviewed, because it triggers emotions. It is a common fact that colors convey various feelings and people respond differently to colors. One of the reasons, why it happens, was mentioned earlier - because of the associative links that brain creates between colors, objects, situations, previous emotions and experiences. As a result, every color receive a meaning behind it. They start to symbolize concepts that are based on a cultural perceptions [6] and which could be seen in the Appendix A.
Thierry et al. [46] expanded this topic and suggested that perception of colors and reactions to them are being influenced by culture and language, which means that surroundings affect people's perception and feelings about colors. Illustration [13] of how colors are perceived by different cultures could be found in Appendix B.

Another reason was found by Wright [50], who claimed that reactions to colors depend on personality traits that let him to categorise people with specific characteristics into groups, which have certain patterns of responses to colors. Wright distributed people into four categories, which are shown in Table 2:

Number of the group	**Explanation of personality traits and reaction to colors**
Group 1	This group of people respond to bright and warm colors, like yellow. People in this group are 'externally motivated' and

	have a graceful nature.
Group 2	This group reacts to calm and subtle colors, such as blue. People in this category are 'internally motivated' and happy.
Group 3	Warm in tone, rich colors are the choices of this group of people. They have demonstrated 'external motivation' and are more intense.
Group 4	Cool in tone, but strong colors. Such colors were chosen by 'internally motivated, but more intense' people.

Table 2. Groups of people and their responses to colors based on their personality traits.

Perception of colors and reactions to them depend not only on the personality traits, but on the current mood as well [52]. For example, red color is perceived as aggressive, but if person is angry, red would stand out even more dominant. If someone is sad, he would perceive colors as more pale, less lively compared to happy person, who would perceive the same colors as being full of life, brighter and shinier.

Colors create an atmosphere in games, but do they really prompt an emotional reactions? To investigate this problem, researchers Joosten et al. [27] have conducted an experiment in the game field to find out if colors can cause emotions in games. During the test were used four colors and they were associated with four basic emotions: surprise - light blue, fear - dark green, joy - yellow, anger - red. In the experiment participated 25 males and 34 females. Participants had to play a game, where background color was manipulated, and rate their emotional states during gameplay by choosing images from "self-Assessment Manikin questionnaire" [9]. Experiment showed that yellow and red were very effective in provoking for emotional responses, where red color was chosen by participants as prompting negative feelings and yellow - as positive. However, dark green and light blue did not cause any effects.

Based on the review of the aesthetics, Theory of Memories, graphical styles, atmosphere and colors, conclusions can be made:

- Create two different environments, but make their design somehow familiar; make it similar to one of those that could be found in well-known games or movies.
- Use game objects that would remind about other games or movies.
- Use questions or tasks that would be oriented to get to know if graphics remind something and if they bring nostalgic feelings.

- During the review it was found that specific artistic elements and object properties make various graphical styles look distinguishably. All or many of artistic elements and object properties have to be used while designing the media technological product.
- Game objects should not be randomly placed in the environment.
- Player should not question the logic of created environment and game objects' origin, or he/she has to be able to receive an explanation about the strange objects' origin.
- Questions or tasks about light, animation or effects should not be used.
- Create an atmosphere by using color meanings that are common for european people.
    - It was planned to give realistic place a tensing and somehow frightening atmosphere. For such purpose will be used grey (because it is associated with a cold temperatures [6]), dull blue (it is associated with depression in western culture [13]), yellow-green colors (often associates with sickness and discord [36]) and some black (reminds people about the death [13], evil, fear and unknown [36]).
    - Unlike realistic place, it was decided to make cartoonish place magical and fantasy-themed. To achieve this feeling mainly purple and violet colors will be used (they symbolize spirituality and mystery [6, 13]).

Continuation Desire Evaluation Approach

Not so many attempts to evaluate continuation desire were made, but still it is a good idea to analyse previous work and collect evaluation methods that were designed not only to evaluate the continuation desire, but the related concepts as well. In this section will be reviewed methods that were used by different researchers to evaluate the continuation desire and closest experiences. After that will be presented an evaluation method that was made specifically for this project to measure the continuation desire, affected by graphical style, during the gameplay.

Evaluation of Continuation Desire

Continuation Desire was evaluated few times by different researchers and scholars, but many investigation methods were commonly conducted as short interviews during the play and as post-experience evaluations and measurements. Until now the continuation desire was evaluated by using The Engagement Sample Questionnaire (ESQ) [39]. The idea of this intrusive approach is based on the assumption that if play session will be paused, players will still want to continue the activity and be able to, first of all, indicate how strong is their desire to keep playing, and secondly, they could reflect on why they want to continue.
First part of the questionnaire consists of questions about respondent's demographics: age, gender, favourite game or genre, amount and frequency of playing per week, etc.
Second part is concerned with the respondent's motivation to begin the experience. In this part person has to answer why he or she wants to begin an experience and has to rate a desire to continue by choosing an option from a Likert scale.
Then goes a third part of ESQ, which could be repeated few times during the experience. During the evaluation of continuation desire, game is being stopped and respondents are being asked to rate their level of continuation desire and answer a series of open-ended questions about the reasons that make them want or not want to play more and what are they feeling.
ESQ finishes with the fourth part that is focused on the willingness to play a game again and reasons that make people want or not want to repeat the experience.
Full ESQ template could be seen in the Table 3.

ESQ Part One: Demographics (gender, age, frequency and amount of playing, favourite game / genre)							
ESQ Part Two: Before the experience							
Q1. Please indicate below the extent to which you agree or disagree with this sentence: "I want to begin the experience" (to quantify the users Continuation Desire (CD))							
Disagree strongly	Disagree moderately	Disagree a little	Neither agree nor disagree	Agree a little	Agree moderately	Agree strongly	Other
Q2. "What makes you want/not want to begin?" (to identify the user's CD and objective)							
ESQ Part Tree: During the experience							
Q3. Please write the code which is written on the screen in the application: (identifying the latest event)							
Q4. Please indicate the extent to which you agree or disagree with this sentence: "I want to continue the experience now!" (Response options as in Q1)							
Q4. "What makes you want/not want to continue?" (to identify the source of the user's CD and objective)							
Q5. "What do you feel now?" (to indicate the user's affect)							
Q6. "What is happening in the experience?" (to explore the narrative generated by the user)							
Q7. "What do you want to do next?" (to identify the user's activity)							
Q8. "General comments concerning the experience so far" (technical, content)							
Q9. "Do you want to continue?" (yes/no) ("yes" resumes, "no" directs to the final part of the ESQ)							
ESQ Part Four: After the experience							
Q10. Please write the code which is written on the screen in the application: (identifying the latest event)							
Q11. Please indicate the extent to which you agree or disagree with this sentence: "I want to try again!" (Response options as in Q1)							
Q12, "What makes you want/not want to try again (in the application / experience)?"							
Q13. "What do you feel now?" (to indicate the user's affect)							
Q14. "What did you just experience?" (to explore the narrative generated by the user)							
Q15. "Why do you want/not want to try again?"							
Q16. "General comments concerning the experience" (technical, content)							
Q17. "How many minutes do you think you have spent in the experience?"							
Q18. Extra questions related to communication of the theme and learning outcomes, not used in this study							

Table 3. The Engagement Sample Questionnaire.

One evaluation with the usage of ESQ was done on the Aporia interactive narrative [5], which was tested with 20 participants. Participants played a game until they reached one of the two endings or until they decided to quit. During the gameplay, players were interrupted at three specific places in the game, where players had to report their level of continuation desire at that current moment. Answers then were combined with information collected before and after the play session, which let to create an overview of each player's desire to continue. Evaluation showed that majority of participants wanted to continue playing even being interrupted three times. After they reached the ending of Aporia, most people felt like completing the game that explains why they did not want to play again.

After the evaluation results were compared across the four player types (killer, explorer, achiever and socializer). Participants were explained the concepts of four player types and were asked to choose one of four types as best describing their playing technique. Even though it was expected to see the biggest level of continuation desire at the explorer player type, because the concept of game consisted in the exploration of environment, however, results showed that almost all players had strong desire to continue. Such results let to conclude that during the development of method to evaluate continuation desire throughout the play no need to concentrate on questions and tasks, oriented to investigate if players like to explore the game world.

Exploration is an activity and player's intrinsic goal, which are not the investigation variables of current study.

Another evaluation of continuation desire was previously done by author in the project named "The Merge of Cartoon and Reality" [12] in order to investigate if cartoonish graphical style can influence the continuation desire in action-adventure game. In order to investigate this problem, a game prototype with three locations was designed. All locations were created in different graphical styles, including cartoon-like style. As "Merge" was a collaborative project, finished game prototype also had a narrative, extrinsic goals and gave a possibility to play this game with a friend. At the end these additional capabilities influenced the evaluation results, which means that such mistake should not be repeated.
Test was conducted upon 26 participants: 22 males and 4 females, mostly all of them were in the range of 20-27 years old. Participants were introduced to the story of the game and were said that they would play three game scenarios and would have to fill a questionnaire before the experience and after each scenario. Questionnaire was based on the ESQ and it was divided into four parts. First part of the questionnaire was given before the experience to collect information about participants' demographics, how many hours per week they play, what game genres they prefer and a list of maximum four games with short sentences or keywords explaining why they liked these games. Second part was given after playing the first game scenario. Questions in this part were asking, what participant feels at the current moment, how could he or she rate every location, did the participant notice if feelings changed based on the environment player was in, how motivated participant is to continue experience and why. Third part of the questionnaire was similar to the previous, except few questions, asking how person could describe the atmosphere of the cartoonish environment and how could it be improved to make it appealing. Last part was also asking about person's feelings, would he or she be motivated to play a full version of game and why. Full "Merge" questionnaire could be found in Appendix C.
Test showed interesting results. First of all, one of the assumptions was that people who like cartoonish games would give higher rates to the cartoonish environment than other environments; people who like realistic games would give highest rates to the realistic environment, and the same with the cubically stylized games. In fact, answers demonstrated inverted results: participants who named realistic favourite games gave lower rates to the realistic environment rather than other two locations; the same happened with participants who named cartoonish and cubic favourite games. Possible explanation is that participants who named cartoonish favourite games most likely are used to play cartoon-like games at their spare time and see high-quality design of their preferred style. Such people can have higher demands for the quality of cartoonish design.
Second assumption was that participants would like to continue playing in place, which style they prefer to see in favourite games. For example, if player likes cartoonish games, he or she would choose a cartoonish place to continue playing. This assumption is close to the first one, but current one is specifically focused on the willingness to continue playing rather than players' aesthetic preferences and likes/dislikes. Answers showed that most of them would like to continue playing in places, which graphical style was not related to the styles of their favourite games and given rates. It could happen because of the two reasons (at least): 1) because participants have seen many professionally made examples of games in favourite style, so they

have examples to compare with; 2) players' attention shifted to the game mechanics and controls. The same problem occurred while testing the third assumption, which sounds like this: participants would experience emotional effect while being in the place with favourite graphical style. In other words, it was expected that visuals would make players more excited and engaged. It could be said for sure that during all play session participants demonstrated increase of continuation desire, but, unfortunately, changes took place not because of the visual design. Participants were so focused on the activities and controls, so few of them even did not notice that graphical style of places have changed. None of the participants answered that they have noticed changes in their emotional state in relation to what environment they were in.
"Merge" project gave a review of how visual design's influence on continuation desire could be evaluated and what problems researchers and scholars could face. Based on the gathered data it is possible to highlight mistakes that should be excluded:

- in order to investigate if graphics are influencing the continuation desire, it is better to design an interactive media without a lot of extrinsic goals, activities and difficult controls that can shift player's attention away;
- if it is possible, provide detailed high-quality graphics;
- just an idea: as it was suggested by one of participants, could be set visible transitions between locations. For example, walls, portals or mountains could be placed between environments so the player could not see coming location until he completed the task;
- focus should be kept on the questions about player's feelings and desire to continue.

Engagement Mapping Method

Method was proposed by Henrik Schønau-Fog and Thomas Bjørner [41] and it aims to classify engagement causes in video games. Different engagement types were reviewed in the subsection "How Graphics Can Affect the Continuation Desire Through Engagement?" and it was noted that sensory, narrative and emotional engagement types can be influenced by graphics, affecting the continuation desire at the same time. As these three engagement types are related to the topic of this project, it was decided to explore an empirical data collection method that was used by Schønau-Fog & Bjørner in order to find out which engagement causes may occur when a player is willing to continue playing.
For their study were prepared 49 reaction cards with words, which were chosen based on the typology of six engagement types. All reaction cards thereby were divided into six broad categories: "Intellectual", "Physical", "Sensory", "Social", "Narrative" and "Emotional". As an example, some words that were written on cards were: "visual", "atmosphere", "explore" (cards from the "Sensory" collection), "anger", "joy", "tension" (cards from the "Emotional" collection) or "suspense", "curiosity" (cards from the "Narrative" collection).
For the data collection were used "Angry Birds" and "Wii Sports" games. For testing and interview, were recruited 18 participants to play "Angry Birds" and 12 - to play "Wii Sports". Participants were free to choose a game they would like to play. During the testing process, gameplay was interrupted and people were asked, if they want to continue playing. If person agreed, he was asked to choose 5 reaction cards out

of 49 that best described, why they wanted to continue playing. After that participants were asked to rank their chosen cards by first selecting the card that best described the reason they wanted to continue, then they had to choose second card that best described the reason to keep playing, and so on.
Researchers faced some problems that occurred during the testing process and that should be eliminated during the evaluation of continuation desire for current study. Firstly, it was a challenge to select words that were understood the same both by researchers and participants. Secondly, were used a lot of reaction cards that would be even bigger problem if similar method would have been implemented into a game. It means that number of words that could describe person's feelings should be lower and meanings of such words would be more broad and abstract.

System Tracking Real-Time User Experience (TRUE)

One more experience measuring system - TRUE [28] system, which seems to be interesting in the way it collects data during the gameplay, - will be reviewed in this subsection. TRUE is a tool for automatically collecting information about the events in software and games specifically. It records information about:

- events (what happened?),
- player's actions (what player did?),
- contextual information about the event (where it happened, what weather was there, at what time it happened, how many players were at this place, etc.)

Also, this method uses pop-up questions, which appear every three minutes of play, asking if this part of the game is too easy, about right or too hard, and what makes this part of the game like that.
In addition to this, TRUE uses brief in-game surveys at the end of the level or after an important event, like player's death or the solving of puzzle, asking participants whether they felt engaged, had fun or how hard current level or task was. Except of mentioned surveys, TRUE provides on-demand surveys whenever player wishes to bring them up and report about his or her feelings and thoughts. Developers of TRUE justifies this decision by the fact that it helps to understand the reason of player's motivation or boredom; it lets to get an information about person's feelings and opinions.
Furthermore, real-time video of the gameplay is being captured that allows to get even more information about the event and player's actions what lead to this event.

TRUE is the one of the methods that are used to track information in a real-time that correlates with the task of this study - to develop a method of evaluation of continuation desire, which was influenced by graphical style, during the gameplay. Description of the TRUE system and explanation of how it works helped to imagine how mentioned techniques could be adapted into a current project's evaluation method. Post-event surveys and pop-up questions could perfectly be used to catch player's feelings and the level of continuation desire. Being implemented into a game interface or game world environment, they will not disturb players during the gameplay.

Secondly, process of recording a real-time video was occurred in author's mind and could be used during the evaluation process as additional option to get an information, which was not taken from the questions and tasks.

Development of Method to Evaluate the Continuation Desire During the Gameplay

Prototype of the game will be designed to test the continuation desire during the gameplay. It will be the world with two places, made in two different graphical styles (Figure 6). Places will be separated and closed from each other, so the player could not enter a new location before he/she completes all tasks in the location he/she is in. It is needed to create a greater and clearer difference between styles of locations. Previous test of continuation desire [12] showed that some players did not really notice the transitions between places and they could not say that styles changed a lot. Also, as players were able to freely travel around the game world, few of them did not even find a cartoon-like location, so they could not rate it and say anything about the style, atmosphere and emotions that would have been triggered in this place.
It will be a game with a hidden story, which will be translated mostly through the graphics and atmosphere. Each location will be given it's unique atmosphere to make game more interesting and give player something worth attending to in order to affect player's willingness to continue playing. Evaluation method will be incorporated into a game, so there will not be any extrinsic goals and tasks except of those that would be made to evaluate a continuation desire. It is clear now that main player's task will be to explore the game world. In order to motivate player to do this, in all two locations will be placed a limited number of "events" (red circles in Figure 5) that will be related to evaluation tasks. After a number of tasks in one place will be completed, next location will open and player will be asked to move there.

