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# Early Requirements Engineering Practices for Gaming Companies

Bachelor of Science Thesis in Software Engineering and Management

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## **A Design Science Study into Early Requirements Engineering within Game Development Companies**

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# Early Requirements Engineering Practices for Gaming Companies

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**Abstract—** Within the game development industry, requirements engineering (RE) is applied and used for finding out and setting requirements during the mid to late stages of the software development cycle. Yet, early requirements engineering (ERE) which is used during the early stages of the software development cycle has not been adopted by the game development industry. The argument being that ERE within video game development is time consuming and contradicting towards how games should be developed. This thesis is an attempt to design an artifact in the form of a design science research which would be used to help game development companies establish ERE in order to define the vision of the game being developed, along with having and sharing a clear view and understanding of how that game will be developed.

**Keywords—**Requirements engineering; early requirements engineering; game development; artifact; design science; vision;

## I. INTRODUCTION

Requirements Engineering (RE) has been a discipline composed of many methods for uncovering, documenting, and defining needed requirements in order to have a structured path for further implementation [16, 17]. Many Companies within software development have their own requirements engineering process to set clear goals for their projects [17]. Early Requirements Engineering (ERE) is a sub-discipline of RE and it is used in software development for finding out, understanding, and setting requirements during the early stages of a software development cycle [26]. Video game developing companies have a different set of requirements than what one would deem standard in normal software development projects [6]. The reason being that video game developers put a lot of emphasis on non-functional requirements such as the storyline that the game is trying to tell, or a general aesthetic feel that they want the game to provide. Yet, within the video game industry, there are many companies that have either not established or have not benefited from using RE and ERE disciplines for defining and understanding their requirements and early requirements when sharing and communicating the vision of a game that they developed. This leaves open opportunities for further research and development into the issue.

### A. Problem Statement

As a part of this thesis, we have reached out and interviewed a number of people from game development companies. They have different roles working in these companies and each company has an average size of around two to six developers. From the companies that have been interviewed and according to the answers given by the interviewees in Appendix C and D, they argue that the lack of creativity is based on communication and vision sharing problems within their work environments. The most common work process routine was presented in a form of a “trial and error” format. The developers have a core concept of an idea, the idea is somewhat implemented, and then it is decided if it’s valuable or not. Currently, their process of working is still viable as long as the company is deemed as small (between 2-6 people). All of the companies between the sizes of two to six developers agreed that their process of “trial and error” would not be sustainable if the company were to grow in staff size.

The problem we are approaching with this thesis is based on the paper written by Kasurinen, et al. [2] which discusses why requirements engineering is deemed as “useless” within the game development industry. The paper focuses more specifically on the non-functional requirements in RE and ERE. Although, it also states that non-functional requirements are the most important requirements for games to make profit from [2]. Their paper discusses abstract factors such as “fun”, “aesthetics”, and “feel” which are difficult to manage and trace for RE [2, 3]. The difficulty of tracing and managing abstract factors such as “fun”, “aesthetics”, and “feel”, are due to game companies essentially arguing that doing RE and ERE conflicts with the creative elements of the non-functional requirements in the early stages of development. Kasurinen, et al. [2] also mention in their paper: “Overall with this evidence it can be argued that requirements engineering needs to be adopted by game organizations more systematically because RE methods do not contradict with creativity, but support it and provide solutions to dealing with game development in the turbulent market environment”. With that said, there is a lot of room of improvement with the processes that game development companies use and our research will hopefully contribute to improving the situation for gaming companies.

## B. Motivation

As mentioned above numerous game development companies find that the methods of the RE discipline are not applicable in their current work environment. This is due to the fact that most gaming companies have a hard time tracking and mapping non-functional requirements such as “fun”, “aesthetics”, and “feel”. We also noticed a pattern from our interviews that most of the developer teams with a small team of people usually have a hard time sharing their vision between developers. However, they expressed the need to improve their development process along with defining early requirements and explaining the vision in a better way. The advantages with our contributions might help reduce the time needed to collect and analyze data as well as provide a simpler process for coming up with better ideas for mapping RE and ERE to the vision that many gaming companies struggle to define. This thesis will also contribute to widening the body of knowledge in future research within gaming, RE, and ERE related topics. Thus, we hope to add a scientific value to an already existing discipline and hopefully make it more applicable for a wider game developer audience.

## C. Research Questions

This thesis will be answering the following research questions in relation to ERE in the gaming industry:

- RQ 1: What current problems and issues do game developing companies encounter in relation to RE and ERE?
- RQ 1.1: Are there any existing solutions that meet the specific needs of gaming companies?
- RQ 1.2: Can a specialized artifact be created and tailored to suit game development companies?

## II. BACKGROUND

Previous work within the research field has produced interesting results in which Shabalin and Kjellman’s [6] thesis paper describes how Creative Leaf along with its underlying iStar language [1, 5] was evaluated as an ERE tool used to map out game interactions. The results of their research stated that most of the interviewed companies could see a limited benefit in using such a tool. Only one out of the ten interviewees would consider adapting the early requirements framework into practice, and then only after the tool was reworked to be adapted for the companies specific need [6]. Some companies already use existing tools such as Google Docs and white/mood boards to record early requirements. Yet these practices are not consistent between different companies and currently, there isn’t a standard disciplinary method for performing RE in the gaming industry due to the abstract design and development processes used within the game creation process.

Shabalin and Kjellman’s [6] thesis paper also aligns with the same subject. Whilst their study is more based

on using Creative Leaf as a test and evaluation tool for ERE in gaming companies, our thesis will focus on further improving and integrating ERE for gaming companies by figuring out what and how the companies would want to use ERE by introducing and trying different ERE implementation approaches. With that being said, Creative Leaf will be taken into consideration when evaluating the responses from our interviewed game developers because it might be a potential solution as the research in this thesis progresses.

## A. RE Processes and Communication Methodologies

Existing RE processes focus on a whole cycle of requirements gathering and understanding which includes: requirements elicitation and development, documentation of requirements, validation and verification of requirements, software development phases, modification of requirements, along with requirement management and planning as described by Pandey et al. [10]. These types of RE process are heavily reliant on user feedback and interaction when designing and establishing requirements. They can be very detailed and lengthy for game development companies to follow and implement.

Coughlan and Macredie [11] have written a paper that emphasizes the importance of communication within software development. It describes four different type of methodologies that can be used to improve the communication issues faced by companies. The four different methodologies used for improving communication: Soft system methodologies (SSM), MUST, Joint Application Design (JAD), and User-Led Requirements Construction (ULRC) [11] all address communication issues within software companies to different degrees.

## B. SSM and Volere Template

Soft System Methodologies (SSM) is a practice that focuses on issues within soft systems. A soft system is described as the social systems within the company and its philosophy states that where there exists any form of a social system then it goes hand in hand with its conflicting and most often contradictory goals [12]. Dahlman [12] explains that social issues are extremely complex and are situated from person to person, which makes every social issue unique. SSM is a methodology which focuses on “messy, changing, ill-defined situations” [11]. The SSM is a seven-phase process. The first phases (phases 1-3) are presented as a “rich picture” phases [11]. The rich picture phase is meant to represent the issue in a pictorial form, where the developers can illustrate the situation graphically via notes and sketches. The next phases (4-6) in SSM introduces debates or agreements, whether all of the group members agree or disagree with the current situation [11, 12].

Non-functional requirements are hard to distinguish and separate from functional requirements [3, 9, 15]. According to Glinz [15], there are seven out of eight software requirements specification templates that do this properly, the simplest one with the least amount of steps out of all of them is the Volere template. The Volere template is designed for requirement creators to list and define different types of requirements in a structured document type format [14]. It is mainly used to test different types of requirements based on a “fit criterion” in order to evaluate a product’s features to the original requirement listed.

