



UPPSALA
UNIVERSITET

IT 14 018

Examensarbete 30 hp
Februari 2014

The Vision in Scrum Development

Studying the Challenges the Vision in Practice

Bastiaan Boel

Institutionen för informationsteknologi
Department of Information Technology



UPPSALA
UNIVERSITET

**Teknisk- naturvetenskaplig fakultet
UTH-enheten**

Besöksadress:
Ångströmlaboratoriet
Lägerhyddsvägen 1
Hus 4, Plan 0

Postadress:
Box 536
751 21 Uppsala

Telefon:
018 – 471 30 03

Telefax:
018 – 471 30 00

Hemsida:
<http://www.teknat.uu.se/student>

Abstract

The Vision in Scrum Development

Bastiaan Boel

Scrum is one of the agile software development processes that is used by practitioners. The practitioners often agree upon a vision in these processes. The vision can help to create a shared understanding in the team and gives direction to the software development projects. The vision is not a part of the Scrum process but essential for the software development. This research studied how practitioners describe the vision in Scrum projects and experienced problems with creating the software related to the vision.

Semi-structured interviews were conducted with ten Swedish IT practitioners working in Scrum projects, which have different roles in the software development. Many of them were setting the requirements, deciding the design and developing the code. The participants worked on different types of products.

Results show that the vision is described in various ways by the practitioners. Some practitioners refer to the vision as the goals of the project, while others refer to the end-product. All practitioners mentioned that the vision is important in the project. Even though the vision is perceived as important, practitioners face challenges in their Scrum development projects. One of the challenges faced was that the vision was often not communicated or externalized in a way that the team could reflect upon, this made it hard for the team to understand the bigger picture. This was especially important for the user experience designers. One of the challenges found is related to the different end-states of the product is that changes of the product are not always supported by the people in the process. The changes that take place in the projects are often incremental and not iterative in nature. This leads to optimizing the current design and not getting the right design.

Creating and actively sharing the vision is important for teams in software development. Practitioners should consider creating various visions that can be used for exploration and evaluation of the possibilities. This can support consistent decision-making and a holistic approach to the system.

Handledare: Marta Kristin Lárusdóttir
Ämnesgranskare: Åsa Cajander
Examinator: Lars Oestreicher
IT 14 018
Tryckt av: Reprocentralen ITC

Acknowledgements

I got a lot of support during my thesis from a lot of different people. I want to thank a few of them in this section:

I am very grateful to and for my supervisor Marta Kristín Lárusdóttir. Marta took time to read, comment and discuss my thesis. She helped me in every stage to focus and structure my thesis and was always motivating and questioning my thought.

Åsa Cajander, my reviewer and contact person who made this thesis possible in the first place. We discussed different thesis topics and Åsa put me in contact with Marta, who became my supervisor. She also joined meetings at the early stages.

I am also thankful to the participants of my research. I would not be able to conduct this study without them. I enjoyed the interviews I conducted and I learned a lot during these interviews.

I want to thank my fellow HCI students for the interesting discussions and support during my thesis. Especially Marten Biehl, Benjamin Langlotz and Mark Conde have been important.

I also want to thank the opponent for my presentation, Linus Sunde, who gave comments on my thesis and posed questions after my presentation.

All other people around me who took time to discuss my thesis or support me while writing it, asking questions and creating a nice environment to work in.

Table of Content

INTRODUCTION.....	8
RESEARCH QUESTIONS	9
BACKGROUND.....	10
AGILE DEVELOPMENT.....	10
SCRUM	11
THE VISION IN SCRUM.....	15
CREATING THE VISION	24
USER EXPERIENCE DESIGN.....	26
SCRUM TEAM.....	28
AGILE & USER EXPERIENCE DESIGN	30
METHOD.....	33
RESEARCH APPROACH	33
PARTICIPANTS.....	34
PROCEDURE.....	36
DATA ANALYSIS	36
RESULTS.....	38
DEFINITIONS OF THE VISION.....	38
CREATING AND CHANGING THE VISION	42
COMMUNICATION OF AND ABOUT THE VISION	51
CREATING THE END-STATE	55
CHANGING THE VISIONS.....	61
DOCUMENTATION	71
DISCUSSION.....	76
THE VISION	77
CREATING AND CHANGING THE VISION	78
COMMUNICATION OF AND ABOUT THE VISION	80
THE END-STATE	81
CHANGING THE VISIONS.....	82
DOCUMENTATION	84
CONCLUSION	85
FUTURE RESEARCH	87
REFERENCES	88
APPENDICES.....	93

Introduction

Software development is the activity of creating digital products. Since the beginning of software development, processes have evolved to structure and manage the software development activity. Each of the processes has their own strengths and weaknesses in dealing with the complexity of software development.

Agile software development is a set of lightweight development processes on how to plan and structure the software development. The agile processes are based on rapid and iterative releases that deliver tested working software at the cost of complex planning and design [1]. Scrum is one of the agile processes. Scrum does not cover the entire software development cycle, as it does not address how design takes place and the vision is created.

Schwaber argues that the vision is one of the two required artefacts to start a Scrum project, by stating: “*The minimum plan necessary to start a Scrum project consists of a vision and a Product Backlog*” (Schwaber, 2004). The vision is not part of the Scrum process, but an essential part of the product development. Pichler depicts it as a surprisingly common mistake to start the Scrum project without having a vision [2].

Lárusdóttir, et al. (2012) address that the vision of the user experience (UX) needs to be made before the implementation starts, but the vision needs to be iterated during the process. It is not described what is meant with the UX vision. An interview study conducted by Kollmann, Sharp and Blandford (2009) gave an account on the importance of the UX vision in agile software development. The effects of a lacking vision they observed were slowed down projects and inhibited and difficult decision-making.

Beyer described that agile processes have problems with producing an “*integrated experience to support users’ work with a cohesive system*” (Beyer, 2010). Singg (2008) reports that the Product Owners think in terms the minimum

set of features that can be marketed in a short time frame, which makes it hard to get the bigger picture or a holistic view of the final product.

The thesis will discuss the vision in Scrum projects and addresses the problem with creating the bigger picture. The topic will be discussed in five main themes, (1) Vision, (2) Involvement, (3) Communication, (4) Changing the Vision and (5) Documentation.

This research is conducted in the field of Human Computer Interaction (HCI) with a focus on the combination of agile processes and UX design.

Research questions

How is the vision defined by IT professionals in the Scrum development process?

What are the challenges for IT professionals in creating the vision?

Who is involved in creating the vision in the Scrum development process?

What are the challenges in the involvement of the team and end-users in the creation and evaluation of the vision in the Scrum development process?

What are the challenges in the communication of the vision in the Scrum development process?

What are the challenges in changing the vision in Scrum?

How is the vision documented in the Scrum development process?

In all these questions, I am particularly interested in the user experience perspective.

Background

This chapter will cover current literature that creates the fundamentals of this research. Additionally it explains the terminology used.

Agile Development

The software is developed in short iterations in a specific amount of time called sprints in agile software development. In these sprints, small portions of the software are iteratively analysed, designed, developed, tested and implemented. The input for the iterations comes from the backlog, a pile of prioritized user stories or features that is up for change. The focus in these iterations is to add value to the software for the customer. This means that at the end of the iteration, there should be a working, tested and ready to use software product that can be used by the customer. The sprints enable the team to deal better with changing requirements through the small steps and lack of work up-front.

The agile culture values the “*one team*” principle; you are either part of the team, or someone who gives feedback on the results. Everyone in the team is a professional and has knowledge about the work that has to be done and would be able to take any task that would be given in the project. As agile software development assumes that the team exists of motivated and skilled individuals, it strives for technical and design quality.

Face to face communication is valued more than using documentation, face-to-face communication is seen as more efficient and effective. No more work than necessary should be done. During the releases, the focus is on teamwork and involvement of stakeholders to make sure the team is on the right track. The link between business and development should be tight to prevent problems and have clear communication. The team regularly reflects upon the work that the team has been doing to discover how the team can work more effectively together as a self-organizing mechanism.

In 2001, the Agile manifesto was created and is since then a beacon in the software development history [1]. The Agile manifesto describes principles that guide agile development efforts in order to create software product. The following principles are at the core of the agile processes. The bold items on the left are seen as more important than the items on the right.

- **Individuals and interactions** over processes and tools
- **Working software** over comprehensive documentation
- **Customer collaboration** over contract negotiation
- **Responding to change** over following a plan

Beyer describes that the agile principles can be adapted as rules that are exactly followed or as guidelines that are loosely followed [3]. Larman describes that if agile processes have one motto, it would be ‘embrace change’ [4]. Surveys conducted conclude that agile processes perform better than the other processes as the traditional and ad-hoc processes [5] [6]. Agile projects are perceived better in productivity, cost and business stakeholder satisfaction.

Scrum

Scrum is one of the most popular software development processes at this moment and is the processes that will be used to study the vision in agile processes. Scrum in the original use of the word denotes a rugby term that was used to describe how excellent companies develop new products by Takeuchi and Nonaka [7]. Scrum is described as an agile process by Schwaber and Beedle [8]. Scrum has a focus on how the process should be managed instead of how the code should be developed as eXtreme Programming (XP) does [9]. These processes could be used as addition to each other, and that is often done in practice [10].

Scrum distinguishes several roles and elements in the process as shown in Figure 1 [11]. The Product Owner (PO) is responsible for the business owner and end-users in the project. The PO is the person that should be satisfied by the team. This means that the PO approves the delivered

software by the team in terms of quality. The PO is responsible for the fact that the sprint must deliver value to the business owner by having working code and tested code.

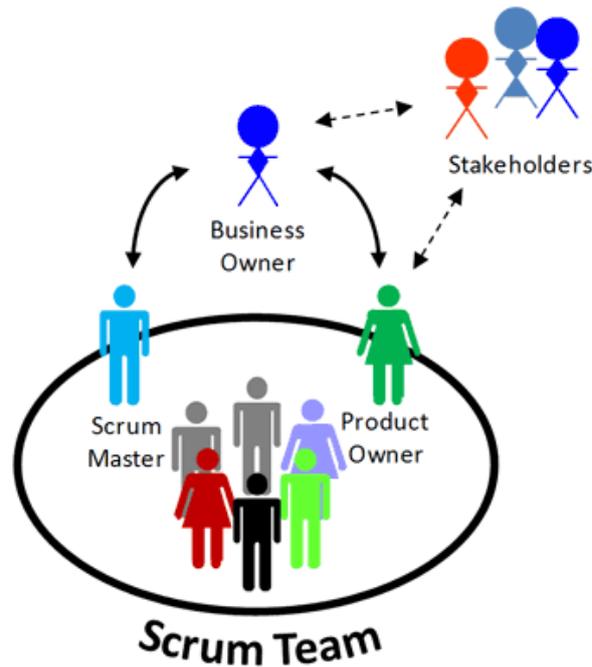


Figure 1 Scrum team, the business owner and stakeholders [11]

The team consists of people who are fully committed to the project and is led by the Scrum Master. Next to leading the team and managing the Scrum process, the Scrum Master runs the daily and other meetings to create and change the backlog and the sprint backlog. The Scrum Master makes sure that during the sprints the requirements do not change for the team. The PO and the Scrum Master cannot be the same person; this is sometimes the case in practice [9]. The team members make sure that they can deliver working software at every sprint and update the work that is done. Persons who have an interest in the project are considered as stakeholders and not as part of the team. The end-user in this thesis refers to the person that will use the end-product. The person that represents the business and initiates the project is the business owner and the stakeholders (e.g. marketing, sales and management) are all other people who have a strong relation to the system that will be developed.

Figure 2 shows the Scrum process. The stories in the sprint backlog will be estimated and prioritized at the beginning of the project so that the most important work that adds most value is done first. The story contains information about what the end-user can achieve with the system by creating this story. Once a developer starts with a story, the first thing that happens is gathering information about this story. After each sprint, the status of the backlog is evaluated and discussed with the team members. Priorities might have shifted or new knowledge is acquired during the last sprint.

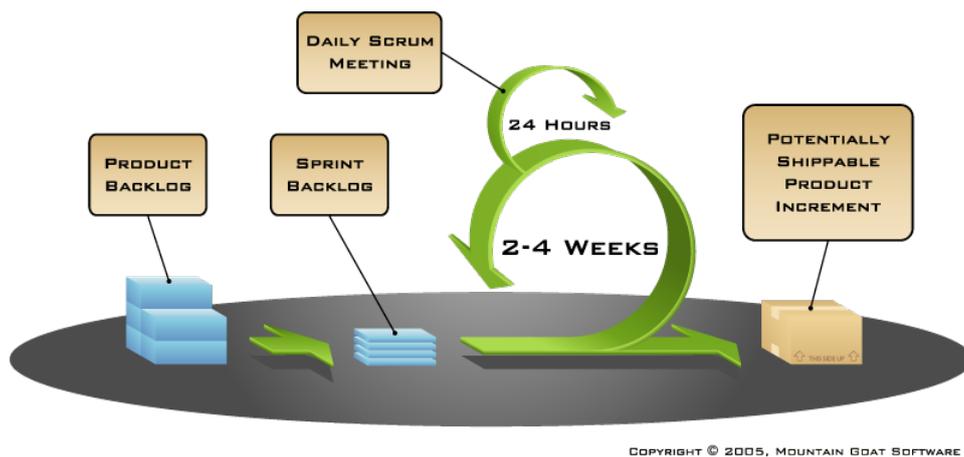


Figure 2 Scrum Development Process [12]

The sprints are usually a month long [4], but there is a cultural value in the community that prefers shorter sprints [3]. The sprint begins with a sprint planning meeting where the user stories are selected from the product backlog to put into the sprint backlog. During the sprint, items may only be added to the backlog, not removed or changed. At the end of the sprint, the implemented story is evaluated with the PO and the other stakeholders in a sprint review meeting. In this meeting, the PO shows what has been built and to make sure that the needs are satisfied. The sprint also ends with a reflection on the direction the team takes with the product and on their work practices.

The daily meetings are there to answer three questions. The team member states what has been done since the last meeting, what will be done and which problems or obstacles there are between the team members and the

goal. Each team member does this to make sure everyone is up-to-date and knows about problems that are encountered. Only the active people in the team may speak up during this meeting, these are the PO, Scrum Master and the team members. Other stakeholders like marketing, sales and management can be at the meetings to listen.