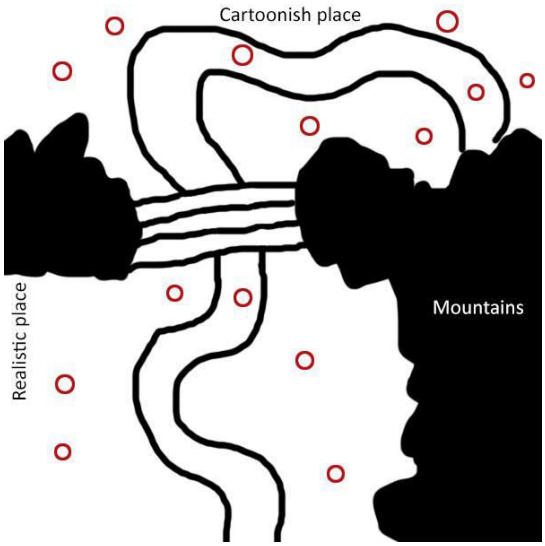

Figure 5. Terrain plan with “events” - red circles.

As the main activity in the current game will be an exploration of the game world, the question then arises: “how different player types could experience the playthroughs?” Bevensee et al. [5] investigated this problem. They created an interactive storytelling application, which players could explore. After that researchers evaluated the desire to continue and compared it across the four player types: explorers, achievers, socializers and killers. Researchers expected that explorers will feel the strongest desire to continue, however evaluation results revealed a general high level of continuation desire among all types of players. It allows to conclude that the concept of exploration game may be similarly engaging to the different types of players, but it has to be remembered that mentioned test was conducted upon only twenty participants. The group of twenty players is too small to make an eventual significance analysis.

Before starting the experience, player will be asked to fill a short questionnaire with basic information about person’s demographics and playing preferences. This information will be collected, because it might help to categorise respondents’ answers. It was decided not to put this part into a gameplay, because this information is not directly related to the current game world and evaluation quests. Added to the gameplay, such questions would interrupt experience by forcing players to stop and think how to answer, and it will ruin the flow.
The first draft of the pre-evaluation questionnaire looks like this:

1. **User information:**

- Age:
- Gender:
- Current Occupation(s):

2. **Player profile:**

- In regards to the past six months, choose how many hours do you play on average each week?

[] 0-5
[] 6-10
[] 11-16
[] 17-20
[] More than 21

- Write few of your favourite games:

- I like to explore the game world.

[] Yes
[] No
[] Sometimes

- Graphics is an important aspect which I look for when I choose a game to play.

[] Yes
[] No

- Does a game have to have a high-quality graphics in order to make you engaged?

[] Yes
[] No

- Can you ever be “in the game” when graphics are non-realistic?

[] Yes
[] No
[] Do not know

- What kinds of graphical styles do you like / dislike? [Open-ended]
- How motivated are you to begin the test? [Likert-scale]
- In regards to the answer above, why? [Open-ended]

Pre-evaluation questionnaire will be tested before an actual evaluation to be sure that potential participants understand questions correctly and will be able to answer them.

After participants finish filling up the pre-evaluation questionnaire, they will begin an experience. Here comes the main question in the evaluation method development - what “evaluation tasks” could be made and what questions could be asked so they could feel like being a part of the game? In order to come up with the tasks, was made a list of questions and statements, which could be used to investigate continuation desire and related feelings. Full list of questions and comments was placed in Appendix D. Below could be seen a list of questions that were chosen for the development of evaluation method. Questions and statements were inspired by examples found in ESQ [39], “Merge” questionnaire [12] and Jennett’s interview schedule [25].

Questions to be asked at the beginning of each environment:
How motivated are you to continue the game? [5-point Likert-scale]
What makes you (not) want to continue playing? [Options to choose: from the most important to least]
Questions to be asked in the middle of each environment:
What do you feel now? [Options to choose]
Questions to be asked after reaching the end of each environment:
Rate this environment.
Why did you gave such rate? Is it because of the…? [Options to choose]
After reaching the middle of realistic environment:
I want to know how next place will look like. [Yes/No or 5-point Likert-scale]
How many places would you like to explore? [Options to choose]

After reaching the middle of cartoonish environment:
Game world quickly grabbed my attention from the beginning. [Yes/No]
How much do you like changes in graphical style? [5-point Likert-scale]
Questions to check the concentration:
What figure was depicted on the mountain in realistic environment?
Or
How many snake paintings did you see?
Or
Did you saw a horse painting? Where was it? [Three options to choose: realistic, cartoonish, didn't see it/don't know]
Questions to be used at the end of the game, when all three locations will be explored:
If there would be one last quest, how much would you like to play it? [5-point Likert-scale]
What makes you (not) want to continue playing? [Options to choose: from the most important to least]
(Even if you do not want to play the last quest) Which environment would you choose to play in? [Four options to choose: realistic, cartoonish, somewhere else, don't know/undecided]
Why would you choose this environment? [Give categories to choose]
I am surprised that game finished so fast. [Yes/No]
Additional questions that could be used:
During the gameplay I did not think of how much time I spent playing. [Yes/No/Sometimes]
I would like to play this game in the future [Yes/No]

Some of the questions and statements that are collected above will be turned into little quests. They will be a part of the story and gameplay, which will be described in next section.

Evaluation Tasks for the Method

Game will start in realistic environment with a scene, where player receives a letter with words "Remember the details. Snakes and horses scare them away" (Figure 6, number 1). It will be a hint to the player, saying that he/she has to look for snake and horse illustrations. Player will need to find them and remember, how many objects were possible to find.
After the scene with the letter, player will be free to start his/her exploration. Player will be able to find snake paintings in realistic environment and a horse painting - in the cartoonish place. In the realistic location player will even find a horse statue, where will be left one evaluation task. Until player will reach a horse statue, he/she will find pieces of paper somewhere on the ground, between shrubs and trees (Figure 6, number 2). On the paper will be written hints, explaining what is happening in the story, where to go and what to find, and questions to evaluate a continuation desire.

When player will reach the horse statue (Figure 6, number 3), he/she will have to press a specific interaction button to read a question on it: "How motivated are you to continue exploration?" (instead of the question

"How motivated are you to continue the game?") and five answers starting from "Not at all" and finishing with "I have never been more motivated!". After the question will be answered, player will receive a number, for example 2330. This number is required to open a box that will be located near the horse statue (Figure 6, number 4). Decision to use numbers was taken to be sure that player will finish "horse statue" task first and only then will go to the "box" task, where could be found a question "What makes you (not) want to continue exploration?" It would be impossible to complete these tasks the other way round.

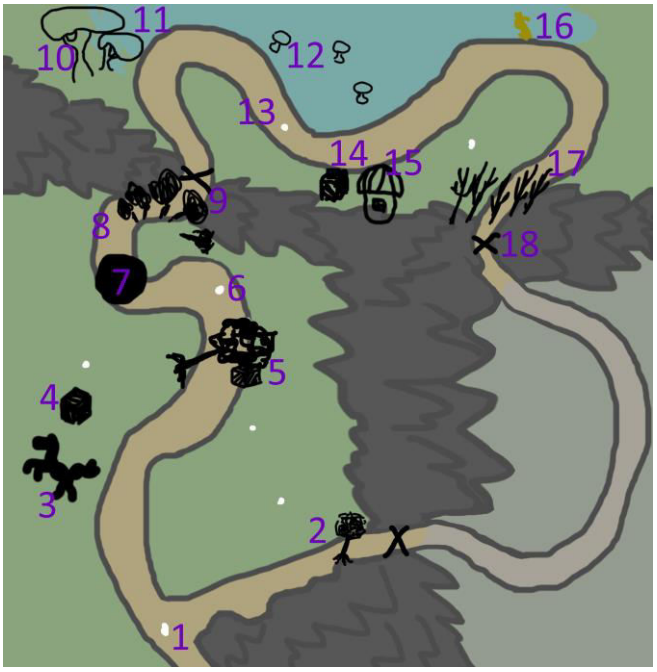

Figure 6. Sketch structure of the game world.

Some quests were inspired by Engagement Mapping Method [41]. For example, in the game will be placed interactive treasure chests or boxes or other objects asking "What do you feel now?" (Figure 6, numbers 5 & 14). Inside of them player will find cards with options to choose: nostalgia, engagement, fun, fear, my feelings did not change, not sure, etc. In order to make player's choice easier, one card will have a group of few related feelings, so player could find the closest option for the emotions he/she will experience, e.g. "interest/curiosity/anticipation" or "fear/anxiety/fatigue". Such boxes or treasure chests will appear in all two environments.

Another example, based on the Engagement Mapping Method, is a task to open a box with question "What makes you (not) want to continue exploration?" (Figure 6, number 4). In a box will be cards with different options, e.g. atmosphere of this place, graphical style of this place, story, tasks, etc. Player will be asked to choose three answers from the most influencing player's opinion to least. The similar technique will be applied to the task that will be made to get to know why player gave specific rate for each place (Figure 6, numbers 9 & 18). This quest will appear in the end of each environment

During the gameplay will appear quests to check out player's concentration. One quest will take place in the middle of the cartoonish location (Figure 6, number 12). In the lake will be placed mushrooms with numbers on their caps, and one bigger interactive mushroom with a question "How many snake paintings did you see? Shoot a correct mushroom". Player will not be able to shoot mushrooms with numbers until he/she will interact with the bigger one. This decision was made to eliminate errors. It is expected that player might become too engaged trying to discover character's abilities and ways to interact with the game world, so player can accidentally destroy important game objects.
Second task to check out player's concentration will appear in the right top corner of the map (Figure 6, number 16). Player will find a pile of money in the lake with a sign that it can be interacted with. At the bottom of the lake will be written a question "Did you saw a painting of the horse? Where was it? Choose a coin with your answer." On the coins will be written possible answers: "realistic place", "cartoonish place" and "I didn't see it/Don't know". Player will have to choose one of them.

It was decided to give a sentence to the player, which would be placed inside of the mushroom house (Figure 6, number 15) and could sound like this: "This world and all those places quickly grabbed my attention from the beginning. Do you agree?" Player will have to agree or disagree with the sentence.

As it could be seen from Figure 6, and from the description of quests, some of the evaluation tasks have specific order and cannot be completed one without another. In order to unlock new environment, player will have to complete all quests in the first one.
When player will complete all tasks in all environments, black window with a piece of paper will appear. There will be written player character's minds and few last evaluation tasks:

1. A task where player will be asked if he/she want to take one last quest.
2. After that player will have to explain why he/she want or not want to take the last quest. To do that. Player will have to choose three answers - from the most important to least.
3. Later player will be asked, which place he would prefer to complete the last quest: "realistic", "cartoonish", "somewhere else" or "undecided".
4. Last task will appear in a form of simple white piece of paper with character's thoughts: "I am surprised that my journey finished so fast". Player will have to choose "yes" or "no".

Developing a Media Technological Product

Few Words About the Story

Story of this media technological product could be seen as an alternative path of narrative, which have been described in the “Merge” project [12].
Everything happens in a world, which is in danger. Evil interdimensional creatures, whom is not easy to see, are trying to destroy this world by colliding different realities. After the attack of these creatures, on the earth appeared places that look like lands from fairy tales or horror movies: they have low-poly trees, shining flowers and big mushrooms.
When player character woke up, he could not find any people around, only strange pieces of paper were scattered on the ground and signs appeared on the trees and stones.

Creation of the Terrain

To be able to measure the continuation desire during the gameplay and find out, if graphical style of the game affects it, was decided to create two locations: one made in realistic graphical style and second - in cartoonish graphical style. Creation process began with the concept sketches, where were schematically shown important location objects and tasks (Figure 6 and 7). The building of the game environment was an improvisation, though it still had requirements that were established in “Graphical Styles”, “Atmosphere” and “Continuation Desire Evaluation Approach” sections.

First of all, a basic terrain with resolution 1000 x 1000 was made. It was created in Unity3D 5.4.2f2 [48].
To highlight differences in graphical style of two locations, they had to be separated from each other, so the player could not see environment he/she is not in and what is coming next. To reach this goal mountains were made by using “Rise/Lower Terrain”, “Paint Height” and “Smooth Height” brushes. The way between two locations was blocked with the gate and big rocks, so player could not go to the second environment until he/she will complete all tasks in the first one.
Realistic graphical style is detailed. In order to meet this criterion, mountains in realistic place should also be detailed. For this purpose were used various texture-brushes from the standard Unity set.
Unlike realistic mountains, cartoon-like mountains had to be stylized, less detailed, so they were smoothed by using “Smooth Height” brush.

When mountains were finished, in the Unity were made small hills and main path, which started in the corner of realistic environment, went through both locations and led to the end of the cartoonish place. Road was made with the “Paint Height” brush. It was done in order to help player navigate in the environment.

After that on the ground were placed environmental objects that were downloaded from the Unity asset store. Detailed trees, rocks and bushes were placed in realistic location. Trees and bushes were added in a non-random way, between the groups of these objects were made bigger empty spaces, so they could create patterns and help player to find a way. Important interactive objects were given a slight glow effect. Grass in the same location was made by using standard “Paint Details” brush. Some fallen trees and rocks were piled on the main road to make player think that a fight or a storm have taken place here.
Also, in realistic location was put a box, a treasure chest and many pieces of paper with tasks and explanations. Later was added a horse statue with one of the evaluation questions. It was placed in realistic environment, as well as few wooden wagons, to create a feeling that someone was living here before, but now this place is abandoned. In addition to that, a little lake was created in the middle of the road and the bridge was designed to make it possible to go to the another part of the road.
As it was mentioned earlier, path to the cartoonish place was blocked with rocks and gate. In front of the gate and rocks were added tall trees, which player have to shoot to clear the path.

When basic design of the realistic place was finished, cartoonish location was filled with simplistic, stylized prefabs: trees, flowers, mushrooms, treasure chest, box and one human-sized mushroom house. Player can easily recognise a fantasy-theme and cartoon-like style of this environment, because objects have unrealistic colors, shapes, sizes, they are not detailed and few items were made glowing. Half of the territory contains a big lake.

Textures for the first location were used small and detailed. All realistic environment was done in green, brown, grey, blue and sand colors.
For the cartoonish place were used big and less detailed textures to make environment look smoothed and blurred. Textures had bright and unrealistic colors, e.g. blue and purple. On the ground could be found spots of red grass to create an illusion of reflections from the red mushroom caps.
The main path was made brighter than environment itself, so the player could easily find it.

Creation of the Atmosphere

In order to save time and build game faster was decided to create it in editing and publishing application - klynt [22]. This application allows to create interactive stories without programming, by using different media, like images, text, sounds, videos. It was thought that program could be used to create a game as well. Second reason to choose this software was the fact that current project does not focus on the game mechanics, programming, animation and many other game aspects. The game prototype should not have any other tasks rather than those that could evaluate player’s continuation desire based on the graphical

style of the game. It means that game prototype should allow players to explore both environments and give tasks or questions to answer during the gameplay. klynt provides a possibility to design an interactive exploring game without fixing enormous amount of bugs.

First of all, were taken 49 screenshots of both locations that were made in Unity. Screenshots were taken from the first-person perspective that would let players imagine that they are exploring game world themselves. All screenshots were edited in Adobe Photoshop [2].

It was decided to give different atmosphere to realistic and cartoonish locations, so this distinction could highlight differences between graphical styles. Also, atmosphere would help to avoid boredom during the gameplay and would give players something to concentrate on.

In the beginning was made a creepy, tensing atmosphere of the abandoned place. It started from the duplicating and blurring every screenshot of realistic environment. After that to the blurred image was set the overlay blend mode and it was put above the original screenshot. Between these two layers was placed a layer with grey-blue background (mostly sky and mountains) painted with the brush tool. This grey-blue background created a perspective illusion, so the mountains, sky and some game objects would look like being far away from the player. Color levels, brightness, contrast were also changed in the Photoshop. To make place look more frighteningly, near the ground and on the background were painted two layers of fog with different opacity levels. Interactive items, such as box, treasure chest, pieces of paper, horse statue were given an addition soft light layer of light to make them brighter. In the end was created dark grey-green gradient layer.
One example of the realistic game atmosphere could be seen in the Figure 7. More examples were added to the Appendix E.