### C. Rich Picture and Mood Board

During the early stages of SSM, there is a rich picture phase which allows people to freely express and explore an idea by drawing a detailed image of the current situation [11, 12]. This situation is meant to describe relationships between climates, conflicts, issues, structures, people, and processes which in turn promotes comprehensive thinking [18]. The detailed drawing of the rich picture along with the situation being described is represented as a combination of cartoons, links, diagrams, symbols, and words [20, 21].

McDonagh and Storer [19] explain mood boards as an inspirational communication which is visually composed of various ideas. Visual ideas represented in mood boards often showcase abstract and/or tactile media such as a combination of various images and/or physical objects that are used to express either actual or conceptual design ideas [19]. Due to the visual nature of mood boards, we will consider introducing it as an alternative to or as a mix between the rich picture in the later stages of our thesis.

### III. RELATED WORK

The paper by Callele et al. [3] discusses the importance of requirements engineering within the game development world. It focuses more specifically on the importance of non-functional requirements and the difficulty of tracking them down when it comes to game development. The basis of their work has a similar starting point as the issue that is being tackled in this thesis. Although the paper by Callele et al. [3] suggests that many failures can be traced to problems with the transition from pre-production to production. The paper does also present a model for video game development that integrates pre-production with production [3]. Although as mentioned above the focus of Callele et al. [3] is focusing on the transition from pre-production to production, the goal for our research is to figure out an effective method to tackle the issues of early requirements engineering process within game development.

The paper by M. Kanode et al. [4] discusses the challenges that can be addressed within game development when using traditional Software engineering practices. The paper further

discusses that game development has unique characteristics that represent challenges to the gaming industry [4]. These challenges may be helped by using traditional software engineering practices. The paper by M. Kanode et al. [4] addresses the unique issue of video game development and the complexity that falls within it when it comes to the non-functional requirements, an issue that our research is addressing as well. There is although not a specific suggestion of what methodology/methodologies that would benefit video game development, with this in mind hopefully our research will be able to produce a methodology that tackles the issue mentioned in the paper.

Atmaja et al. [22] have made a similar approach to a unique issue within the game development world, mainly the term Dynamic Difficulty Adjustment (DDA). Their research is based on the idea that there is no proper way to set the difficulty settings that a game should have. They have created an artifact to address these issues by modifying the general game design document format by making it more suitable for developing video games with a passive DDA mechanism [22]. The paper by Atmaja et al. [22] also approached a different issue within the world of game development, with a similar approach as the research that we are conducting. Mainly being the focus of modifying existing methodologies to create an artifact for the sake of solving an existing issue. The only difference being that their solution is meant for a different problem.

### IV. RESEARCH METHODOLOGY

Our research will be investigated as a design science study in which an artifact will be created. We have designed two sets of exploratory interview questions as “initial” questions (listed in Appendix A), the answers of which will be analyzed for creating the artifact and “follow-up” questions (listed in Appendix B) which will be used to evaluate the artifact and answer the research questions. These interviews are carried out by recording and transcribing the spoken words into a text document. Then interview results are considered to be qualitative data and are coded in the open coding format [8].

#### A. Comparing Methodologies

Before beginning this thesis a research methodology had to be decided on. Different research methodologies were compared to each other in order to decide which one would suit the research. The decision stood between mainly three different methodologies as either: a case study, a design science, or making an experiment.

Creating an Experiment within software engineering requires these phases in the experimentation process: definition, planning, operation, and interpretation [23]. Thus the experiment option was ruled out early due to the belief that our contacts would not have the time or interest to

participate in an experiment. Gathering contacts was a difficult task, and jeopardizing the opportunity due to using an experimental research methodology was not an option.

For this research, it was decided early that we would make use of qualitative data that we would gather. The question was if we would do a qualitative case study or a design science research. The previous thesis paper by Shabalin and Kjellman [6] focused on doing a case study research. Although case studies are a popular option for researchers, we decided against performing a case study based research because case studies have guidelines for finding the answers of how and why within a case [24], whereas our goal is to have an improvement of a situation.

A design science type of research has a lot of emphasis on creating and evaluating an artifact or method and changing it according to the received feedback [25]. It is a research method that aligns almost perfectly with how we approach our research questions and the situation we want to improve. Therefore design science was the ideal choice for our research.

### B. Design Science

The design of our artifact will be finalized according to the design science IS Research Framework outlined in Figure 1. The environmental characteristics along with the knowledge base that we use will directly contribute to the IS Research in order to create our artifact.

### C. Open Coding

The open coding format was chosen because it provides a simple layout for identifying relevant themes and mapping keywords or phrases to those themes. Specifically, the line-by-line coding method from open coding is used to code the interviews. With line-by-line coding, a more thorough qualitative data analysis is performed [8]. The full set of open coding tables performed on the transcribed interviews can be found in Appendix C and D.

The gaming companies that we interviewed were located via our personal contacts and from contacts on social media that work in gaming companies in Sweden (Shown in Table I). Most of these companies are small Indie game development companies who employ people with various years of experience.

Initial interviews consisted of a total of 4 different companies with 8 people interviewed and 5 interviews performed (Shown in Table II). Each interview had between 1-3 people interviewed.

The follow-up interviews included all 4 of the original companies plus 1 extra gaming company. This consisted of 6 people interviewed and 5 interviews performed (Shown in Table III). Each interview had between 1-2 people interviewed.

Company #	Interview ID	Company Type	Company Size
1	1 & 8	Indie Games	3
2	2 & 5 & 6	Indie Games	2
3	3 & 7	Indie Games	15
4	4 & 9	Game Engine	6
5	10	Indie Games	2

Table I  
GAME COMPANY DESCRIPTIONS

Company #	Interview ID	Interviewees
1	1	CEO/Programmer
1	1	Sound Artist
2	2	Graphics/Sound/Game Designer
3	3	Game Designer
4	4	Programmer/Web Designer
4	4	UX/Game Designer
4	4	Project Manager
2	5	Programmer/Game Designer

Table II  
INITIAL INTERVIEWEE DESCRIPTIONS

Company #	Interview ID	Interviewees
2	6	Graphics/Sound/Game Designer
3	7	Game Designer
1	8	CEO/Programmer
1	9	Sound Artist
4	9	Project Manager
5	10	CEO/Developer

Table III  
FOLLOW-UP INTERVIEWEE DESCRIPTIONS

### D. Data Collection

For collecting the necessary data we split up the data collecting process into two different rounds. The first (initial) round of interviews was meant to obtain data necessary for us to pinpoint the major issues that the game developers have. As mentioned above the first round consisted of five interviews from four different companies, the questions we prepared for these interviews was to figure out how the different companies value their ERE processes. The questions asked during the interviews were formatted with ERE in mind, more specifically how their current ERE process works, if their current process is deemed functional or not, and what improvements can be made.

In the second (follow-up) round of interviews, the focus will be on showcasing and deciding if the artifact and examples we created from it would be useful to the game developers. The main purpose is to gather feedback on the artifact that we have built so that it could be further improved. Specifically, if the game developers would use it and why would or why wouldn't they use it. The results from this second evaluation will provide us with more resources on improving the artifact.