The PO is also prioritizing the product backlog. The product backlog exists of user stories that describe the overall user requirements the PO can prioritize. The product backlog is used to give input to the sprint backlog. The sprint backlog contains a part of a story or multiple stories that can be developed within a sprint. The delivered product at the end of the sprint is reviewed with the PO and other stakeholders and the business owner, which can be an internal or external client that pays for the project.

Beyer describes that the distinction between end-user, client and an internal stakeholder is not made in the agile processes [3]. The end-user has a different stake in the developed product than the purchaser. Without empathy and knowledge of the end-user, decisions can be made that serve the project instead of the end-user. What often is overlooked is that the end-user work is quite stable, the work itself does not change [3]. Although, applying wrong methods in gathering requirements can make the end-user requirements look like they have changed, Beyer is referring to the development of work systems, not a consumer-based context.

The end-user is often represented by someone else because it is hard to get an end-user in the team. In Scrum, the end-user is often represented by the PO and sometimes supported by a customer team. Agile processes can learn from the UX design community in how to incorporate the end-user in the design and development process. Krippendorff argues that designing for the end-user is a myth because user experience designers are caught in the web of stakeholders [13]. User experience designers have to take every stakeholder in account when designing the system. The stakeholders can have conflicting interests and have more influence on the project than the end-user.

The Vision in Scrum

In this thesis, the vision will refer to a broader concept that contains all different visions: product vision, design vision, conceptual design and Big Design Up Front (BDUF). First, the vision in Scrum will be discussed followed by the role it plays in the product development. After that, the different visions are described together with the end-state of the product.

The discussion between agile and UX design has mostly been about how to integrate UX design into the process. A related topic that has been described, but not much discussed is the vision in the agile environment. The vision in Scrum is defined by Schwaber as:

“The vision describes why the project is being undertaken and what the desired end-state is”

(Schwaber, 2004)

The desired end-state can have many different forms. The end-state could refer to the business that creates the software with increased amount of end-users, sales or other business goals. The end-state can also refer to the end-state of a customer’s business. Another interpretation is the end-state of the end-users, how their new situation will be with the implemented product. It could also refer to the end-state of the product, the product that should come out of the process. Highsmith writes that a clear vision should bound the exploration of the agile Process [14]. This means it should give a direction to the product. Highsmith describes a product vision by two tools that can be used for creating a vision, a product vision box and a vision statement [14].

The Role of the Vision

Pearce and Ensley have shown a strong positive relationship between the shared vision and team dynamics, teamwork behaviour, team altruistic behaviour and team courtesy behaviour in product and process innovation teams [15]. Sharing the vision is important to work effectively together in a design team [16]. Therefore, it is important to know how design and

product development teams can work together in creating this shared vision. Methods, tools and techniques can play an important role in this.

Teasley, et al. perceive the development of a shared understanding as essential to conduct any form design in a team [17]. This shared understanding can help to put the focus on what the end-user needs instead of the stakeholder [18]. Failing to establish a shared vision will lead to contradicting and or inconsistent visions that can lead to wrong requirements and extra work [19]. The vision encourages deeper engagement in the process. The vision can give the team a better understanding of the end-product and facilitate a shared understanding [20]. The vision helps to determine what actions should be developed first and which can be done later [21].

How a problem is framed depends on the frame the professional has. Schön as defines a frame as:

“Underlying structures of belief, perception and appreciation”

(Schön 1994)

Nanoka refers to the frame as made up of:

“Mental models, beliefs and perspectives”

(Nanoka, 1991)

The frame influences the perception of what is relevant for solving the problem ahead. A frame helps the professional to determine what values and goals in the product are important and how we can evaluate it. The frame influences together with the knowledge of the professional influences the decisions and action taken by it [22]. This strongly influences how a person interprets the vision of a product.

Design is not only done and seen as an individual creative activity, but as an activity in a network of stakeholders [23] [13]. Every person in a product development team has their own part of the vision that is directly important

for them [21]. Krippendorff discusses a change in the work environment of the user experience designer [13]. The environment changed from a fairly individual to a highly diverse and interdisciplinary environment that exists today. Software development processes have problems with the complex and multidisciplinary nature of the product development [24]. Working together in the multidisciplinary teams enables them to solve the problems they have with more specialized knowledge. There is also a downside to this multidisciplinary approach as all disciplines bring an unique understanding and approach to solving the problem [25]. Team members can come from different disciplines. Even within the field of design are different disciplines that have different focuses and that influences the framing of the problem.

Cummings and Davies describe in their paper that the word vision comes from the Latin *vide*, that means “to see?” [26]. The explanation mark means that it is not seen by ordinary sight. They define a vision in the following way:

“Conceptualizes something seen which is not actually present or historical”

(Cummings & Davies, 1994)

The vision can be a tool for evaluation, decision-making and shared understanding within the team. It gives clarity about what the team wants to achieve in the project and puts focus on the end-users. Different concepts that are referred to as a vision will be discussed from a UX design perspective. This means that the technical parts are excluded.

Product Vision

A definition of the product vision described in New Product Development focusses on the match between the organization and the market to create the product concept [27]. The definition has a focus on the feasibility of creating the product in the current organizational and market context.

“The fit between an organization’s strategy and the market needs to create an effective product concept”

(Brown & Eisenhardt, 1995)

Another definition is given by Tassarolo [28]. The definition emphasizes the importance of sharing the product vision with all those involved in the development. Clear objectives for the team and a strategy how to go there are also important according to this definition.

“Clear objectives and a well-recognized strategy for the development process and to share these objectives and strategy with all those involved in the development”

(Tassarolo, 2007)

Crawford and Benedetto defined the product vision and have like Tassarolo a focus on clarity of the vision within the team [29]. The definition does not address what goals are meant. The focus of this definition is on the shared vision in the team.

“The clarity of directions, goals and objectives for the development of a product within a team”

(Crawford & Di Benedetto, 2000)

Benassi, et al. discuss different definitions of the product vision from the literature in new product development, change and strategic management research [30]. A definition of a product vision is created in their paper, which prefers a graphic representation for the vision that can be made with the help of other models. A warning is given to the graphic description about the complexity that could arise.

“Product vision is a high-level description, succinct and preferably graphic, of a product that does not yet exist, for which a project will be developed. This vision may comprise the following dimensions: shape, function, events, modules and interfaces between them, requirements, and goals. It should also be capable of defining product scope and be challenging and motivating to team members”

(Benassi, et al., 2011)

The product vision in this thesis will be referred to as the intended goals and effects on the business and business context that the product will create.

Design Vision

An interview study conducted by Kollmann, Sharp and Blandford have given an account on the importance of the UX vision in agile [31]. The effects observed were slowed down projects and inhibited and difficult decision-making. Lárusdóttir, et al. address that the vision of the UX needs to be made before the implementation starts, but needs to be iterated during the process [32]. Although, in the research, the definition of the UX vision is not described. Kollmann, et al. defined the UX vision [31].

“The concept of envisioning the experience
the user should have when using a product”

(Kollmann, et al., 2009)

The experience that is envisioned can be used as a vision to strive for and that guides development efforts. As experiences cannot be designed, the focus should be put on the elements that can evoke these experiences and ideas behind the product. Designing the product with certain principles and qualities makes it possible to evoke experiences. Beyer and Holtzblatt described a vision that has a focus on the future situation of the customer [21].

“High-level statement of what you intend
your project to accomplish in its impact on
the customer”

(Beyer & Holtzblatt, 1999)

It is not clear what is meant with the term customer, if it is the end-user of the system or the business or the client. Lerdahl describes a concept called goal vision that contains interaction qualities.

“The goal vision is a tool for evaluation and
reference in the design process”

(Lerdahl, 2001)

All decisions about the concept are evaluated by the goal vision of the new system. This makes sure that all decisions about the product are made with a consistent set of qualities in the end-product. The goal vision as described by Lerdahl takes a broader perspective than the product alone. It includes qualities between the elements that play a role between end-users and the context.

“The goal vision should contain the intended interaction qualities [...] Such interaction quality should incorporate the interaction between the different users, the interaction between the user and product and the interaction between the user and the environment”

(Lerdahl, 2001)

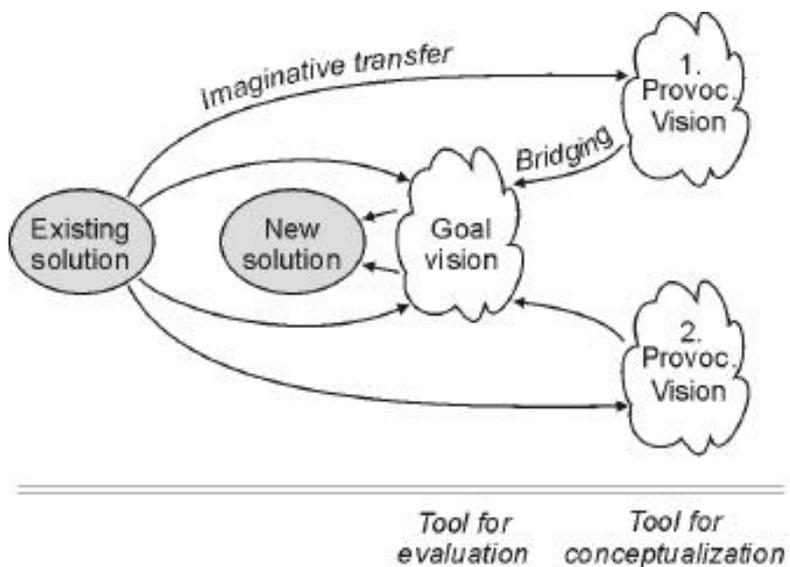


Figure 3 The goal vision by Lerdahl [33]

Wroblewski describes another concept that is related to the product and its qualities, which are design principles [34]. Design principles can fulfil the same function as the vision does.

“Design principles are the guiding light for any software application. They define and communicate the key characteristics of the product to a wide variety of stakeholders including clients, colleagues, and team members. Design principles articulate the fundamental goals that all decisions can be measured against and thereby keep the pieces of a project moving toward an integrated whole”

(Wroblewski, 2009)

In this thesis, a design vision is the qualities and principles used to create the product that affect the perceptions and responses of the end-user and end-user situation on use or anticipated use of the product. The design vision can function as a tool for making decisions for the product in a consistent way during the Scrum process.

Larman described the product vision box as a tool to create the product vision based on the work of Highsmith. He describes steps that should be taken during a workshop with the team. The first step is to split the team up in small groups. These groups create the cover of the product, as it should be sold in a box. This box can contain the name, selling points, graphics, qualities and other details. The different groups present the results and should come to a common vision box or other common artefact that represents the product vision. One of the tools mentioned by Larman and Highsmith representing the vision is the vision statement [4]. The vision statement Larman refers to is created by Geoffrey Moore [35]. Moore recommends a format to state the vision. Larman describes that it should be put on the wall where the team is located.

A format recommended by Moore for the vision statement goes as follows: **For** (target customer) **who** (statement of the need of the opportunity). **The** (product name) **is a** (product category) **that** (key benefit, compelling reason to buy), **unlike** (primary competitive alternative). **Our product** (statement of primary differentiation).

Larman describes the product vision box as a tool for the product vision, while it also comprehends the design vision. Larman makes no explicit distinction between the two types of vision.

Conceptual Design

Starting software development without an idea of the end-state is hard, some researchers refer to the high-level and barely sufficient design up-front that is needed before the Scrum process starts [36] [3] [37]. The high-level designs are often created in sprint zero [38] [3]. In this sprint zero, the development and design team can do research and design activities that will be needed to get an understanding of what the team is making [39].

High-level and barely sufficient design up-front are abstract terms. An example the abstract nature of high-level or barely sufficient design up-front can be given by using the model created by Garret that is shown in Figure 4 [40]. The model is focused on User Centered Design (UCD) for the web. The model shows different levels in design for the web. It differentiates various but highly connected layers in a design of a website.

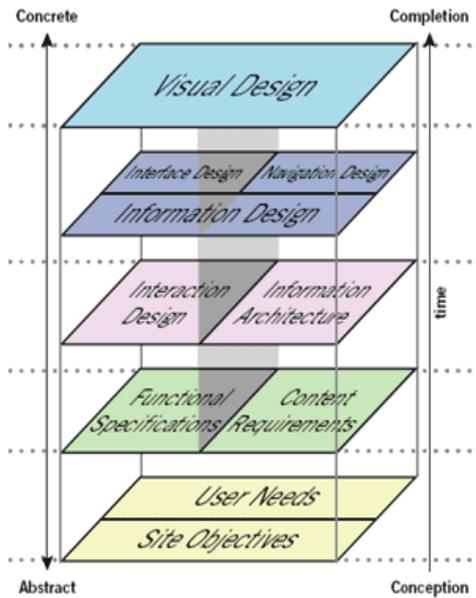


Figure 4 Elements of User Experience Model [40]

The conceptual design in this thesis contains representations of features and the main structure of the product. It emerges from the product vision and design vision and shows one possibility of the end-state on a high level.

Big Design Up-Front

Tollestrup took the description of the vision of a company given by Kunde: “a leading star that one should strive after” and “a mental image of a desired future situation” and translated it to a product design context [41] [42]. This resulted in the following definition:

“The desired future product and interaction with this product”

(Tollestrup, 2004)

This definition corresponds with Big Design Up-Front (BDUF) that is done in traditional waterfall processes. In this situation, agile is seen as an implementation process and not as a design process. In this thesis, the definition of Tollestrup will be used to refer to the BDUF.

The End-State

The end-state refers to the product that emerges from the Scrum development process. The end-state can be seen as the developed parts in the sprints put together. It evolves through the addition of the increments that result from the sprints in Scrum. A discipline heavily involved in this is UX design. Cohn describes that skilled and experienced user experience designers should think holistically and work in an iterative way to the bigger picture [9]. Cohn suggests the approach that Sy uses at Autodesk. The approach is to chunk the design conceptual design to focus on the sprint and still have the holistic approach to the design [38]. A chunk is a small part of the system that can be developed in one sprint. A BDUF is not always the same as end-state, as problems can occur and priorities can change during the process.

Creating the Vision

Scrum acknowledges the importance of the vision in the development process. There are two different approaches described by Cox, et al. in the creation of a shared vision [43]. One approach is by one person communicating the vision to the team, the other approach is to mutually develop and create the vision as a team effort.