Figure 7. Example of the realistic place atmosphere: 1 - how it was in the Unity, 2 - how it looks after editing in the Photoshop.

It was decided to make cartoonish place more positive, mysterious and fantasy-themed. The beginning of the atmosphere creation process was the same - by duplicating and blurring all screenshots of the cartoon-like place. Between these two images was also added a layer with the blue background to create a perspective feeling. After that were changed color levels, brightness and contrast. To highlight red reflections on the grass under the mushrooms, was created a new layer with red spots painted with the brush tool. Blend mode of this layer was set to the “hard light” and both opacity and fill were decreased to 70%. Some trees in cartoonish place were given an interesting and engaging effect: around the tree trunk and branches were painted shiny purple spots that are giving this place a sense of magic.
After that was made a dark purple gradient layer to the all scene. Instead of the real fog, in this place appeared a layer of light-violet smoke above the ground. Above the lake was painted magical blue vapor. In order to highlight a foreground of the scene, on the background was added an additional dark purple layer, which was multiplied with the original screenshot. In order to make place more fantasy-themed was drawn a translucent layer of light with bright yellow spots around each flower. Shiny spots appeared around the mushroom house as well.
To make interactive items visible and bright, was created a layer with the light-yellow or light-orange silhouette of needed objects and the blend mode of this layer was set to the “soft light”.
In the end colors were changed again to add blue tone to the scene.
Example of cartoonish place atmosphere could be seen in Figure 8. More examples were added to the Appendix E.

Figure 8. Example of the cartoonish place atmosphere: 1 - how it was in the Unity, 2 - how it looks after editing in the Photoshop.

Implementation of the Continuation Desire Evaluation Method

Now will be explained how continuation desire evaluation method was implemented into a gameplay.

From the beginning of this project was thought to make three locations with different graphical styles and different "events" inside of each of them. Questions that was planned to use for three locations are collected in the subsection "Development of Method to Evaluate the Continuation Desire During the Gameplay" and even bigger list of questions is added to Appendix D. Not all of them were used after all, because game in this case would have been either too big and it would require more time to build it or too filled with tasks that would distract player from exploring.
Game starts from the scene with letter on the black screen. On this letter are written words "Remember the details: snakes and mushrooms scare them away…", which let players start imagining their own story. Start a game is possible by clicking on a button "Launch" on the same scene with the letter. After that players will be free to explore realistic environment by pressing arrow buttons that are placed on the screen (Figure 9). No other GUI elements were used in the game. Based on the Federoff's recommendations [18] interface was made as minimalistic and invisible as possible to avoid player distraction and increase the immersion.

Figure 9. Example of the interface.

First "event" was created at the horse statue. When player will find a horse statue, he/she will be asked to push it and then answer the question "How motivated are you to continue your exploration?" by choosing one answer out of five: "not at all", "not so much", "undecided", "motivated enough" and "I have never been more motivated!" At this point player will not be able to come back or skip the scene (Figure 10).

Figure 10. Horse statue task.

After completing a task player will receive a code "2330", which allows to open the box next to the horse statue. If player would have tried to open the box first, the scene with the box on the black background would show up. On the box player would have seen words "You cannot open it! You need a code…"
If player will like to return to the horse statue after completing a first "event", he/she will see a scene where on the horse statue would be written "You were here already, silly human".

As it was mentioned above, after receiving a code player will be able to open the box. In the box player will find an old paper with text: "Good! As you have the code to open the box (2330), you won another question. What makes you (not) want to continue your exploration, human? Choose three cards: from the most influencing your opinion to least". At the same time on the screen will appear cards with following answers: "atmosphere of this place", "graphical style of this place", "story so far", "questions", "idea of our project", "it reminds you games you have played, or other experiences…", something else…" (Figure 11). It was decided to give options like "questions" or "story so far" to choose, even though current project is not focused on evaluation of the continuation desire based on the story or game mechanics. It was made to give as many options as possible and not force players to choose cards that do not truly describe their reasons to continue playing.

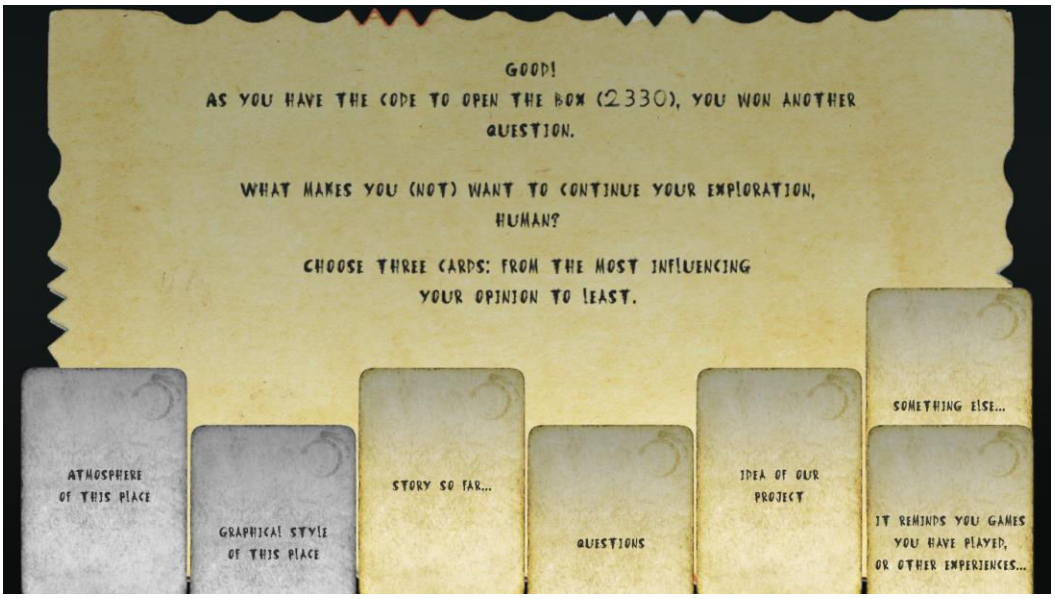

Figure 11 Box task with cards.

Third evaluation task could be found in the treasure chest, which was placed under the fallen tree leaves. Player will be able to open it only after completing a box "event". In the treasure chest player will find a map with the question in the middle: "What do you feel now?". This time player will have to choose only one answer. Feelings that player could choose were grouped into twelve categories, which are shown in the Figure 12.

Figure 12. Treasure chest task.

During the journey player will find many pieces of paper. Some of them will contain an evaluation tasks. First task on the paper could be found on the road to the other edge of realistic environment. On the paper player will see a text: “You know, I'm kind of interested how next place will look like. Do you feel the same?” Five possible answers were written under this text: “not at all…”, “or maybe. Not sure…”, “I'm still undecided…”, “I think yes…”, “very much the same!” In the realistic location will be no more other questions written on the paper.

Next task will appear in the form of the giant rock in the middle of the road. On the ground beside this rock could be find a new question, which sounds like this: “say, human, how many places would you like to explore if I let you go?” Answers were also written on the ground: “1”, “2”, “3” and “as many as I can”. By choosing one answer player will clear the way to the following “event”.

Another task when player will have to clear the way will ask to rate realistic environment by shooting a tree with the number on its trunk (Figure 13). The same as other tasks, player will not be able to skip this one or return and complete it again.

Figure 13. Task where player have to rate realistic environment.

The last “event” in realistic environment will be faced in front of the gate. Grey-purple smoke that comes from the gate will let player understand that next place will be magical.
Current task and answers will be cut on the mountain. Player will have to explain with three answers, why did he/she rate realistic place the way he/she did. All answers that were given to choose from are related to

the visual design of the place or feelings that could have been encountered: “visual style of this place”, “atmosphere”, “color choices”, “light”, “makes you feel nostalgic”, “it looks like games you like/dislike”, “it affects your emotional state”, “congruency between the objects and atmosphere”, “(not) catches the attention”, “something else”.

Next place waiting to be explored is a cartoonish place. First two tasks in this place will be found almost from the beginning. Player will see big and small trees, which he/she will be able to interact with. Player will have to start from the big tree “event” (Figure 14), otherwise he/she will not receive a small tree task. On the big tree trunk player will read a question “can you tell me again, human, how motivated are you to continue your journey?” On the same tree branches were written five answers. One of them player will have to choose to complete the task. After that on the big tree trunk will appear words “good! Now you can try your luck with the smaller tree”.

Figure 14. Big tree “event”.

Small tree “event” will ask player to choose three answers, from the most important to least, that make him/her want or not want to continue the game. Answers were placed on the trunk, branches and polygonal crowns. Chosen answers become crossed out with the bright red crosses (Figure 15).

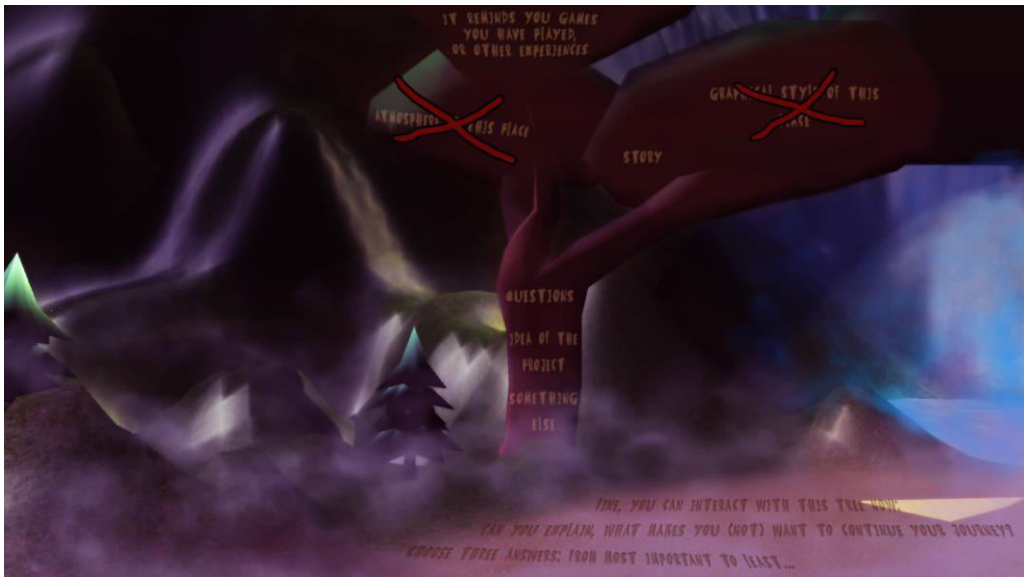

Figure 15. Small tree "event".

Following interactive item with the task is a red mushroom that was placed in the lake. Player can interact with it any time. However, the task will become available only after completing both tree "events". Until then on the screen will appear scene with the words "we will not say anything…". When a mushroom task will be activated, on the screen will appear a scene with the question "how many snake paintings did you see? Choose a correct mushroom" (Figure 16). Mentioned snake paintings were drawn on the mountains and cards in realistic environment. In the game world player will be able to find nine snake paintings. This question will be asked to find out how focused person is during the gameplay. Answers to choose from will be following: "1", "3", "6", "9", "don't know or didn't see any".

Figure 16. Red mushroom "event".

One more task could be found on the piece of paper near the red mushroom. Piece of paper was left on the main road, so player would not miss it. On the paper person will see some thoughts of the character that was here before: “they asked, how much I like changes of the graphical style of my world. Hmmm... I don't even know. How about you?” On the same piece of paper, under the text, player will notice options how to answer this question: “don't like changes in graphical style at all”m “hmmm... not really?”, “undecided”, “not bad”, “like it very much! Let the world be like this!” The completion of this task will allow player explore cartoonish place further.

In the cartoon-like location were added more tasks than in realistic one, because some questions were meant to be in the third location, which was not created. This is the reason why they are put next to each other and could easily be found.

While exploring second place, player will see a mushroom house on the top of the hill. In front of the mushroom house he/she will find a treasure chest that contains the same question (“what do you feel now?”) as in the realistic environment.

It should be mentioned that mushroom house was also made interactive. By clicking on a pulsar button, attached to this game world object, a scene with the old paper will show up. Player will be able to read a text on this paper “This world and all those places quickly grabbed my attention from the beginning. Do you agree?” and answer “yes” or “no” to this question.

To the cartoon-like place was added one more task to check the concentration. A little pile of coins was placed in the water. Coins were made shiny, so person could easily find them. A pulsar button will appear when person will come closer to the pile of coins. The task itself looks like two questions “did you see a painting of the horse? Where was it?” that were written on the ground. On the few coins were written possible answers, such as “realistic environment”, “cartoonish environment” and “don’t know/didn’t see it” (Figure 17). Person will have to choose only one answer. The completion of this task will allow player to proceed with the exploration.

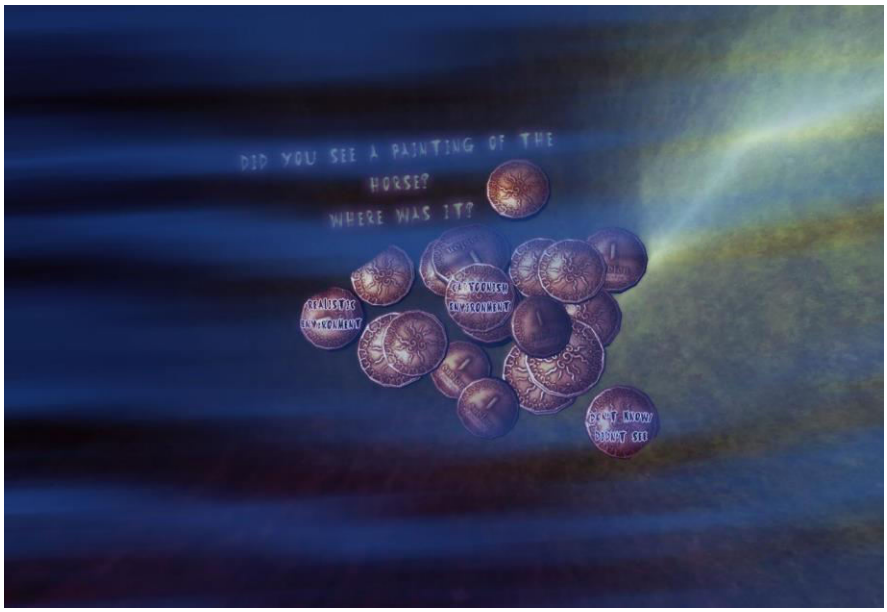

Figure 17. Money "event"

Another evaluation task that was copied from the realistic place's tasks is one where player will be asked to rate an environment by shooting a tree with the number on it's trunk. After this "event" will be completed, player will have to explain in three answers, why he/she gave such a rate to the cartoonish location.

As there is no third location to explore, tasks that were planned to be given at the end of the game, will appear after the last question in the cartoonish location will be answered. On the screen will show up an old paper with the text "don't go away, human! Say, how much would you like to take one last exploration quest?" Player will have to choose from the following answers: "don't want at all", "not so much", "undecided", "I think I would like to" and "I really want to take it!" After that person will be asked to explain, why he/she want or not want to take last quest. The same as in the realistic and cartoonish places, participant will have to choose three answers- from the most important to least.
One more important thing to know - which environment player would like to choose to complete last quest. Options to choose from are: "realistic place", "cartoonish place", "somewhere else", "undecided.
Last sentence that will be given is "I am surprised that my journey finished so fast" with only two possibilities - to choose "yes" or "no" - to reach the end of the game.

Evaluation Procedure

In order to avoid distractions that can break the immersion and flow, thus influencing the continuation desire, test will be conducted in one of the rooms at Aalborg University, Copenhagen, where will be no other people and noise, and where will be the same conditions for all participants. During the evaluation

process only one participant will test a game, because 1) author has only one computer to test on, 2) it will be a singleplayer game, so other people in the room will distract a participant.

Before the test it will be explained that players will play a short game for as long as they want or until they reach the end of the game. Also, it will be said that players will not be interrupted during the gameplay and have no time limits. Participants will know that they will have to complete some tasks, but the tasks will not be described.

