REVEALING THE SECRET PIECES OF THE PUZZLE

Studying the hidden influences of agile development context on user-centered design

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Abstract

In a world dominated by digital technologies, user-centered design aims to ensure that the users are catered with solutions that deal with their needs. As agile methods have become a prevalent approach in software development, it is crucial for the two disciplines to work together. However, existing studies have already presented incompatibilities between the methods of the two disciplines. This study intends to investigate the impact that agile principles have on the adoption of user-centered approach on a broader scale through the many parties involved in the process. By conducting interviews with practitioners and interpreting the results through the lens of Engeström’s activity system model, the findings of the study reveal significant influences imposed on the user-centered approach by external and organizational factors that are intensified by the agile principles. Three main areas of concern are identified and accompanied by broad suggestions on how to approach resolving them, focusing on the empowerment of UX designers, accurate deliberation of the intentions and practices of user-centered approach, and close collaboration to raise awareness of the benefits of user-centered approach. Lastly, it is emphasized that the identified areas of concern – primarily the problematic impact from clients and executives – need further extensive research to provide definitive solutions.

Keywords: Agile software development, user-centered design, user research, user involvement.

1. Introduction

Since the widespread adoption of digital devices in our everyday lives the influence of the users on the design of technologies has significantly increased. As a matter of fact, the focus on the users in computer-based technologies was recognized as a crucial factor already decades ago, as Nickerson phrased it in the seventies: "The need of the future is not so much for computer-oriented people as for people-oriented computers" (Nickerson, 1969, p.178). This incentive gave rise to the discipline that is known as user-centered design (Norman & Draper, 1986). User-centered design (UCD) is not a method or a framework by itself, but rather a philosophy or a design approach that emphasises the role of the user in a successful design process. It primarily concentrates on three basic principles: early focus on the users and their tasks, evaluation and measurement of the product usage, and iterated design (Rubin, Chisnell & Chisnell, 2008). In itself UCD encompasses a variety of methods to study, validate and document the context of the problem from the user perspective, such as interviews, field studies, prototypes, personas and scenarios, and usability testing (Rubin, Chisnell & Chisnell, 2008).
The degree to which the users are involved in the design activities of UCD might vary. For example, participatory design is an extension of UCD that empowers the users by involving them in the conceptualization and decision-making of the design process (Ehn, 1988; Sharp, Preece & Rogers, 2015). Meanwhile, other approaches mainly opt to rather involve users purely for gathering information about their motivations, contexts and tasks instead of handing them the authority of actual decision-making. Regardless of the exact approach, UCD emphasises the need for a direct engagement with the users. By following an iterative manner, UCD facilitates the consideration of feedback gathered from the evaluation to refine the designs and implement the necessary changes. The activities of an iteration of UCD are perfectly encapsulated in the requirements set by the ISO standard 9241-210 “Human-centred design for interactive systems” (Ritter, Baxter & Churchill, 2014):

1. Understanding and specifying the context of use
2. Specifying the user requirements in sufficient detail to drive the design
3. Producing design solutions that meet these requirements
4. Conducting user-centered evaluations of these design solutions and modifying the design to take into account the results

Although digital technologies allured the world, the practitioners and the clients in the software development field were constantly experiencing frustrations with the process of software development in the late 20th century. Practitioners, while learning from their past mistakes, had created development methods that focused on cumbersome processes to lead them through the issues (Misra et al., 2012). This began to create problems with following the planned schedule and budget, and hinder their development pace, leading developers to deploy solutions that eventually solved problems that were obsolete by the time they finished (Martin, 2003). Consequently, several methods emerged in the 1990s that would allow developers to consider the inevitably changing nature of the problems, such as Extreme Programming (XP), Scrum and Adaptive Software development (Cockburn, 2002). In February 2001, 17 industry experts from various software development related disciplines gathered together to share their experiences and discuss the principles and values that they follow in their practice (Martin, 2003). Finding out that the different methods they utilized in their practice were indeed guided by common values, they opted to formulate a set of values and principles of development that would allow responding to changes during the development process, leading to the formation of Agile Alliance (Cockburn, 2002). The Agile Alliance introduced the Agile Manifesto that included the four core values of agile software development (Martin, 2003):

- **Individuals and interactions** over processes and tools
- **Working software** over comprehensive documentation
- **Customer collaboration** over contract negotiation
- **Responding to change** over following a plan
As the agile manifesto values responsiveness to changes, agile methods are all iterative in nature to enable reacting to changes throughout the whole development. Furthermore, the short iterations in agile – referred to as sprints in Scrum (Schwaber & Beedle, 2002) – facilitate the frequent delivery of working software, which is considered as "the primary measure of progress" (Beck et al, 2001). Extensive documentation is discouraged and substituted with direct communication between the individuals of the team and other stakeholders, such as customers who are closely involved in the processes.

After the turn of the century, agile became a buzzword in the industry and agile software development methods have been picked up in enthusiastic manner (Schneider & Vasa, 2006; VersionOne, 2013; Lárusdóttir et al., 2014). However, the adopted methods were rarely followed through in their pure form (Solinski & Petersen, 2014), instead the practitioners found ways to incorporate certain aspects from the agile methods into their existing organizational development processes resulting in hybrid methods (West, Grant, Gerush & D'Silva, 2010).

Considering the prominence of UCD and agile development disciplines in the software development field, it is not surprising to find a range of studies on the topic of integrating the two disciplines in practice (Brhel, Meth, Maedche & Werder, 2015; Salah, Paige & Cairns, 2014; Silva Da Silva, Martin, Maurer & Silveira, 2011). However, as the existing research primarily concentrates on the integration of methods, examining the compromises that are made in the UCD practices in order to retain the benefits of user-centeredness in agile context, they overlook the influence to conducting UCD and user research from the subsidiary aspects of agile development – such as the impact from the client and the company executives – that a more holistic approach of investigation could provide. Moreover, as it was suggested that in practice the agile methods are often implemented as hybrid solutions to fit in the context of the existing organizational processes, focusing solely on the methods leaves little room for generalizing upon the outcomes of such studies, as the hybrid methods might vary on a considerable range. The lack of holistic attention to the context is arguably alarming, as it could lead to any of the following problematic outcomes:

- Proposing solutions for integrating UCD and agile development that are unsuitable for the culture, business model or the structure of the company;
- Failing to address the role of the authoritative positions in the compromises made in UCD practices to fit into agile development processes;
- Failing to consider the various motivations that different positions in the company might have for following agile development or UCD processes.

As an attempt to contribute to reducing this gap, this study aims to investigate these broader effects of the agile development principles and accompanying mentality on the UCD practices by stating the following research question:

*How do the various parties involved in the agile development context affect conducting user-centered research and design, and how to overcome the obstacles for user-centeredness arising from these influences?*
This question is tackled by conducting a qualitative study involving the user experience (UX) design practitioners in agile work environments from Estonia and Sweden. In order to adopt a more holistic perspective, the activity system model (Engeström, 2015) is applied to the findings to draw out obstacles imposed on user research and UCD by the subsidiary activities in an agile development context.

2. Related research

This section provides an overview of the existing research studying the integration of UCD and agile methods in practice. Regardless of the limited attention to the outlying actors in the context, the presented cases still provide insight into the problems that practitioners experience in the field, and are proven to be valuable when a broader perspective is applied to the findings in the later stages of the study. First, the chapter presents the issues with utilizing user-centered activities in agile context. Next the solutions that the practitioners have applied in such instances are described. Lastly, this section introduces the theoretical framework – activity theory – which was applied in the final stages of the data analysis.

As agile software development methods started to gain significant attention in the mainstream development practices, McInerney and Maurer (2005) decided to investigate how it is being welcomed by the designers in the field and whether they perceived these methods to be integrable with the UCD approach. While the authors initially pointed out the differences between the agile development and UCD as possibly problematic obstacles, the feedback from the practitioners was broadly positive, as they considered both approaches to have adapted to each other successfully. Years went by and the immense development of digital technologies incited McInerney to turn back to the same professionals to determine whether their impressions had changed. Notably, their enthusiasm had dampened. While at the start of the century, the practitioners saw more opportunities to conduct up-front user research and designing, they later conceded that the users were involved rarely and most of the research was carried out with client representatives and user proxies (McInerney, 2017). As users are the focal point of UCD, these responses paint a rather dismal picture of the state of end-user involvement in agile development practices.

2.1 Challenges for user-centered activities

These cases investigated by McInerney reveal some additional issues: problems with performing evaluation or implementing the necessary changes based on the information from the evaluations, and dispersed focus as a result of working simultaneously on the design of the ongoing developments and future iterations (McInerney, 2017). While these obstacles might possibly have roots in various aspects, the excuse is more often than not the lack of time, as agile development methods are considered to be a fast approach to development. However, this common interpretation of agile concept is distorted, as the focus of agile is not meant to be on the pace, but on the quality of the delivered software.
(Handa & Vashisht, 2016), as the short iterations or sprints are intended to provide opportunities for changes, not to simply speed up the development.