Pichler describes that putting one person, the PO in charge of the product will solve the problems with the difference between the vision and what is been realized by the team. Shore describes that having a team play the role of the product manager will create trouble with a consistent and compelling vision [44]. The cases Shore described that succeeded had one member that took control of the vision and the product development. Robert & Veryzer mention that having a strong product champion with the vision for the product and the drive to lead the project is a critical factor for success [45]. Robert & Veryzer describe that the visionary should have knowledge about the market and the technology the product is using.

The skill of vision for leaders is defined as:

“Cognitive ability to mesh a variety of factors together to create an effective, holistic view and to communicate it to others”

(Brown & Eisenhardt, 1995)

The skill is deemed important for the project leader who needs to combine the market needs with the organizations competencies in a context of stakeholders with different skills. This means that only the leader or decision maker in the group will need to have the vision and be able to communicate it.

Envisioning a product is constrained by the knowledge of the user experience designer of the system [46], tools can not compensate for this weakness, but having different understandings and frames in the team can. Patton describes that every stakeholder can be involved in designing the requirements, this helps the team to understand what the software should be able to do and why [47]. Sy points out that the activity of gathering data that influences the vision and facilitates the shared vision that is required for design projects [38]. Mayhew argues that all team members in a design process should be a part of the overall process. A shared understanding is created by including all team members in the overall process [48]. Including all specialists early in the process is also a way to address issues early that can influence the project later on. This helps everyone to understand the issue and how to deal with it later in the design.

Beyer suggests that a vision should be built together by the team after all required data is collected [3]. The description includes PO, user experience designers and developers. One aspect Beyer highlights is that everyone must walk through the collected data. The team needs to interpret and understand so the idea's will be based on data. Reviewing high-level designs with a multidisciplinary team will reveal design and implementation issues that would have come up later in the project that would have slowed the project down, or caused rework [3]. Different visions should be developed and brought together to create a coherent one. The data that is collected

helps to refine the vision in the team. This creates a shared set of assumption and a frame that the team can agree upon and work with [18].

Patton describes that unorganized conversations helped everyone to get useful background information that they needed, and this form of communication was helpful for creating a shared understanding [47]. The importance was emphasised by pointing out that unorganized conversation that anything could be said brought light to many fears they would never have gotten in another way.

“This free form conversation supplied everyone involved with an immense amount of useful background”

(Patton, 2002)

These conversations support the process of creating a shared understanding.

User Experience Design

The Scrum development process does not cover the whole product development process. It needs other methods or processes to complete the cycle. One of the aspects that is lacking is the design of the user interface. One of the disciplines that has been actively researching this area is HCI. This thesis will refer to the person who designs the parts of the system that the end-user interacts with, as an User eXperience Designer (UXD).

User centred design (UCD) emerged because of problems in software development. In 1985, Gould and Lewis described three principles for software development that would lead computer systems that are useful and easy to use [49]. These principles are: Early focus on end-users and tasks; Empirical measurement and Iterative design. Later, Norman and Drape pointed out the need for understanding the end-user of the system [50]. They emphasized that the system is made to serve the end-users and that the needs of the end-user should drive the development and decisions

made. Other definitions added end-user involvement to it, not only understanding of the end-users of the product.

The UCD approach has different methods and ways to incorporate these principles in the software development process. The methods range from extensive studies of the workplace to rapid evaluation with paper prototypes. UCD has as a goal to create a good User eXperience (UX). Over the years, many definitions of design and UX design have come up with different properties. For this research, the ISO 9241-210 definition will be used to describe what UX is.

“A person’s perceptions and responses that result from the use or anticipated use of a product, system or service”

(ISO 9241-210)

There are different approaches to design for this experience during the process of creating a design. UCD has mainly been used in the waterfall processes where UCD had time to create a holistic design that could be implemented in the next phase.

The design process can be described as the elaboration and a reduction of ideas [51]. The elaboration phase is about creating ideas and the reduction phase is about making decisions about which idea to go with. One important characteristic of the design process is the iterative nature and the constant reflection on the design to create the best possible design. One of the problems described by Buxton is the ‘hill climbing’ that can occur in these iterations, which is the current design optimized while another concept with a higher local maximum is a better option [52]. Creating multiple designs helps to prevent this and can help to get the design right [53]. Figure 5 displays this need for exploration in a visual way. The different visions need to go through a process of design in which visions are explored and evaluated.

Every situation and UXD is unique and has its own needs, therefore the process of designing consists more of principles than a methodology to follow according to Löwgren & Stolterman [23].

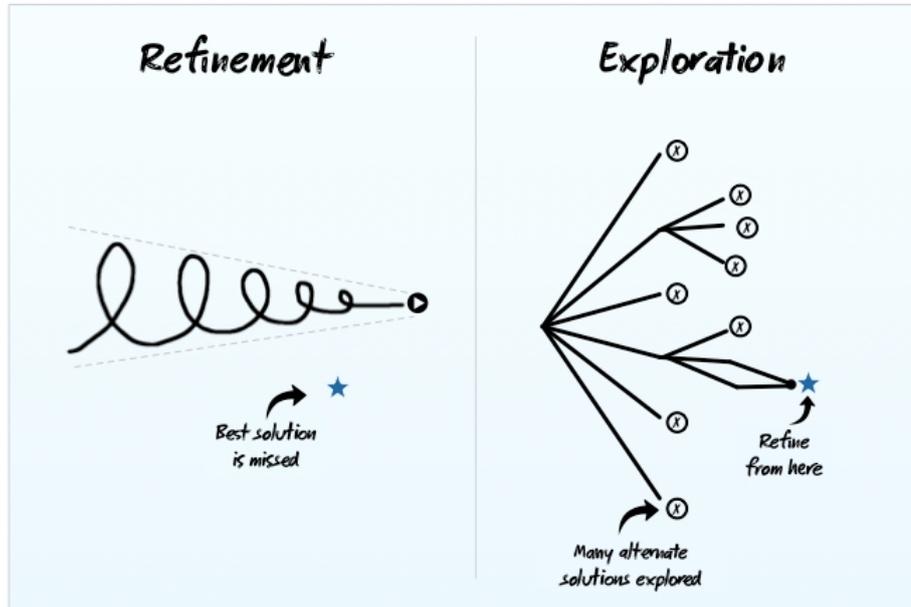


Figure 5 The design space exploration and refinement [54]

Scrum Team

A new perspective has entered the agile environment in the role of UXD. This perspective differs from some existing perspectives and creates new friction among the disciplines in the software development, visible in theory and practice. Krippendorff emphasizes the importance of a second-order understanding for UXD in the web of stakeholders they work in. Krippendorff describes it as:

“Understanding someone else’s understanding is an understanding of understanding, an understanding that recursively embeds another person’s understanding in one’s own, even if, and particularly when, these understandings disagree, contradict one another, or are thought by one to be wrong or appallingly unethical. This recursive understanding of understanding is a second-order understanding”

(Krippendorff, 2005)

There is one team in Scrum. All the team members are able to do every part of the development. Each member can take any item in a sprint and develop that item. The problem with having a UXD in the team is that the UXD is unlikely to be able to code and thus does not fit in the team [3]. The UXD works not as a real team member because the developers do not understand the UX design as the UXD does and the UXD does not understand the work the developer does. Patton believes that the developers should know about UX. Developers should work together and know about each other's fields. Their experience describes that a greater understanding from both UX and development supports effective collaboration. This view matches with others like McInerney & Maurer that suggest that interface design should be a team effort [55]. Lee argues that collaboration between UX and developers should be supported [56]. Ambler suggests that this will not only help with addressing UX issues, but that it also promotes the skill of UX [37]. Lee & McCrickard warn against overspecialization of the team members as this brings the cohesiveness in danger, they should have an understanding of the other team members specialties [57]. Ambler argues that the UX practitioner should know more than only UX and that they need to expand their skillset. Others go even further, to say that UX people must think and work like an engineer to be successful working in an engineering environment [48]. Beyer marks these as the extreme and describes that the UX practitioner can be part of the PO team [3]. The PO team is a team that gathers information and makes designs for the PO.

Several researchers point out the struggle between the UXD and developers during the development process [58] [59]. The struggle can be caused by the power relation and the different ways of working and communicating. The disciplines attempt to defend the work that they are doing. One aspect, that has been mentioned before is the difference in working speed [60]. This causes challenges in the collaboration between the two groups.

Agile & User Experience Design

Agile and UX design both emerged out of problems in software development. One of the problems is that agile and UCD developed without paying attention to each other. The UX design community was not involved in the creation of the Agile manifesto. Gulliksen et al. argue that agile processes do not apply all the key principles of User Centred System Design (USCD) and see no reason why agile cannot be fitted to UCSD [61]. Others like Chamberlain, Ambler, Detweiler and Obendorf et al. recommend that UCD methods should be used in a way that fits agile practices [59] [37] [62] [63]. The combination of these two philosophies gives challenges for practitioners. To work successfully in this type of development, UXD need to understand the agile culture [3].

Agile development is sceptic towards any planning as plans reduce the flexibility and will never work out as intended. Agile claims that changes are the core of software development and the team has to deal with the change that happens during the Scrum development [8]. The end-user work is quite stable according that is often overlooked to Beyer [3]. Although, applying wrong methods in gathering requirements can make the end-user requirements look like they have changed. Beyer is referring to a work system context, not a consumer based context. Most literature agrees on that agile processes need to do some activities up-front, but are not that specific about what kind of activities.

Software developers using agile processes are not always successful in delivering products that satisfy the end-users. The iterative nature of the development is one of the causes proposed found by other researchers [64] [39]. Practitioners loose the big picture of the project while the focus is on the current work.

One of the proposed causes is the focus on small pieces of the software during the sprints [36] [32] [65]. The small parts draw attention away from the whole system. Dingøy, et al, provide a description of the problem:

“In the current state of agile software development, it can be difficult to obtain a perception and understanding of the broader picture of the software. Features and iterations entail a vertical separation of the system under development. In other words, each feature or iteration represents a vertical cut through the system (.), which is limited to the parts of the system relevant to that feature or iteration. As a result, maintaining a consistent and unified vision throughout the many iterations of development can be difficult”

Dingøy, et al (2010)

One of the aspects addressed is that the UXD sprints have a different nature than the developers. The iterations UXD’s make are shorter and are different in nature. The iterations in design are meant to explore the design space to look for the best design. This can be done by sketching or other methods and can take from seconds up to weeks or months. While the developers iteration is about making and testing the code, with a focus on making it work.

Ferreira et al. describe that two different views emerged on how the design and development team should work together [60]. One of the views believes that keeping agile and UX on separate tracks is the best way. Nodder and Nielsen make the recommendation based on the fact that the UXD’s can work one sprint ahead [36]. The other view argues that having the agile team and UX team working closely together is the best way of developing quality software. Integration of the two different roles relies on the effort in involving the other team members in the activities to receive their input [60]. In this way, working as one team will reinforce the team in becoming one. One of the principles for integrating agile and UX proposed by Chamberlain, et al. is ‘Collaboration and Culture’, that means that the customer should be an active member of the team, but more importantly,

the UXD's and developers must communicate on a day to day basis and work really close together [59]. These views assume that the UX vision is created during the Scrum process. Cohn describes that being on a separate track does not mean that the UXD is not a part of the team [9]. Cohn emphasizes the importance of being one team in agile, even if the team members' work on different tracks.

Sy describes how they have a separate track to do design and information gathering or evaluation methods [38]. The second track should be a sprint ahead of the development so that the development receives validated designs [38]. Others argue that the design should be done a few tracks ahead so that it can be validated and tested. Integrating the second track might cause problems for the flexibility of rearranging the backlog and thus the agility of the process. Although, Beyer suggests that there is hardly any attempt to rearrange the backlog [3]. In practice, this might not be a problem at all other than that it creates different teams.

UXD and developers both have a different working speed [59]. Practitioners apply often lightweight methods to comply with the time-boxed agile process [66]. Formal usability testing does not fit in the sprints and the changes after each iteration are not big enough to justify a test [67]. Usability testers would like to carefully plan and conduct their tests, which conflicts with the principles of speed and simplicity of Scrum. This principle does not only have a negative impact, the limited time forces the research to be to the point and well thought through and the decreased gap between the creation and acting on the evaluation of the software is another advantage [38].

Method

This chapter explains the research approach and procedure in this study. An introduction to the selection of the participants and the method of data gathering is described. The chapter concludes with a description of the method of analysing of the data.

Research Approach

Semi-structured interviews were conducted to gather data. A set of questions was prepared based upon the literature. The first version of the questions was discussed with researchers at Uppsala University. Based on these discussions, a new set of questions was prepared that was discussed with a practitioner who works in a Scrum setting. The interviews evolved slightly over time, some questions needed to be added and altered as questions were hard to understand.

Questionnaires are not able to collect the required data; an observational study would need to be supported by interviews to access their experience and opinions. Byrne describes:

“Open-ended and flexible questions are likely to get a more considered response, than closed questions and therefore provide better access to interviewee’s views, interpretations of events, understandings, experiences and opinions“

(Byrne, 2004)

The data that is required in this research is located in the minds of the participants and is therefore hard to observe. The interviewer did not actively engage in influencing the interviewee by giving opinions or experiences during the interview [68]. This gives this research a constructionist stance to the data and data collection. These two decisions make the stance to the data closer to constructionism than emotionalism and positivism. This approach is valuable because it emphasizes the importance of participant’s perspective.

“This approach is valuable insofar as it draws attention to the fact that experience is never ‘raw’, but is embedded in a social web of interpretation and re-interpretation”

(Kitzinger, 2004)

Participants

Ten IT practitioners working in different business settings in Sweden were recruited for a one hour interview. The participants had different roles and responsibilities in the Scrum projects that they were working on, so there were three PO's, three UXD's, two developers, one Scrum Master and one head of development that participated. All of them had at least two year experience in using agile processes and half of them had formal training in agile processes or using Scrum particularly. Eight of the participants have experience with user interface design and six of them with programming. The participants are described in Background Table 1 below. Most participants worked on products for internal use, two participants worked on consumer products and two participants worked on business to business application. Seven of the participants worked in an organization with more than 250 employees, two with 51-250 employees and one with 4-10 employees. All but one of the participants worked in the same room as the rest of the team.

The codes of the participant are given based on the role the participant chose by themselves in a background questionnaire. This means that in some cases, an UXD has the role of PO in Scrum, while not all tasks of the PO are done by that person. The PO role is sometimes split up to multiple people in the project. Some participant codes are marked with a “*”, which means that these participants are members of the same Scrum team.