During the testing process in the room will be only one participant and one test conductor standing at the other corner of the room to not to disturb participant, but always be in the room in case if participant will have any questions or will face any problems.
The evaluation process will start from the pre-evaluation questionnaire, which will be printed on the paper and given to each participant. After that players will be able to start playing. To play a game players will use only a mouse. As in the game was not made a mechanism collecting players' responses, in order to do so was decided to record a screen during the each playthrough. This idea was taken from the TRUE method [28].

After the evaluation, participants will be shortly debriefed about their experiences during the test. When all testing will finish, players' answers from recorded videos will be transferred into a Google Forms, so it would be easier to visualise collected data.

Testing Pre-Evaluation Questionnaire

Before evaluation process could be started, pre-evaluation questionnaire from the subsection "Development of Method to Evaluate the Continuation Desire During the Gameplay" should be tested to be sure that participants would understand questions they were given. With this purpose pre-evaluation questionnaire was shown to five random people in the Aalborg University in Copenhagen. Test of the pre-evaluation questionnaire allowed to conclude that potential participants could have problems with two questions from the questionnaire:

- Can you ever be "in the game" when graphics are non-realistic?
It had to be "yes/no/do not know" question. There are two problems with this question. Firstly, not all asked people understood what means "to be in the game". Two out of five people were not sure how to interpret this question. It was tried to rephrase question by using words "immersed" and "to become present" instead of "in the game", but discussion showed that it will not help to understand this question as well.
Second problem is that three out of five people said that "being in the game" happens from time to time and depends on many factors: how good graphics are, how interesting narrative is presented, what tasks could be completed during the gameplay and much more. It means that person can be "in the game" when

graphics are non-realistic because of the other game aspects; as well as person will not become “in the game”, because story, atmosphere or quests are e.g. not congruent.
It was decided to remove this question from the pre-evaluation questionnaire.

- What kinds of graphical styles do you like / dislike?
It had to be an open-ended question. Three out of five people did not know how graphical styles could be distinguished from each other. Also, people said that they cannot choose one or few favourite graphical styles, because they play different games that are made in various graphical styles. They did not know how to answer this question and suggested either to provide short descriptions of the graphical styles, so they could read and choose from, or write lists of games, categorised by their graphical styles.
It was decided to remove this question from the pre-evaluation questionnaire. By the way, it would be possible to find out what graphical styles of the game participant likes by watching at his/her favourite games’ graphical styles.

Pre-evaluation questionnaire was corrected and during the test will be given a new version, which looks following way:

3. User information:
- Age:
- Gender:
- Current Occupation(s):

4. Player profile:
- In regards to the past six months, choose how many hours do you play on average each week?

[] 0-5
[] 6-10
[] 11-16
[] 17-20
[] More than 21

- Write few of your favourite games:

- I like to explore the game world.

[] Yes
[] No
[] Sometimes

- Graphics is an important aspect which I look for when I choose a game to play.

[] Yes
[] No

- Does a game have to have a high-quality graphics in order to make you engaged?

[] Yes
[] No

- How motivated are you to begin the test? [Likert-scale]
- In regards to the answer above, why? [Open-ended]

Test results

User Information

Test was conducted upon twenty participants: 60% (twelve people) were male participants and 40% (eight people) were female participants. All participants were in the range of 20 and 28 years old. All of them were students, however, some participants were also working as designers, freelancers, programmers and one of them was a tester.

Player Profile

Summary from the collected data revealed that biggest part of participants (40%, eight people) are used to play from 0 to 5 hours per week in regards to the past six months. 25% of participants or five people claimed that they play approximately 6-10 hours per week. 15% of participants or three persons said that they play around 17-20 hours per week. 10% of participants or two persons answered that during the last six months they play approximately 11-16 hours per week. Also 10% of participating people admitted that they play more than 21 hour per week.

When participants were asked if they like to explore the game world, 60% or twelve people agreed with the sentence, 5% or only one person answered negatively and 35% of participants - seven people - claimed that they like it sometimes.

Pre-evaluation questionnaire showed that for fifteen participants (75%) graphics is an important aspect which they look for when they choose a game to play. Other 25% (five people) disagreed with this sentence.

Another question about the game graphics disclosed that 65% of participants (or thirteen people) do not think that game have to have a high-quality graphics in order to make them engaged. However, 35% of participants (seven people) think that this sentence is applicable to their experience.

In the pre-evaluation questionnaire was also asked how motivated participants were to begin the experience. Two participants out of twenty were highly motivated to begin playing. Eight participants were motivated

enough, also eight people did not know if they want to participate or not. Many participants explained their reason to begin playing in the way that they like testing, were curious and wanted to know what they will experience.
The last two participants were not happy about testing and admitted that they did it just because they were asked to do a test. Fortunately, no one have chosen the option “not motivated at all” that could be seen in the Figure 18:

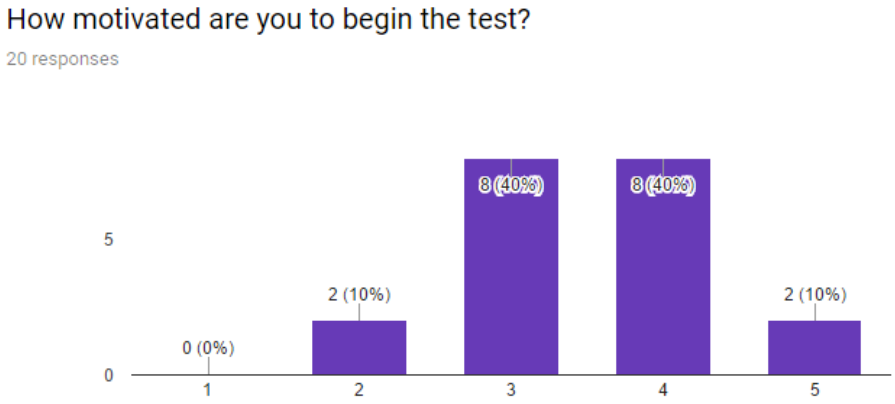

Figure 18. Motivation to begin the test.

Evaluation of Continuation Desire During the Gameplay

Evaluation of Continuation Desire began with the task where participant had to find a horse statue and answer how motivated he/she is to continue experience. Four people were highly motivated and rated their continuation desire as “5”. Nine people were motivated enough to continue playing. Five people out of twenty were undecided, two persons were not happy about continuing the experience and, finally, zero participants did not want to continue at all and did not decide to quit testing session at this point. Collected rates after completing the horse statue “event” are presented in the Figure 19.

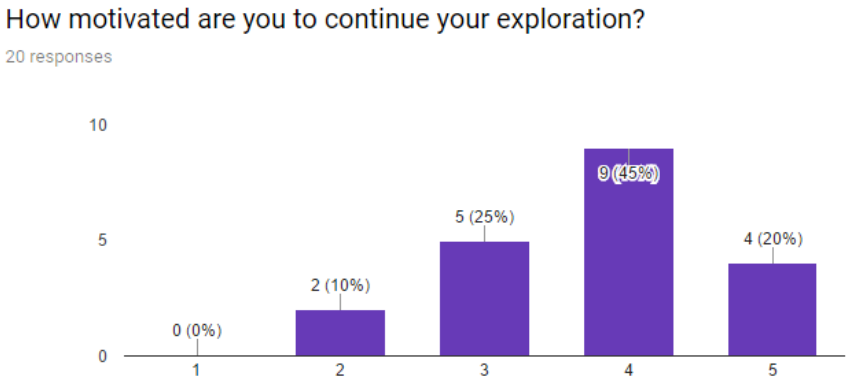

Figure 19. Continuation desire in the realistic place.

After that players were able to complete a box quest, where they had to choose three options explaining why they want or not want to continue playing. Players had to choose answers from the most important to least.
Collected information demonstrates that the very first reason to want or not want to continue playing is the atmosphere of realistic place - ten people out of twenty have chosen it. Though it should be mentioned that even five people have chosen graphical style (instead of the atmosphere) as the most important reason that influenced their continuation desire.
Second reason that influenced many participants' continuation desire was graphical style of realistic place - nine participants have chosen it.
The third reason that was chosen by biggest number of participants (9) was story.
Results are shown in the Figure 20.

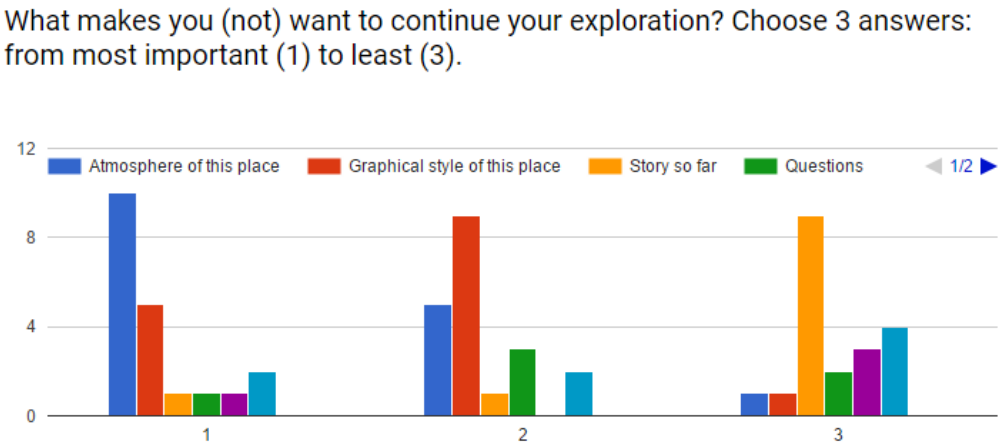

Figure 20. Reasons, why people wanted or not wanted to continue playing.

Later players were able to find a treasure chest with the question inside, asking what they are feeling at that moment. 30% of respondents were experiencing interest, curiosity or anticipation. 15% admitted that they have felt fear, anxiety or fatigue while playing in realistic environment. 10% of participants (two persons) have chosen determination or purposefulness. Also two persons claimed that they were feeling engagement, enjoyment or enthusiasm. The same amount of people decided to choose an answer "surprise/wonder/amazement" as one that describes their feelings best. Two more participants explained that their feelings did not change from the moment when they started their journey. One participant out of twenty have felt boredom or lack of interest, also one participant - sadness or disappointment, and the last one was not sure about his/her feelings.

Next question that had to be answered was: "I'm kind of interested how next place will look like. Do you feel the same?" Six participants strongly agreed with the sentence. Also six participants answered that they

feel the same. Four people were undecided if they want to know what place will be next. Two respondents did not feel the same and two more people strongly disagreed with the statement. All their answers are shown in the Figure below.

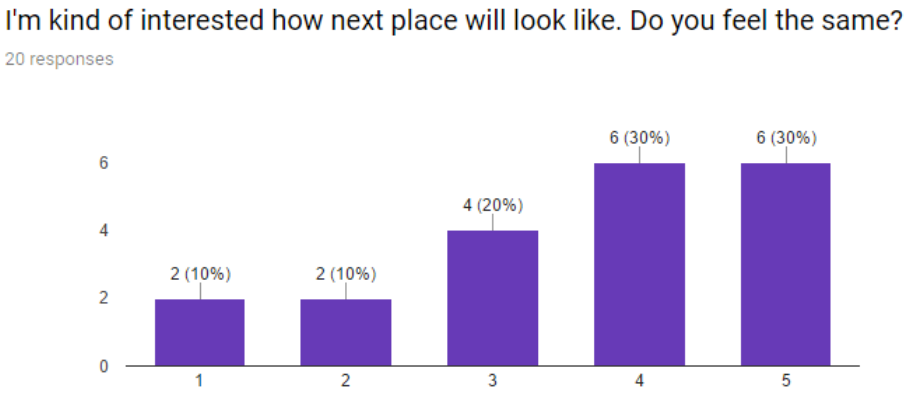

Figure 21. Answers showing how much people want to see next location.

To be able to continue exploration players had to clear their path by destroying a big rock that blocked the way. To destroy it, they had to answer the question "How many places would you like to explore?" Results reveal that biggest part of participants (30% or six people) would like to explore two locations. Five participants (25%) would like to see three locations. The same amount of respondents (25%) wish to explore as many places as they can, and four participants wanted to explore only one location during the all gameplay.

After that players were asked to rate realistic environment. Many participants (eleven of them) gave a rate "4". Four participants gave the biggest rate, also four people were undecided if they liked realistic environment or not. One player did not like realistic environment and zero gave the lowest rate to realistic place's design (Figure 22).

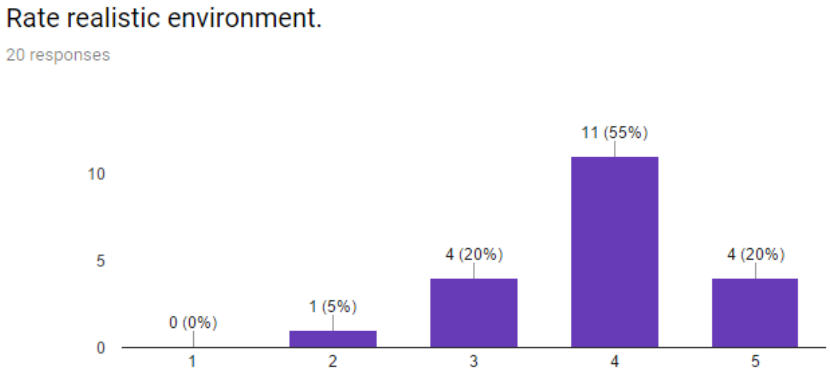

Figure 22. Rates of realistic environment.

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The last task in realistic environment was to explain in three answers why player rated one or another way. Even 70% of participants (fourteen of them) claimed that atmosphere was one of the reasons to give a rate they have chosen. Another reason is visual style of the place - twelve people have chosen it, and the third reason is the fact that environment affected nine players' emotional state. Results could be seen in the Figure 23.

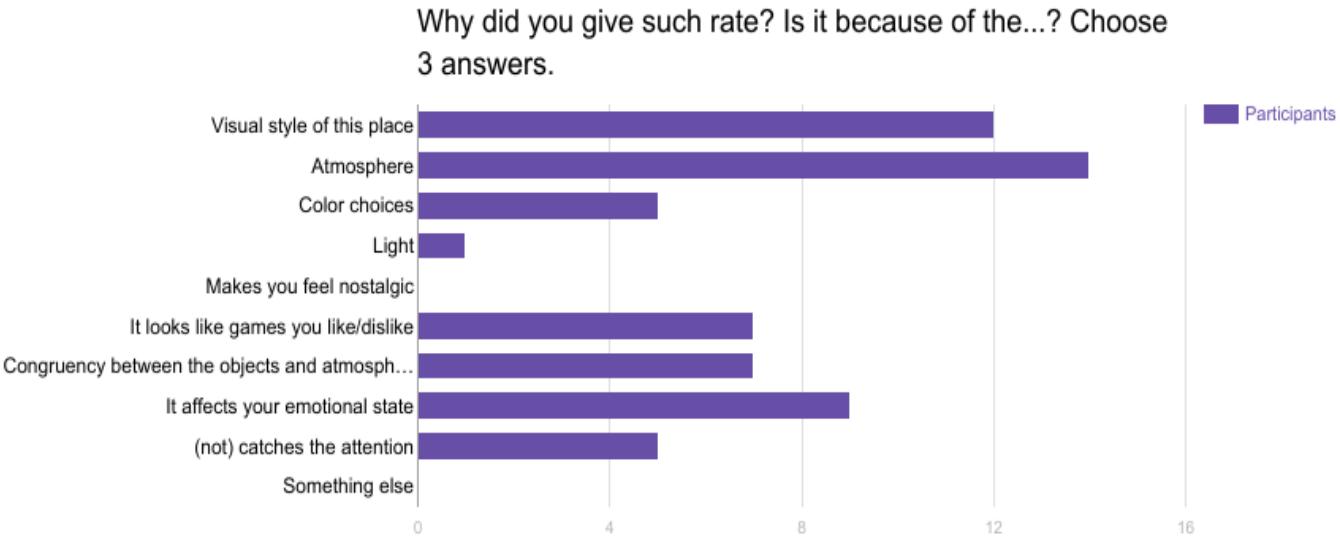

Figure 23. Reasons to rate realistic environment in one or another way.