Nevertheless, challenges originating from the rapid pace of agile have been noted by a range of studies. Most crucially agile has been considered to hamper conducting in-depth user research up front (Lárusdóttir, Cajander & Gulliksen, 2013; Salah, Paige & Cairns, 2014; Brown, 2013) and during the short iterations of the agile process (Wale-Kolade, Nielsen & Päivärinta, 2014). As the agile principles are intended to anticipate changes and provide opportunities for course corrections during development, it discourages to delve deep into the complete field of the problem from the start, and the design validation conducted in the feedback loop of the iterative and incremental approach is preferred over design up front. The study of Salvador, Nakasone and Pow-Sang (2014) validates this belief, as the findings suggest that user-focused methods are rarely applied in the requirements stage – instead in the majority of cases usability methods are utilized in the implementation stage. Moreover, as agile development principles value direct communication with the customer, the research activities in agile methods tend to rely upon the information gathering from the representatives of the client. Therefore, introducing user-centered research techniques tends to become an issue (Cajander, Lárusdóttir & Gulliksen, 2013; Lárusdóttir, Cajander & Gulliksen, 2013), as it requires a lot of convincing to substitute existing practices, where the communication line has already been established, for more time-consuming methods. Silva Da Silva, Silveira & Maurer (2011) point out that the involvement of users in UCD and involvement of the client in agile development should be considered a similarity between the two approaches, while others (Cajander, Lárusdóttir & Gulliksen, 2013; Lárusdóttir, Cajander & Gulliksen, 2013) perceive it to be an issue, as the customer representatives might not share the same interpretations as the end-users. The main significant common aspect of the two is the shift away from a designer-centric approach, as both involve external stakeholders.

In the cases where the end-users are indeed involved in the design process for validation and usability testing, problems regarding the consistency of involvement might arise – often including the users in the early stages of the projects, but less during the implementation stage (Lárusdóttir, Cajander & Gulliksen, 2013). As a substitute, several practitioners have opted to validate with and gather design ideas from their colleagues – designers and developers – either in the form of usability testing or heuristic expert evaluation (Wale-Kolade, Nielsen & Päivärinta, 2014; Lárusdóttir, Cajander & Gulliksen, 2013).

Another challenging aspect is considered to be design chunking (Salah, Paige & Cairns, 2014) for integrating the design activities into the development iterations, as designers customarily focus on the holistic design and might find it troublesome to incorporate this sort of partitioning in their processes. Giving precise estimations on research and design activities is often found challenging, which might lead to overburdened iterations, as initial time estimates might be exceeded (Loranger, 2014). However, while design chunking can evidently lead to scheduling issues (Ferreira, Sharp & Robinson, 2011), Federoff et al. (2008) question how it can affect the holistic design, if the planning and designing is done in a "piecemeal" demeanour. Sy (2007) further suggests that by
splitting the designing process for the sake of agile approach, the designers are presented with a supplementary task of focusing on the ordering dependency of these design chunks. This seems problematic, as UX design professionals in a software development company are oftentimes already overburdened, as they are outnumbered by the agile teams (Salah, Paige & Cairns, 2014), having to juggle between several projects and attend the compulsory meetings of different agile teams. As the agile principles value direct communication between team members, there could be an abundance of meetings for these designers to attend, which in turn might not leave enough time for finishing the research and design work that is their primary responsibility (Federoff & Courage, 2009).

Salah, Paige and Cairns (2014) have identified the minimalist approach to documentation in agile processes as another source for a potential challenge, suggesting that thorough documentation could improve the understanding between the two disciplines by clarifying the UX deliverables. Moreover, experienced UCD practitioners have presumably been creating extensive documentation in the past (Brown, 2013), and as a result a moderate portion of their practices might need remodelling to fit into agile processes.

Successful integration of any two disciplines relies upon a bilateral understanding of each other’s disciplines, and this, as expected, applies to agile and UCD as well. Therefore, an efficient communication of the expectations from either side is crucial. As one of the agile principles states that: "Working software is the primary measure of progress" (Martin, 2003), it might create a conflict with designers following UCD approach who focus on in-depth research, as these could be considered competing goals (Salah, Paige & Cairns, 2014). Not only is it important for the developers to have a comprehensive understanding of UCD, Brown (2013) argues that for successful integration the UX designers need to be trained in agile methods. The conflicting goals with developers are not the sole challenge of communication, as the objectives and views of the company executives can also have a compelling impact on the integration of UCD in agile processes (Cajander, Lárusdóttir & Gulliksen, 2013). Misguided understanding of agile and UCD disciplines or general disinterest in UCD on the executive level might result in lack of support for in-depth UX activities (Loranger, 2014). In addition to comprehension of and interest in the UCD discipline, the general company culture has a significant influence on the integration of user-centered approach, as an organization where power struggles are existent could have a more cumbersome task to redesign their processes and harmoniously adopt new design approaches (Ferreira, Sharp & Robinson, 2011).

### 2.2 Overcoming the challenges

As is evident from the presented challenges, there are plenty of aspects to focus on when proposing solutions for a successful integration of UCD and agile software development. The following section presents the suggestions from studies that aim to provide structure and guidelines for practitioners who are facing the aforementioned challenges.

Considering the critical need for the UX designers to conduct research prior to designing and development, the general consensus appears to be to fit these processes into the little design up front approach (Brhel et al., 2015; Kuusinen, Mikkonen &
Pakarinen, 2012; Silva Da Silva, Martin, Maurer & Silveira, 2011). It could be described as a compromise between the agile principles, that discourage extensive research and designing ahead of development, and UCD approach focusing on in-depth research of the users and context. Typically, the little design up front is executed in a reserved time slot called *Cycle Zero* (Sy & Miller, 2008; Sy, 2007) or *sprint 0* (Sfetsos, Angelis, Stamelos & Raptis, 2016), which is intended to be carried out in the initial stages of the project and prior to development. The sprint 0 can last up to 6 weeks (Sy, 2007) and contains the research, analysis and ideation activities (Brhel et al., 2015) that are necessary to elicit an initial set of requirements and formulate an initial concept for the solution. In addition, the results of the sprint 0 must include the designs for the first iteration(s)/sprint(s) of the development team. This measure is intended to provide designers with the opportunity to avoid inconsistency, by enabling the creation of a bit more holistic picture of the concept than with a more traditional agile approach, yet still leave room for corrections in the concept as the length of the sprint does not support the creation of any concrete big picture (Sfetsos, Angelis, Stamelos & Raptis, 2016). While sprint 0 would still combine several UX design activities – research, ideation, designing – Brhel et al. (2015) suggest the separation of product discovery and product creation.

Having relieved the issue of absence of design and research prior to development, the next challenge is to manage design activities during development. As the agile team developers require designs and requirements as input, and the designs of the first sprint(s) are delivered as the result of sprint 0, the designers continue on a separate track from the developers, working one or a few sprints ahead of development (Sy & Miller, 2008; Budwig, Jeong & Kelkar, 2009; Loranger, 2014). Although separated, the design and development tracks are heavily interwoven, as the UX designers are expected to juggle between several activities in order to effectively support with developers at their current sprint, and simultaneously create input for their next sprint. Therefore, the UX designers need to conduct research and requirement elicitation for future sprints, create designs for the next development sprint, and validate the results of previous development sprint (Sy, 2007). Such model of separate tracks (Appendix 1) for integrated UX design and agile development seems to be welcomed by a number of studies (Sy & Miller, 2008; Brhel et al., 2015; Budwig, Jeong & Kelkar, 2009; Sy, 2007). However, considering the challenge of design chunking (Salah, Paige & Cairns, 2014) and estimating design and research tasks (Loranger, 2014) this approach might run off tracks regardless, as underestimating the time expenditure on design tasks could still delay development, even if separate tracks are applied (Ferreira, Sharp & Robinson, 2011). While there does not seem to be a silver bullet that could solve the issue of design chunking and imprecise estimations, Sy (2007) emphasizes the importance of starting with well-defined design goals and comprehending the intended high-level design plan – both of which rely on research conducted in sprint 0. Producing a basic set of sketches, a workflow diagram or even using a stack of post-it notes could help the UX designer to pin down the high-level roadmap for the design (Brown, 2013) that would facilitate design chunking and at the same time, in its simplicity remain flexible enough to react to anticipated changes. In order to keep the consistency between the general high-level roadmap and designs
produced during the development sprints, the UX designers need to critically review the roadmap at design vision sprints every so often (Budwig, Jeong & Kelkar, 2009).

Design artifacts, such as the aforementioned roadmap are seen as a sufficient substitute for documentation which is customarily reduced in favour of direct communication between individuals. These artifacts can broadly be divided into two groups: artifacts such as personas, scenarios and user stories employed for conceptualization of user needs, and secondly artifacts like prototypes, wireframes and mock-ups for the communication of designs (Brhel et al., 2015). One of the main reasons for snubbing extensive documentation in favour of direct communication in agile methodologies is the attempt to remain susceptible to changes and lengthy documentation is likely to either restrict the responsiveness to changes or become outdated if any changes are embraced. Alternatively to design artifacts, environments such as a Wiki page that is easy to update, can be employed to tackle the challenge of deficient documentation (Sy, 2007).