The participants were recruited through a request on LinkedIn in a group called “*Agile Sweden*” and “*Agile UX Sweden*” and some others were approached due to their membership. Others were recruited through referrals of participants and personal contacts. When the number of ten participants was reached, the recruitment was stopped.

Code	Title	Age in Years	IT Experience in Years	Agile Experience In Years	Agile Training	UI design Experience	Coding Experience
(PO_1)*	Project leader	20-35	2-3	2-3	Yes	Yes	No
(PO_2)	Consultant	36-50	10+	10+	Yes	Yes	Yes
(PO_3)	Interaction Designer	20-35	4-9	10+	Yes	Yes	No
(SM_1)*	Project Manager	36-50	10+	4-9	Yes	No	Yes
(DEV_1)*	System Developer	20-35	4-9	2-3	No	No	No
(DEV_2)	IT consultant	36-50	10+	2-3	No	Yes	Yes
(DEV_3)	Head of Development	36-50	4-9	4-9	Yes	Yes	Yes
(UXD_1)*	Web Designer	36-50	4-9	2-3	No	Yes	No
(UXD_2)	UX Design Consultant	20-35	4-9	2-3	No	Yes	Yes
(UXD_3)	Interaction Designer	20-35	10+	4-9	No	Yes	Yes

Table 1 Background information of the participants

Code	Organization Type	Organization Size	Development Type	End-users	Compelled Use	Release
(PO_1) (DEV_1) (UXD_1) (SM_1)	Traditional Organization	250+	Internal Design & Development	Internal	Yes	Incremental
(PO_2)	Financial Industry	250+	Internal Design & Development	Internal	Yes	Final Product
(PO_3)	B2B Software	51-250	Internal Design & Development	External		Incremental
(DEV_2)	Traditional Organization	250+	Internal Development	Internal	Yes	Final Product
(DEV_3)	Gaming Industry	250+	Internal Design & Development	External	No	Incremental
(UXD_2)	Traditional Organization	250+	Internal Design & Development	Internal	Yes	Final Product
(UXD_3)	B2B Service	0-10	Internal Design & Development	External	No	Incremental

Table 2 Background information of the organizational context

Procedure

All participants received the same information about the study. After that, a time and place was set where the interview took place. The researcher was introduced as a master student and background information was given about the study. The study started with the participants reading the research goals and the rights of the participants. It was followed by a consent form that states that the participant voluntarily participates in this research and that the data will be analysed anonymously. Additionally the participants signed a form to agree on the audio recording of the interview for data analysis purposes. A pre-interview questionnaire was filled in to collect background information in a structured and efficient manner. After this step, the recording was started.

The interview part started out with some easy questions about the team, the product and their role in the product development. At the end of the interview, the participant had the opportunity to bring up topics to discuss. Most of the interviews took place in the participants' office environment in a meeting room with no one else around. One interview was conducted in a restaurant during lunchtime. The interviews were recorded with a voice recorder and notes were taken. The interviews were conducted in English.

Data Analysis

The interviews sessions were verbally transcribed according to the audio recordings using a free version of Express Scribe [69]. The transcriptions were checked by listening to the recordings and reading the transcriptions at the same time. The transcriptions were filtered from any data that could identify the participant or the organization of the participant in any way.

The process analysis is comparable with the description given by Braun and Clarke [70]. The process of analysing the data consisted of four stages. The first stage started by printing transcriptions and code them on paper. The coding procedure was repeated in an iterative way. The second stage was to make cards of the printed transcripts and sort the cards into different themes. The third stage existed of sorting the data into different sub-themes

within the given themes. The data was organized within these themes to discover patterns and contradictions between the different participants. The fourth stage was to name and define these themes. The cards were easily retractable by the use of the participant codes and line numbers in the printed document.

A code that contains the participants' role and a number is used to refer to the participants, the codes are given in the first column of Table 1. Each participant has their own identifier to be able to look up the background and context of that person. The quotes can be retraced to its original context using the participant and line number that are given in the quote. The quotes might be rephrased to make the text readable but conserve the meaning.

Results

This chapter presents the results of the data collected with the semi-structured interviews. The chapter starts with the different descriptions of the vision given by the participants to give their perspective on the vision. The next part is about their and the team's involvement in making and changing the vision followed by the communication. The chapter continues with the results about the end-states and the change of the visions followed by the results about the visionary and the documentation.

Definitions of the Vision

The participants were asked about their thoughts on what the vision is in the Scrum development process. Some participants did not feel comfortable answering questions about the vision, while others had no problem. After talking about the vision, a question about what they meant with the product vision set them silent. When asked about the product vision, one participant replied:

“Depends on how you, what do you mean with product vision?”

(UXD_2)

Another participant also showed that there was not a clear definition of a vision, by saying:

“Was that an answer to your question?”

(UXD_1)

Other participants took a long time to think about and answer the question. A few participants gave a description of their product vision, design vision, conceptual design or end-state of the project and referred to these concepts as the vision.

Some participants had a focus on the effect the product vision has on the end-user and the market or business.

“A product vision starts to say what is the effect we want to have out on the market place, in question of how many new customers do we bring in, how much more revenue we bring in or add benefits for the company or customer, from both perspectives basically”

(PO_2)

The participant describes the effect in terms of business by number of users and revenue. There is no relation to the product, other than the effect. The PO continues to describe the vision as something that goes through a process:

“So you basically create multiple families of users, depending on their role. Now, what we start to have is the initial part of a elaborated product vision. Product vision is often too little in order to explain and view complex products and services”

(PO_2)

The participant remarks that the product vision is too little for complex products. A following participant states that the vision is the information and facts of what the new system has to achieve according to some participants. How the end-users will use the system to help them is not specified:

“How the functionality will work and look like is secondary”

(SM_1)

How that will be achieved is secondary in the vision according to some of the participants.

Another participant describes that the vision is about the effect as well:

“Remember that the product vision is more about the effect, it is not about how the product looks”

(PO_2)

The design of the product is not important in the vision. Another PO describes that the vision is about the impact:

“The vision would in my brain be, this is the impact we are going to get and if it is measurable, that would be great”

(PO_3)

The participant adds that a measurable vision is great. Some participants pointed out the importance of the UX elements in the vision. A participant describes:

“That kind of user experience things, I think they are really key factors to success”

(UXD_3)

The participant refers to the UX elements as key factors to success. A Scrum Master refers to it as something that tells for who it is and what it will do for the users.

“Which target groups are you doing this for and how will it help them”

(SM_1)

It should describe how it would help the target groups. An UXD adds more elements to this, that person includes quality aspects of the product into the description.

“In the vision there is a targeting group, perhaps some quality aspects and what you are supposed to do with the product and so on”

(UXD_3)

The description encompasses goals, users and quality aspects of the product. Other participants described their vision in terms of how they think the future situation of their users should be:

“That the user can feel that it is a good place to go. That it is the only place to go, to start everyday work”

(UXD_1)

The description emphasizes the end-user situation and feelings towards the project. A participant at an online game company has a strong focus on UX elements as well:

“Each game will have what is the vision of the game and where do we want to be. That is, who are we trying to attract and what is the feeling, who are the characters and what are the stories involved in the game and so on”

(DEV_3)

It emphasizes the feelings and the match with the elements in the game. Some participants describe the vision as a direction for the final design, a direction in which the development process goes. A Scrum Master describes the vision as a sense of direction of the final product you want to develop:

“It is a balance between telling to create an image that make people understand what you are trying to achieve and on the other hand not to go into details and to be able to evolve the product rather than specify it because you will learn so much during the process of building it”

(SM_1)

The description also tells that it is an important communication tool.

One of the participants regards the vision as the end-state of the product where changes can take place during development:

“As much for us to understand where we are going, like in a bigger picture than a design, it is a direction”

(PO_1)

Another participant distinguished the product vision as something that includes all information and representations that are made before the development of the system is started:

“I think that these levels are all, everything is product vision. Because it is not implemented yet, it is something that we want to achieve”

(UXD_2)

This is a broad description of a vision. Every description of end-users, goals, contexts and sketches, prototypes and final design are part of the product vision.

“A product vision is not one or two statements. It is actually a lot of information depending on the complexity of the organization”

(PO_2)

Creating and Changing the Vision

Participants were asked about the involvement of themselves, the team and the end-users in making and changing the different visions. The challenges in the involvement of the practitioners are also addressed.

Two of the PO (1, 2) and one UXD (3) were involved in the creation of the product vision. Other participants were not involved or there was no data was collected to indicate involvement. Only two participants spoke about a design vision of which one of them was involved in the design vision (UXD_3). The other participant had another team creation the design vision before the Scrum process started (DEV_3). Other participants have not explicitly mentioned a design vision.

Product Owners and UXD's were often involved or owning the conceptual design. The developers and UXD_1 were not involved or mentioned involvement in the conceptual design.

Design Studio workshops and other workshops are popular methods to get everyone involved and to understand the project, one of the participants refers to one of the projects:

“We have actually done that kind of sketching, but sketching the possible outcomes, sketching the persona's, sketching the features, not the design. The features that might be build. The what, the why, the who and the how, using the design studio method for doing this. Everything, for so that everyone is, feel that they are involved, not just getting a document in there”

(PO_3)

The participant refers to the perception of being involved in the creation. Another participant involved every one of the team and gave them the opportunity to explain their vision.

“We started out doing workshops where we called in everyone at the same time. Everyone had some kind of workshop explaining their view of the vision and then we aligned that with the product”

(PO_2)

The participant describes the alignment of the visions as a part of the workshops. The PO states that understanding what you are going to make is important:

“And I mean, if you explain the why, and you explain that to the whole project team, everyone will understand why we are doing it. They will get motivated”

(PO_3)

The PO relates the understanding of why the product is made to the motivation of the team. One of the developers experienced a situation in which there was no person taking care of the vision far as the participant knows. There was a BDUF and the Scrum process was started to implement this BDUF.

“It is really hard to tell, we couldn’t find any. Of course, I can tell there was no one, one in charge. I couldn’t see anybody who was the father of the project or, you know what I mean”

(DEV_2)

The developers had no visionary nor someone responsible for the vision. The design was already finished, changes were done by the developers themselves. A PO describes that in his organization developers sometimes start projects. This is because they see something and start working on it. After a while they need more resources and a project is started this way.

“The developer starts with a vision actually, he is not very good at telling that vision to other people. So he becomes kind of the hero”

(PO_3)

The PO has a negative experience with these projects. There is no start of the project and a vision that is not clearly communicated. A participant argues that the involvement of everyone is important in the visions.

“If I continue with the project I would like to change just that. I would like to make everyone involved in the product at the same level”

(SM_1)

The participants described that they want to have different disciplines or the whole team involved in the process. The participant describes that the involvement should be at the same level.

This also stated by another participant:

“You should, it should really be a team that helps each other out and have the same decision level”

(PO_3)

The importance of the team is pointed out. A participant emphasizes the importance of the involvement of developers:

“Also developers of course, the vision needs to be, even though you do not want to get into technical discussions that early, the vision needs to be able to be realized”

(UXD_2)

The developers were not involved in creating a description of what the system should do and how it should look like, all PO’s were involved in this and two out of the three UXD’s.

Challenges

This part will address the challenges related to involving stakeholders in making and changing the vision in Scrum. It will also address the involvement and the nature of the involvement of the end-users. The last challenges that are described here are related to consultants.

Low Interest of the Developers

An issue that came up when talking about the involvement in the vision is the involvement of developers. The developers have a low interest in getting involved in the vision:

“None of the experienced developers managers who have been there for ages weren’t really that keen on going to all the project meetings and stuff. We were more interested in getting shit done”

(DEV_2)

The developers were more interested in doing coding instead of going to meetings.

That experience matches with the one of the UXD experience:

“My experience is that it is hard to get developers to be engaged in understanding the products vision”

(UXD_2)

It is hard for the UXD to engage the developers in understanding the vision. A Scrum Master describes the same problem:

“They write code, they are technicians. So, they are not all that interested in the vision. They want to solve the technical issues, not the user issues”

(SM_1)

The interest of the developers is on the technical issues. Similar statements were made by a developer:

“I like to code, not talk too much with users and decide what to do. I like to get instructions of build this product now”

(DEV_1)

The developers want the instructions on what to build. One of the UXD describes that they included a developer in the PO team to involve developers:

“We have included one developer that can be sort of a representative and spread the knowledge about what we are building and what vision we have to the rest of the team”

(UXD_2)

The developer has the task to spread the knowledge about the vision to the rest of the team.

User Experience Designers have little Time

A negative experience with not fully committed UXD to the team came up in two cases. One of the PO describes:

“They were a bit left behind”

(PO_2)

And continues after asking about why they were left behind:

“They were not quality oriented I would say. That was probably due to the fact that they were only working part-time. So they were always catching up when we met them and then they had to work really fast to be able to provide”

(PO_2)

The PO describes that the UXD’s had no time to catch up and provide quality in the limited time they had. Another PO describes that the UXD’s were slowing the development down.

“We should be able to shorten our lead times. We should be able to shorten the time between development and testing if the developer made much more of the design. It also becomes a bit of a bottleneck. It is a funnel there”

(PO_1)

The PO describes the UXD as a bottleneck. The other PO tried to solve this by having the developers make designs.

“Developers can do that, if they got some design guidelines to lean back on”

(PO_1)

Guidelines would be sufficient for developers to make the designs according to the PO.

A participant tried to make different designs for an important design and test which one was best with the end-users.

“But since we had two designers and they were working part-time, they could not supply us with the needed secondary and tertiary design. They could only give us the first design, they did not have enough time. Which actually meant that we had to redo for a large cost when we came in here”

(PO_2)

The problem was that the UXD’s did not have time to make different designs that can be tested with the end-users.

End-User Involvement in the Vision

A PO presents designs to the end-users and organized focus groups for feedback, also other input methods were used for the evaluation of their design. The PO describes the process when a new part of the program is created:

“Then we create, most of the time I am creating wireframes on paper. Then we are getting up a group of users, end-users, which look at this on paper and discuss about this and give us feedback about it. Then we change it depending on the feedback. We also, we upload it online for everyone to see. We get some feedback from there. Then we are creating from that, wireframe, we created there. And then it goes back in the ordinary feedback loop were users give feedback”

(PO_1)

The evaluation takes place on the part that is designed and takes place in discussions.