To conclude this study we created a refined version of the artifact base on the feedback gathered from the second round

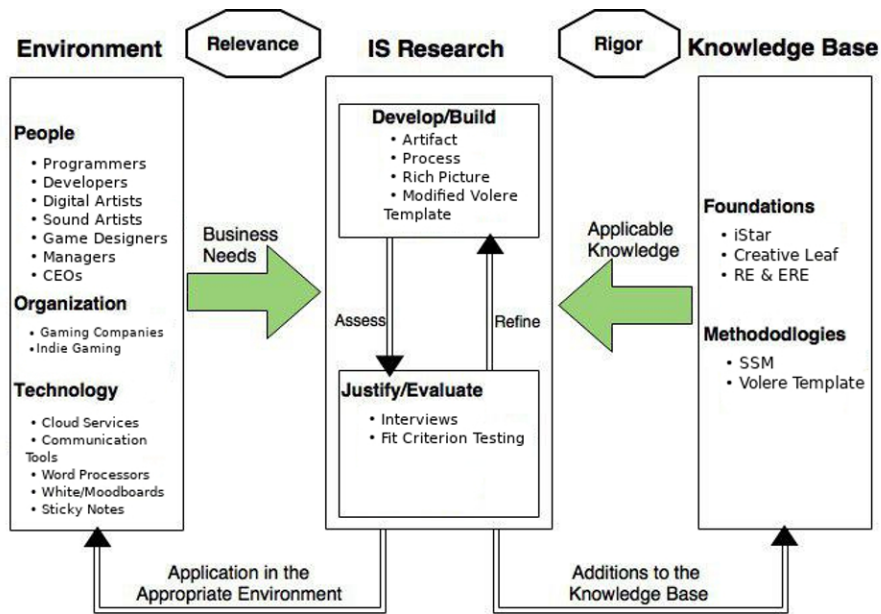


Figure 1. IS Research Framework

of interviews. The refined artifact will take into account all the feedback and crucial details in order to establish a desirable and adaptable artifact for sharing the vision and documenting ERE.

## V. RESULTS

### A. First Round of Interview Findings

During the first round of interviews, the thesis idea was explained to the gaming companies and their ways of working was uncovered, the coding of interviews for this first round can be found in Appendix C and the most common issues uncovered displayed in Figure 2. We found out that most of the interviewees didn't have a structured plan for creating games when they've decided on an idea, instead their planning procedures included talking and writing game design ideas on whiteboards, sticky notes, Trello, and Google drive. There was one interviewee who stated that their planning procedures included creating detailed design documents for developers and designers to reference back to when creating games. Even though there is a lack of structure among most of the interviewed companies, all of them had some common roadblocks when it came to establishing the overall vision along with presenting abstract ideas. A need for more management, a better structure, and a lightweight document was proposed as a solution for improvement by half of the interviewees. Two of the five companies interviewed didn't see a need to improve their current processes but they were open to process improvement proposals.

As the interviews continued, all of the interviewees said that their current process would not be sustainable in the case that their companies grew in size because tasks and

project members would need to be divided up per fields of experience such as digital designers, programmers, and sound artists. Four out of five companies mentioned that they had times where poor planning slowed down their development process and in some cases, the game being developed had to be abandoned due to the problems being too big to manage by the team. When asked about how they mapped game mechanics and interactions, interviewees responded differently with some saying that it was done by sticky notes and whiteboards while others said they create prototypes and used building blocks to visualize desired game features.

In concluding the interviews we offered the interviewees an option of a proposed artifact solution as either a tool or a method/process to help them with better establishing ERE and strengthening their development process. Though, none of the interviewees expressed any interest in using a tool for finding and documenting early requirements from their game development process because it was expressed that using tools would be slower than verbal communication. Interviewees strongly pointed out their need and reliance on verbal communication for sharing ideas. Therefore our artifact would need to be designed as either a method or process that focuses on interactive tasks involving communication frameworks, techniques, and methodologies.

In Figure 2 we present the most common issues uncovered from the coding and shared by all of the interviewed companies. Vision was the largest and most common issue expressed by the companies which included concretely defining a clear direction of a project and the main ideas along with having an understanding of the requirements at the early stages of planning and development. Communication

was the second largest issue expressed by the companies because project members would have difficulties in fully understanding either the vision, abstract ideas, or visualizing a game mechanics. A third major issue was about the lack of experience with developing games and working with RE and ERE for most of the companies due to them being small indie game development companies.

A small number of companies had some issues with their worry of failure mainly due to how they carry out their planning and development processes. Documentation was another minor issue with which some companies lacked an effective way of documenting RE and ERE in their early stages of planning while most of the other companies prefer to continue using whiteboards and sticky notes. Issue related to limitations and time were also discussed, these included developer and skill limitations along with financial and resource limitation and a limited amount of time for implementing features.

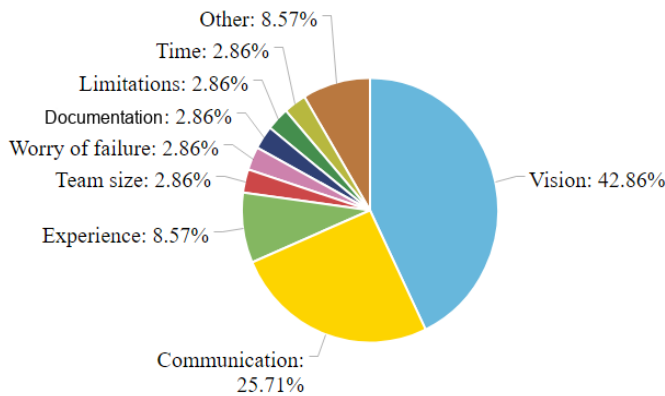


Figure 2. Coding Issues - Initial Interviews

### B. Artifact Description

With SSM [12, 13] focusing on the social aspect of the issue, and with the simplicity of a modified Volere template [14, 15] we partially combined both of them in order to create our artifact that would hopefully be of use for gaming companies. Our intention is to create an artifact that is simple to use, whilst keeping the focus on communication. This is because their development process includes abstract non-functional requirements along with a fast-paced communication-based development process with minimal user interactions and existing RE processes [10] (mentioned earlier in section III) have too many steps for gaming companies to perform in a timely manner. Initially, we created a prototype artifact that represents how the final first version of the artifact should be implemented (see Figure 3).

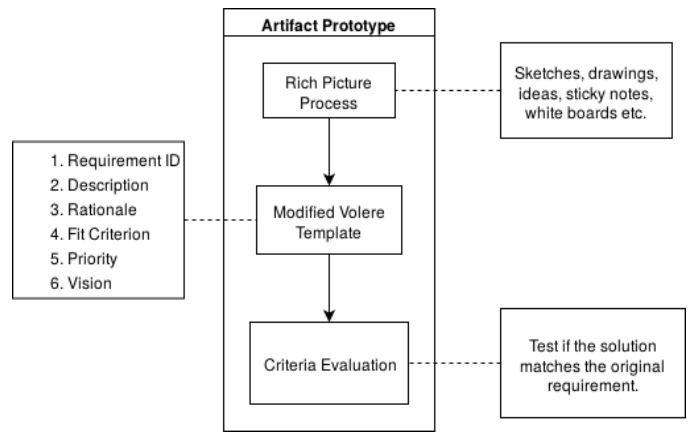


Figure 3. Artifact Prototype

Coughlan and Macredie [11] provide four different methodologies for communication (also briefly mentioned in section III): SSM, MUST, JAD and ULRC. Although all four focus on communication each of these methodologies has its own processes that would not be applicable for our artifact. JAD emphasizes more towards communication and documentation, MUST focuses on establishing a vision and improving communication through workshops, and ULRC is emphasizing on training each individual user to perform and create goal models on their own. From these four different methodologies, we decided that SSM is a practice that will be partially implemented for our artifact. Due to SSM's flexibility and focus on a balanced agile communication experience towards developers [12, 13], the methodology could potentially improve the issues that our contacts have.

Our idea is to utilize the Rich Picture process from the SSM methodology. The reasoning is that (as mentioned earlier) most of the gaming companies struggle with communicating the vision to their fellow colleges. Also, the gaming companies all shared similar ERE processes such as sticky notes, whiteboard drawings and so on. The modified Volere template is essentially the same, but some of the processes within the Volere template are removed due to the template focusing on some aspects which are currently not needed by our game developer contacts. Categories such as customer satisfaction/dissatisfaction, support materials, originator, and conflicts have been completely removed. Categories such as history have been changed to vision. This is due to the request of the developers having a simple and "easy" artifact to work with. We wish to simplify and also modify the artifact further so that the artifact could be considered useful for the contacts that we've interviewed.