Efficient communication between the agile team members and the UX designers is of utmost importance for the integration of UCD approach and agile methods. Loranger (2014) stresses the significance of keeping the teams consistent, indicating that a close-knit group of individuals are more capable of making quick decisions in the development process. Since agile development relies on self-organizing teams (Ferreira, Sharp & Robinson, 2011), a closer relationship between the individuals that facilitates fast decision-making can reduce the amount of micro-managing the teams, resulting in a team closer to this agile ideal. As mentioned beforehand, understanding each other's disciplines and motivations is crucial. In order to improve the comprehension of UCD approach, Sy (2007) suggests involving the agile team members in the design activities as this can inform the developers of the benefits and the processes of UCD, making them more susceptible to the input from designers.

The above-mentioned solutions from related research generally focus on the practices of UX designers and collaboration with developers, however, few of these solutions suggest how the user involvement could be improved in agile processes. While sprint 0 provides opportunities for research, it is uncertain whether this research relies on the input from the customer representatives or the user. Brhel et al. (2015) similarly note that while studies arguably value the continuous stakeholder involvement, there is a lack of empirical research conducted to determine whether this reflects in practice. As certain studies already reveal substituting users for colleagues and developers in usability methods (Wale-Kolade, Nielsen & Päivärinta, 2014; Sy, 2007), it further casts doubts over involving the crucial piece of the UCD puzzle: the user. Brown (2013) proposes a possible solution for maintaining a consistent user involvement, as she endorses the use of regularly scheduled events with users. However, this would only succeed provided, that there is no resistance for user involvement from any stakeholders.

The presented instances from a range of studies solidify the notion that there is a certain gap in the research conducted into the integration between UCD and agile disciplines, as the focus remains on finding ways to consolidate the methods from two fields, yet the broader implications of agile principles for UCD are seldom examined. As
the process of an agile development project is a network of interconnected actions by various parties, the influence of agile principles on UCD and user research might not be directly related to the methods that are utilized. As it was discovered after the initial analysis of the results of this study, applying an activity theoretical perspective – Engeström’s idea of perceiving work processes as collective activities in specific (Engeström, 2015) – shows great potential for investigating the impact that these various subsidiary activities might have on UCD and user research.

2.3 Activity theory

Practices for approaching design vary on a moderate scale, creating a shortage of unifying theoretical perspectives to apply as a lens to study the practice (Kaptelinin & Nardi, 1997). However, by interpreting software development and all its intrinsic and subsidiary processes as a network of collective activities, it reveals itself as a suitable candidate for an activity theoretical approach of study.

The roots of activity theory date back to the early stages of the 20th century, as the novel socio-cultural perspective emerged in Russian psychology – introduced by the ideas of Vygostky and Rubinshtein – suggesting the influence of culture and surrounding society to be more significant in the development of human mind and its mediated activities (Kaptelinin, n.d.). Inspired by this line of thought, Aleksei Leontiev formulated activity theory as a distinct conceptual framework, claiming activity (interaction between a subject and an object) to be a transformative force moulding both the subject and the object of the activity (Kaptelinin, n.d.).

Activity theory lies on five basic principles: hierarchical structure of activity, object-orientatedness, internalization/externalization, development and mediation (Kaptelinin & Nardi, 1997). The first principle describes the three-level hierarchy of activity, action and operation – activity directed at and motivated by an object is the highest level of the hierarchy, which in turn comprises of a set of goal-driven conscious actions, which are implemented through automatic condition-induced operations (Kaptelinin & Nardi, 1997). The object-orientatedness expresses that “the things that constitute this reality have not only the properties that are considered objective according to natural sciences but socially and culturally defined properties as well” (Kaptelinin & Nardi, 2006, p. 67). Internalization/externalization indicates that internal and external activities are required to be analysed collectively, as they transform into each other (Kaptelinin & Nardi, 1997). Mediation principles states that human activities are mediated by culture. The final principle – development – implies that any “human interaction with the reality should be analysed in the context of development” (Kaptelinin & Nardi, 2006, p. 71).

Activity theory started to gain broader attention after the writings of Leontiev were published in English, spurring interest in a range of disciplines (Kaptelinin & Nardi 2006). It was picked up by Yrjö Engeström who proposed an extended interpretation of activity as a collective activity by adding a third node into the subject-object relation – community – creating a model of three-way relation named activity system model (Engeström, 2015). Additionally, Engeström introduced three types of mediational means that moderate the interactions between the main nodes: rules that mediate the
interaction between subject and community, tools mediating the interaction between subject and object, and finally division of labour mediating the community-object interaction (Kaptelinin, n.d.). Furthermore, Engeström proposed another additional aspect to the model, by suggesting the need of adding outcome – the result of the object transforming through the activity. The resulting activity system model with the mediating nodes and outcome is presented in Appendix 2.

However, in order to apply Engeström’s activity model to study real-life phenomena – such as conducting user-centered design activities in a software development process – it is suggested that a broader perspective is applied and the phenomena to be depicted as a network of activity systems (Kaptelinin, n.d.). This approach is also utilized in this study, as further described in the following chapters.

3. Method

Since the aim of this study is to investigate the practices of UX designers in agile development processes and explore the state of user involvement, it is highly anticipated that the method of choice should provide the researcher with the tools for reaching a comprehensive and interpreted understanding of the practices and contexts of the studied practitioners. Therefore, this study was carried out in the form of a qualitative study, as qualitative research is characterized by a rich and extensive dataset, analysis that embraces the concepts and ideas that emerge through the identification of classifications and patterns, and outputs concentrated on interpreting and modelling the social world of the subjects of the study (Lewis & Ritchie, 2003). All of the aforementioned characteristics are considered beneficial for getting a comprehensive overview of the practices of the research subjects and the aspects impacting their motivations and adopted methods.

As a first step of the data gathering semi-structured interviews were conducted. Semi-structured interviews were favoured as they present the researcher with the opportunity to remain flexible and probe for further information based on the emerging discussion points from the responses of the interviewee (Lewis & Ritchie, 2003), all the while still having a set of prepared questions to guide the conversation and maintain the topic of the interview. The data gathered from the interviews was analysed by following the thematic analysis approach (Braun & Clarke, 2006). The codes, categories and themes emerging through the thematic analysis were then further structured by using an activity theoretical perspective.

Considering the intent to reach meaningful implications for practitioners, by possibly proposing guidelines for UX design practitioners for improving user involvement in their practices, it seemed poetically appropriate to apply user-centered approach in the ideation of these guidelines. Therefore, after the analysis based on the data gathered from the interviews was concluded, the individuals from the interview sample were contacted to invite them as participants in a Nominal Group Technique session – a method of collective creative decision-making similar to focus groups and brainstorming, with the
crucial difference of having a particularly clear structure to support balanced participation (Horton, 1980).

3.1 Sampling
The recruitment process of participants in the study can be considered to have followed the purposive sampling approach (Lewis & Ritchie, 2003). The recruitment of participants aimed to collect a heterogeneous sample of designers from a range of different backgrounds: software development service providing companies, product development companies and UX design service providing companies. Heterogeneous samples provide the opportunity to discover overlapping themes across different cases (Lewis & Ritchie, 2003), yet simultaneously present the dissimilar aspects of these cases that might inspire further investigations in future studies. The participants were recruited broadly in two ways: invitation over direct contact, and by using a public sign-up sheet at a meetup for UX design practitioners.

During the stage of conducting interviews two instances of snowballing or chain sampling (Lewis & Ritchie, 2003) emerged, as in one case a previously interviewed participant had shared their experiences to a fellow designer. In the other case of snowballing, one of the participants chose to have the interview in a room where another designer was residing as well at the time and decided to join in with the interview.

Altogether the sample consists of nine people from Sweden and Estonia, five males and four females. The experience in the UX design field varies quite significantly – between 8 months and 8 years. Four of the participants have higher education experience in a UX design related area (mostly HCI or interaction design). The business models of the companies where the participants are employed, are diverse as intended by the heterogeneous sampling. Three participants work in a company that internally develops a product either directly intended for the end-users or for other businesses. Three participants are employed in a company that provides UX design services for businesses and other software development companies. Two people are working as a designer in a company providing software development services to external businesses, and the last participant is employed in a company that follows a mixed business model, providing both UX design services separately and a complete package of software development service. The overview of the background of each participant is presented in appendix 3.

The sampling for nominal group technique followed a convenience sampling approach (Lewis & Ritchie, 2003), as the time constraints forced to utilize the connections that were already established with the practitioners that participated in the interviews. Since the Nominal Group Technique session involves multiple participants concurrently, the scheduling of the session was problematic, specifically considering the daily routines and work duties of the participants, and therefore the resulting sample size was modest, as only two people managed to take part: the participants Sam and Mia from appendix 3.

3.2 Data gathering
Majority of the interpretive studies utilize interviews as a central method for data gathering, as it allows the subjects to express their views and interpretations (Walsham,
While interviews with a strict structure and phrasing could be efficient in terms of ease of execution, they lack depth as subjects are limited to restricted responses (Benyon, 2014). Driven by the motivation to explore unanticipated themes that arise from the responses, yet concurrently remain in line with the research question, semi-structured interviews were utilized. The flexibility of semi-structured interviews allows the researcher to react to emerging topics with follow-up questions and adapt the order of the prepared open-ended questions to the flow of the interview.