The PO experienced some problems in the evaluation:

“But the vast majority of the users do not really understand that they are able to influence because they are not used to be able to influence. If it takes them five minutes to do something that should not take them five minutes to do. That it could be done easier. They do not always tell us that, because that is how IT systems work and I cannot change this”

(PO_1)

The PO states that the end-users did not understand that they were able to influence the product. A developer describes that the design was created and evaluated before the implementation started:

“It would have, it felt like the first tests were good enough to carry on the sharp development”

(DEV_2)

There were no end-users involved anymore after the implementation started. A third developer had no end-user involvement in their project.

“We receive roughly 10 billion metrics per day. That is quite a lot of data to base your analysis on. We think it is better to get 10 billion metrics than asking one hundred persons”

(DEV_3)

The project used the measurements that they gathered with the current developed and implemented product online. One of the UXD makes use of the LEAN UX approach. The team finds out what works best and starts developing the most important functions.

“With this private customer frame were we try different concepts and see how they respond. We also do some alpha/beta testing on different versions of the site to see if this one is better than the other one and so on”

(UXD_2)

The UXD tries out different conceptual designs at their customer with a lot of manual work instead of code to find the best design. An UXD is not in a stage in which they do usability testing in their project yet, but will use it later in the project.

“We haven’t started that here now, but I always do usability testing. Usability testing is also a good way of doing user research”

(UXD_3)

The UXD stated that it is a good way to gather information on users. All but one project had end-users involved to gather information at the beginning of the project. The information was gathered through contact with different user groups and used to create persona’s, scenario’s, sketches and evaluate designs. The online gaming agency had no end-users involved; their process existed of cooperation between a game designer, a developer and an artist.

Consultants

Some participants experienced problems with consultants in the role of the PO. The consultants influence the feedback cycle of the decisions.

“If there are many layers between there, which is often when consultants come in. Then you have a weak product ownership. One of the key things in agile is that the cycle time is short and if you have to wait for responses, cycle time slows down. So you can’t keep up with velocity”

(PO_2)

Participants experienced a delay because the PO’s in these cases could not make decisions fast enough for the development. There were too much layers between the decision makers and the team.

Communication of and about the Vision

Participants discussed the problems they experienced with the communication of the vision.

In one case, the developer had no sense of the vision other than making a newer version of the existing system that complies with the new requirements and is more user friendly.

“In our case, we were supposed to make a new version of the old thing that they already had. That was not really that much of a vision in that sense. But, the challenge was using new technology and a product that you actually could maintain, modular and user friendly”

(DEV_2)

The developer was not aware of the vision, the developer mentions aspects of the old system that needed to be improved the Scrum project.

Challenges

One of the challenges experienced by UXD's is to get all the information from the PO's, other challenges are the language used and the focus of the communication in the team.

The Product Owner does not Communicate Enough

At the time of the study there was no visual representation of the vision. A participant describes the situation:

“The product owner has a pretty clear picture of what he wants it to be”

(UXD_2)

The PO has a clear image of what should come out of the project.

The UXD struggles with this:

“He thinks he knows the solutions all the time and we want to challenge the preconceptions and built something new, something better”

(UXD_2)

The UXD wants to understand what the PO has in his mind. The UXD does not think the PO has the best design in mind and is not able to see the design.

“He doesn’t have any, he hasn’t drawn them or something, he is just telling us how the system should be all the time. He has it all in his head, which is not the ideal case”

(UXD_2)

The PO communicates only how it should be without showing it, the design is in the mind of the PO. Another participant has a similar experience in one of his projects.

“In another project they think they know the vision and they think they know the... but we never had that start-up thing, so all that is in the head of the product manager for that product and he doesn’t really share with the rest of the people, so there is a disconnection”

(PO_3)

The PO describes that people in the team think they understand the vision and that the PO does not share his vision with the rest of the team.

Using Business Terms to Describe the Vision

A PO that is responsible for the designs experiences problems in the communication about what the vision is:

“Can you actually say what the vision is and not just speak in broad marketing terms. That is usually what they do. It is this bla bla bla here and bla bla bla there, That is very hard to strive towards, the reason to have a vision is to kind of have an automatic steering of the project”

(PO_3)

The language used is often broad and can be interpreted in different ways. Another PO emphasizes to make the vision understandable for the business.

“The business side creates the product vision and they use the business terms because the product vision is the communication tool towards business also. We want to have the business terms there, we want to understand how business talks about it and those are the words and terms we want to use in a domain language later on, so that everyone else speaks the same language”

(PO_2)

The PO argues that it is important to speak the same language in the vision and points out that it is a tool to communicate towards the business as well. The business should be able to understand the vision and therefor business language should be used.

Technical Discussions at Start-up Meetings

A problem that one of the participants mentioned is that the discussions are often technical:

“Our discussions of how to, how the solutions are, are often technical. The look and feel is not. It is more about the technical things in the start-up meetings”

(DEV_1)

The discussions are often technical in the start-up meetings. The participant continues with describing why this is:

“How the user should interact is not a big deal. They have one solution and we can say it is good or bad or.. I think we are often. It is not so much discussions of that part”

(DEV_1)

The participant describes that the user part of the system is not that hard. Another participant points out that they often have discussions about the implementation of the system.

“We are too much deep down in the implementation to look up and look at the vision, we forget that sometimes”

(SM_1)

They are too deep in to the implementation and forget about the vision. A developer describes how they make sure it fits in the end-state that is created.

“We test a small part, hopefully click around a bit more and we do try to make things look the same in the system, feel the same and work the same as we done before in other parts”

(DEV_1)

The developer describes that they test a small part and click around a bit more to see that it fits in the end-state. The developer describes the effect Scrum has on the developed software.

“Because if you focus on one part, it is easier to have it as module. It is easier to be focused, if it is broken down to small pieces”

(DEV_1)

The systems created will be more based on modules because it is easier to focus that way.

Creating the End-State

Participants were asked about their experiences and thoughts on creating the end-state(s) of the product in Scrum. How the participants mash the different visions together into a holistic and coherent design that fits in the bigger picture that the end-state creates. A reflection of the end-state is created in the conceptual model, therefore this is included in this chapter. Some participants perceive no problems while doing this and other participants do experience problems.

The UXD and PO's all had a conceptual design before the project started, one project had a BDUF. One of the UXD describes:

“I do not mind doing some rough sketch of what the product should be at the beginning and working from that”

(UXD_2)

The UXD describes it as a rough sketch and works from that. A PO describes how he approaches the process:

“Sometimes you need to quickly sketch it out. I have done quick prototypes like, Balsamiq style, like quick ones. Just to get this is the main flow, the big one and then I add stuff to that just to kind of always reform the, so that, You steer with that”

(PO_3)

The participant uses quick methods to establish a main flow for the design and uses the LEAN UX approach.

“You build a hypothesis and then you validate that one”

(PO_3)

The participant tries to validate their design. Not every participant shared the conceptual design that was made. One of the UXD's did not share the

rough sketch with the team. While another did this actively by making it visible for the team.

The participant in the role of the Scrum Master does not experience the end-state as a problem as long as you have a strong vision:

“I see in theory that could be a problem, but with a strong vision, I see that is not a problem”

(SM_1)

In this case, the vision was described by wireframes of the main parts of the product created by an external consultancy. The conceptual design was there for the whole system. Still some problems came up:

“We have some inconsistencies in the user interface where we have similar functionality in different parts that does not really look the same or that does not work the same”

(SM_1)

The Scrum Master encountered inconsistencies between functionality and terms of how it works and how it looks. One of the PO's does also not experience any problems with creating the end-state.

“We are the same people working with it. In the end it all passes through me, so I have some kind of control over it”

(PO_1)

The PO feels in control of the end-state as everything passes through him. This is the same project as a Scrum Master is working in (SM_1).

“If you have a big vision, if you know how these parts are going to integrate with each other. I would say it is not a problem”

(PO_1)

The PO concludes that if you have a big vision that it is not a problem.

Another PO argues that the end-state could be a problem in Scrum projects.

“Only if you do not have an overall alignment between the parts of the system. You need to have system level alignment in that also. Buttons and interactions happen in the same way, there shouldn’t be surprises”

(PO_2)

Overall alignment in the project will prevent this from happening. The PO does a lot of testing with end-users to try out different conceptual designs:

“You create multiple options until you come into an integration point, an integration point might be, this is when we test with the customers for the first time”

(PO_2)

The PO emphasizes the exploration of options until choices have to be made to continue the development. The PO describes an example of what is tested:

“How do they allow system navigation, is it forced navigation, is it open navigation, we tested that and found that open navigation is much better for the user, we went with that”

(PO_2)

These different choices were shown in a PO room where all information about different aspects of the system is put on the wall. One of the items is the design overview.

“Then we need to understand, but then we always have in a project multiple total solutions overviews, so you see how it works together all the time”

(PO_2)

Multiple overviews were put on the wall to see the how everything works together. The PO that is also responsible for the design sees no problems

when creating the end-state. The PO sketches out the conceptual design before the Scrum process:

“I think it is fairly easy to keep the bigger vision, but of course sometimes you need to quickly sketch it out”

(PO_3)

The participant perceives it as fairly easy to keep the end-state right. The participant sees the elements of the interface as something that can be reformed. The end-state can be changed during the process.

“Just to get this is the main flow, the big one. Then I add stuff to that just to kind of always reform the... you steer with that and the big design kind of and change that sometimes. That is how I have been making sure we do not miss anything”

(PO_3)

The participants creates the main flow and adds the elements to it. Changes can be done if it is needed. The online game development team starts out with a more abstract vision. They do not have a design up-front and do not expect to get it right the first time.

“No one expects us to have the perfect solution from scratch. No one is aiming to have a perfect, just start doing it and then we will see”

(DEV_3)

This participant works in a different context as the other participants do. The user group is not compelled to use the product. The goal of the product from the user’s perspective is to have fun.

The participant relies on metrics to make sure the product works and makes changes accordingly. In this projects, the interface changes incrementally.

“Not the whole interface because, we are making smaller incremental changes at the time and then we measure what is working best”

(DEV_3)

Challenges

Different challenges came up while discussing the end-state in the Scrum process. One of them is that the end-state keeps changing, others are the struggle with waterfall methods, the focus of the discussions and the different perceptions of success. This will be explained in more detail below.

Design Up-Front

The UXD that is part of the PO team also experiences problems. A UXD experiences a struggle with designing up-front:

“Yeah, there are lots of problems with creating the whole system because when you create the whole system and you are leaning against, or going against working normal waterfall that you have a big idea of what should be implemented and this idea is not shared with most of the people in the team”

(UXD_2)

The UXD thinks that it is too similar to waterfall processes. This participant does not mind creating rough sketches of the product in the beginning:

“I do not mind doing some rough sketch of what the product should be at the beginning and work from that”

(UXD_2)

Creating a rough sketch of how the product should be is not seen as a problem. The participant experiences problems with creating the best design for the whole system is seen as a problem. The participant gave an example of input forms that were needed in different parts of the system:

“That is why I want to make all five of the forms, because I want the form concept to fit for all forms”

(UXD_2)

The UXD wants to be in control and works further ahead to make sure it fits in the end-states to create a perfect design. The participant does not know what to do about it.

“That is really hard, I do not have an answer to that I think what I usually do is actually design all the five or six forms to make sure it is, it will fit and be perfect”

(UXD_2)

The UXD chooses to design them all at once to make sure the forms fit the design. A developer experiences the same problem in his current project.

“In the project where I am in now, the developer team really wants to lay out all of the access models and the data model upfront before the complete access model is actually needed. That is the same problem just to, another context”

(UXD_2)

A PO describes a struggle with the description of project success:

“I mean the reason for most projects to fail. People focus on, of this is a pet peeve of mine. People focus on, if you reach the deadline, the project is a success. Even if nobody sells it or uses it afterwards. Only reaching, that is a typical consultancy firm, at least in Sweden”

(PO_3)

Different responsibilities and values within the organization create different versions of product success. The participant describes that people often focus on the deadlines.

Changing the Visions

Participants were asked about the changes in the vision and the motivation behind it. Some participants struggle with changing the vision in the Scrum development process.

There is a difference between what has been envisioned at the beginning of the project and the final result. A Scrum Master describes:

“We have a vision of how we think now the end-product should look like, but we realized that that is not going to happen”

(SM_1)

The Scrum Master describes that what was envisioned is not going to be realized in the project. On the question where most changes take place in the product, the Scrum Master described:

“How the users interact with it, of course there are technical decisions to make as well, but that does not influence the product itself as much as the alternative ways of building it for the user”

(SM_1)

Most changes were made on the interaction design and a few technical issues. One UXD argues that they do not know enough:

“We do not know enough of the market, of the subject and so on. As we learn more about the costumers and the context and subject we have to adept the vision”

(UXD_3)

The participant mentions different sources where new information comes from.

A participant describes that they gain more knowledge during their projects:

“When you start the project, you have the least amount of knowledge about what will happen, once you start a project you gain more knowledge”

(PO_2)

The participant states that you have no idea about what will happen.

Another source of change described by a participant:

“As soon as you deliver something to the users, you get a lot of feedback. And it is not always or not likely that it is the feedback that you thought you would get”

(SM_1)

User give feedback, the Scrum Master describes that it is often not the feedback that is expected. Participants talked about the changing vision:

“That is extremely hard to tell, stuff like that should be up for change as well as the development process comes along”

(DEV_2)

The developer states that the vision should be up for change. Another participant describes:

“Of course we discover new things during the project and we should discover new things that should be incorporated in the vision”

(UXD_2)

The new elements that are discovered during the process need to be incorporated in the vision according to the UXD. The UXD continues:

“I think the product vision should change because of these, what you learn inside the Scrum team and what you learn from the users, it should change and it is hard”

(UXD_2)

There is a lot of learning within the team and from the users. The UXD states that it is hard that the vision changes. A PO states that the visions changes and that it is how it works:

“We learned within the two years, it develops, the vision develops as well, but it is not for the better”

(PO_1)

Many aspects change when the implementation takes years, for the better according to the PO. The PO explains:

“It is not a problem, it is how it should work. If it is not, you are developing things today that you said two years ago that you are going to develop, then you are doing something wrong”

(PO_1)

The PO states that it is wrong if nothing changes in the time you develop the vision. A UXD describes that new ideas and realizations come during the project:

“You realize things when you are starting to work on it. You come up with new ideas and if everyone thinks they are good, you can change it”

(UXD_3)

The UXD states that they can change it when everyone agrees. A developer worked from a BDUF that was intended to be implemented in the project. The prototype was tested with end-users but had to deal with some changes in the process:

“I do not think you can do it in that many ways. So it is very hard to make any drastic changes to what you are supposed to do”

(DEV_2)

The developer did not see any danger in making changes to the big design up-front that was created by external UXD's. The developer states that you cannot do it in that many ways referring to the design.