Journey in the cartoonish place started with the task to rate the level of continuation desire. As it could be seen in the Figure 24, seven participants were highly motivated to continue experience. Ten participants were motivated enough to continue. Two respondents were undecided if they want to continue or not. One participant did not wish to continue playing, but still did not quit the experience.

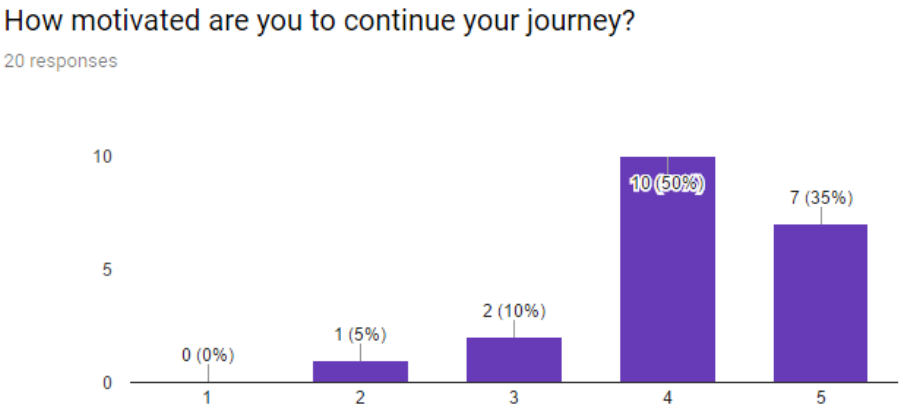

Figure 24. Continuation desire in cartoonish environment.

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The same as in the realistic environment, after evaluating the level of continuation desire, participants had to explain their decisions. Collected information shows that the most important reason to rate continuation desire in one or another way was an atmosphere of cartoonish place - eleven people have chosen it. Also, seven people have chosen the graphical style of the place as the main reason for their desire to continue. Second reason to wish to continue playing is a graphical style - half number of participants have chosen it. Third reason was the same as in the realistic environment - the story that was liked by seven people. Results are presented in the Figure 25.

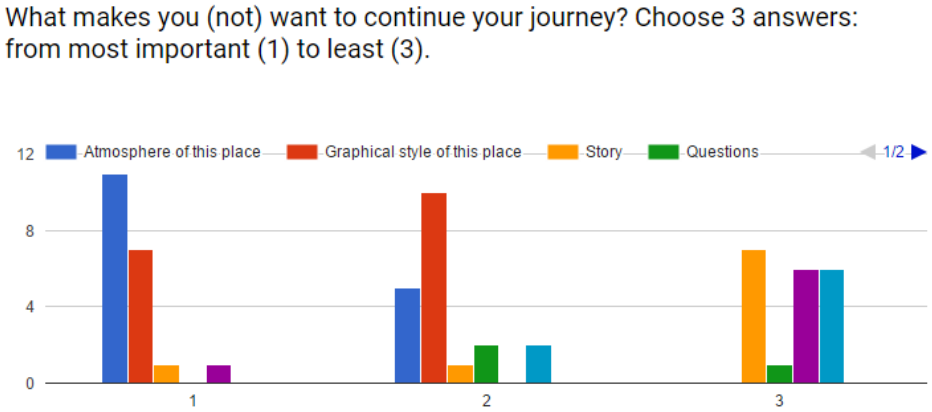

Figure 25. Reasons why participants want or not want to continue playing.

In the cartoonish location were made two concentration-checking tasks. One of them sounds like this: “How many snake paintings did you see?” Correct answer was “9”, and only 15% of participants have chosen it. The biggest part of respondents (45% or nine people) did not know or did not see snake paintings in realistic environment. Three persons thought that there were six snake paintings, the same amount of people have chosen the answer “1”. Two participants have found only three snake paintings.

Another concentration-checking task sounds this way: “Did you see a painting of the horse? Where was it?” Twelve participants answered that horse painting was found in cartoonish place. Seven participants did not know or did not see this painting and only one have thought that painting could have been in realistic environment.

Additional question to evaluate the continuation desire that would have been based on the visual design of the game was added into the cartoonish environment. It asked people how much they liked changes in the graphical style (from realistic to cartoonish). Biggest part of participants (50%) liked changes a lot. A little bit smaller amount of participants (25%) liked changes as well. 20% of respondents were unsure and only 5% of asked people did not like changes of the graphical style.

After that people were asked what do they feel. Five participants (25%) answered that they feel fun, satisfaction or inspiration. Four participants (20%) claimed that they were feeling interest, curiosity or anticipation. Surprise, wonder or amazement are emotions that were felt by 15% of respondents. This time even 15% of players also have felt a nostalgia. Two persons said that they were engaged and two more admitted that they had faced a boredom. Finally, only one person was feeling sadness or disappointment while exploring the cartoonish environment.

During the gameplay participants were also asked if the game world and two environments quickly grabbed their attention from the beginning. 55% of answers are positive, while 45% are negative.

When players have reached the end of the cartoonish location, they were asked to rate cartoon-like place. Twelve players (60%) liked second location very much and gave it the highest rate. Six people (30%) liked it as well and two people were undecided if they like cartoonish place or not.
Results of how people have rated the cartoonish place could be seen in the Figure 26.

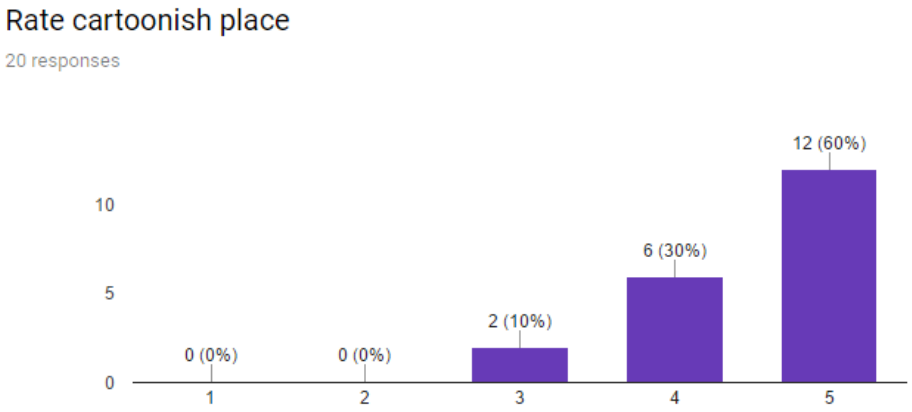

Figure 26. Rates of cartoonish environment.

Next task was to explain in three answers why person rated cartoonish environment they way he/she did. Even 80% of respondents agreed that the visual style of the second place is the reason they liked it. Twelve participants also have chosen an atmosphere and 50% of participants have thought that it is a congruency between the objects and atmosphere that made them like this place.
Bar chart with other results is presented in the Figure 27.

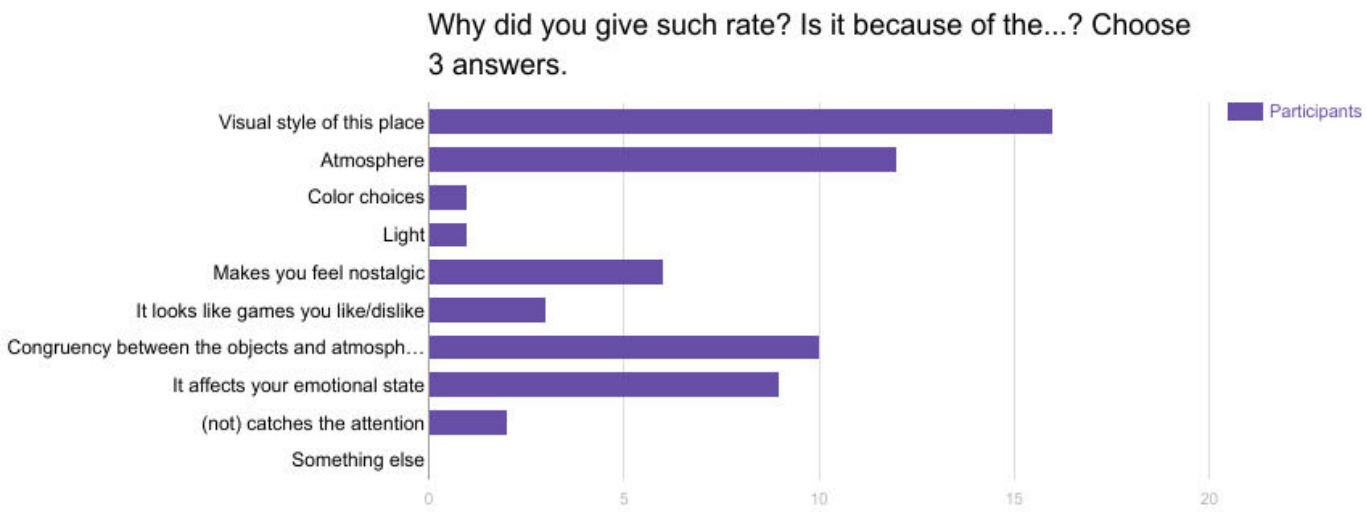

Figure 27. Reasons to rate cartoonish environment in one or another way.

At the End of the Game

When players reached the end of the game, they were given few more questions to answer. The first one was asking if players would like to take one last quest. Seven players were highly motivated to play more. Six players agreed to take the last quest. Two people were undecided and also two did not want to take the last mission. Though even three participants highly disagreed to play more. It could be seen in the Figure 28.

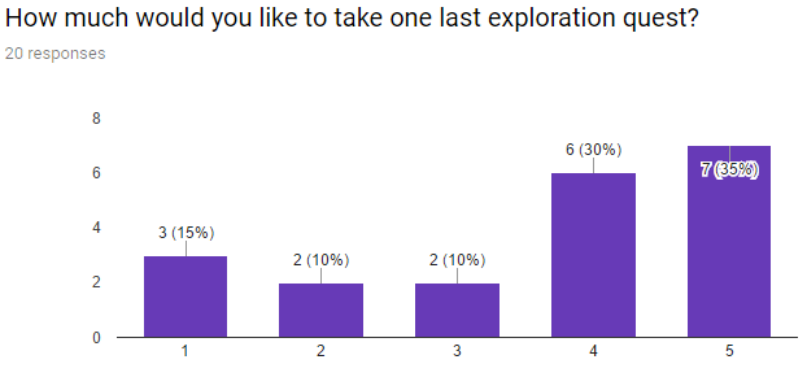

Figure 28. Continuation desire after finishing the game.

In order to get a better understanding of what motivated people to wish or not to wish to continue playing, players were asked to explain it by choosing three answers: from the most important to least. The biggest amount of participants (nine of them) have chosen an atmosphere of one or both places as the main reason to desire the continuation. Second reason seems to be a graphical style of one or both places - eight people

have chosen it. In the third place are both idea of the project and the fact that this media technological product reminded players games they have played. It is shown in the Figure 29.

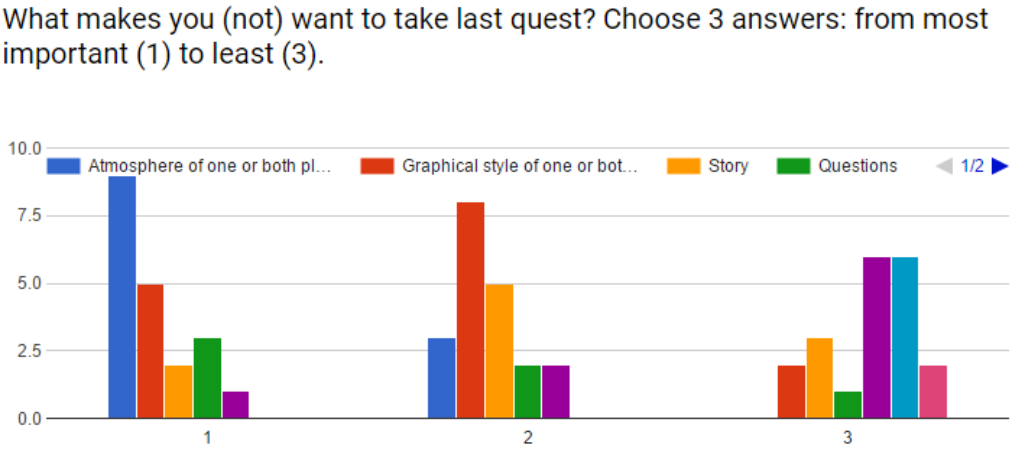

Figure 29. Reasons that influence the continuation desire after finishing the game.

Also players were asked to choose a place where they would like to complete last quest. Half of the participants would be happy to explore new place. Six participants have chosen a cartoonish place, one person would like to do it in realistic location. Three people were undecided which place to choose.

Finally, participants received a sentence “I am surprised that my journey finished so fast” and two options to choose - “yes” or “no”. Fifteen respondents agreed with the sentence, but five players out of twenty were not surprised.

Interview

After each game session participants were interviewed. They confirmed that after reaching the second place their motivation to explore increased. Especially it was felt by people who have found realistic place’s atmosphere scary and who normally do not play horror games. When players finished the game, many of them said that they would like to play a full version of game, they would like to explore other territories. It correlates with the results of people’s answers to the question “Even if you don't want to take last quest, could you still choose an environment where would you like to complete last quest?” where biggest part of participants expressed their desire to see a new place.

It should be mentioned that participants were asked to comment on the answers they have chosen at the end of the game. Especially if people did not want to take the last quest or were undecided about it. After the

interview it became possible to pick out three main reasons describing, why they do not want to complete the last quest or were undecided.

According to participants' opinion, the biggest problem with this media technological product and evaluation method is that evaluation tasks are not "invisible" to the player. In other words, it was easy for players to understand that evaluation was designed in the form of tasks instead of the questionnaires. Some participants agreed that, while playing, they remembered that it was testing session.

Another thing that made players' continuation desire decrease was the lack of freedom. Players were able to move through the environment only by clicking on the buttons at the edges of the screen.
Also, players' movements were limited - they could not explore all corners of the place, they could not look up or down. Many participants said that game was static and it negatively affected the continuation desire.

Third reason that made them not want to continue was that it felt like they were in a small territory and, even having limited movement possibilities, explored everything they could. It explains why some participants did not want to take the last quest, especially in the places they already played.

Line Charts To Compare the Results

In order to see if results were influenced by participants' gender, answers were grouped in two categories: male rates of continuation desire and female rates of continuation desire. In these two categories were also added answers of how many places participants would like to explore: 1, 2, 3 or 4 (instead of "as many as I can"). Then averages of these answers were calculated and depicted in the line charts. As it can be seen from the Figure 30, the desire to continue in female participants was higher from the beginning to the end of the experience. Even though differences between male and female answer averages are small, the tendency can be seen and it will be discussed in the section "Discussion".

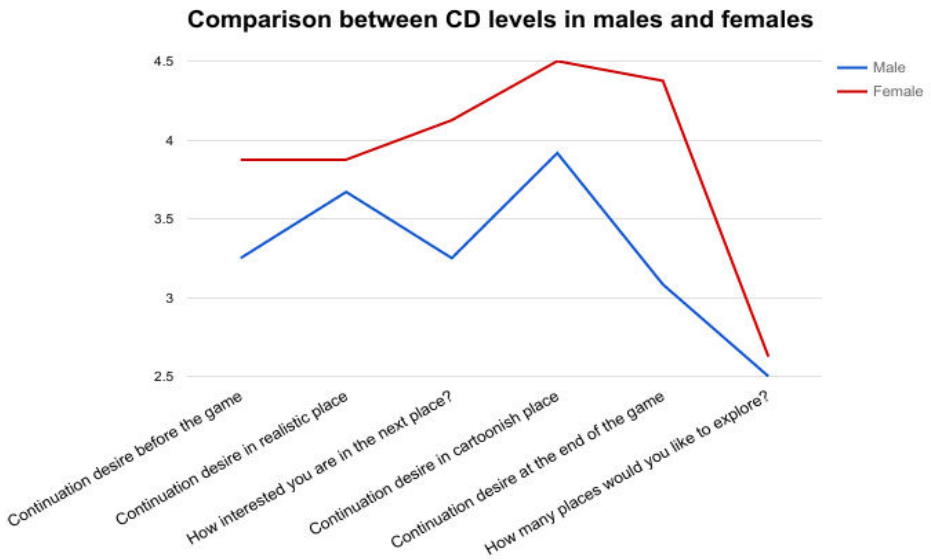

Figure 30. Comparison between the levels of continuation desire between male and female participants.