A set of questions were devised prior to the interviews (Appendix 4), aiming to explore the background, experience and practices of the interviewees, the business model and processes of their respective companies, and their perception on the user involvement in the development practices of their companies.

Due to the locational conditions – some of the interviewees are situated in Estonia, while the study was conducted in Sweden – several interviews were conducted over a Skype call, which could have implications for these particular interviews, as closer involvement is known to enhance the openness of the interviewees (Walsham, 2006). Regardless of the form the interview was conducted, the participants were first provided a consent form informing them about the topic and the process of the interview, and their conditions and privileges of their participation. After receiving their consent, they were provided with a short informal spoken description of the motivations behind the study, serving the purpose of reducing the formality of the process by establishing a conversation, in order to make the participants more open about their personal experiences.

Subsequently the audio recording was initiated. Audio recording the interview was favoured, as it is considered a more accurate record of the conversation than notes taken during the interview (Walsham, 2006). Furthermore, by reducing the amount of secondary activities, such as taking notes, it assists the researcher to maintain focus and notice unanticipated topics that may arise and require further attention. After covering the questions about background information, the participants were asked to describe the general process of the projects within their working environments and reflect on the involvement of their role and users. When the participants expressed something they perceived to be an issue, they were intermittently asked about their views on how to resolve it. The length of the interviews varied considerably, lasting between 50 and 96 minutes with the average length approximately 72 minutes.

The secondary data gathering – utilizing the method of Nominal Group Technique (NGT) – was conducted following the conclusion of the analysis of the interviews in order to gather insight from the practitioners regarding their ideas to solve the user involvement issues in agile processes. It is a structured method for collective creative decision-making intended to support balanced participation from all participants (Horton, 1980). Prior to utilizing the NGT method, the participants were asked to rank the problems affecting the user involvement in their practices – issues, that were identified as a result of analysing the data gathered from the interviews.

NGT method consists of six straightforward stages (Delp, Thesen, Motiwalla & Seshadi, 1977), five of which were carried out in this study. First the participants were
presented with the problem that is to be solved and they were asked to silently write down their ideas for solving the issue without communicating with each other. This approach is intended to ensure the participation of all participants in the generation of ideas, as it prevents the situation of that is prone to focus groups where certain opinion leaders emerge and other participants withhold their personal ideas and rather agree with the majority. Secondly, all of the generated ideas were presented one by one and recorded on a whiteboard as it is required to present all the ideas in full view of all the participants (Horton, 1980). Third, the participants discussed the proposed solutions for clarification and consolidated ideas where it seemed appropriate. Subsequently, the participants selected a number of solutions they consider priority and ranked these solutions on a scale provided by the researcher as the moderator of the session. Next, the participants revealed their rankings and discussed the results. According to the formal process of NGT, a sixth stage would follow, where the participants rank the solutions once again to reach the final decision collectively (Delp, Thesen, Motiwalla & Seshadi, 1977). However, as the problems tackled in the NGT session in this study do not have a single "silver bullet" solution that needs to be presented as the result of the study, it was determined that the results of the preliminary ranking are sufficient to consider the prioritized solutions as valuable input for the study.

One of the limitations of NGT is considered to be reduced flexibility, as the problem that is tackled in the session is fixed and might seem either irrelevant or misleading for the participants (Delp, Thesen, Motiwalla & Seshadi, 1977). As an attempt to decrease the likelihood of the occurrence of the aforementioned limitation, the participants of the group sessions were first asked to rank the problems affecting the user involvement in their practices. The two issues that were considered a priority were then the subject of two separate rounds of NGT session, each round lasting approximately 50 minutes.

3.3 Data analysis

The data gathered from the interviews was put through an extensive analysis guided by the notion of thematic analysis. As the interviews provided an extensive and rich set of raw data about the user research practices of design professionals and user involvement in these practices, it was considered to be undesirable to frame this raw data within a theoretical framework early on, as it might restrain the outcomes into a certain theoretical perspective, possibly leaving valuable outcomes unaccounted for. Therefore, thematic analysis was applied, as it is considered a flexible research tool for providing a rich and complex account of data, and it is not restrained by any certain theory (Braun & Clarke, 2006). Thematic analysis is based on comprehensively analysing qualitative data to identify recurring patterns. While Braun & Clark (2006) propose guidelines for conducting thematic analysis in six steps, they emphasize that the guidelines are not rules and need to be applied flexibly to fit the research questions and data. Moreover, it should not be considered a linear process, but instead a recursive process, where the researcher needs to move back and forth between the dataset throughout all of the phases. The proposed six phases of theoretical analysis are the following (Braun & Clarke, 2006):
1. **Familiarising yourself with the data:** the researcher reads through the data repeatedly with the aim of gaining a comprehensive overview and understanding, and noticing the potential codes to be extracted.

2. **Generating initial codes:** the researcher determines the noteworthy text units within the data and developed into codes and categories. The coding method utilized in this phase was *initial coding* (widely known as *open coding*) (Saldaña, 2013).

3. **Searching for themes:** the codes and categories are assembled into preliminary themes.

4. **Reviewing themes:** the reviewer revises the themes to confirm that the themes and data associated to it are in a logical relation.

5. **Defining and naming themes:** the researcher conducts a final refinement of the themes and assigns them clear definitive labels.

6. **Producing the report:** the researcher reports the findings.

An example of the formation and refinement of codes and themes is presented in appendix 5. Having reached a certain point in the analysis where the noteworthy themes and categories had emerged, but the thematic map of the analysis appeared to lack structure and insight, it was decided to consider alternative ways for structuring and interpreting the output of the thematic analysis. Based on the emerged themes that were indicating towards four main areas of tensions hindering user involvement in agile software development processes, the data seemed best suited to be interpreted through the lens of activity theory – the Engeström’s idea of collective activities and networks of activity systems in specific – as the themes implied the need for a broader analysis of the effects from subsidiary activities. Moreover, the identified tensions seemed to correspond well with the idea of contradictions within an activity system network. Contradictions in activity theory represent a conflict within an element of an activity system (*primary contradiction*), between different elements (*secondary*), between different activity systems (*tertiary*) and between different development stages of an activity (*quaternary*) (Kuutti, 1996; Engeström, 2015).

Considering that the NGT sessions were informed by the results from the analysis of the interview feedback, further comprehensive analysis of the results from NGT sessions was not deemed necessary. Moreover, as the method facilitates creative decision-making, the results of NGT sessions should not be considered raw data, but instead propositions for solving a problem. Therefore, the prioritized ideas gathered from the two rounds of sessions are included in the discussion where they are directly observed in the context of the activity system network and related research.

### 3.4 Limitations and ethical considerations

Qualitative studies often face their fair share of criticism, as an open-ended and less structured approach is perceived to be "unscientific" for those working in the more rigorous field of natural sciences, casting doubts over the validity of qualitative research (Lewis & Ritchie, 2006). As a way to overcome this disbelief, the researchers are urged to
provide a "thick description" of their research – "deep, dense, detailed accounts" of the process of the study (Creswell & Miller, 2000) – meaning a thorough coverage of both the research methods applied and the findings of the study, as it provides the reader with an opportunity to assess the validity (Lewis & Ritchie, 2006).

As mentioned beforehand, some of the interviews were conducted over a Skype call, which might have had negative implications on the openness to share more exclusive details. However, it is worth noting that while it might have affected the richness of the data gathered, it is unlikely to have had any significant ramifications on the validity of data that was gathered.

Due to the difficulties in scheduling a NGT session, the modest sample size (two people) of the sessions might initially be considered a problem, as the results might be perceived to not carry weight as they are the result of the discussion and prioritization of only two people. Admittedly, it is a limitation – having a larger sample size would have resulted in a broader selection of ideas for ranking. Nevertheless, the proposed solutions gathered from the sessions could still be considered as valuable, as they can be used to reinforce the findings of the interviews and the related literature.

The interviews conducted with the professionals prompted them to describe and reflect on their practices. This discussion, however, might require revealing some delicate business-related details. In order to instil trust into the relationship with the participants and to conform to the ethical guidelines proposed by the Swedish Research Council (Vetenskapsrådet, n.d.), the participants were required to sign a consent form informing them about the process and background of the interview, and their conditions and privileges of their participation. Regarding the confidentiality of the participants and their respective companies, any personal labels – such as names of the person, client or company – have been anonymized by providing aliases.

4. Results and analysis

The analysis of the interview data provided two major insights. Firstly, the themes containing the tensions that impede user involvement in the research activities of agile development practices. Secondly, the data provided a broad overview of the research practices of UX designers in agile development projects. However, the structure of a thematic map was found to be lacking clear insight into the impact that subsidiary actors in the agile context impose on the UCD practices. Alternative approaches were considered, and as a result an activity theoretical perspective was introduced, as it provided opportunities to interpret and structure the emerged issues as tensions between the various activities by different actors in the process of agile development projects.