The first version of the artifact (see Figure 5) showcases the important elements of our created process for gaming companies. By design the artifact is meant to work within an agile framework. For each sprint in the agile work-flow a rich picture has to be drawn out by either a single person



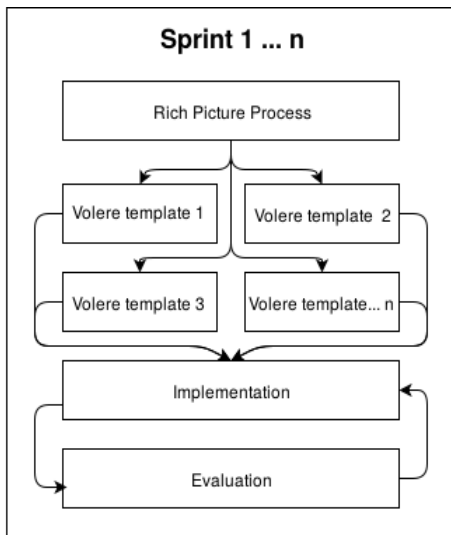


Figure 5. Artifact - Version 1

or a group of people and the image drawn should focus on a current problem or situation that needs to be further developed [18]. After the rich picture has been drawn out and decided on, then the members involved start documenting individual requirements identified from the rich picture into modified Volere templates. Once the Volere templates are filled out, the team should assign tasks and start implementing the

requirements. The implementation stage should produce the desired features as described in the Volere templates. These ready features would need to enter the evaluation stage where they are evaluated based on their fit-criterion. If the created feature doesn't pass the evaluation phase then the process loops back between the implementation and evaluation phases until the feature passes the fit-criterion.

We have designed a rich picture of an example plat-former game (see Figure 4) that focuses on character design along with basic abilities and upgrades to accompany the first version of the artifact. In our rich picture example the character is created and as he progresses throughout the game, he is able to gain new abilities such as running and jumping and even character upgrades.

From this rich picture example we also designed our own versions of the Volere template and present two examples (see Figures 6 & 7) which document two abstract requirements of the rich picture, which in our case, is the character's upgrades and the character himself. In our version of the Volere template we provide a descriptive name of the identified requirement, document id, description of the requirement, rational to describe the reason for the requirement, vision to provide an example of what the requirement should look like or function as, fit criterion to set a measurable mechanic when it is evaluated, and task priority.

### Plat-former rich picture example

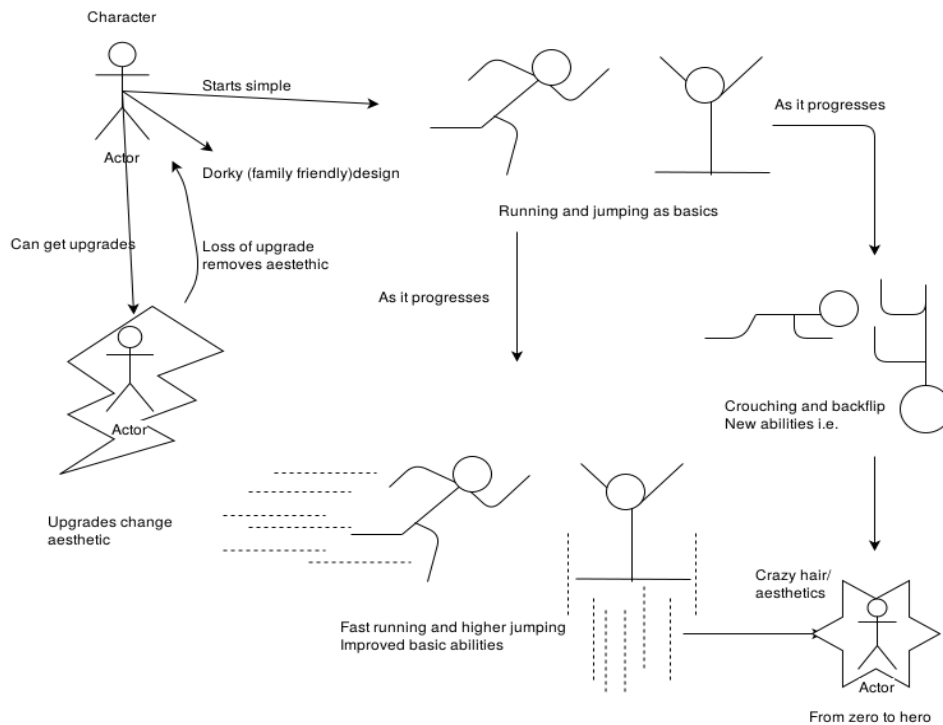


Figure 4. Rich Picture - Example Character

### Modified Volere template example 1

Name: Upgrades	ID: 001
<u>Description:</u> The user can get upgrades while progressing the game.	<u>Vision:</u> Should achieve eagerness/progression curiosity. Expand on the feel of theme, hints of lore, etc...
<u>Rationale:</u> To enable sense of accomplishment to the player.	<u>Fit criterion:</u> Too overpowered? Too weak? Is it fun?
Priority: High	

Figure 6. Modified Volere Template - Example 1

### Modified Volere template example 2

Name: Character	ID: 002
<u>Description:</u> Dorky design due to vision of a family friendly game.	<u>Vision:</u> Think "Super mario bros" esque, in the form of a theme.
<u>Rationale:</u> To enable sense of family friendliness.	<u>Fit criterion:</u> To fit the theme.
Priority: Medium	

Figure 7. Modified Volere Template - Example 2

### C. Second Round of Interview Findings

In the follow-up round of interviews, the artifact was presented and explained to the gaming companies and coding for this round can be found in Appendix D. Most of the interviewees liked the rich picture but two interviewees had mixed feeling about the rich picture process (seen in Figure 4). They expressed concern that the rich picture would take time to learn and implement correctly and the final image might end up being misleading due to the lack of an evaluation phase to correct any visual details before moving on to writing the modified Volere templates. They were also worried about the varying levels of design skills among the companies employees being problematic with abstract elements (such as sound effects), because not everyone can contribute with drawings to the rich picture. Some interviewees pointed out that they would rather appoint a developer that has experience with design who would be able to draw out the rich picture

rather than any of the other developers. The concept of mood boards was also presented to the interviewees as an alternative to the rich picture and all the interviewees said that they would be willing to use a mix between the rich picture and mood board because elements from the mood board can be used to describe abstract features and game mechanics.

When the modified Volere template was discussed, half of the interviewees had positive feedback due to the way they currently use sticky notes and whiteboards to write down details or ideas. They liked that the examples of our modified Volere template are structured and easy to write. Yet, the other half of the interviewees thought that the modified Volere templates have too many steps or that they are unnecessary when Trello cards and sticky notes can be used instead. One interviewee expressed that there are missing steps and that they would like for a creator of the template to be listed when they are being written. Another interviewee also mentioned that it would be hard to keep track of the templates without a tracking system in place.

As the final two stages of the artifact were discussed, most of the interviewees provided only positive feedback. There was one interviewee who thought that the implementation stage might take too long depending on the number of early requirements identified and written using the Volere templates. Furthermore, one interviewee also recommended that the evaluation phase should loop back to the rich picture process to correct any problems faced after implementation.

Figure 8 depicts the type of feedback gathered from the coded interviews. There was positive feedback received which was mostly towards the rich picture process because the interviewed gaming companies liked the fact that the example of the rich picture process provides a visual way to express their vision. A second positive point that was common was about the structure of the whole process and that it was a logical and easy to follow process. Plus a third positive but less significant point was that the process can be easily adapted to smaller games and development teams as opposed to larger ones.

Negative feedback was second to positive feedback with most of the complaints focusing on the modified Volere template as companies said that it either had too many steps to do, using modified Volere templates would become messy, and some companies thought that the modified Volere templates were unnecessary. Other negative feedback focused on the process being too complicated to follow, the effectiveness of the rich picture process, and the adaptability by developers or the training required to work with the process outlined in the first version of the artifact.