More line charts were done to compare the levels of continuation desire throughout the experience. In the first line chart (Figure 31) it is possible to see that before the game were more people who was not sure if they want to play or not. The number of undecided participants became smaller during the exploration of realistic environment, while number of unmotivated people did not change from the beginning. It is clear that amount of motivated and highly motivated participants increased when game was started. It can be said that continuation desire during the exploration of realistic environment enlarged.

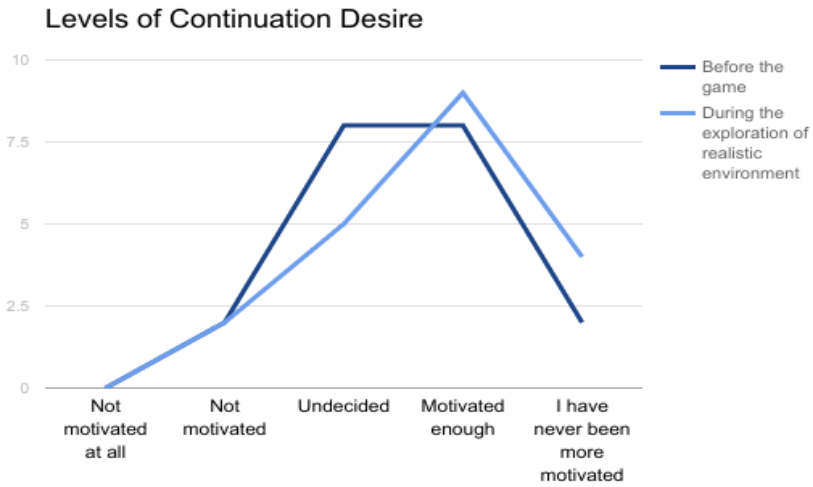

Figure 31. Comparison between the levels of continuation desire before the game and during the exploration of realistic environment.

Into the second line chart (Figure 32) were added levels of continuation desire during the exploration of cartoonish environment. Number of people who do not want to continue playing decreased, as well as number of undecided people, in comparison to the number of unmotivated and undecided people before the experience and during the exploration of realistic place. At the same time could be seen a growth of number of people who desire to continue playing.

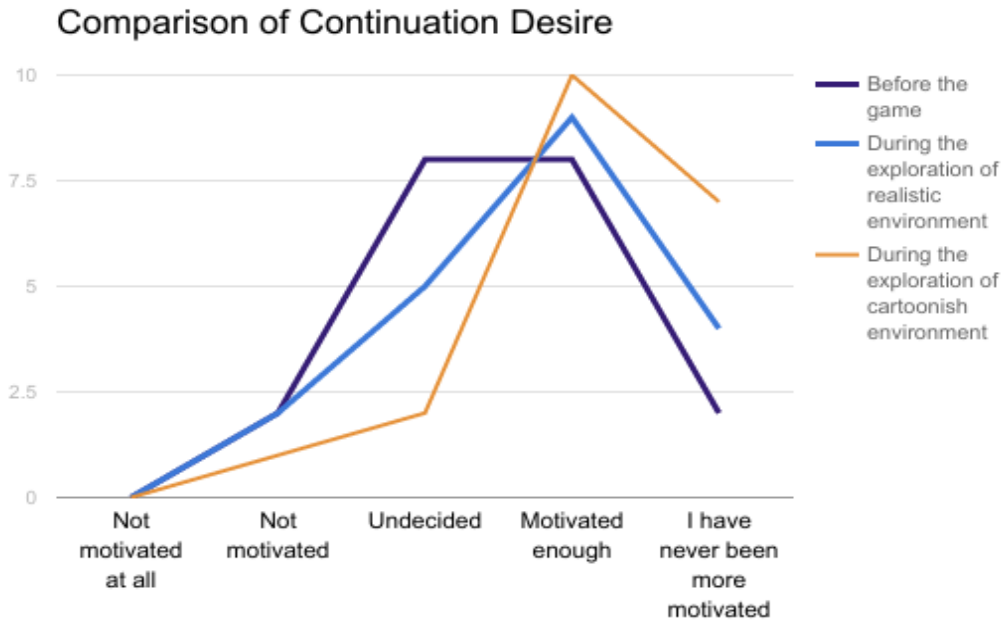

Figure 32. Comparison between the levels of continuation desire before the game, during the exploration of realistic environment and during the exploration of cartoonish environment.

Finally, into the third line chart (Figure 33) were added levels of continuation desire at the end of the game. The number of people who do not want to continue playing increased a little bit in comparison to the amount of unmotivated people during the exploration of cartoonish place. The number of undecided people, as well as highly motivated to continue, remained the same as in the cartoonish place. Unfortunately, a number of people who want to take the last quest decreased.

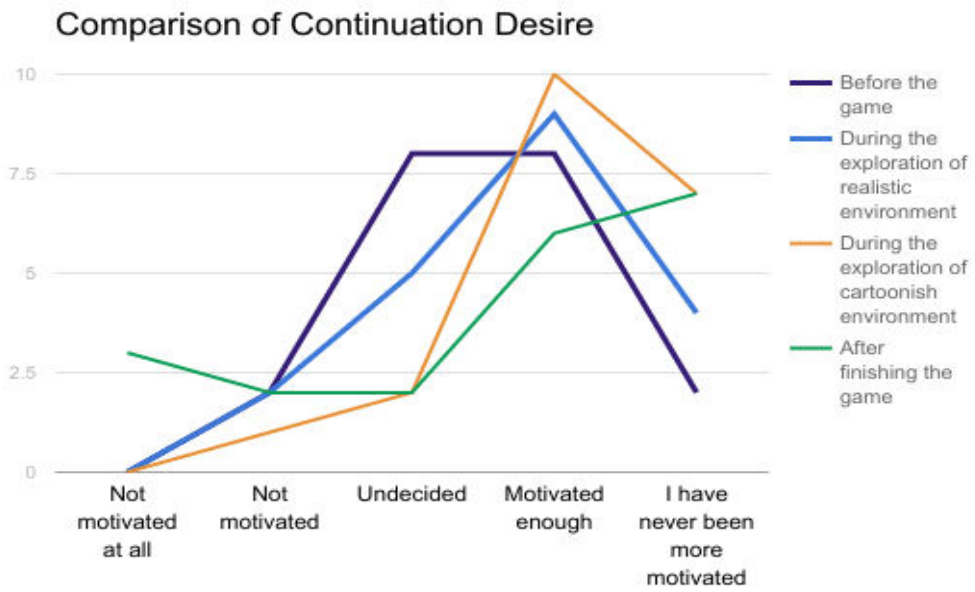

Figure 33. Comparison between the levels of continuation desire before the game, during the exploration of realistic place, during the exploration of cartoonish place and at the end of the game.

Discussion

In this section the results will be analysed. At the same time will be looked at different problems encountered during the testing.

To begin with, the first part of the final problem statement will be answered. The first part of FPS sounds this way: *"How the continuation desire, affected by the graphical style of the game, can be measured during the gameplay?"* As the method of evaluation of continuation desire during the gameplay was created and tested, the most important answer to this question will be the fact that this method really evaluates changes in continuation desire. In the Figures 31, 32 and 33 are depicted levels of continuation desire at the different parts of testing. Comparison line charts clearly show that method was able to evaluate changes in continuation desire throughout the gameplay.
Furthermore, it is necessary to remember answers on the statement "I am surprised that my journey finished so fast". As it was mentioned earlier, 75% of people agreed with the sentence. It means that fifteen people have expected that game will last longer or they wished it to be longer. Before the evaluation, it was not said how many places or tasks were made in the game, so players could not know when they will reach the end of the game. Also, players were free to quit at any time, but no one stopped an experience.
Another question that supposed to check players' expectations about the game and willingness to keep playing was "How many places would you like to explore?" Six people have chosen two places, five people - three, also five people have chosen an option "as many as I can" and only four people would like to finish their exploration with realistic place. Results show that 80% of participants were motivated to explore more than one environment.
All this information let to conclude that players were experiencing the desire to continue playing and that evaluation method *does* evaluate changes in continuation desire.
It should be mentioned that in the current project is not focused on *how engaged* people became while playing, but rather on the possibility to evaluate *changes in continuation desire* itself.

But were these changes because of the graphical styles of the game?
The story, game mechanics, graphical interface, controls, possibilities, lack of effects and even text fonts were the same in both realistic and cartoonish environments. Changes were made only in graphical style, atmosphere and color choices. Even though in the cartoonish place were few new evaluation tasks that were absent in the realistic place, during the interview many participants said that in the cartoonish environment were too many tasks and they were too obvious that made the experience less engaging. This allows to argue that continuation desire increased after people reached cartoonish environment and the amount of highly motivated people stayed the biggest at the end of the game is because of the changes in graphical style of the game.

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Second reason to claim that continuation desire changes happened because of the changes in graphical style are participants' explanations of why did they want or not want to continue their exploration. Respondents had to explain it in three answers - from the most important to least. According to collected information (Figure 20, 25 and 29), three reasons that influenced the continuation desire in realistic place were:

1. Atmosphere of the place;
2. Graphical style of the place;
3. Story.

Three reasons that influenced the continuation desire in cartoonish environment were:

1. Atmosphere of the place;
2. Graphical style of the place;
3. Story.

Three reasons that influenced the continuation desire at the end of the game:

1. Atmosphere of one of both places;
2. Graphical style of one or both places;
3. Idea of the project and the fact that this media technological product reminded players games they have played.

In all three cases atmosphere and graphical style stayed the most important aspects that motivated respondents to rate their continuation desire in one or another way. It has to be discussed though, because one problem was encountered when people had to explain their reasons to continue playing. During the interview respondents were asked to comment on their answers, made at the end of the game. Turned out that many people were not fully sure what are the differences between the atmosphere and graphical style and how players can evaluate atmosphere and graphical style separately from each other. Some participants said that they did not know what to choose first, because, in their opinion, atmosphere is connected with the graphical style. It allows to admit that graphical style of the game was the main reason that influenced the continuation desire.

Another reason to claim that continuation desire during the gameplay was affected by graphical style of the game is that players gave high rates for both environments for their visual style and atmosphere (Figure 23 and 27). It means that visual style and atmosphere were the main aspects in both environments that players paid attention to and what strongly amazed them, so it motivated participants to choose it as explanations in their answers.

Also, it could be remembered that fifteen participants liked changes in graphical style that correlates with the given rates and growth of continuation desire after reaching the cartoonish environment. This result allows to suggest that graphical styles differently affect the desire to continue.

In order to investigate this question deeper and verify the second part of the FPS (*"do graphical styles influence the continuation desire depending on the people's visual style preferences?"*), participants' levels of continuation desire, rates and favourite games were collected in a table in Appendix F. All games were grouped in two categories by their visual style: realistic or cartoonish. The table was made to find out if players with realistic favourite games gave higher rates to realistic environment and lower rates - to cartoonish, and vice versa. The same analysis was made in a project "The Merge of Cartoon and Reality" [12], where results came out negative. In the mentioned study correlation was not found, but there were encountered a lot of problems that influenced the results. For example, few problems were that participants did not pay attention to the environment because of the rich gameplay and some respondents did not even found a cartoonish place in the game world. Such problems were eliminated this time, so the results could be calculated again.
Current testing showed that mostly all participants who have mentioned cartoonish games as their favourite have given a "4" or "5" rates to the cartoonish environment, whereas realistic environment received smaller rate, and vise versa. Cases when participants mentioned both cartoonish and realistic favourite games and gave equal rates for both cartoonish and realistic places in this media technological product, were counted as true for the statement.
In spite of the fact that results let to suggest that people give higher rates to the environments (and, as a conclusion - to the games) that fit their visual style preferences, it barely can be considered as a vital result, because test was conducted upon a small scale of participants. Results can become significantly different if evaluation would have been conducted upon the larger amount of people.

In addition to mentioned findings, it was tried to find out if visual style of favourite games correlate with the levels of continuation desire in realistic and cartoonish places. Only seven players that mentioned realistic favourite games had a stronger continuation desire in realistic place than in a cartoonish, and vice versa. On the other hand, even six players that mentioned realistic favourite games had a stronger desire to continue in a cartoon-like environment rather than realistic one. All other participants were equally motivated to continue in both realistic and cartoonish places. As results are very different and contradictory, it could be stated that
a) there are no significant correlation between player's visual style preferences and continuation desire,
b) test should be conducted upon the larger amount of people, so the correlation could be seen better,
c) people provided favourite games, which they liked not because of their visual style, but because of the other game aspects, such as game mechanics or narrative. The reason, why they liked games they have written, was not questioned.

One more thing that has to be done is a review of the concentration-checking tasks. From the first task, which is the question "How many snake paintings did you see?", could be seen that seventeen participants gave the wrong answer or claimed that they did not see snake paintings or did not know the correct answer. It may happen because of the two reasons: 1) most likely people did not focus on the paintings, did not count them and did not try to remember this number, and 2) snake paintings were not always clearly visible. First reason would indicate that players were not fully focused on the game environment and even with a

hint from the beginning they did not tried to count snake paintings. Second reason would mean that it is a disadvantage of the current media technological product and it has to be fixed for the future evaluations. Second concentration-checking question was “Did you see a painting of the horse? Where was it?” This time the biggest part of participants gave the correct answer (“cartoonish place”). Seven people answered that they did not see it or did not know, and only one person have chosen a realistic place. As the second question appeared in the same place, but later than the first one, it is possible to notice how changed amount of the correct answers. After people received a question with snakes, they started to look at the cartoonish place more carefully and have found a horse painting on the wall.

Finally, should be discussed a difference in the levels of continuation desire between male and female participants that was demonstrated in a Figure 30. During the interview mostly male participants complained that current media technological product has a lack of possibilities and limited movements that makes it static and not so engaging. In the game were no achievements or levels, were no real enemies to destroy. It could be suggested that for the male participants is more motivating to play dynamic games, where the emphasis is placed on the action or narrative rather than on contemplation of visual information. However, it is only a suggestion and should be verified in the future.

Conclusions

In this project was made an attempt to answer the Final Problem Statement:

How the continuation desire, affected by the graphical style of the game, can be measured during the gameplay, and do graphical styles influence the continuation desire depending on the people's visual style preferences?

To be able to answer this question, were analysed concepts of continuation desire, engagement, flow, immersion, narrative and how they are related to each other. At the same time was analysed the question how continuation desire could be influenced by visual characteristics of the game, such as atmosphere. In addition to this, was reviewed a Theory of Memories, were described graphical styles and defined their main distinguishable characteristics that were used to create a media technological product with two environments: realistic and cartoonish. Analysis of the continuation desire, graphics and playing experience evaluation methods, like Engagement Mapping Method and TRUE system, helped to create own evaluation method that can measure the levels of continuation desire during the gameplay and without any interruptions. To be sure that evaluation method really evaluates changes in continuation desire, it was tested upon twenty participants.

The results succeed to indicate changes in continuation desire because of the changes in the graphical style of the game. Even though the test was conducted upon the small amount of participants, it still can be concluded that graphical style of the place influences the desire to continue.

Second part of the final problem statement was not supported by the results. First of all, evaluation showed that players gave higher rates to the environments that corresponded to their visual style preferences, which were find out from reviewing their favourite games. On the other hand, collected information demonstrated that players, who have chosen cartoonish games as their favourites, desired to continue less in the cartoonish place than in the realistic, or the equally in both places. The possible reasons why results are too vague are: 1) because of the small sample size, 2) because of not knowing, why players have chosen their favourite games and what visual styles they really appreciate.

Finally, with one success criteria being approved, and one - being a failure, it suggests that more extensive evaluation would be needed to confirm the first result and either confirm or refute the second one.