Challenges

Some challenges related to change were found in this study. The stakeholders play a role in the challenges the participants face, the choices that are made and the nature of the changes that are made in the Scrum development.

Evolving End-States

One UXD worked in a project where a conceptual design was created before the start of the project by an external consultancy. The UXD is responsible for the look and feel of the application and is moderately involved in the wireframes.

“You can see things that are not going to work and you have to make changes. We had a small font and we make it bigger to make it look more modern and easier to use. Looking better and everything, in the beginning it is like a yeah this is looking good. Then it is like this is boring, so much changes, it looks more like modular”

(UXD_1)

The experience of this participant is that the design starts out good and gets worse over time. The UXD that also implements the design in a start-up recognizes the problem with the end-state:

“Even in the beginning you need to have some or one big picture of snapshots of the product. You can't really glue it together and hope it will work”

(UXD_3)

The participant describes the problem when creating all small parts of a design. The small parts still need to be designed together as a whole system in every sprint.

The UXD describes a problem with the continues delivery of the software:

“We want to deliver something next month, that is only a subset of the vision but still it is on the way to the vision. But still this part should be, also needs to be designed as a product”

(UXD_3)

The participant describes that every delivery should be designed as a holistic end-state that can be the final one. The participant continues with describing it more in detail:

“It is moving from one whole picture to another whole picture all the time and it supposed to be working together and also look nice and so on”

(UXD_3)

The new stories cause a change in the design, it is moving between end-states in the Scrum process. The participant experiences a problem with this:

“For me, it is taking out a lot of time”

(UXD_3)

The participant addresses the fact that maintaining the end-state this way takes a lot of time. The participant describes that you realize that things have to be moved around during the sprints and that the Scrum process supports this.

“You realize things and you understand that you really have to move things around a bit to get it together again and I think that process is supported as well”

(UXD_3)

The process supports change as well according to the participant.

Struggling with Stakeholders

Participants seem to struggle with stakeholders outside the team that have different expectations. One participant experienced that there was no option to change the up-front designed product that they had to implement:

“There is no option to tell the people behind the project, we do not have time to do this, but we could do that and prioritize it in that way. The finished product is not negotiable”

(DEV_2)

The end-state was not negotiable. Some refer to the organization as a source of the problem.. A Scrum Master describes:

“It should change and it is hard. In this environment, in this organization it is hard. You are forced to make a project plan and be very specific about which deliveries you will make, so you are forced to decide on the vision beforehand”

(SM_1)

The Scrum Master experiences struggles the organization, it forces to specify a lot of elements beforehand and it is hard to change this. A PO mentions another problem:

“Different parts of the organization have different visions, for that I am sure”

(PO_1)

There are different visions within the organization. One of the organizations experienced problems with communicating the vision:

“People understand it as a design manual, as this is what we are going to do. But it is not, it is a sense of direction for us. It is for us to understand the bigger picture, not for us to understand the smaller picture”

(PO_1)

The vision was expected to be the end-result of the project instead of the vision. One of the consequences was that change in the vision was harder to achieve.

Trade-offs during the Scrum Development Process

The Scrum Master in this research mentions that some technical implications came up during the process, most of it related to the interface.

“A few technical implications that came up during the process. It would be easier to build it that way. To do a dropdown list instead of whatever. Ok, do it the easy way”

(SM_1)

Some choices were made in favour of the ease of implementation. Another developer argues that the builders of the prototype did not have enough knowledge about what the system was capable of and was intended to do.

“The prototype assumed a lot of stuff that was impossible to do since the people involved in creating the prototype did not really know what the system could or was supposed to do”

(DEV_2)

What was envisioned was impossible to implement for the developers according to the participant. One of the UXD’s points out that there is no time or resources to make it as envisioned at the beginning.

“Well, some changes have been made. I guess that is because we do not have time or we do not have resources to make it as good as it is intended to be”

(UXD_1)

The quality of the system was reduced through the lack of resources.

The participant describes that not everything will be done:

“It is not for the better most of the time. It is more we do not have time for that. Hopefully it will come at the end”

(UXD_1)

The participant describes that the changes done are not always positive for the project. An element that drives the change is described by one of the PO's.

“A big thing in deciding is bang for the buck. How much time does it take to develop this and what is the effect that which we can assume we are getting from it”

(PO_1)

The participant describes that the decisions are made on return of investment. How much do they get for the investment they do.

Incremental and Iterative Changes

The changes the participants make during the development are incremental and not iterative in the interface. A participant describes:

“We are making smaller incremental changes at the time and then we measure what is working best”

(DEV_3)

Several small changes are made and measured against each other to find the best one. One of the developers added that it was up to them to make sure the quality did not go down.

“That was up to the experience and individual skills of the person involved in the project”

(DEV_2)

The developers decided themselves what was best for the product and project. The people of the project that created the user interface and the prototype was not there anymore and changes were made by the

development team. Another element is that the conceptual design that has been made was not good enough:

“We had some prototypes to work with. We made some changes and it is getting. There are more changes to come, it doesn’t fit”

(DEV_1)

The changes that are done make the design not fitting anymore. One of the UXD experiences a similar problem when the bigger picture appears to be not the best interface solution. The participant remarks:

“When you start a project and create some framework, a design framework, this is kind of like how the application should be. Then it is easy to create different options but when you move on, when you have implemented something, then I think it is easy to lock on to that framework that you already created”

(UXD_2)

Exploring different options in early stages is easy according to the participant, it is hard to change the designed framework later on in the process. The participant describes one of the causes:

“It is hard to deviate from that because we delivered something and we developed it. Developers are not really keen on refactoring interface stuff”

(UXD_2)

The software is already delivered, developers do not appreciate redoing the design.

A participant states this as a more general problem:

“It is too damn hard to throw away what you have done, even though it is wrong. It is to kill your darling, that is for everyone, that is for the developers, that is for the project managers who come up with some cool features and then realize that they are the wrong features. It is very hard for them to acknowledge that and actually do something else”

(PO_3)

The PO describes the problem with throwing away own work.. Another experience related to the struggle of making changes is related to other stakeholders in the project. It is hard to make them understand that the interface needs to be changed:

“It is also challenging to make the stakeholder, or the product owners understand that oh sorry, this design was not good enough, we need to try this one instead and we need the developer to change all the code to reflect that. That is hard to measure. So yes it is harder because it is, if you discover that the design doesn't fit together nicely late in the project. It is hard to change”

(UXD_2)

The participant points out that it is hard to proof that one design will be better than the other. A change in design causes a lot of work in the project.

Documentation

Participants were asked about how the vision is documented. If there was an explicit vision or not and the challenges the participants faced in documenting the visions.

Not everyone was aware or interested in the documentation. Furthermore, not every vision was openly shared with the whole team. A UXD describes:

“What I am trying to do right now is to produce something where we can all look at a prototype that I can discuss with the product owner and the team, everyone that is involved in the project”

(UXD_2)

The UXD tries to create something to look at and discuss with the whole team. Almost all projects had a document of the product vision stating the goals and intended effects. Two teams used effect maps to visualize the relations between the end-users, features and effects. A participant describes:

“That is a really powerful way of capturing the vision”

(UXD_2)

The effect maps are seen as a powerful way of capturing the vision. One project had a BDUF documented in a prototype in the team’s room visibly for everyone. Only two projects reported on an explicit design vision with intended qualities and principles the product should have. The online gaming company was very specific about the experience that the product wants to create for the end-user. The start-up focused on the design by gathering examples of products and stating principles that the product should entail.

Almost all projects had a conceptual design before the development started, only the project with BDUF was further in the design. Not every project that had this conceptual design shared with the whole team, while others

had it explicit on the wall. One of the projects has a document explaining the concept design that was created for external stakeholders.

Some of the visions are documented and or represented in the project. There are different ways of doing this. A participant describes how their vision is documented:

| “In a couple of PowerPoint slides”
(DEV_3)

The participant adds a bit more detail to it:

| “Just a few slides with a couple of bullet points”
(DEV_3)

Another participant describes:

| “In the wireframes, but also in PowerPoint presentation with images and text”
(SM_1)

The vision was represented in different ways in different documents.

Another participant describes:

| “Wrote a quite big report with images and proposed solutions saying something in this area, we want to go in this direction”
(PO_1)

The participant describes a report that contains a elaborated conceptual design. An UXD documents examples of designs as part of the vision:

| “We are doing a lot of prototypes on paper and we are also sharing a lot of good examples of other products that we really like to have like a common vision that, this is how it is supposed to feel like when you are using our product”
(UXD_3)

The examples are used to create a common vision about the system. Other participants use tools to capture the vision:

“Effect maps with different users”
(PO_2)

The effect map is used to document the vision. The PO continues with describing storyboards and prototypes. The PO describes how it is put together in their project:

“All of this should be on one large wall, that is the product owner wall”
(PO_2)

All these artefacts are represented in a big PO wall to have an overview. A participant describes the location of the vision:

“I printed it out and put it up somewhere close to the developers, like a design wall in some sense”
(PO_3)

The product owner wants to have the vision close to the developers. A developer tells that they made a prototype and made it work step by step. The prototype was placed in the coffee room so that everyone could test it. The developer describes their process:

“When we started, we had a lot of stuff mocked-up, it looked like the prototype and we filled it with working components as we went along”
(DEV_2)

The parts of the prototype were replaced by real code step by step, the prototype was visible for the whole team.

Some show low involvement in the documentation:

“I do not know. The vision of the product.
In the [organization] it is often a lot of
documents, not always read by everyone”

(DEV_1)

The developer does not exactly know about the documentation. Similar statements were found another developer.

Challenges

Two challenges with the documentation came up in this research, the amount of detail in the documentation and the interpretation of the documentation.

Interpretation of the Documentation

A PO states that the written product vision is just a piece of paper:

“The product vision is a piece of paper with
words and letters, it is how you use it is
crucial”

(PO_2)

The PO points out that the use of the vision is crucial. The PO describes that it is hard to know how well the vision is understood:

“One of the crucial parts will be that you do
not know how well it is understood until the
product interface and behaviours are visible”

(PO_2)

The PO points out that the understanding becomes clear when the interface and behaviours are visible.

One of the aspects that was pointed out by a developer was that the vision depends on the person:

“Depends on who you are asking and how involved you are in sort of product vision wise in any project. So as far as I can tell it is different based on where your interests are and where you are in the project organization”

(DEV_2)

Next to the interest, the developer points out that your position is also relevant on the vision. A PO points out the different interpretations:

“Different people seeing the product vision will interpret that and this interpretation might be really good. But it is not good if we do not understand each other’s interpretations”

(PO_2)

The PO describes that understanding each other’s interpretation is important.

The Amount of Detail in the Documentation

The participant describes that the BDUF stops at a certain level because it misses details:

“That depends because you can never tell on a detailed level where you are going. We can have a broad vision of what the product should be. It depends on the product and the vision as well. You do not want to get your hand tied back if you can do some innovation in the process”

(DEV_2)

The amount of detail in the vision is different for each product, the developer points out that the amount of detail can stop innovation in the process.

Discussion

This chapter will interpret the previously presented results of this study in light of the existing literature and addresses reliability and validity issues.

Reliability and Validity

The research is conducted with participants that work in different environments, not only organization wise, but also working with different types of end-users. Some participants have internal end-users and others have end-users outside their organization. Two participants have consumers as end-users of their product. These working environments bring different working circumstances and influences on their Scrum projects that are carried out. Participants could have given socially desirable answers even though they were told that they would stay anonymous. One project was researched from different angles within the Scrum team which controls for this effect. In this project, multiple experiences could be compared on the same Scrum process. The internal validity refers to the validity of the data gathered within this research. The external validity refers to the generalizability of this research to other projects. More different projects would increase the external validity while more experiences on the same Scrum process will increase the internal validity. Multiple accounts on the same events would make the data more reliable too. Internal validity is sacrificed to increase the external validity of the data by including more different projects. This is a threat to the internal validity of the data in this research. Six different Scrum processes are studied, five of them with one participant. One Scrum process was studied with four different participants in different roles. The self-representation effect can have occurred to make the participants organizations role seem more favourable than it actually was. Important elements could have been missed due the time limit of the interviews that would have come up in other interviews.

One aspect that is often unattended in the description of the vision is the context of the organization. An organization that works on a product for internal use can have different challenges and opportunities in the Scrum development than e.g. external end-users. Business to business and business to consumer development processes give different stakes, priorities and values to the Scrum process. Another factor is the complexity of the product, Product complexity differs greatly and influences the development. Complex products can require e.g. specialist skills, research up-front, complex technical decisions that influence the whole project. These different contexts and products have can have unique struggles and challenges. The start-up and online gaming company are severely different from the other participants. Researchers found that the UX issues impact can be limited by the management style and the process the UX takes place in, even though it is seen as an important element on different levels in the organization [71].

The Vision

In this research, the term product vision was used to ask about the vision. The participants answered in various ways that showed that they thought about all four types of the vision while answering the question. This could be due to the different backgrounds and disciplines of the participants. In the light of this, it was decided to analyse the answers according to these four different types of visions.

There is a not a uniform understanding in the theory and the practice of what the vision is. A description of the required vision for Scrum as a design and development process is missing. Participants in this study refer to different concepts when talking about the vision. The product vision, design vision, conceptual design, the end-state or BDUF. A holistic approach to describe the vision is missing. Most participants referred to the vision as the information their project started with. Some participants describe the vision as an on-going process that evolves with all information until the end-state is created.

There are two main differences in the descriptions on the vision, the vision of the product or the effects. One perspective focuses on the effects the product will create, these visions are more abstract and descriptive in nature and can be realized by different products. In this interpretation, the direction of the solution is not set. This vision is relatively abstract and more descriptive in nature. Examples of this are the design and the product vision. The other perspective focuses on the product and its design; this corresponds with the conceptual design, BDUF and sketches. This perspective has a focus on how the design for the experience will be made.

These differences can be interpreted by looking at the design process as a process of exploration and evaluation. The design vision and product vision can help explore and evaluate different options in the design process. The conceptual design and the end-state are the result of this.