The third and fourth type of feedback that we received was neutral and change related feedback (changes to the artifact). Neutral feedback was neither positive nor negative in nature

and it is mostly addressing the vision process, modified Volere template, and the first version of the artifact as a whole. As for the change related feedback, companies stated changes to the modified Volere template, changed to the process layout and changed to the rich picture process.

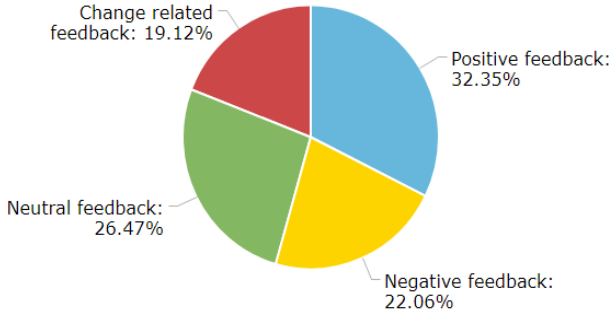


Figure 8. Artifact Feedback - Follow-up Interviews

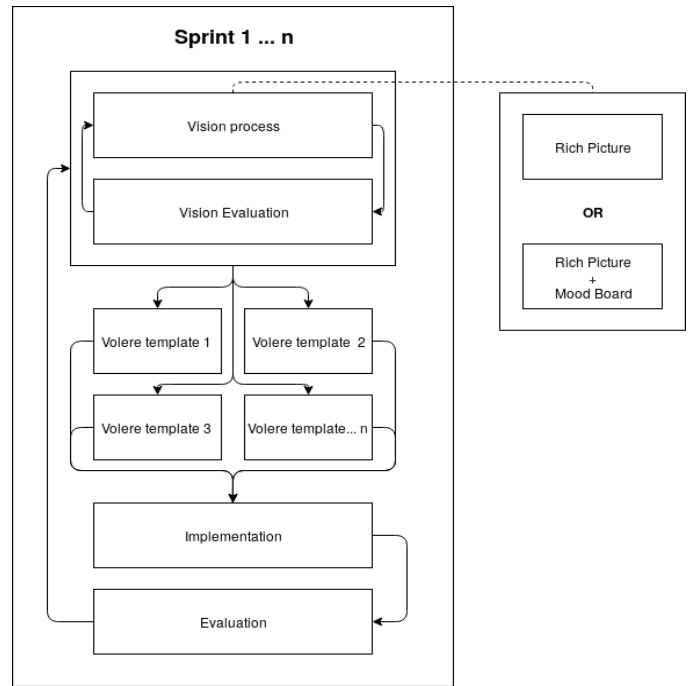


Figure 9. Artifact Version 2

#### D. Revised Artifact

The revised artifact (see Figure 9) takes into account all the important changes expressed by the interviewees after they provided feedback on the original artifact. In the revised second version of the artifact, the rich picture process has been renamed and split up into two steps which include the vision process and a vision evaluation of that vision process. The vision process lets developers choose to design either a rich picture or a mix between a rich picture and a mood board.

In the vision process we recommend that an experienced designer within the gaming company should design the initial vision and that designer should also be involved with figuring out if there are any changes to be made to the vision during the vision evaluation stage. We included the vision evaluation step as a quality safety measure so that the draw vision can be discussed and agreed between all the involved members at which point the vision is refined by the designer.

When the vision is finalized, the involved members continue to the next stage of the artifact which is to create modified Volere templates (see Figure 10) that focus on identifying and solidifying early requirements from the vision process. Our template consists of eight sections as opposed to seven from the original version previously presented in the first version of the artifact. Originator is the extra section added to the template in order to identify the creator of the template as requested by the interviewees.

Towards the final stages of the artifact we decided to connect the last evaluation stage with the vision process/evaluation stages. This change is due to the negative feedback we

received because if unexpected changes happen in the implementation or evaluation stage, then it should also be changed in the vision process. Once the implementation process is in progress, the developers will most likely figure out that some of the features might either not be applicable for the game that they are developing or were implemented better than described previously. Furthermore, the developers have the option of adding/removing bits and pieces to their vision process.

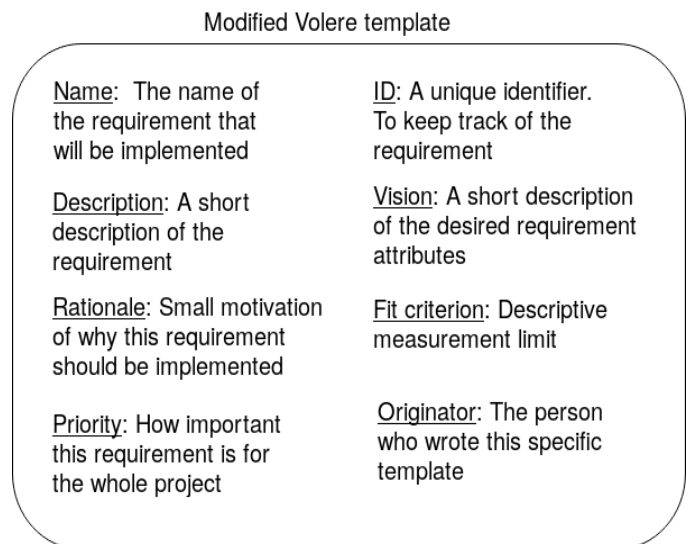


Figure 10. Modified Volere Template

## VI. DISCUSSION

### A. Research Questions

Regarding research question 1: What current problems and issues do game developing companies encounter in relation to RE and ERE?

During our first round of interviews the companies interviewed were asked questions regarding how their development process was planned out. We found out what they did when they had an idea along with how that idea was formulated and solidified. We asked them how their planning procedures were carried out, more specifically how different scenarios have affected their overall projects as a whole. To summarize the data analyzed from our findings we discovered that the most common and consistent issues between most of our contacts were that they didn't have a structured planning procedure that incorporates ERE for developing games nor did they have any sort of design document to specify ERE for their games. Additionally, disagreements on the vision and communication difficulties within each project's team were also a major problem that our contacts face. The issues identified from the coding of the initial round of interviews (Appendix C) can be seen in Figure 2.

Regarding research question 1.1: Are there any existing solutions that meet the specific needs of gaming companies?

After we discovered what problems the different companies were facing from the initial interviews, we started looking into designing our own solution for their needs. At first, the Creative Leaf tool was looked at as a potential solution because it offered ERE mapping features with an easy to use interface, but none of the gaming companies wanted a tool to solve their problem. Therefore we discarded the creative leaf tool as a potential solution for our contacts.

Different communication frameworks were also researched such as JAD, ULRC, MUST and SSM [11]. Out of these frameworks, SSM offered both communication and vision sharing practices through its rich picture process. Concerning the issue of documentation mentioned by our contacts, different system/requirement specification documentation templates were looked at and the Volere template was identified as the most viable documentation solution for gaming companies due to its simplicity in detailing non-functional requirements. These existing solutions can be easily adapted by gaming companies, but they contain too many steps for most companies to follow correctly. In order to fit the specific needs of gaming companies, the existing solutions would need to be modified.

Regarding research question 1.2: Can a specialized artifact be created and tailored to suit game development companies?

When we uncovered the problems that gaming companies face and researched existing solutions, we designed our own artifact. Our artifact aims to address all the four issues of concern that the companies have which includes: having a structured early planning process that focuses on communication, having proper and simple documentation for specifying early game requirements, and a clear way to understand and share the vision between members. The artifact that we created is partially using existing solutions, more specifically the rich picture process from SSM that we use as a way of creating and sharing the vision along with our modified version of the Volere template (see Figure 3).

After the artifact was created it was presented to the gaming companies again and feedback was provided. We analyzed their views on the first version of the artifact and the feedback that we received and coded (see Appendix D) varied widely between companies. Yet there was an overall positive view on the first version of the artifact from most of the companies (see Figure 8).