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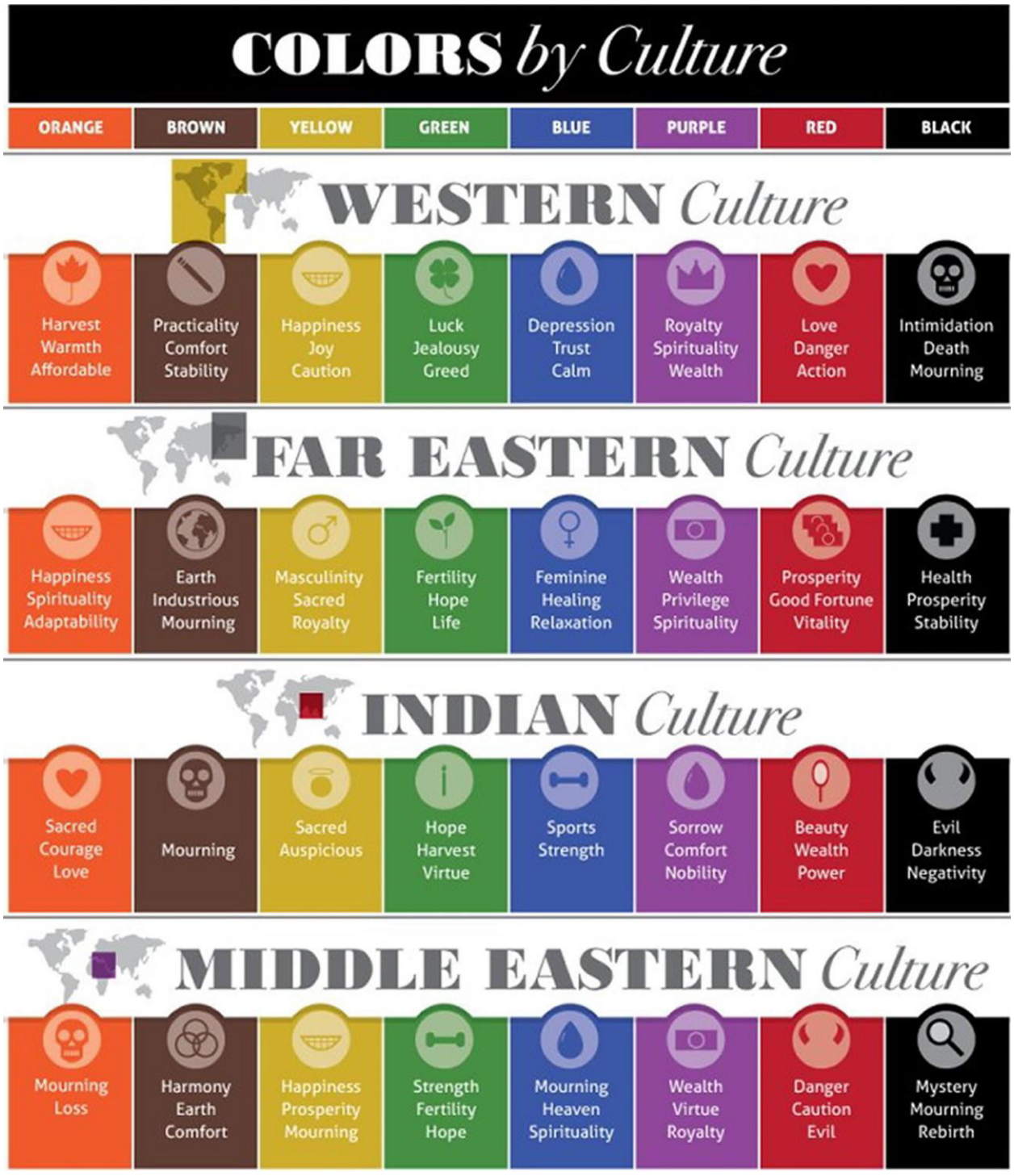
Appendices

Appendix A. A table of color meanings by Black, J. L.

Appendix B. Illustration of how different cultures perceive colors.



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Appendix C. The Merge: questionnaire.

I Part. Questions, which could be asked before testing session:

1. A little bit of demographics

- Your age?
- Gender?
- Current Occupation(s)?
- How motivated are you to begin this test?

Likert-scale, where 1 – "I'm not motivated at all" and 5 – "I have never been more motivated!" Question from the Engagement Sample Questionnaire.

2. If you play games, please answer the following questions:

- In regards to the past six months, how many hours do you play on average each week?

Will be possible to choose:

1. 1-5

2. 6 – 10

3. 11 – 16

4. 16 – 20

5. More than 21

- List which game genre(s) you enjoy the most.
- Write max. 4 favourite games (if you play at all) and keywords/short sentences, why you like them.

II Part. Questions that will be asked after playing the first game scenario:

Pause 1 questions.

- What do you feel now?

Question from the Engagement Sample Questionnaire

- Rate the realistic environment.
- Rate the cartoonish environment.
- Rate the Cubic environment.

For all three questions: Likert-scale, where 1 – "Dislike a lot" and 5 – "Like a lot".

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- Did your feelings change in relation to what environment you were in? If yes, write shortly how you felt being in a cartoonish environment.
- How motivated are you to continue this test?

Likert-scale, where 1 – "I'm not motivated at all" and 5 – "I have never been more motivated!"

- In regards to the answer above, why?

This question will help to figure out why participants are motivated to continue experience and are there any "graphical" reasons for this or not.

III Part. Questions, asked after playing second game scenario:

Pause 2 questions.

- What do you feel now?
- How would you describe the atmosphere of the CARTOONISH environment?
- Do you have a preference about which environment you would like to continue playing in, and if so, which one?

Participants will be able to choose between realistic, cartoonish and cubic environments.

- Do you have any feedback in regards to the CARTOONISH environment and/or how it could be improved to make it more appealing to you?
- How motivated are you to continue this test?

Likert-scale, where 1 – "I'm not motivated at all" and 5 – "I have never been more motivated!"

- In regards to the answer above, why?

IV Part. Questions, asked after playing third game scenario:

Pause 3 questions. The end.

- What do you feel now?
- There is NOT a fourth game version, but if there was: how motivated are you to continue this test?

Likert-scale, where 1 – "I'm not motivated at all" and 5 – "I have never been more motivated!"

- In regards to the above answer, why?

Appendix D. A list of questions for the evaluation of continuation desire.

Questions About Narrative:

Can you tell me the story of this game? [Open-ended]
This question say nothing about graphics. Even though player can create a story from the design of the game world, atmosphere and tasks, it do not mean that this story is interesting for the player and motivates him to continue playing.
By the way, person can come up with the story just after he/she was questioned, but the story itself is out of interest, because it is not related to the topic of the project.
Most likely this question will not be asked.
Can you understand or feel the story through the visuals? [Yes/No/Not sure/Did not think about the story]
What if person do not understand the story? The capability to read or feel a story through the visual design is not the point of this study. Also, this question might make participants think that in the game is one and correct story, which they have to understand, and if people will not be sure, they will answer "no", "not sure" or "did not think about the story". It does not mean that they are not willing to continue playing anyway.
Most likely this question will not be asked.
Was it easy to understand what is happening? [Yes/No]
If person did not think about it, after receiving this question he/she will.
If person will not understand what is happening, he/she will not understand what he/she has to do (look at next question) and for what feedback to wait. It will be a problem of the prototype, but not of the evaluation method.
Most likely this question will not be asked, because if person will not understand what is going on, most likely he will quit his activity very fast and it will say a lot about the continuation desire. The only thing that will be unclear - why person decided to quit? To get to know this, person still have to receive this one question.
Was it easy to understand what you have to do?
It can be seen from the gameplay process. If player is able to complete the task and finish the game, it means that he understood what he had to do, but, of course, this question can be asked during the interview after the testing process.
I want to unlock all locations in order to know the rest of the storyline.
This question will show if person wants to continue, but the reason is not related to the topic of this project. Maybe will be asked, but not sure at the moment.

Questions Concerning a Continuation Desire:

What do you feel now? (From ESQ)

Will be asked in order to know what person feels. Unfortunately, it is not clear if changes happened because of the influence of graphics. To improve the situation, could be additionally added a question "How do you think, why your feelings changed?" or "How do you think, what influenced your emotional state?"

Did your feelings change in relation to what environment you were in? If yes, how they changed?

or

My emotions change with the game's progress. [Yes/No]

First questions looks better than second, because it asks specifically about graphics' influence on feelings. This question will let to find out, does a connection between graphics and person's emotional state in current case exists?

On the other hand, changes in person's feelings will be noticed from the question "What do you feel now?" if this question will be asked in every location.

Most likely this question will not be asked. Instead, first question (from ESQ) will be supplemented by another question or answer options.

Do you want to continue the game? (From ESQ)

Can be combined with the question below, because if person is not willing to continue, he could chose an answer "not motivated to continue at all". Otherwise, "yes" answer to the first question and then "not motivated to continue at all" - to the second, are contradictable and illogical.

How motivated are you to continue the game? [Likert-scale] (From ESQ)

Will be included into an evaluation method.

Why do you want to continue playing?

or

What makes you want to continue playing? (From ESQ) [Options to choose]

Will be included into an evaluation method.

Which environment would you like to continue playing in? [Three options to choose: realistic, cartoonish, don't know/didn't see]

Might be asked after second location will be opened, so player could compare two locations, and after third location will be unlocked - player will be able to compare three of them. The problem is that if person just unlocked new location, he will be interested to explore a new one rather than come back to the old location. After cartoonish place will be unlocked, it is expected that many players will choose cartoonish place not because they liked it more, but because it will be new and intriguing.

Most likely this question will not be asked.

Are you interested where you would be transferred next? [Yes/No or Likert-scale]

or

I want to know how next place will look like. [Yes/No or Likert-scale]

One of these questions will be included in evaluation method. They are concerned about player's desire to continue (to know more, to explore locked environments). These two questions are similar to the question "How motivated are to continue the game?", but they are specifically focused on the player's interest in visual design.

If there would be one last quest, how much would you like to play it? [Likert-scale] (From ESQ)

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Question will be asked at the end of the game.
If player will choose "do not want to play it", question about environment (below) will still be given. Player may do not want to continue because of the different reasons (e.g. having no time right now or being tired), but he may like the graphical style of one place and will be happy to play in this place when he will be free and rested.
(Even if you do not want to play the last quest) Which environment would you choose to play in? [Three options to choose: realistic, cartoonish, somewhere else]
Question will be asked at the end of the game.
Why would you choose this environment? [Give options to choose]
I am surprised that game finished so fast. [Yes/No]
It will show that participant wishes/does not wish to continue and he lost/does not lost track of time, which is common for the flow experience.
Statement will be given at the end of the game.
I would like to play more. [Yes/No]
Question is similar to "If there would be one last quest, how much would you like to play it?", because both of them are asking if person would like to continue playing. Most likely answers will be the same.
One thing that makes these two questions different is that question "If there would be one last quest, how much would you like to play it?" will be understood as option to play last quest right now, whereas statement "I would like to play more" may be understood as option to play whenever participant wants.
Statement may be paraphrased: "I would like to play this game in the future", but right now it becomes similar to the statement "I am surprised that game finished so fast".
Most likely statement will be used.

Alternative: after person completes quests in first location, he can receive a question (or option?) "Would you like to unlock next environment or play more in current one?" If person will choose next location, it will say nothing about person's desire to continue or did he like or dislike first place. Person can be interested in new places, but it does not mean that he did not like graphical style of the first place.
If person will choose to play more in first place, it may become a problem, because game will require more quests for the current place. On the other hand, it will show that person liked the design of the first place.

How many places would you like to explore?
Will show player's interest in exploring other environments.

Immersion and Flow:

During the gameplay I did not think of how much time I spent playing. [Yes/No/Sometimes]
or
When I entered into the game world, I lost track of time. [Yes/No/Sometimes]
Statements are similar to one that was above: "I am surprised that game finished so fast", because all of them are concerned about lost track of time. If player is surprised that game finished so fast, then it means

that person actually was not thinking of how much time he is playing and how much time he will have to spend - otherwise he will not be surprised.
Actually, one of the statements can be used anyway (during the gameplay), just to confirm that person did not lie at the end of the game and that he/she understood statement "I am surprised that game finished so fast" correctly.
Do realistic graphics give you a greater sense of actually being in the environment? [Yes/No/Do not know]
or
Realistic graphics give me a greater sense of actually being in the environment. [Yes/No or Likert-scale]
or
Can you ever be "in the game" when the graphics are non-realistic? [Yes/No/Do not know]
If person answers "yes" to the first and second questions, it can mean that in realistic environment he/she will be more immersed than in other two environments. Immersion thus will enlarge player's desire to continue playing in realistic location.
Unfortunately, a problem with immersion can occur, because realistic place was planned to be the first one, but immersion requires time. Player might not become immersed because of lack of time.
One of the questions/statements may be used in pre-evaluation questionnaire.

Aesthetics, Atmosphere and Graphical Style:
Rate realistic and cartoonish environments.
How much player likes each of them? Rates will show a level of attractiveness of every graphical style, which depends on the 1) preferences of each participant, 2) how good (professionally made) objects were in each environment, 3) how good atmosphere was given to each place, 4) feelings of nostalgia and enjoyment, triggered by similarities with previously liked games and movies. Maybe there are more reasons to give high or low rates for each place. It would be good to know these reasons, so question "Why did you gave such rate?" should be asked as well.
How would you describe the atmosphere of realistic environment?
How would you describe the atmosphere of cartoonish environment?
As each environment will be given an atmosphere, it would be interesting to know if person understands the mood of the place. However, it will not say anything about person's desire to continue playing, because person can understand and feel the tone of the place, but still do not want to continue playing in this place. Most likely questions will not be asked. Instead, "atmosphere" will be given as one of the category to choose while answering other questions.
What did you like about realistic place's design?
or
What is the best (worst) element of the realistic place?
What did you like about cartoonish place's design?
or
What is the best (worst) element of the cartoonish place?
or
What did you think of the choice and use of colours in the game?

or

Did you like the colors of the game?

All these questions can be combined in one question "Why did you gave such rate?". Players will not receive open-ended questions during the gameplay, but they will receive options to choose from. Such options can be: "colors", "atmosphere", "game objects" and even more.

Also, after the play session, players will be asked to share their opinion about the game and each place.

Did you like the game objects?

or

Which environment's game objects you liked the most (the least)?

It will show a preference for more or less detailed models. Details is one of the property that define the graphical style, but there is a risk that participants may judge from a designer's perspective. Less risky would be to ask "how important for you is the realism of the graphics?" or something about importance of the graphics overall.

Most likely this question will not be asked.

Concentration and Attention:

Did you notice the transitions between locations?

or

Did you notice that graphical style of the place have changed?

or

How much do you like changes in graphical style? [Likert-scale]

Can be asked once after the second or third location will be unlocked to check if player really have noticed.

Is it easy to focus on the surroundings?

Similar question will be asked at the end of the game or during the post-testing interview (if player will quit in the middle of the session). Instead of this, player's concentration can easily be checked - player can be given to find an answer which would be somewhere around or he/she can receive questions at the end of the second and third place, asking, for example:

Did you saw a *painting of the spirit*? Where was it?

How many *horse paintings* did you see?

What figure was depicted on the mountain?

Player will be given several options (including "I did not see it/I do not remember") to choose from and if he/she was focused on the game, he/she will be able to choose a correct answer.

One problem can occur - that player will guess and choose a correct answer, which will not indicate that player was focused on the game. To eliminate this problem, one statement about player's concentration will be given at the end of the game.

Game quickly grabbed my attention from the beginning. [Yes/No]

or

Game environment quickly grabbed my attention from the beginning. [Yes/No]

or

It was difficult to stay focused. [Yes/No]
or
I became less aware of the real world and things around me. [Yes/No]
One of these statements will be asked at the end of the game.

Questions Regarding Nostalgia and Theory of Memories:

Do this place remind you something?
or
What game or movie cartoonish place reminds you?
Kind of obvious questions, which will not be asked, because, firstly, they say nothing about player's desire to continue playing, and secondly, they should have been open-ended, but it would interrupt an experience. Instead of this, when player will be asked about his/her feelings, can be given an option "I feel nostalgic".