Creating and Changing the Vision

In two of the projects, the concept design was already created and was handed over to the team which can have a negative effect on the team. Some practitioners report positive effects of involving the developers in design studio's [72]. Some participants use these methods or other workshops to involve the team. Researchers have shown that engagement in each other's activities can help with the integration of UX design in agile processes [73]. Some participants experienced problems with involving the developers, the involvement of the UXD's or the end-users.

Low Interest of the Developers

Practitioners experience problems with involving the developers in the vision. The developers were not interested in the visions of the product and focussed more on the technical aspects of the product. Several researchers emphasized the need to involve the whole team in the creation of the visions [18] [46] [3] [48]. Lerdahl describes that in his research teams often go too quickly in the details of the product while it could be better to stay higher more abstract level to create a shared vision [33].

User Experience Designers have little Time

Some teams had no dedicated UXD's and experienced effects on the speed of the development and the quality of the designs. It is important to be able to explore multiple design options for the quality of the designs [52]. Gathering all information about the vision is needed for the UXD to be able to deliver what the client and end-users need and what is possible. Missing meeting and discussions influence the amount of information gathered and can influence the work the UXD delivers. Some changes were done without involvement of UXD. These changes were done by the developers themselves and others in agreement with Scrum Masters or PO's. These changes can be a risk for the design vision that is often not communicated in the team. Researchers found that the responsibility for UX is not clear and refers to "*the diffusion of responsibility*" in Scrum Projects [32].

End-User Involvement and Focus

Current end-user evaluation methodologies used are focused on the developed story in the sprint. This makes sure the story is correctly implemented and it works. The focus on the small parts can be a problem for the coherent system; the testing does not take a holistic approach to the system. A common complaint of UXD practitioners is that the usability tests that are done are not formal usability tests, it are inspection methods done by usability experts and acceptance tests in the form of a product demo which collects comments and reactions [3]. Methods used in practice are often not suitable for this goal and are not usability tests but evaluations with domain experts, guidelines and heuristics [74]. Another problem a participant encountered was that the end-users did not understand that they could influence the product. This could be caused by the validation attitude of the tests.

Communication of and about the Vision

The PO, the language used and the focus of the communication give challenges in the communication around and of the vision.

The Product Owner does not Communicate Enough

The PO's seem to think that they communicate enough to the team or that the team does not need to have all information. It is possible that the PO's experience the current communication as sufficient in the team. The communication can keep important information that is needed for the UXD. Sharing the vision is important for the team and can create contradicting or competing visions [19] [15].

Using Business Terms to Describe the Vision

One of the problems mentioned by the participants is the use of abstract terminology. Hey et al. show that using abstract high-level terminology lets the team believe they are on the same page [18]. The abstract level can hide disagreements in goals, assumptions, values and understanding. Making this high-level terminology explicit exposes conflicts. Explicit frames can be discussed in the team and a common frame can be formed. By creating these explicit frames, differences between the frames are revealed and assumptions can be challenged. These discussions can to create a shared frame. The product vision should contain clear language that is understandable for the team to work with.

Technical Discussions at Start-up Meetings

The discussions within the team are often technical in the daily meetings and the sprint start. Discussions in the projects are often focused on the small parts, this is one of the proposed causes of the problem with creating the end-state by other researchers [36] [32] [65]. This could also be related to the fact that the developers are not involved and show a low interest in the different visions. A factor that also contributes is the amount of developers in the team. There are more developers in the team than other roles.

The End-State

Some participants experienced problems with creating a holistic end-state, while other did not. Mostly the UXD's experience problems in this part, while the PO's do not experience problems. These participants state that a strong product vision helps them. Other participants see no problems because the same people are working with it and it all passes through the PO. Participants reported problems in consistency, a bigger problem occurred when the conceptual design that the Scrum project started with appeared not to be good enough.

The different responsibilities in the team can lead to different perceptions of the product success. Agile processes argue for one team with shared responsibilities. It can be that in practice is this not experienced that way. One of the discussions this brings is the question of who can judge the quality of the software. This can be identified as a direction for further research.

Design Up-Front

Some participants struggle with that they want to design too much up-front. The UXD's want to create a solution that will fit everywhere in the system. The practitioner can feel pressure to use the agile principles as a rule and not as a guideline to be agile.

Changing the Visions

Evolving End-States

A situation that occurred is that the initial created conceptual design was not good enough. The end-state that emerged had problems and needed to be changed. A UXD described that it is hard for the people to admit that their work was not good enough. Rather than creating a new bigger picture, fixes are applied to make it work in the current one. This is referred to by Buxton as getting the design right, making it work in the current end-state [52]. Buxton argues that it is important for the product to get the right design, this means to get the end-state and recognizes this problem as one of the biggest weaknesses of the agile processes. Patton describes his experience in this as “*We considered alternative ideas only when we didn’t like the one we were currently using*” [75]. As agile processes assume that it is hard to do right at once, this is also true for design.

One of the UXD addressed the fact that every delivery should be designed as a whole product. Adding user stories impacts conceptual design of the system and has an influence on the end-state it creates. This was seen as time consuming, but not impossible in the process. This problem could be the case when the team releases the product incrementally. Products that are incrementally released deal with a different situation as the products that are released when it is finished. In the incremental release case, different versions of the whole picture should be created to make a whole and coherent design. Each of these versions impacts the end-states of the future situation in a different way.

Struggling with Stakeholders

Support for changing was missing, if a solution did not fit in the end-state that emerged from the conceptual design. An UXD described that it is hard to change the interface and make the team understand that it is needed to create a new end-state in order to make the design better. The UXD is dependent on the willingness of the team and the PO to implement changes in the design.

Trade-offs during the Scrum Development Process

The scope or initial vision of what the product should do at the end of the development was seen as something that was not up for change by some participants. Some changes described by participants pointed to the ease of implementation in favour of the end-user quality of the end-product, this is also stated by some participants. Singg reports that the PO think in terms of the minimum set of features that can be marketed in a short time frame, which makes it hard to get the bigger picture of the final product [76].

A participant pointed out the focus on delivering in time, which is discussed by Larman [4]. Larman states that people remember a project being late. A project is seen as a success if it is delivered in time with 75% of the features, while it is seen as a failure if the project goes over time with 100% of the features. One of the points Larman does not address is mentioned by a participant which stated that the final deliverable product is often not questionable. Cohn (2010) discusses this as a common Scrum problem and argues that quality changes should be addressed by higher management and not by the PO [9]. A PO in the research stated that choices are often made by return on investment. Schwaber points out that the PO is responsible for delivering the vision in a way that maximizes the return of investment [77]. This could mean that increasing the quality of certain feature has a lower priority than implementing new features.

Incremental and Iterative Changes

One of the problems encountered is that the changes made in the design are often incremental and not iterative in nature. Refactoring the interface is not always an option. This can be caused by the stakeholders, the focus on the return of investment and the resources available in the project. Making a new design can be a long and costly endeavour.

Documentation

The product vision is often documented while the other visions are not always documented and communicated. Two teams used effect maps to visualize the relations between the end-users, features and effects. The effect maps are seen as a useful tool for PO's to make decisions about what and why the work is done. The product vision was often documented and accessible in the team, but not always accessed by the team member.

There does not seem to be a design vision in most of the projects. Only two project reported on an explicit design vision with intended qualities and principles the product should have. The online gaming company was very specific about the experience that the product wants to create for the end-user. The start-up organisation focussed on the design by gathering examples of products and stating principles that the product should entail. All other projects had a UXD or PO in control of this part. The person in control of the end-state then implicitly held the design vision. It is not clear if these projects have a conscious design vision at all.

Interpretation of the Documentation

Literature and the participants argue that written visions are abstract and can cause miscommunication through different interpretations. Visual communication is more clear when communicating the UX and design of the products. Each type of vision should be communicated in a way that fits that vision.

The Amount of Detail in the Documentation

Vision statements that were referred to in documents are not enough to cover the vision. Some participants used methods as effect mapping to create an elaborated product vision. It is clear that only a product vision is not enough to guide the Scrum development. Some literature argues that the vision should be clear and concise to convey the message [30], this can be true for people outside the team. Within the team, a deeper understanding of the vision is required. This could be more information about the design vision, conceptual design or the bigger picture or the information these visions are based on.

Conclusion

This research studied the vision in Scrum environments. The results have shown that there are different interpretations of the vision in Scrum. The vision can refer to different concepts for the practitioners. This research has shown that most of the researched teams start out with a conceptual design and a product vision. The design vision and the end-state emerge during the Scrum process and get less attention during the development.

The Scrums teams consist of practitioners with different roles. Not all teams had full time UXD practitioners and consisted mostly of developers and a PO. One challenge found in this study is that the discussions in the teams are often technical and focused on the current sprint. This can be caused by the interest and or involvement of the developers in the different types of visions. Involving the team in the creation of the different visions makes it possible to discuss these in the team.

There are several challenges for the UXD practitioners in the teams. One of challenges is related to the resources that are available. The not fully committed UXD's experienced problems with exploring different solutions and delivering quality in the given time. Another challenge is the support to change the current end-state to a new one that will fit better. The Scrum process embrace incremental changes, but iterative changes are harder to make for UXD practitioners because of the stakeholders in and around the team.

It is beneficial to represent the different visions in the teams work environment and understood by the whole team, if possible created by the team themselves. The explicit visions can help the team to discuss and reflect on to the end-states that the team is developing. Practitioners should know and reflect on the different visions of the product that will be developed and emerge during the Scrum process.

In this thesis, an explicit design vision is recommended to create a holistic approach that is needed to the product development in Scrum. A design vision is the qualities and principles used to create the product that affect the perceptions and responses of the end-user on use or anticipated use of the product. A design vision can help to make changes that are consistent with the whole and maintain consistent quality and decisions making in the project.

Future Research

Some future research directions can be identified from this study, future studies can include the following:

1. Research can be done on if other development processes have problems creating this bigger picture or holistic design. It could be that the identified problems are not specific for the Scrum process but can be found in all types of software development processes that include products with a user interaction.
2. Conduct more research about the different visions in the different development processes. Create a model that can help to understand the different and conflicting visions in software development processes.
3. Study the decision-making in Scrum teams, with a focus on the UXD of the system to see how important the quality of the product is in comparison to the other elements of the development process.
4. Scrum uses customers and sometimes end-users as quality inspectors, the result of this could be that they have no idea what could have been possible with the product. Research can be done on the problem of customers or end-users as acceptance criteria for quality. The attitude is towards the evaluation seems to be to check if the software is good enough instead of if it is right.
5. Some practitioners worked with external consultants in their team as PO, UXD or as developers. Research can be done on how this affects the Scrum team, responsibilities and decision-making. The impact of consultancy on the product development industry could be explored.

References

- [1] K. Beck, M. Beedle, A. van Bennekum, A. Cockburn, M. Fowler, J. Grenning, J. Highsmith, A. Hunt, R. Jeffries, J. Kern, B. Marick, R. C. Martin, S. Mellor, K. Schwaber, J. Sutherland and D. Thomas, "Manifesto for Agile Software Development," 2001. [Online]. Available: <http://agilemanifesto.org/iso/en/>.
- [2] R. Pichler, *Agile Product Management with Scrum: Creating Products that Customers Love*, Boston: Pearson Education, 2010.
- [3] H. Beyer, *User-Centered Agile Methods*, Morgan & ClayPool Publishers, 2010.
- [4] C. Larman, *Agile and Iterative Development*, Boston: Pearson Education, 2004.
- [5] S. W. Ambler, "Answering the "Where is the Proof That Agile Methods Work" Question," 2012. [Online]. Available: <http://www.agilemodeling.com/essays/proof.htm>.
- [6] "The CHAOS Manifesto," The Standish Group, 2012.
- [7] H. Takeuchi and I. Nonaka, "The new new Product Development Game," *Harvard Business Review*, no. January-February, pp. 137-146, 1986.
- [8] K. Schwaber and M. Beedle, *Agile Software Development with Scrum*, New Jersey: Prentice Hall, 2001.
- [9] M. Cohn, *Succeeding with Agile: Software Development Using Scrum*, Boston: Pearson Education, 2010.
- [10] G. Rong, D. Shao and H. Zhang, "Asia Pacific Software Engineering Conference," in *SCRUM-PSP: Embracing Process Agility and Discipline*, 2010.
- [11] D. Rawsthorne, Artist, *Scrum Team*. [Art]. Agile Atlas.
- [12] *Scrum Process*. [Art]. Mountangoat software, 2012.
- [13] K. Krippendorff, *The Semantic Turn*, CRC Press Inc, 2006.
- [14] J. Highsmith, *Agile Project Management: Creating Innovative Products*, Addison-Wesley Professional, 2009.
- [15] G. L. Pearce and M. D. Ensley, "A reciprocal and longitudinal investigation of the innovation process: the central role of shared vision in product and process innovation teams (PPITs)," *Journal of Organizational Behavior*, pp. 259-278, 2004.
- [16] M. Buchenau and J. F. Suri, "DIS '00 Proceedings of the 3rd conference on Designing interactive systems: processes, practices, methods, and techniques," in *Experience Prototypin*, New York, 2000.
- [17] S. D. Teasley, C. A. Lisa, M. S. Krishnan and J. S. Olsen, "Rapid Software Development through Team Collocation," *IEEE TRANSACTIONS ON SOFTWARE ENGINEERING*, pp. 671-683, 2002.