The artifact can be tailored to meet the specific need of each individual company, but we discovered that tailoring it to suit everyone's needs would unfortunately not work. Still, we believe that the artifact has the potential to solve some aspects within early requirements engineering of game development. The feedback that was received from the second round of interviews gave us the opportunity to further improve the first version of the artifact. Even though the second version of our artifact has not been tested nor shown to any game developer, it is changed with the feedback received in mind (see Figure 9). The second version of the artifact would suffice due to the fact it has been changed based on the negative feedback that was received.

### B. Threats to Validity

There were a couple of setbacks and differences that were identified during our research. One of the contacts that were originally interviewed agreed on a follow-up interview, unfortunately this contact became unreachable when the time for a follow-up interview came. With that said, another contact from a new company agreed to share their thoughts of the artifact even though this company had no previous connection with us in terms of the first round interviews. The replacement company might have different issues with their ERE process, even factors that have not been considered beforehand. On top of that the contact might not even share the same issues that the round one interviews shared.

Further, due to some of the contacts being abroad or unreachable, some of the interviews were done using communication platforms such as Skype to gather the necessary data. Although some of the recordings turned out to have a higher quality than others, in turn this made the transcribing process more difficult and potentially inaccurate.

This might have changed the outcome of our results, due to the potential of missing crucial data from the interviews recorded.

From the second round of interviews, some of the feedback that was received has the potential of being biased. Throughout the interviews we noticed that some of the contacts either showed little to no interest for the artifact while others simply claimed it was a “good” solution. Whereas some of the of the contacts had only mostly negative comments about the artifact as a whole. This could be the case of the artifact being completely contradicting to their current methods of game development, or that the artifact was a success.

## VII. CONCLUSION

The purpose of this research was to find out what the most common issues game development companies face in the earliest of stages of their development. After finding out that communication and sharing of the vision were the most common issues present, we decided to create an artifact that would hopefully be of use by the gaming companies. The idea was for the companies to give feedback on the created artifact to see if we managed to cover to issues present or if our artifact needed further improvement.

The feedback of the companies towards the artifact had mixed results; a majority of the companies liked the purposed rich picture process as an attempt to share the vision of the desired product. Although all the companies were in favor of the rich picture process, it could be further improved in combination with a mood board as an attempt to further expand on sharing the vision. The modified Volere template was understandable to all the companies but two of the companies decided that it would not be of use for their specific work environment.

As an overall overview of the artifact three out of five companies had a very positive response towards it, with the most notable negative feedback being the worry of adaptation. One of the companies agreed that it is developing on the path towards the right direction, although it would need more work for it to be fully functional. Lastly one of the companies had little to almost no positive feedback for the artifact.

### A. Future work

The feedback received from the second round of interviews allowed us to create what we believe is an improved version of the artifact. Although the improved version was never put to test nor was there any research made to check if it is actually better, we believe it could be evaluated and improved by future researchers. The second version of our artifact is only based on the feedback that was received during the second round of interviews. For future work, the second version of the artifact could be a potential starting point for researchers to try and

improve it for a wider range of game development companies.

This research could be remade from scratch using the same research methodology, but the focus could be pointed towards bigger and better-established game development companies in order to figure out if the artifact could be of use for those companies as well. This is due to the fact that the companies that we contacted were only smaller “Indie” game development companies.

Considering the modified Volere template was the section that had the majority of the negative feedback. One could research ERE within the game development with the same/similar vision process in mind, but excluding or changing the modified Volere template to something more fitting.

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## VIII. APPENDIX A

### A. Initial Interview Questions

- 1) How long have you been working developing games?
- 2) What's your position in this company?
- 3) What's your experience with game development?
- 4) What are your planning procedures for creating a new game?
- 5) Do you have any difficulties with your current methods of planning?
- 6) Do you gather and use/document data for early requirements engineering? If not, do you plan to do it and how?
- 7) Is there any way you would like to improve your current methods of early planning?
- 8) Do you think your current methods would still be sustainable if i.e the company would grow?
- 9) Has there ever been a situation where you'd have to change the very basic of your game due to "poor" planning?
- 10) If yes, how did that change the process of the game development?
- 11) Has there ever been a case where you wished you planned your game more cautiously?
- 12) How do you map out game interactions and do you find it useful?
- 13) Which areas do you have difficulties in and in what way would you like to see improvements?
- 14) Are there any supplementary tools that you use for creating or gathering requirements during the game development process? If so describe how they help.
- 15) If there were anyway you wished to improve would you prefer a tool or a new requirements process? Why that tool or process?

## IX. APPENDIX B

### A. Evaluation Interview Questions

- 1) In general what is your overall view on the artifact?
- 2) What did you like? What did you dislike?
- 3) Would you consider using the artifact? Why or why not?
- 4) Do you believe the artifact would be useful for game developers? Why or why not?
- 5) How does the artifact compare to your current methods?
- 6) Is there anything you prefer with our artifact?
- 7) Do you think The rich picture process could be of use within game development?
- 8) Do you think The Volere template could be of use within game development?
- 9) Any changes you can think of? That would make it more "useful"?

## X. APPENDIX C

### A. Coding of Initial Interviews (1-5)

ID	Code	Note	Quote
1	Planning	Planning procedures	"We are getting better and better at talking about the scope of the game."
1	Planning	Planning procedures	"We try not to jump onto a project without at least thinking about what the core of the project is and not to cut corners where ever possible."
1	Planning	Planning procedures	"You might think that it takes not much to know about the mechanic which you think is easy to implement but it actually ripples from code to music to graphics."
1	Planning	Planning procedures	"It depends on the project because sometimes it's born from a script and the scope is set by the script and its born from a core idea or an image and this gives it a lot of wiggle room."
1	Planning	Difference in planning procedures	"So the difficulty with that is that every project is so unique"
1	Planning	Communication	"Sure, we do have issues with communication with members"
1	Planning	Member communication	"Yeah, some visualization problems in making it concrete."

ID	Code	Note	Quote
1	Growth planning	Sufficient methods	"If there around a 10 member increase then we would need to reconsider our current method of planning."
1	Planning	concept, visions and ideas	"But if you increase your work by 10 members then not everyone's idea can be as valuable and you would need to subdivide responsibilities/tasks and create groups."
1	Roadblock	Task management	"Something might seem like a hard task, but eventually become the major roadblock in the entire project."
1	Progress	Lack of planning	"Because time kind of flies, a work week can go by with zero progress made."
1	Improvement	Type of improvement	"If I was to develop a tool to help with early planning, I would not create actually create some sort of software, with like visual solutions."
1	Improvement	Type of improvement	"I would construct a method to as quickly and as coherently as possible arrive at a concise image between everyone in the team."
1	Improvement	Type of improvement	"And all this is supposed to be done with minimal writing and drawing, try to move at the speed of talk, and just jot down some quick notes, no more than 3 words."
1	Type of development	Successful trail and error approach	"It kind of revolutionized the game in the sense of that it melded perfectly with the mechanics, it melded perfectly with people's expectations, it actually fixed quite a dramatic disconnect between our narrative and our mechanics."
1	Type of development	Negative towards documentation	"It would be impossible to arrive at the prototype/demo we are at today, if we were held down or anchored to our initial planning or game design document."
2	Planning	Planning procedures	"Whatever we wanna play, what we find funny, or fun to play. That's the initial procedure, just what do we wanna play. What kind of perspective do we wanna use."
2	Planning	Planning procedures	"Sticky notes haha, definitely sticky notes, and then what we do is we write on pieces of cardboard paper, we cut it out and then put it out on the wall, so that we can see the scope of when we are i.e making a level."
2	Planning	Negative planning procedures	"Yeah, we don't set limitations on us, besides technical limitations. We use game maker to make the games, so we have those limitations, but besides that we are like "what about this", "what if we add this", "what if we put this" which makes development kind of like hell sometimes."
2	Planning	Positive planning procedures	"Since then we kind of learned from that mistake, that it's better to write a design document."
2	Concept and goals	Vision	"I guess clearer definitions of what we want for the game."
2	Concept and goals	Vision	"So its super important to keep that clear goal always in mind, which is something that we are gonna do into the next game after this one."
2	Growth planning	Sufficient methods	"No, bigger companies needs so much more planning, we are just two people so it's very easy."
2	Poor planning	Setbacks because of poor planning	"We had this Sims kind of talking system, we found that boring, that was like 2 months of work that we scraped."
2	Poor planning	Setbacks of poor planning	"So we spent another 2 months making 20 small games, still now I'm thinking "was that a good choice?"."
2	Tools	Negative towards it	"Yeah, I don't see how tools would help, we got paper and pens and that helps for those things."
3	Planning	Planning procedures	"You usually go through a basic idea, white it down and get a design document. that's the most important part, get a document where everything possible is written there so everyone can reference that document."