Questions About Player's Expectations and Likes/Dislikes:

I like to explore the game world. [Yes/No/Sometimes]
May be asked in a short questionnaire before testing, but not really need to be asked, because evaluation of continuation desire in "Aporia" project demonstrated that willingness to continue playing a game, which has no enemies, achievements or possibilities to socialize, can still be strong in all player categories.
I am interested in the graphical style of the game. [Yes/No]
or
Graphics is an important aspect which I look for when I choose a game to play. [Yes/No]
This question could be added into a pre-evaluation part of the questionnaire.
What expectations of game and environment you had?
or
Did you had any expectations of game and environment?
Most likely respondents will have no expectations, because they will not be said how the game world will look like, what genre the game is and what is the story of the game.
This question will be asked during the interview.
Does a game has to look good for you to be enjoyable? [Yes/No]
or
Does a game has to have a high-quality graphics in order to make you engaged? [Yes/No]
Question is similar to one that was above: "graphics is an important aspect which I look for when I choose a game to play". However, the fact that graphics is an important criterion for choosing a game does not say how good graphics should be in order to make player enjoyed or engaged.
Question can be included into a short questionnaire.
How important is visual realism to you? [Important/Not important/Do not know or Likert-scale]
The word "important" can be understood differently. One person can understand this question as "do you like realistic visuals?", another person can understand as "do you ever play games that are non-realistic?"

or "is visual realism a criterion for choosing a game?". None of these interpretations say about the possible level of immersion, level of engagement or player's expectations. But if visual realism really is important, then it can mean that player would like the realistic style more than cartoonish.
Also, this question is somehow related to the question "do realistic graphics give you a greater sense of actually being in the environment?"
Most likely this question will not be asked.

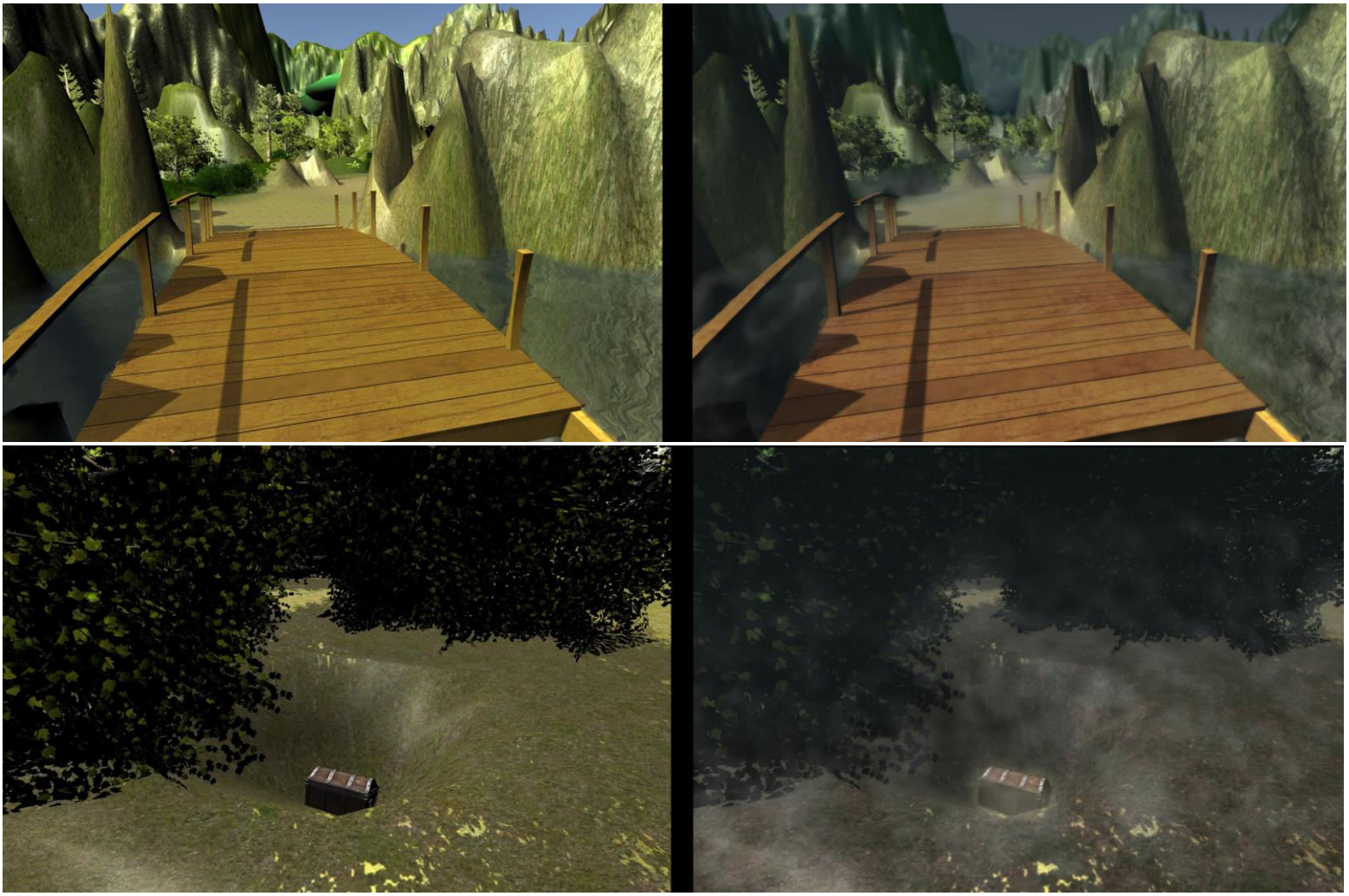
What kinds of graphical styles do you like / dislike? [Open-ended]

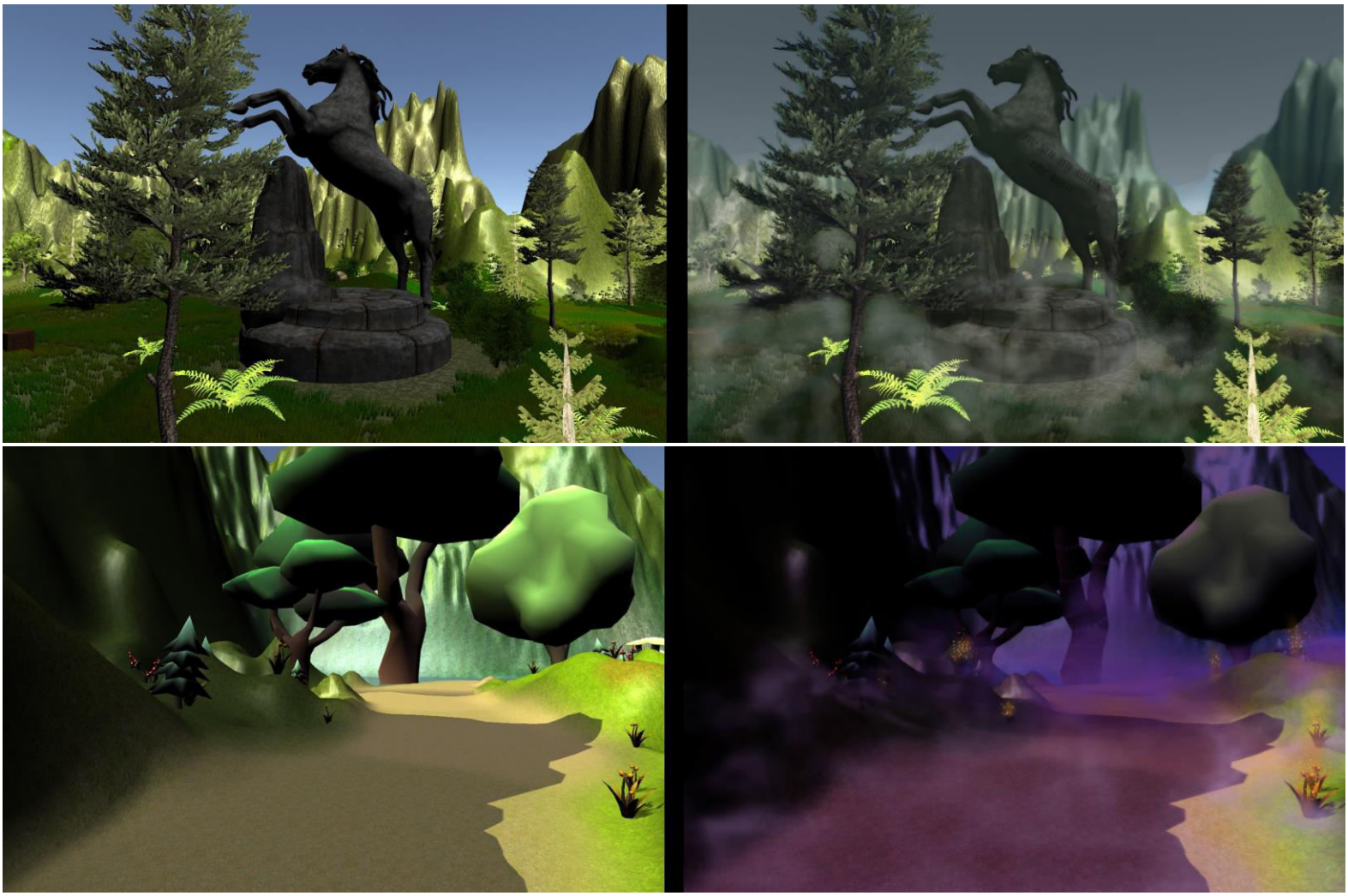
Too abstract, people may not know what graphical styles exist, but question can be added into a pre-evaluation part of the questionnaire anyway.

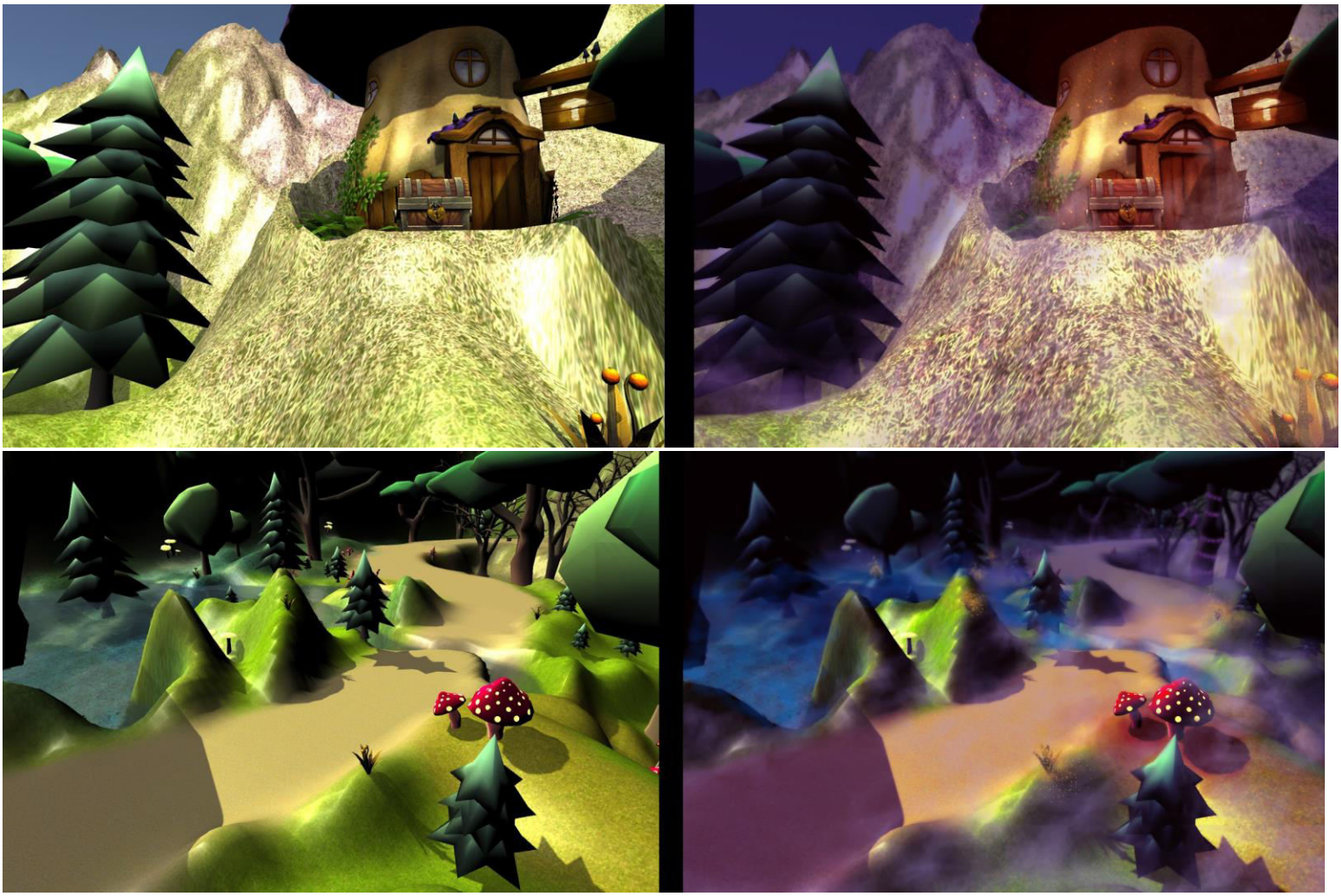
What do you find the aesthetically most important in a game?

Too abstract. Games are very different and have different designs, so players may not know what to say. This question will not be asked.

Appendix E. Examples of the atmosphere.







Appendix F. Table of content from the evaluation.

Game	Graphical style	Like exploring?	CD at the beginning	CD in realistic place	Rete of realistic place	How much want to see next place	CD in cartoonish place	How much like the changes in graphical style?	Rate of cartoonish place	CD at the end	Chosen place
The Simpsons: Tapped out	Cartoonish	yes	3	4	3	5	4	5	5	5	Cartoonish
Skyrim	Realistic										
Overwatch	Cartoonish										
The Witcher	Realistic	yes	4	4	4	5	4	5	5	5	Somewhere else
Skyrim	Realistic										
Overwatch	Cartoonish	yes	4	5	4	5	5	5	5	5	Somewhere else
Heroes of Might and Magic	Cartoonish										
The Witcher	Realistic										
Assassin's Creed	Realistic										
Call of duty	Realistic	Sometimes	3	4	4	3	3	2	3	2	Realistic
Far Cry	Realistic										

Dark Souls	Realistic	yes	4	5	5	5	5	5	5	5	Somewhere else
Tomb Raider	Realistic										
World of warcraft	Cartoonish										
League of Legends	Cartoonish	Sometimes	4	3	2	2	4	5	5	4	Cartoonish
Minecraft	Cartoonish										
WoW	Cartoonish	yes	3	2	3	1	2	3	4	1	Undecided
Diablo	Cartoonish										
Hearthstone	Cartoonish										
Resident Evil 4	Realistic	Sometimes	3	4	3	4	4	5	5	4	Cartoonish
The Witcher 3: Wild Hunt	Realistic										
Hearthstone	Cartoonish										
Archeage	Realistic	yes	4	5	5	5	5	5	5	5	Somewhere else
League of legends	Cartoonish										
Overwatch	Cartoonish										

Mass Effect 2	Realistic	no	3	3	4	1	4	3	4	2	Undecided
Dark Souls	Realistic										
The Sims	Cartoonish	yes	5	4	4	5	5	5	5	5	Somewhere else
Journey	Cartoonish										
Witcher III	Realistic										
Mass effect	Realistic	Sometimes	2	3	3	3	4	4	4	3	Cartoonish
Uncharted 4	Realistic										
Assassin's Creed Syndicate	Realistic	Sometimes	4	4	4	3	4	3	3	3	Somewhere else
Team Fortress 2	Cartoonish										
GTA V	Realistic	yes	4	5	5	4	5	5	5	5	Somewhere else
DMC	Realistic										
Halo	Realistic										
World of Warcraft	Cartoonish										
Legend of Zelda	Cartoonish	yes	5	4	4	4	5	4	5	4	Somewhere

Pokemon GO	Cartoonish										else
Metal Gear Solid 3	Realistic										
the Sims	Cartoonish										
The Fallout games	Realistic	Sometimes	2	3	4	3	4	3	4	1	Somewhere else
Mass effect	Realistic	Sometimes	3	3	4	4	4	4	4	4	Somewhere else
Metal Gear Solid	Realistic										
Overwatch	Cartoonish										
Journey	Cartoonish	yes	4	4	4	4	5	5	5	4	Cartoonish
Heroes of Might and Magic	Cartoonish										
WoW	Cartoonish	yes	3	2	4	2	3	4	4	1	Undecided
Overwatch	Cartoonish										
Civilization V	Realistic	yes	3	4	5	4	4	4	5	4	Cartoonish
Heroes of Might & Magic III	Cartoonish										
Dark Souls	Realistic										