Consequently, a network of activity systems was constructed to broadly illustrate the nature of the user research activity and its relations to the various subsidiary activities that take place in the context of agile software development processes. Subsequently the tensions identified in the analysis were included in the network of activity systems, presenting them as contradictions within and between the activities.
This section is divided into three parts. The first part presents the network of activity systems. In the second part, the themes that emerged through the process of thematic analysis are introduced and presented as contradictions in the network of activity systems. Lastly, the results of the NGT session are presented, linking the proposed ideas to previously presented tensions as plausible resolutions.

4.1 Network of activity systems
The UX designers in agile development projects are mainly concerned with conducting user research and design activities. Herein the central activity of the network of activity systems in this study was identified as user research (figure 1). The object of their primary activity is twofold, involving both user needs and problems, and requests from the client. In order to interact with the object of the activity, the subject – UX design specialist – assumes a number of actions that help them to establish the nature of the object and conceptualize based on it, the outcome of which is eventually the designs and requirements for developing a solution.

There are a number of tools available for the subject in this activity system that are utilized in the interaction between the UX design specialist and the object, which is the user needs/problems and client’s requests. On one hand, these tools can be presented in the form of experience and competency in research and design methods, such as interviews, workshops, observations, storyboards, user stories and validation methods, while on the other hand, they can be more explicit in the form of a document of requirements or design software. The community of the activity consists of the members of the agile team, product managers, client’s representatives and user intermediaries – each with a role to play in the interaction with the user needs/issues and client’s requests (object). The division of labour describes how the tasks concerning the object of the activity are divided between the UX design specialist and various roles of the community.

Figure 1. User research activity system.
Finally, the rules that mediate the interaction within the activity system come from internal factors of the company – such as company culture, vision of the product that is being developed, and the agile framework followed in their practices – while other conventions, for example deadlines and the traditional processes of the client, are enforced by external factors.

As mentioned earlier, the user research activity system (further referred to as URAS) is not a solitary activity, but instead a part of a wider network of various activity systems as presented in figure 2, that are all concerned with software development. However, not all of these subsidiary activities are internal activities, as the client’s activity system (CAS) can have significant implications in this network, as it can be considered both a rule-producing system for URAS (dashed line 1, figure 2), by establishing deadlines and imposing certain process related constrains, and an object-producing system for URAS (dashed line 2, figure 2), by providing requests regarding the solution. Furthermore, CAS could also be perceived as an object-producing activity (dashed line 3, figure 2) for the company management activity system (CMAS), as it presents the company with a project to manage. In turn, CMAS can be interpreted as a rule-producing activity as it imposes its own rules on both user research (dashed line 4, figure 2) and development activities (dashed line 5, figure 2). As URAS provides input for developers in the form of designs and requirements, it is regarded as an object-producing activity (dashed line 6, figure 2) for the development activity system (DAS). Considering the outcomes of DAS and CMAS – working and bug-free software and profit respectively – a relation between the two activity systems appears, as the expected outcome of the former results in the outcome of the latter, making DAS an outcome-producing activity for CMAS (dashed line 7, figure 2).

Figure 2. Network of activity systems in the context of agile development projects.
4.2 Themes and contradictions

Four major themes emerged through the analysis of the interviews, each referring to a specific area where issues arise that hinder the user involvement and user-centered design approach in UX design practices of agile software development processes. These four areas covered are collaboration, practices, organizational influence, and finally knowledge, awareness and attitude.

4.2.1 Collaboration

In order to efficiently utilize user-centered design methods in the agile development processes, it is crucial for the designers to have a good collaboration with the other parties of the process. However, there are several obstacles, associated with involvement, incompatible tools, and communication, that could harm this collaboration. Several participants (Pam, Amy, Eva) pointed out the occasional lack of their involvement in the stage of problem exploration and statement, explaining that by the time they were involved the concept needed to be formalized in design had already been created by colleagues. Bob, who works in a UX design agency, emphasized that this type of late involvement is always a recipe for failure. This manner of conduct is condemned as it is unsure whether users were involved in or user perspective was even considered in this preliminary research. Furthermore, it leaves little room for conducting additional user research and interpreting the raw information by themselves, as other parties would need to be convinced about the earlier research conducted by the aforementioned parties is not sufficient.

Pam: "Sometimes the input comes to us [separated UX team] in the form of designed views, that have been composed by the analyst [of the agile team]. I know it sounds like it should not work like that, but still usually the input information already comes in some processed form from the agile team that we need to work on."

Mia suggested that even instances where only the problem statement as been defined without any further conceptualization of a solution should be disapproved, as it limits the designer into a fixed scope of research. While it does not directly hinder user involvement in user research, it prevents gaining a holistic picture of the context and ignores the prospect of other, possibly more crucial problems for the users. As the roots of this issue lead to the procedures of the company are managed altogether, it can be defined as a primary contradiction of the division of labour in CMAS (arrow C, figure 3).

Mia: “I think it should be more about us analysing the actions and processes of the user and seeing what could be done to improve it. But often it just goes in the way, that we are provided with a problem or problem domain and told to find out how to solve this problem specifically. I feel like we need more opportunities for basic problem exploration.”
As UX designers tend to be vastly outnumbered by the developers in a project, they are expected to adhere to the standard practices and tools used by developers for planning the tasks. Tim and Amy brought out the tensions for the collaboration between the two disciplines that this might create, as they have found it cumbersome to divide their research activities into segments with a suitable size and provide precise estimations.

Amy: "Agile team expects quite precise estimations. And then in the beginning I will have to say something like: "This will take around 15 hours". But then it might eventually take 50, as you’ll turn out pivoting 10 times or so."

This issue had also been noted by the developers collaborating with Tim. During the interview, when Tim was asked about how they have approached this problem within the company, he let out a slight chuckle and responded: "To be honest, we didn’t even try to tackle this problem, as it would have just created more headaches and management. So we still plan our tasks separately.". This issue has been depicted as a secondary contradiction between the object and division of labour in the URAS (arrow G, figure 3), as the problem implies the incompatibility of the object of user research with the practices of planning and distributing tasks in an agile project.

Several participants considered communication between agile team members and UX design specialist to be of utmost importance, as the implementation of the user perspective in the final solution relies on how well the UX designer manages to pass on the designs to the agile team members. However, Ron and Mia note the supplementary benefits that close communication with developers could have, as involving them in the designing process could raise their awareness of the UCD approach and persuade them to see the value in it. When Mia joined her current company she started to conduct surveys to find out how everybody would like to be involved in the UX design process and eventually managed to convince them all to support UCD approach, or as she responded when queried about the number of people in the company working in UX design: "I think that all the employees are UX-minded".

Nevertheless, Mia, as well as Amy and Pam reflected on negative examples of how miscommunication or lack of communication can lead to solutions that deviate from the solutions that were based on information gathered from the users.

Mia: “Sometimes there’s even situations where the developer comes up with a solution based on either assumptions or additional input from another source, implements it in production and then I’m reviewing it at find out that it is nothing like the intended design.”

This problem has been defined as a tertiary contradiction between the outcome of URAS and the object of DAS (arrow I, figure 3), as poor communication between agile team members and UX design experts is likely to have the significant implications on how the design output and user perspective is implemented in development.
Pam and Eva identified a problem, which is specifically prevalent in lengthy projects, that UX designers are considered to be necessary only at certain moments of the projects, because UX is perceived as an “add-on”. As a result, UX designers juggle several projects at the time and they turn their attention to a project only when the agile team requires their aid. Since this hectic involvement takes place during the development process, the UX designers are not provided with the time to conduct thorough user research. Instead the agile team provides their own analysis results in the form of requirements or even designed views – of which the designers are uncertain whether users were involved, or the user perspective even considered in the process of constructing these concepts – and asks for the UX designers to improve it based on their knowledge, experience and best practices. This problem could be perceived as a secondary contradiction between object and division of labour within DAS (arrow J, figure 3), considering that it stems from the nature of the project (object in DAS) that creates a situation where agile team starts to perceive UX design as an “add-on”, leading to hectic involvement of UX designers in the process.

*Pam: “I think the reason is mainly that we have these extremely long projects with several sub-projects. Some views have already been created, confirmed and implemented a long time ago and the new subprojects are based on the same UI elements and same basic interactions. Then the Agile team analysts just create their own visuals of the new problems by using the existing UI elements. And so we receive already processed input not raw information.”*

### 4.2.2 Practices

The second theme assembles a set of obstacles deriving from the to the incompatibility between certain agile development practices and UCD practices. As UX designers are expected to function on similar grounds with developers, the designers are often forced to yield and alter their approach, which in turn has implications on the user-centeredness of their design activities.

Although the agile development principles do not approve of producing comprehensive design up front, this is still often the approach followed in practice as described several of the participants (Bob, Ron, Sam, Pam, Eva). Despite UCD approach actually embracing conducting thorough research and design up front, the participants argue that this prevents carrying out changes that might arise from user testing and gathering feedback, since the designs would require too significant modifications that would affect the pace of the project.