ID	Code	Note	Quote
3	Planning	Planning preference	"Have a more set design document from the start, usually you just improvise a document every time."
3	Planning	Poor planning	"We've been close to it but we have usually avoided it. I know a lot of people that have done that but I've been lucky."
3	Planning	poor planning	"It's usually about people having too big of ideas or unrealistic ideas, like we we need to have 10 different cut scenes but our graphics team can only do one."
3	Planning	Planning procedure	"Then compile it because this is what we're going to do for development. Of course this is very basic and overhead planning."
3	Planning	Planning procedure	"After that the game documents needs to be broken down into tasks to then start to assign it."
3	Planning	Planning procedure	"You often have a deadline and you split the time in between into sprints so you have different goals for every part."
3	Artifact	Ideas of tool	"I would maybe say a new process because it doesn't necessarily mean that it's better."
3	Artifact	Ideas of tool	"If you have an alternative way for planning something this way instead of my way it might be better than a specific tool for "my method"."
4	Scope		"But we broadened the scope and now its a creation tool for creating emerging games with VR support."
4	Vision	Their specific vision	"So the vision is that our company is a kind of platform where you can create games and impressive experiences and our vision is that our platform will host lot of different types of games."
4	Tool usage		"The tool we use is Google Docs and yesterday we wrote down a road map and some ideas and that was it."
4	Vision	Started with a blank vision	"so if we rewind to when we started this then there was no vision at the time it was just a blank canvas with our inspirations which let to where we are now."
4	Tools	Usage of tools, and how they save resources	"We have lots of different services to do that. We strive to collect as much as possible in the cloud, so we use different tools for different kinds of content."
4	Planning	Planning procedure(in form on how to make physics based game)	"I've actually been buying lots of toys recently."
4	Planning	Planning procedure	"Well from the beginning it was just me with inspiration and obsession, so there has never been any tools for that, but I've been writing down lots of ideas on Google Keep."
4	Vision	Vision sharing	"We kind of agreed to the vision and since we agreed on the vision it's quite easy to discuss things."
4	Vision	A type of trail and error approach	"Yeah it depends how big it is. We also use a tool called Snap which i envisioned and I had to write that down because it was too big to start prototyping but if its a smaller thing then I can do it."
4	Planning	Structure of planning and their idea of planning	"So we found that structure of creative process that you kind of eluded to in the beginning that it's killing the whole creative process and if there are no boundaries at all then it's kind of difficult for them to create as well, so we need to frame it in order to say that this is the problem we're going to solve and that's why we have this vision to help us create in a unified direction and along the way we have also hard deadline that we must meet."
4	Planning	Sustainability if the company grew	"No, it would not be sustainable."
4	Planning	Communicating the vision	"Well its communication, that what it comes down to. And of course there are great tools such as slack and so forth, but it is inevitable as you grow, and if you are not extremely good in communication it is very difficult."

ID	Code	Note	Quote
4	Simplification	simplification process	"I don't think so, but maybe, the biggest changes have been made because they want to simplify things and we agree on that."
4	Philosophy/idea	small vs big companies	"But when you build platforms you have longer perspectives so you can't have the same philosophy as small games."
4	Planning	Vision and sketches, how to	"But before we start implementing things we need to go deeper and more detailed like looking at different inspirational sources, references, but also doing sketches, wire frames, and starting prototyping just to visualize a mechanic or a movement."
4	tools usage	Thoughts of tools and ERE	"Well it would depend on the situation we are in because we would like to move as quick as possible and the tool or method shouldn't get in the way of that. So that's why we try to use whichever method is the quickest for us to solve that specific problem or implementing that idea."
5	Planning	Planning procedure	"Later in the development we began mapping out the game with post it notes in our apartments wall, we're still living in the same apartment."
5	Vision	Lack of vision?	"We sat down and thought what do we really want to do."
5	Vision	Change of vision	"Yeah, we had some writings first, but pretty much all of that changed eventually. "
5	Planning	Positivity towards documentation	"But yeah in the middle of it we kind of had to write something, for reasons of applications and stuff. But that was also really good, we noticed how good it is to do that."
5	Vision	Lack of ERE, unneeded?	"That is why we did it, I don't know if we would have written down stuff, since were only two people, our ideas change pretty fast from one to another."
5	Vision	Lack of ERE, unneeded?	"Flexible. In a good way, and a bad way. Because we remove big chunks of games sometimes."
5	Vision	Positive, but not really	"I would say I think this is the best way for us to work. But yeah there are difficulties, because sometimes it can be a little bit vague."
5	Planning	Planning procedures and vision	"Most of the time were like "Heyy what you gonna do today?" because we sit in the same office. And I'm like "yeah partner what are you gonna work on today?" He says "I'm gonna do this, what are you gonna do?"."
5	Planning	Planning procedure	"So we have some lists of stuff that needs to done for the game, then we prioritize and try to work on same and close to each other, so we can give feedback on what we put into the game."
5	Planning	Planning procedure	"Uhm... I don't know, I mean. Maybe? I mean I'm very happy the way we work"
5	Sustainability	Planning sustainability	"No. The reason we can work like this is because we are two people, there is no miscommunication, if I say something, I say it directly to partner, and I know obviously that it reached him. I don't it would ever work maybe even 3 people, or 3 might work,"
5	Vision	Shared vision	"When I think the vision is one way, and partner has this other vision, and soon as I start programming, I start to implement my vision of the same thing. In our heads, or in my head when I'm implementing it, were both thinking the same thing, but when I show its like "No, this is not really what I meant" we could be more clear or specific on what exactly."
5	Vision	Shared vision	"But sometimes it's also hard to know that before it's to late. Because, yeah I guess if we were more specific with everything with what we say and what we plan, so that wouldn't happen so often. It doesn't happen to often, but it does happen sometimes and it can be a little frustrating."
5	Planning	Planning procedure	"I think we work mostly with mockups, and prototypes, if there is something I can do really fast i can try out in the game pretty much instantly, but if it's something bigger, we work with mockups and try out to map it out how its gonna look or feel."