- [18] J. H. G. Hey, C. K. Joyce and S. L. Beckman, "Framing innovation: negotiating shared frames during early design phases," *Journal of Design Research*, pp. 79-99, 2007.
- [19] M. B. Rosson and J. M. Carroll, "Scenario-Based Design," in *The Human-Computer Interaction Handbook: Fundamentals, Evolving Technologies and Emerging Applications*, New York, Lawrence Erlbaum Associates, 2002, pp. 1032-1050.
- [20] G. Chin, *Agile Project Management: How to Succeed in the Face of Changing Project Requirements*, New York: American Management Association, 2004.
- [21] H. Beyer and K. Holtzblatt, "Contextual Design," *Interactions*, pp. 32-42, 1999.
- [22] D. A. Schön, *The Reflective Practitioner - how professionals think in action*, New York: Basic Books, 1983.
- [23] J. Löwgren and E. Stolterman, *Thoughtful Interaction Design*, Massachusetts: THE MIT PRESS, 2007.
- [24] M. Hneif and S. Hock Ow, "REVIEW OF AGILE METHODOLOGIES IN SOFTWARE," *International Journal of Research and Reviews in Applied Sciences*, 2009.
- [25] S. Kim, "Interdisciplinary Collaboration," in *The Art of Human Computer Interface Design*, Addison-Wesley, 1990, pp. 31-44.
- [26] S. Cummings and J. Davies, "Mission, Vision, Fusion," *Long Range Planning*, pp. 147-150, 1994.
- [27] S. L. Brown and K. M. Eisenhardt, "Product Development— Past Research, Present Findings, and Future Directions.," *Academy of Management Review*, pp. 343-378, 1995.
- [28] P. Tassarolo, *Product Innovation Management*, pp. 69-82, 2007.
- [29] M. C. Crawford and A. C. Di Benedetto, *New Product Management*, New York: The McGraw-Hill Companies, 2000.
- [30] J. L. G. Benassi, D. C. Ameral and L. D. F. Junior, "Product vision management: concept and models evaluation," *Product: Management & Development*, pp. 163-172, 2011.
- [31] J. Kollmann, H. Sharp and A. Blandford, "Agile Conference," in *The importance of Identity and Vision to user experience designers on agile projects*, Chicago, 2009.
- [32] M. K. Lárusdóttir, Å. Cajander and J. Gulliksen, "The big picture of UX is missing in Scrum projects," in *The big picture of UX is missing in Scrum projects*, Aachen, 2012.
- [33] E. Lerdahl, "STAGING FOR CREATIVE COLLABORATION IN DESIGN TEAMS: Models, tools and methods," Norwegian University of Science and Technology, Trondheim, 2001.
- [34] L. Wroblewski, "Developing Design Principles," 2009. [Online]. Available: <http://www.lukew.com/ff/entry.asp?854>. [Accessed 12 8 2013].
- [35] G. Moore, *Crossing the Chasm*, Revised Edition ed., HarperBusiness, 2006.
- [36] C. Nodder and J. Nielsen, "Agile Development that Incorporates User Experience Practices," 26 3 2013. [Online]. Available: <http://www.nngroup.com/reports/agile-development-user-experience/>.

- [37] S. W. Ambler, "Tailoring Usability into Agile Software Development Projects," in *Maturing Usability*, London, Springer-Verlag, 2008, pp. 75-95.
- [38] D. Sy, "Adapting Usability Investigations for Agile User Centred Design," *JOURNAL OF USABILITY STUDIES*, pp. 112-132, 2007.
- [39] T. Silva da Silva, A. Martin, F. Maurer and M. Silveira, "2011 Agile Conference," in *User-Centered Design and Agile Methods: A Systematic Review*, Salt Lake City, 2011.
- [40] J. J. Garrett, *The elements of user experience*, New York: New Riders, 2003.
- [41] C. Tollestrup, "Value and Vision-based Methodology in Integrated Design," Aalborg University, Aalborg, 2004.
- [42] J. Kunde, *Corporate religion: building a strong company through personality and corporate soul*, London: Financial Times/Prentice Hall, 2000.
- [43] J. F. Cox, C. L. Pearce and M. L. Perry, "Towards a model of shared leadership and distributed influence in the innovation process," in *Shared leadership: Reframing the hows and whys of leadership*, Thousand Oaks, Sage, 2003, pp. 48-76.
- [44] J. Shore and Chromatic, *The Art of Agile Development*, Sebastopol: O'Reilly Media, 2007.
- [45] W. Robert and J. Veryzer, "Discontinuous Innovation and the New Product Development Process," *Journal of Product Innovation Management*, pp. 304-321, 1998.
- [46] J. M. Carroll, "Five reasons for scenario-based design," *Interacting with Computers* 13, pp. 43-60, 2000.
- [47] J. Patton, "OOPSLA 2002 Practitioners Reports," in *Hitting the Target: Adding Interaction Design to Agile Software Development*, New York, 2002.
- [48] D. J. Mayhew, *Usability Engineering Lifecycle*, Oxford: Morgan Kaufmann, 1999.
- [49] J. D. Gould and C. H. Lewis, "Designing for usability: key principles and what designers think," *Communications of the ACM*, pp. 300-311, 1985.
- [50] D. A. Norman and S. W. Draper, *User Centred Systems Design*, Hillsdale: Lawrence Erlbaum Associates, Inc., 1986.
- [51] P. Laseau, "Graphic Thinking for Architects & Designers," John Wiley and Sons, 1980.
- [52] B. Buxton, "Sketching User Experiences: Getting the Design Right and the Right Design," Morgan Kaufmann, 2007.
- [53] M. Tohidi, W. Buxton, R. Baecker and A. Sellen, "CHI 2006 Proceedings • Usability Methods," in *Getting the Right Design and the Design Right: Testing Many Is Better Than One*, Montréal, 2006.
- [54] D. Traynor, Artist, *Exploring the solution space*. [Art]. <http://insideintercom.io/criticism-and-two-way-streets/>.
- [55] P. McInerney and F. Maurer, "UCD in Agile Projects: Dream Team or Odd Couple," *Interactions*, pp. 19-23, 2005.

- [56] J. C. Lee, "Proceeding CHI EA '06 CHI '06 Extended Abstracts on Human Factors in Computing Systems," in *Embracing Agile Development of Usable Software Systems*, New York, 2006.
- [57] J. C. Lee and S. D. McCrickard, "Agile 2007: Proceedings of the Agile 2007 Conference," in *Towards extreme(ly) usable software: Exploring tensions between usability and Agile software development*, Washington, 2007.
- [58] J. Ferreira, H. Sharp and H. Robinson, "User experience design and agile development: managing cooperation through articulation work," *Software: Practice and Experience*, pp. 963-974, 2011.
- [59] S. Chamberlain, H. Sharp and N. Maiden, "XP'06 Proceedings of the 7th international conference on Extreme Programming and Agile Processes in Software Engineering," in *Towards a framework for integrating agile development and user-centred design*, Heidelberg, 2006.
- [60] J. Ferreira, H. Sharp and H. Robinson, "Values and Assumptions Shaping Agile Development and User Experience Design in Practice," in *Agile Processes in Software Engineering and Extreme Programming*, Trondheim, Springer, 2010, p. 178.
- [61] B. Gulliksen, B. Göransson, I. Boivie, S. Blomkvist, J. Persson and Å. Cajander, "Key Principles of user-centred systems design," *Behaviour and information Technology*, pp. 397-410, 2003.
- [62] M. Detweiler, "Managing UCD within agile projects," *ACM*, pp. 40-42, 2007.
- [63] H. Obendorf and M. Finck, "Scenario-based usability engineering techniques in agile development processes," *proceedings of the Conference on Human Factors in Computing Systems*, pp. 2159-2166, 2008.
- [64] A. Begel and N. Nagappan, "First International Symposium on Empirical Software Engineering and Measurement," in *Usage and Perceptions of Agile Software Development in an Industrial Context: An Exploratory Study*, 2007.
- [65] T. Dingsøy, T. Dybå and N. B. Moe, *Agile Software Development: Current Research and future Directions*, Heidelberg: Springer-Verlag Berlin Heidelberg, 2010.
- [66] D. Kane, "Agile Development Conference," in *Finding a place for discount usability engineering in agile development: throwing down the gauntlet*, 2003.
- [67] M. K. Lárusdóttir, E. R. Bjarnadóttir and J. Gulliksen, "The Focus on Usability in Testing Practices in Industry," *HUMAN-COMPUTER INTERACTION*, pp. 98-109, 2010.
- [68] D. Silverman, *Interpreting Qualitative Data*, SAGE Publications: London, 2006.
- [69] N. Software, *Express Scribe*, 2013.
- [70] V. Braun and V. Clarke, "Using thematic analysis in psychology," *Qualitative Research in Psychology*, no. 3:2, pp. 77-101, 2006.
- [71] K. Kuusinen and K. Väänänen-Vainio-Mattila, "How to make agile UX work more efficient: management and sales perspectives," Copenhagen, 2012.
- [72] J. M. Unger and J. A. White, "CHI 2008 Proceedings · Case Studies," in *Agile User Centered Design: Enter the Design Studio – A Case Study*, Florence, 2008.
- [73] J. Ferreira, H. Sharp and H. Robinson, "Agile Conference (AGILE)," in *Agile Development and User*

Experience Design Integration as an Ongoing Achievement in Practice, Dallas, 2012.

- [74] J. Ferreira, J. Noble and R. L. Biddle, "Proceeding AGILE '07 Proceedings of the AGILE 2007," in *Agile Development Iterations and UI Design*, Washington, 2007.
- [75] J. Patton, "Consider Multiple Solutions," *user centric*, pp. 2-3, 2008.
- [76] M. Singg, "Agile 2008 Conference," in *U-SCRUM: A Agile Methodology for Promoting Usability*, Toronto, 2008.
- [77] K. Schwaber, *Agile Project Management with Scrum*, Washington: Microsoft Press, 2004.
- [78] W. Buxton, "Performance by Design: The role of Design in Software Development," *Proceedings of the Second International Conference on Usage-Centered Design*, pp. 1-15, 2003.
- [79] G. S. Lynn and A. E. Akgün, "Project Visioning: Its components and impact on new product success," *The Journal of Product Innovation Manangement*, pp. 374-387, 2001.
- [80] ISO 9241-210, "Ergonomics of human system interaction - Part 210: Human-centered design for interactive systems," International Organization for Standardization, Geneve, 2009.
- [81] D. A. Schön and M. Rein, *Frame reflection: Toward the resolution of intractable policy controversies*, New York: BasicBooks, 1994.
- [82] I. Nonaka, ""The knowledge-creating company"," *Harvard Business Review*, pp. 96-104, 1991.
- [83] B. Byrne, "Qualitative Interviewing," in *Social Research Methods*, C. Seale, Ed., London, Sage, 2004, pp. 179-192.
- [84] C. Kitzinger, "Feminist approaches," in *Qualitative Research Practice*, C. Seale, G. Gobo, J. Gubrium and D. Silverman, Eds., London, Sage, 2004, pp. 125-140.
- [85] J. Highsmith, ""Design the Box"," Cutter Consortium's Agile Project Management E-Mail Advisor, 2001.

Appendices

A. Interview Introduction

Thank you for participating in this research. My name is Bastiaan Boel, I am a master student at Uppsala University and I will interview you to get to know more about the creation, communication and use of the product vision in agile Scrum projects. This research is intended to understand this better and see what we can learn from it. The results will be used to publish a paper.

The interview will be recorded with your permission for analytical purposes. The recordings will only be heard by the researcher and or reviewer of this research and won't be used for other purposes than this research without your permission. The data will be analyzed, stored and presented anonymously in a way that it is not possible to identify you and your organization.

I might ask very similar questions, or the same questions during the interview, this is to make sure that I have an answer for it and I do not forget anything, it has nothing to do with the answers you have given. It is important to give honest answers on how you perceive, practice and experience it in your projects. Remember that there is nothing wrong with what you are saying. You have the right to stop the research at any time without giving a reason.

I will start with a background questionnaire to collect background information about you and your organization. I do this in form of a questionnaire to speeds the process up. Tell me if you have anything to add to the questions or the answers are not applicable to you or your organization.

Feel free to ask any question related to this research and the procedure. If a question would endanger the interview, I might have to answer it afterwards.

B. Recording Permission

I am voluntarily taking part in a research study conducted by Bastiaan Boel for the purposes of understanding the vision in Scrum development. I understand that my participation will be recorded on digital audio for analytical purposes.

I understand that data and information I share today will be handled confidentially and anonymously.

I understand that the audio recordings will not be used for any commercial purposes whatsoever.

I will not be identified by name or by showing my face. My personal information will be protected; taking part in this study and the results from the study are not part of my performance review. My information will be rolled up with the rest of the data from the other study participants.

I discharge Bastiaan Boel from any liability for using the recordings from this study according to the uses outlined above.

Signature: _____

Name: _____

Date: _____

C. Background Questionnaire

1. Job Title: _____
2. Scrum Role: _____
3. Age
 20-35 36-50 51-65
4. Number of years of experience in working with IT in a professional environment
 0-1 2-3 4-9 10+
5. Experience with doing user interface design in a professional context
 Yes No
6. Experience with doing programming(no HTML/CSS) in a professional context
 Yes No
7. Number of years of experience in using agile methodologies
 0-1 2-3 4-9 10+
8. Number of years of experience in using Scrum
 0-1 2-3 4-9 10+
9. Use of daily stand-up meetings
 Yes No
10. Make use of sprint zero,
 Yes No
11. User interface design up-front, before the sprints start
 Yes No
12. Formal training in agile
 Yes No
13. Company size in number of people
 0-10 11-50 51-250 250+
14. Designers and Developers
 Work in the same room Work at the same floor Somewhere else

D. Interview Questions

Introduction

- Can you tell me about the products you are working on
- Can you describe the team
- Can you tell me shortly about the Scrum process your team is using
- Tell me about the role you play in the project
- How does a project start

The vision

- What is the product vision for you
- What is essential for a successful product vision
- How does the vision evolve over time, which information is most important for this

Relation to the vision

- What are your experiences with the vision in agile
- What role does the vision play in the process for you
- How do you use the product vision in the agile development process

Creation

- Who is involved in creating the vision
- What activities are undertaken to create the vision
- Do end-users play a role in the construction of the product vision
- How involved are designers and developers in the process of creating a vision
- Conflicting visions during the creation
- How is the future of the product taken in account during the creation of the vision
- Can you tell me how the vision is used in the daily meetings

Responsibility

- Who is responsible for the vision in the project
- How does this affect the practice,
- how does this person communicate the vision
- What initiatives does that person undertake in relation to the vision
- How do you see your responsibility in relation to the vision.

Documentation and representation

- How is the vision externalized or represented in the project?
- Which methods are used to represent the vision

Communication

- What have you learned about the vision in relation to the different team members?
- How is the vision communicated to and in the team
- What actions are taken when the vision changes
- Do you communicate it different for team members?
- Are there different visions in relation to the product
- conflicts in the vision of different stakeholders, differences in perspectives on the product vision

The Final Product

- What role does UX and or design play in the vision
- How do you split up the vision into stories
- How do you make sure the different parts fit together as a coherent design?
- Do you experience problems between what is made and what was envisioned
- How would you relate the vision to the end-product

Is there anything I forgot to ask or that you would like to tell