*Ron: “Sometimes we also – which is not ideal by far – do a lot of design work first and then there’s the development phase. [...] But you learn a lot during the development stage – like "ok, that design decision doesn’t actually work here" – and you would have to go far back to change things.”*
As these large-scale modifications are obstructed by the pace, the impact that user testing can have on the development process is reduced as well, rendering these user-centered feedback-gathering methods void. This clash between the rules set by the agile principles and the nature of user research that requires thoroughness and a lot of time is therefore identified as a secondary contradiction between the rules and object of URAS (arrow D, figure 3).

However, it is worth noting that the participants displayed to have rather adopted the agile mind-set, which favours incremental development of ideas in order to remain flexible to unanticipated changes. Therefore, as an attempt to responsive to changes and maximise the time and effort they could afford to spend on research and designing, most of the participants (Tim, Ron, Ken, Mia, Bob, Sam) have adjusted their practices accordingly, by being one or more sprints ahead of the development team and conducting preliminary research in sprint 0.

As projects that follow an agile method are expected to provide frequent deliverables at the end of each sprint, UX designers have started to streamline their processes by reducing certain activities they have deemed excessive – such as validating identified problems with the users (Pam) – in order to keep up with the development pace. It must, however, be specified that in Pam’s case these types of validations are mainly done by exchanging information over a long communication line – from the UX team to agile team’s analyst, who contacts the client, who, in turn, asks the questions from the users and returns the response over the same long line – therefore significantly increasing the time it takes to receive validation. As a result, guidelines and assumptions are applied and attention to user perspective lessens. Time constraints, yet, are not the only reason to reduce the amount of validating problems with the users, as Ron pointed out that bothering users with topics they have already discussed might develop a resistance from the users to involve them in problem exploration.

Ron: “The customers might also have done some user research and then UX designer comes in and wants to also talk to users, which might have some resistance from the users, as they have to explain the same thing twice and it might be frustrating for them.”

Although the UX designers realize the importance of involving users and focusing on the user perspective in their practice, they tend to leave the users out of the view more than they would like to admit, reducing their approach to following general guidelines and best practices for designing user interfaces and user flows (Amy, Eva, Pam) instead of being user-centered in their design and research activities.

Eva: “If the input comes as individual views and small tasks or problem statements from the agile team, then we mainly rely on widely known principles and personal experiences when working on it.”
While design guidelines can certainly help with creating visually appeasing solutions, they lack the consideration of user perspective. Bob expressed his criticism towards this type of streamlining of UX design activities and was particularly outspoken.

Bob: “Quite often it’s just that UX designers try to follow some guidelines on what elements to use, font size 12, action buttons on the right and so on. But this is just hygiene. This is not UX.”

In the network of activity systems, this issue is identified as a contradiction between the object and tools of URAS (arrow F, figure 3), as substituting user-centered methods with guidelines, principles and assumptions is in evident conflict with the nature of user research.

4.2.3 Knowledge, awareness and attitude

The third theme that emerged contains obstructions to user involvement, which derive from the knowledge and awareness, or rather lack thereof, of any parties involved in the process, which can provoke a certain attitude that does not approve of user involvement in the research practices of agile development processes.

Multiple participants (Sam, Bob, Tim, Ron, Pam) expressed their concerns over the misinterpretation of UX design among both the clients and the colleagues. They stated that the misguided notion of UX designers could lead to clients opting to reject the inclusion of UX as in their eyes it is not worth the investment, which is spent on user research.

Tim: “Clients don’t often realize the meaning of UX and that’s where the main difficulties and obstacles come from. They want UX and after seeing the estimations they are not sure about the efficiency of it anymore.”

Additionally, Amy declared that often it is the “designer” label, which ultimately misleads the misinformed people.

Amy: “In Estonia it is usually so, that people just assume that any kind of designer is intended to do everything from calling cards to interviewing users and everything in between.”

However, this is not only an issue that occurs with customers. Eva and Pam reveal that similar situations occur within software development companies as well, as the management does not approve of investing in UCD activities, as they fail to see the benefits.

Ken, Sam, Pam and Bob point out that there have been some significant improvements, as clients have started to explicitly ask for a user-centered approach, seeing the value in thorough research that involves users. It is worth mentioning, however, that three of the four aforementioned participants work in a company that provides UX design services specifically. Sam, having worked in his current full-time
position for a year, conceded that this might have a considerable influence on how his impression has changed.

Sam: “Generally I think that our [UX design agency] clients come to us mainly for the UX keyword in our name and therefore are more aware of the meaning of it. But I admit that clients of mainly software development companies might not understand clearly what it is about. In that way I think that our clients are approaching us with an already existing awareness which is good for us and them.”

The problem of misguided understanding and lack of awareness of UCD and UX design affecting user-centered activities is labeled as three tertiary contradictions (arrows A, figure 3). Firstly, a contradiction between CAS and CMAS, as misinformed clients can impose restrictions on how the company should manage their project. Secondly, a contradiction between CAS and the tools of URAS, as a misinformed client can also affect the methods utilized in user research through their representatives in the project. Finally, a contradiction between the CMAS and tools of URAS, as similarly to some clients the managers of the company can constrain the user-centered methods applied in user research through the allocation of investments.

The following issue, brought up by most of the participants, is directly related to the attitude towards users, as they described instances where either the client, company managers or developers displayed apparent distrust in the competence of the users.

Sam: “Clients sometimes think that they know more than the users and it might be difficult to explain the value of user involvement to them.”

Bob: “The teams that have experienced a fail because of bad UX, they realize that it is important to start researching as early as possible. But there are a lot of those who don’t have this experience first hand and then they think: ‘What does the user know anyway? We know way more.’”

Since this mentality can be present on both sides – the client and within the company – it can often result in a serious lack of consideration of user perspective, as the client’s input is being utilized as the primary source for research. As a result, nearly half of the participants admitted to mainly rely on the information gathered from client’s representatives.

These restrictions on applying a UCD approach arising from the distrust in users are identified as three tertiary contradictions (arrows B, figure 3). The first contradiction is between CAS and the tools of URAS, as the distrusting client restricts the research and design methods involving users. Another contradiction is between the CMAS and tools of URAS, as similar distrust in users from the company managers can result in the latter restricting user-centered methods. Lastly, a third contradiction between URAS and DAS, as the developers’ lack of trust in users could lead them to invalidate the designs and requirements provided for them as an input, should they disagree with the users’ point of view.
The last contradiction within this theme is related to the knowledge about agile development principles. Several participants (Pam, Ron, Amy) confessed to have limited knowledge about what the agile principles convey and how exactly to follow an agile method in UX design practice – at least at the moment when they started working in the field. While Tim and Mia revealed to have received a formal overview of the agile processes followed in the company, others like Ron, Eva, Pam and Amy admitted that the company did not provide any extensive introduction to their agile processes other than a few tips.

Ron: “It is weird, but we learn by doing. We have some general background information and will receive some tips in the beginning, but I had to learn it myself and work it out how to fit UX into it.”

Without a proper comprehension of the agile methods, introducing research and design activities into this process can be a difficult task. Furthermore, not understanding the processes of the developers could be a problem for effective collaboration between the two parties. However, Sam and Bob pointed out that lack of understanding the agile development principles is also a problem for developers, as agile is often used as a buzzword while not fully understanding the principles behind it, resulting in the companies actually following a sequential development approach.

Lack of understanding of the agile principles and methods can be interpreted as a secondary contradiction between the subject and rules of URAS (arrow H, figure 3), as this lack of comprehension can be described as a tension between the UX designer and the agile framework that mediates its interaction within the user research activity.

4.2.4 Organizational influence
The final theme covers the problems that stem from the culture of the organization and reflects on how the vision, traditions and other aspects of the company can affect conducting user research.

The first issue that emerged was brought up by several participants (Amy, Eva, Bob), albeit through fairly different perspectives. Bob and Eva described the difficulties of introducing UCD approach in a large established company, as the structural and cultural features of the company hindered the change.

Bob: “It’s a vast company and therefore more difficult to convince all the structures to support user involvement in design. You might eventually reach a mutual understanding with people and everybody understands the problem and the importance of UX. And then employees change. And then you explain it again to new people. This happened often that you needed to pick this topic up again and convince new people of the same thing.”

In the case of Amy, the problem is quite different. As she is working at a start-up company, there are barely any deep-running cultural traditions, yet the general mindset of a fresh start-up is set on survival, deeming all other goals secondary – implementing UCD included.
This general issue can be abstracted to a secondary contradiction between the rules and the object of CMAS (arrow K, figure 3), as the core of this issue is in the cultural features of the company that obstruct changes within the management processes.

The second problem with connotations of organizational influence on user research is related to the vision of the founders of the company. Although initially brought up by only one participant – Mia – it requires examining as it was ranked among the primary issues in the Nominal Group Technique session. Mia revealed that lately the managers (who are also the founders) of her product development company had started to micro-manage the design process by conducting design sessions with a limited group of people within the company.

Mia: “But we’ve also done it so, that only a few certain people are involved [in ideation]: CEO, PO and designer. I feel that these meetings make it easy to understand the vision of the CEO and it might be easier to implement it, but users are mostly ignored in this approach. Feels like it’s a design by committee approach.”