XI. APPENDIX D

A. Coding of Evaluation Interviews (6-10)

ID	Code	Note	Quote
6	Overall view	Positives feedback	"It feels like a natural upgrade to be honest, I think it would be pretty nice to use."
6	Overall view	Positive feedback	"Seems more easy to use, as I said a natural upgrade with less steps for everyone. It seems like a nice upgrade."
6	Overall view	Negative feedback	"But it is a new system so of course you'd have to adapt to that."
6	Usage consid- eration	Feedback	"Yeah I'd believe it would be feasible to use the artifact. "
6	Usage consid- eration	Positive feedback	" It probably would be, as a I said, it's a natural upgrade."
6	Rich picture process	Positive feedback	"Yeah absolutely, if you can put a graphic representation of an idea, in someway I think it's easier than to tell it. "
6	Vole template	Feedback	"Yeah probably."
6	Mood board	Feedback	"I think a combination of both would be the best one. Because a mood board usually, it sets the graphical or aesthetic theme. But i think you could use the rich picture process to maybe visualize a game mechanic instead. "
7	Overall view	Feedback	"What I think that it would work nicely but not for our size of a development team. It would be a good tool for a slightly larger development team."
7	Overall view	Feedback	" I'm always a fan of iterative processes and I also like that its using predictive metrics to find out if you over shot or under shot your goal."
7	Overall view	Feedback	"There seems like there should be a man-in-the-middle between the templates and implementation where things are validated"
7	Overall view	Negative feedback	"There seem to be a lot of missing steps between the Volere template and the implementation where you actually hammer down the tasks."
7	Rich picture process	Negative feedback	"So the rich picture is kinda limited to my ability to actually communicate via drawing."
7	Rich picture process	Negative feedback	"How would you explain music that way or sound effects or sound design? it's also an issue with the rich picture I think."
7	Overall view	Feedback	"This could be a workable way to structure because a system is better than no system."
7	Mood board	Feedback	"The mood board is only drawing so the the mood board wouldn't stand on it own."
7	Rich picture process	Feedback	"I'm not sure if people can crystallize what their ideas is even if they have a rich picture and often the case is that you actually fall back on better judgment."
7	Changes	Change related feedback	"Although I would cut it at the end of the Volere template and then I would separate the evaluation and implementation phases from this crystallization phase "
7	Overall view	Negative feedback	"It demands that you have like the entire vision there at once, it seems very volatile, like really able to sink a project before it started."
7	Overall view	Negative feedback	"It lacks that, single persons core vision."
7	Changes	Change related feedback	"But isn't important to define things like this, in the process? Like if it's optimal for the team to have one person designing the rich picture and then bring it in for feedback, and stuff. Shouldn't that be a part of the artifact?"

ID	Code	Note	Quote
7	Overall view	Negative feedback	"There are some invisible steps here and there."
7	Rich picture process	Negative feedback	"I Don't think the rich picture is the optimal way to explain what your game idea."
7	Volere template	Negative feedback	"I don't think the Volere is the only way to have a high level agile multi task."
7	Changes	Change related feedback	"And have those gatekeeper moments, those gatekeeper moments have to be coupled with some kind of like fail safe system, i.e. if the entire team can't be on the vision or maybe not understand the vision you can't do wrong."
7	Related process	Similarities of process	"We don't do a rich picture process, we talk a lot. "
7	Changes	Change related feedback	"Put your own artifact through the artifact, too see what pops out in the other end. If it's even manageable."
7	Changes	Change related feedback (Volere template)	"And you actually have customer satisfaction and customer dissatisfaction and I feel like that should be front line and center. "
7	Overall view	Adaptation	"I think i would have to try your artifact or your method to actually understand how it works"
7	Overall view	Feedback	"This might work, I see some pitfalls. It just seems like that you kind of missed the most crucial part of validating your artifact."
8	Overall view	Feedback	"I think that each section is good."
8	Volere template	Negative feedback	"I just think that in game development it can get to complicated, for this kind of "card"."
8	Volere template	Negative feedback	"More of an issue "what upgrades?" "How do they affect everything else?" Each thing becomes much more complicated."
8	Volere template	Negative feedback	"It'll just become piles upon piles with cards. That would be the biggest problem that I can see."
8	Overall view	Feedback	"Each part is good, it's just that I feel it's gonna be more difficult."
8	Overall view	Positive feedback	"I think it's good having the whole vision concept. Also, things like description and rationale is always important."
8	Related process	Similarities of process	"I almost have a similar thing where I write like a genre of the thing and a description of what it could be. And then the rationale is not how I write it, I just keep a separate note for it and the fit criterion."
8	Related process	Similarities of process	"The vision I kind of keep for myself. But I think it's good for other people."
8	Rich picture process	Positive feedback	"I would consider the Rich picture part, writing like a vision for it, probably. It's not really been put to practice but I am definitely inspired by it."
8	Volere template	Negative feedback	"I wouldn't be able to use it because of what I mentioned before, it would be to difficult."
8	Overall view	Usability of the artifact	"Not really."
8	Rich picture process	Positive feedback	"Well the rich picture process, take the rich picture example, I think that could definitely be good."
8	Changes	Change related feedback	"I think that the evaluation and implementation can go all the way back to the rich picture process instead of where it is."
8	Changes	Change related feedback	"And you kind of miss the general aspect when it comes to check within yourself that we are actually doing what we decided to do(the idea)."
8	Changes	Change related feedback	"These templates, they are good to keep track but only if you actually are able to keep track of them. If there is no real system of tracking it will just pile up and wont be used."

ID	Code	Note	Quote
8	Mood board	Positive/change related feedback	" I think both are good, I think it's good to have it, it only helps for the feel for the game. I mean it won't tell you how the game will work, it's more for feel, which is important. It helps if you are gonna explain a vision, I think it would definitely help."
9	Overall view	Positive feedback	"I can see the process, and i can definitely see the benefits of it."
9	Overall view	Positive feedback	"But I think for some people this could provide some help, a structure to the creative process. I can definitely see the benefits."
9	Rich picture process	Positive feedback	"Instead of explaining things with words, rather explain things with pictures."
9	Volere template	Positive feedback	"Because it is easier to get a map of what you are trying to achieve and then you can have someone that does the templates without to define the requirements."
9	Overall view	Positive feedback	"So yeah I like the structure, I could definitely see the potential with it."
9	Overall view	Positive feedback	"Yeah I could definitely see that to be working."
9	Related process	Similarities of process	"I guess I'm used to working with other project managements, we have extreme programming, we have cards, you then sort, it's the same principle you define your colleges into cards. "
9	Overall view	Positive feedback	"I mean it is a very kind of straight forward process in a sense. I would say that there's nothing that I dislike."
9	Volere template	Feedback	"What I can see is some challenges with some parts and I think that the cards/templates are very straight forward."
9	Rich picture process	Feedback	"I think the challenge is as I said before, what goes in to that rich picture process?"
9	Overall view	Negative feedback	"well I think it probably takes a couple of times before you get used to that process, but once someone gets used to it, it probably could work."
9	Rich picture process	Feedback	"How it's done in a visual way instead of the boring text things."
9	Mood board	Feedback	"I think the mood board is good to be used as an inspiration of something, i mean if it's for a visual, if you want to something visual like you want to do a identity."
9	Mood board	Change related feedback	"That gives you an idea what mood you want to achieve, then that gets translated into a rich picture... Yeah I would probably use them in a combination."
10	Overall view	Positive feedback	"I mean I think it looks quite logical in a sense."
10	Overall view	Feedback	"I can tell right now I think this. I think this would be better for smaller games, as in if you were to put this for GTA 5, I think it would not work."
10	Overall view	Positive feedback	"But I think for the kind of games that we do, we can make something very similar to what you have now because they are so small, I think for us, I think it would be good."
10	Overall view	Positive feedback	"I mean I'm not really sure what to dislike, I mean it is simple, just draw the overall things."
10	Overall view	Positive feedback	"Sure, I mean for the way our business is built up."
10	Rich picture process	Feedback	"The results of it is good for a small company, but the use of it could maybe be better for bigger companies."
10	Volere template/changes	Feedback and changes	"We might just remove the Volere template, because the rich picture would most likely be self explanatory."
10	Rich picture process	Positive feedback	"I think it's good that it can be applied to every different level of the game."
10	Volere template	Positive feedback	"So in that sense it's good that you kind of lowered what's on it."
10	Changes	Change related feedback	"The originator, the guy who made this requirement, if you make it like a rule that if you are the one who thought of this requirement."

ID	Code	Note	Quote
10	Changes	Change related feedback	"You don't want too much information, its good to reduce."
10	Mood board	Positive feedback	"I think it's a good idea actually, as I said you kind of get the pictures straight away by just looking at it for a good 10 seconds."
10	Mood board	Change related feedback	"I would say in combination, I think if using it on its own that would make room for a lot of misunderstandings."
10	Mood board	Negative feedback	"You cannot really explain a game by just showing pictures, I think that's impossible, from a developer point of view."