In the network of activity systems, this problem can be interpreted as a secondary contradiction between the object and division of labour in URAS (arrow L, figure 3), as there is an evident issue with the uneven involvement of different parties in the interaction with the object of user research activity.

Extensive user research activities are often considered time-consuming activities and justifying the use of these methods is considered difficult for projects that are focused on delivering expected results on certain deadlines, as reported by Ron, Sam, Amy and Pam. This can lead to streamlining the methods as indicated by Ron.

Ron: “In a typical project we don’t get too much time for doing this [thorough user research], so you have to settle for "good enough".”

Although deadlines are not only restricting the selection of methods for UX designers, as it hinders the implementation of any changes – which is strongly against the core values of agile principles – Bob and Sam point out that this sort of deadline-focused mentality has been adopted by the agile teams regardless.

Bob: “The biggest obstacle is when the team sets goals based on deadlines not quality.”

While the remark from Bob illustrates the deadline-focus as something that is imposed by the mentality of the team, it is worth noting that the problem in fact originates from the inflexible details of the contract that is signed between the client and the executives of the company. Therefore, this issue does not originate from the time-consuming nature of research activities, but instead from the management of the company. Furthermore, Amy suggests that the clients themselves can sometimes be the victim of the deadlines, as they are, in turn, funded by third parties, which is the prevalent case for projects in the public sector projects in Estonia.
Amy: “Strict deadlines constrain the implementation of user research results. If the ministry says that the system has to be live on 5th of June, then in the beginning of June you either cry or laugh, but you will deploy the system, regardless whether all the user input was implemented or not.”

As this problem with the restrictive deadlines is in fact indirectly imposed on the user research through the agreements between the client and company executives, it is labeled as a tertiary contradiction between the objects of CAS and CMAS (arrow E, figure 3).

By presenting all the aforementioned issues as contradictions in the figure of network of activity systems (figure 3), it provides a quick and valuable overview regarding the most problematic aspects of following a UCD approach in agile development processes. The network of activities and the useful takeaways that it provides will be further discussed in the Discussion chapter.

Figure 3. Contradictions within the network of activities.

4.3 Nominal Group Technique proposals

As described beforehand in the Method section, the NGT session started with the participants prioritizing the issues that emerged from the interviews (as presented in the previous section). Based on the ranking, the participants considered the following five issues to be the most crucial problems in this exact order:
1. Miscommunication between agile team members and UX design specialists (contradiction I, figure 3).
2. Design by committee approach applied (contradiction L, figure 3)
3. Lacking involvement in the problem statement and exploration stage (contradiction C, figure 3)
4. Vague or misinterpreted understanding of UX in-house and externally for clients (contradiction A, figure 3)
5. Streamlining UX practices as a result of constraints (contradiction F, figure 3)

Because of time constraints, only two rounds of NGT session were carried out, by using each of the two prioritized issues as the subject of the session. In the following, the proposed solutions for each issue are presented, on the condition that they gathered any points in the final ranking. The highest ranked solutions are further deliberated upon in the Discussion section.

The participants proposed six solutions for the issue with the highest priority (contradiction I, figure 3). Three of the proposed solutions received more than one point in the final voting, resulting in the following ranking:

1. Establishing interdisciplinary teams (5 points)
2. Establishing clear processes of communication between UX designers and agile team (4 points)
3. Motivate developers to contribute to UX activities by introducing ways for them to participate on regularly organized company events (2 points)
4. Organize common activities for UX designers and agile team to improve the personal relations of the individuals (1 point)

For the issue with the second highest priority (contradiction L, figure 3), the participants proposed five solutions, four of which received points in the final voting. The solutions were ranked as follows:

1. Directing the “committee” towards thinking from the user’s perspective, by asking indicative questions (5 points)
2. Divide the areas of authority into smaller sections and provide the UX designers with a clear authority (5 points)
3. Insist the participation of at least one representative from different disciplines (1 point)
4. Fire the self-opinionated person (1 point)

5. Discussion

While the problems with practice that were described in the interview broadly coincided with the findings from the related research, interpreting them as tensions within the user research activity and between its subsidiary activities provided a new, more holistic
perspective to the findings. Depicting these tensions as contradictions in a network of activity systems, it led to a discovery of the main areas of obstacles in a broader context surrounding the user research activity. A quick look at the schema of the network of activities (figure 3) can identify these areas as follows: (1) the users’ needs/problems and client’s requests as the object of user research activity, (2) the intersection of the management, the client and the tools of user research, and finally (3) the connection between the outcome of user research and the software development project.

The current section reflects upon this discovery, to draw out its associations to the findings from related research and present how the proposed solutions from NGT sessions could provide some relief in these areas.

5.1 Inconvenient nature of user research

The central concern for all UX designers in their work is the consideration of user perspective in the designs. However, as the evidence clearly indicates, it is also at the center of inception of several contradictions, suggesting the objective of user research to possess an incompatible nature for the practices utilized in agile development. As the demands and expectations of clients have a significant impact on the direction of any agile development project – with the exception of internal product development, in which instance it is substituted with the vision of the managers and executives – it is often the case that the objective of UX designers is to research and analyse the expectations of both: the client and the user. This, however, can lead to a conflict of interests, should the opinions of users and clients collide (Lárusdóttir, Cajander & Gulliksen, 2013), leaving the UX designer to face a complicated decision – whether to conform to users or to the client. There is a noted tendency to substitute the users for the representatives of the client (McInerney, 2017) or the colleagues of the designer (Wale-Kolade, Nielsen & Päivärinta, 2014; Lárusdóttir, Cajander & Gulliksen, 2013) in the process of gathering requirements and validation, specifically in an agile context as it values close collaboration with client – a problem, which was also brought up by several participants in the interviews. While this measure is broadly seen as a way to save time by utilizing the more accessible stakeholders, the existing research merely and brushes over the fact, that this approach is hardly user-centered. This indicates that opting to exclude the users in the research activities is bizarrely seen as a way to streamline the user research process, although in such instance it can barely be considered user research at all.

Nevertheless, the justification by the practitioners to follow such manner of conduct needs to be addressed as well, as they certainly have a justifiable rationale for streamlining the research activities. Indeed, conducting thorough user research is a time-consuming effort, adding another inconvenient aspect to the nature of user research, in addition to the aforementioned conflict of the objectives. As the short sprints of agile methods set constraints on any extended activities, user research included (Salah, Paige & Cairns, 2014; Brown, 2013), the practitioners tend to go for what they perceive to be the second-best thing – following design guidelines, keeping a user perspective oriented mindset, and involving other stakeholders of the project to involve a variety of opinions and decrease the reliance on their own personal ideas. For example, as suggested by the
participants of the NGT sessions, in the instances of the design ideation being conducted by a closed group of people (what they referred to as “design by committee” approach), one of the preferred solutions was to keep asking indicative questions that would guide the committee to think from the user’s perspective. This further indicates the significance that the practitioners place on a user-oriented mindset.

Another condemned feature of user research that calls for further attention is the ambiguity regarding the estimations of the actions. As implied by the interview participants and Loranger (2014), there is an atmosphere of uncertainty around the duration of research activities, which can lead to underestimating tasks and misplanning the design/development iterations. While the “little design up front” (LDUP) approach (Brhel et al., 2015; Kuusinen, Mikkonen, Pakarinen, 2012; Silva Da Silva, Silveira, Maurer, 2011) is principally seen as a reduced version of conducting extended research of user context and some design activities up front, as is considered customary in UCD, it could have a hidden benefit that is not discussed in the related research. In fact, the increased understanding of the context and problems could improve the estimations of tasks in the subsequent sprints. Furthermore, the separation of design and development tracks, in which the design is a few sprints ahead of development (Sy & Miller, 2008; Brhel et al., 2015; Budwig, Jeong & Kelkar, 2009), could also be considered advantageous in this aspect, as it presents the designers with the opportunity for error correction and learning from past miscalculations without directly impacting the pace of the development.

As presented, there are several aspects of the very nature of user research – inherent conflict in objectives, time-consuming practices, ambiguity of tasks and their duration – that are inconvenient for the integration with agile development practices. On a closer inspection it appears that the aforementioned aspects are dependent on how well the purpose and practices of user research are defined. This leads to the claim, that the problems related to all of these aspects could be improved as a result of careful deliberation and clarification of the intentions and practices of user research. However, it is not sufficient if these intentions are clear merely to the UX designer, as the development process is a collaborative effort of multiple parties. This thought is further discussed in the following sections.

5.2 Dismissal of UCD methods

Considering the fact that the management of a company naturally has a significant control over the processes – including user research – of the agile development projects, which in turn is highly dependent on the intentions and investments of the client, it is not really surprising to identify the intersection of management, client and the user research activity as an area that poses obstacles for user research.

Through the allocation of resources, the executive managers of the company are ultimately responsible for the practices that the UX designers can apply in the process of user research. As several interview participants pointed out, this influence most commonly has a detrimental effect for the user-centered approach in research. Related research as well as the participants of the interview suggest that one of the reasons for this
issue resides in within the lack of interest in UCD or unawareness the benefits of UCD among the executives of the company (Cajander, Lárusdóttir & Gulliksen, 2013; Lárusdóttir, Cajander & Gulliksen, 2013) – subject, which is further examined in the next section, which discusses the UCD awareness issues within the company. Another reason is directly related to agile method followed in the development process of the company, as it sets the emphasis on close collaboration with the client. As the company management is driven by the income from clients, it might create a bias among the executive and management levels towards following the direct input from clients not users, as their aim is to satisfy the clients not the end-users of the solutions that the company develops. This is amplified in the instance of agile development projects, as the direct involvement of client representatives, creating a more immediate feedback loop, can enhance the motivation to appease the client.

Pragmatic executives might often carry a distorted view of agile principles (Loranger, 2014), considering it to be a fast and efficient path to delivering the results of development (Handa & Vashisht, 2016). Although the true focus of agile methods is on quality – facilitating the implementation of unanticipated changes through the use of short iterations – this misinterpretation by the executives and managers leads them to consider the iterations as more frequent deadlines. As a result, this misconception manifests as lack of executive support for user research, as frequent validation with users is obstructed.

While the related studies in the field occasionally discuss the impact that the company management can have on practicing design in a UCD approach, the attention provided to the influence from the client side is remarkably scarce. However, the results of the study, as well as the interviews conducted by Cajander, Lárusdóttir, and Gulliksen (2013) imply that similarly to the executives and managers, the mentality of the client plays a significant part on how user-centered methods are applied. The empowerment of client – as a result of the close collaboration endorsed by agile principles – makes the issue all the more relevant, since the transparency of the processes facilitates the intervention from the client, either directly or by means of pressuring the management, as the client is in control of the funding.

As illustrated, the user research activity in the context of agile development is open to be influenced by the surrounding parties – along with the management of the company and the client. This issue sends a clear signal that the UX designers need to be empowered by providing them with a clear authority over the methods utilized in user research (Brhel et al, 2015; Kuusinen, Mikkonen & Pakarinen, 2012) in order to protect their interests and follow the UCD approach.

5.3 Neglecting the UX design input
Since the goal of the UX designers is to propose solutions and the duty for the developers is to implement them, it is particularly concerning, however not surprising (Kuusinen, Mikkonen & Pakarinen, 2012), to have identified the connection between user research and development as one of the main area of complications.
Both related research (Salah, Paige, Cairns, 2014; Kuusinen, Mikkonen & Pakarinen, 2012) and the results from the interviews harmoniously emphasize the importance of efficient communication between the UX designers and developers for the collaboration in the fast-paced context of agile development to work effectively. However, in this study it has been unveiled that the developers occasionally exhibit distrust towards the users, considering themselves to be more competent to make design decisions. In the worst case scenario, the resulting disagreement could lead them to intentionally disregard the input provided by designers. These conflicts in the collaboration lead to bottlenecks in development (Ferreira, Noble, Biddle, 2007), and as severe disagreements require time to be resolved, it could be specifically damaging in the rapid agile development context. Such skepticism towards user input is plausibly rooted in the lack of awareness of the benefits that user perspective in design and development can provide. This notion is further solidified by the ideas that underline the need for either close collaboration between the designer and agile team (Budwig, Jeong & Kelkar, 2009; Sy, 2007) or for the designer to be embedded in a cross-functional agile team (Inayat, Salim, Marczak, Daneva & Shamshirband, 2015; Silva Da Silva, Silveira, Melo & Parzianello, 2013). Working within the same team helps to establish a closer personal relationship between the UX designers and developers, enhancing the trust between the individuals and improving the understanding in each other’s motivations and disciplines. A similar line of thought was reflected throughout the NGT session that tackled the problem of miscommunication between UX designers and the agile team, as three of the four suggested solutions aimed to improve the developers’ awareness of UX design methods and benefits among other things – the highest ranked proposition being the creation of interdisciplinary teams.

However, presumably on most occasions the developers' disregard of the user perspective in the solution does not actually involve any malicious intent at all. Instead of the communication of the benefits of user perspective, the blame lies on the inefficient communication of user perspective itself. Considering that agile principles endorse minimal documentation, the UX designers have to employ design artifacts (Brhel et al. 2015) to pass on the understanding of the user perspective, yet UX designers occasionally struggle with this task (Cajander, Lárusdóttir & Gulliksen, 2013). As presented in the interview results, this can lead to deviations as the developers might either misinterpret the input or apply their own assumptions, resulting in implementations that diverge significantly from the designs. This indicates towards a more general problem with communication, as the deviations that are based on developer’s assumptions are discovered after implementation. While the aforementioned ideas of interdisciplinary agile teams involving the UX designers could be seen as one way to relieve this issue, Sy (2007) has suggested that the documentation that mediates the communication needs to support avoiding such problems as well, proposing the use of easy to update tools such as Wiki pages that assist the information exchange about changes.

In conclusion, the issues between the user research and development activities can be generalized as problems regarding the awareness of UCD benefits and the consideration of UX design outcomes in implementation, both of which derive from inefficient communication. Whether the aim is to convince the developers of the importance of user
perspective or to ensure the inclusion of the design output in the implementation, closer communication is shown to enhance trust and mutual understanding of each other’s disciplines and would help to validate the assumptions of the developers before they are implemented and result in a solution that deviates from the intended design.

5.4 Implications for practitioners

As this study investigates the practices of UX designers on a detailed level, while also providing reflections on a higher level, it provides several takeaways for UX design practitioners. The results of the analysis of the interview data and the examples from related research present multiple valuable practical lessons to learn from and serve as a comprehensive overview of the ways that UX design has been integrated into the agile development context. Moreover, the proposals from the NGT sessions provide direct insight into the preferences of fellow practitioners on how to solve the issue of miscommunication with agile team and the problem of limited involvement in design ideation.

On the other hand, the high-level conclusions presented in the discussion can be seen as useful guidelines for evaluating the UCD capability in their own work environments. These high-level takeaways that could be beneficial as the baseline for internal evaluation of UCD capability are the following: clarity and transparency of the UX design intentions and practices, authority of UX designers in the decision-making and method selection, and finally the awareness levels of UCD benefits and acceptance of UX design output.

5.5 Implications for further research

In this study, the goal was to employ methods that would open up a more holistic perspective on the user research activity and its connections and influences from surrounding factors in the context of agile development processes. While the findings associated to the nature of the practices of user research and agile development broadly concur with the revelations from related research that have studied the integration of UCD and agile disciplines, the discovered tensions from other subsidiary factors – the management and executives of the company and the client – have received less attention, and specifically in the case of the impact that the client poses to user research, barely no attention at all. This suggests that further in-depth research is required to determine the extension and the facilitators of the influence that a client can have over the practices followed in user research.

5.6 Limitations of the study

As qualitative research often is, the results of this study could also be subject to certain criticism in terms of the validity of the findings. In order to provide the reader with the option to assess the validity of the results, the research process has been transparently documented, providing the interview guide and an example of the code generation process in the data analysis process, and reflecting openly on the slight change of course in the method selection when the of activity theoretical perspective was introduced in the late stages of the study.
Considering the author's personal experiences in the field, it was necessary to take measures for reducing the probability of imposing any researcher bias during the study. As a preventive effort, the interviews were conducted in a neutral and open-ended manner, leaving room for unforeseen discussion topics arising from the responses of the interviewees and not leading the participants towards any “expected” answers. In the NGT sessions, the researcher refrained from expressing any personal opinions and remained in a purely moderating role. In addition, compiling the interview sample of practitioners from companies with different business models was seen as another way to reduce the reliance on the author’s personal and presumably biased experiences.

However, the involvement of such practitioners might raise questions regarding the generalizability of the results. In order to assure the relevance of the results in the context of all three involved business models, the presented findings are combined based on the common issues that emerged from the interviews. Moreover, although it is uncertain whether in the year 2018 development practices in Sweden and Estonia have any significant differences, the possible limitation of the sample needs to be addressed. The sample for the interviews consisted mainly of practitioners from Estonia, as only two of the participants work in Sweden. Therefore, the results presented based on the interview data are predominantly a reflection of the practices in Estonian software development and UX design fields, reducing the generalizability of the results to a more global scale.

The late introduction of activity theory might, however, have created an increased probability of imposing researcher bias, as the issues that emerged from the thematic analysis were put through an interpretative lens. These interpretations could have been strengthened by having another researcher validate the findings through an additional interpretation. As this is an individual Master’s study, the second validation was substituted with discussing the results with the supervisor of the research project and the process of interpreting the tensions as contradictions was done over three iterations.

Further limitations of the study might reside in the internal validity of the findings, as the data gathering primarily relied on one method – the semi-structured interviews with the practitioners. The expectation to reinforce the internal validity of the findings through assessment of the results in the NGT sessions was regrettably not met, as the sample size of the sessions does not provide enough substance for making conclusive judgments on its own. A possible measure for gathering supporting evidence for the results could have been a quantitative approach in the form of a survey, but unfortunately the time constraints were restricting. In order to provide relief to this limitation, the results of the study and assessment from the NGT sessions were supported by the findings from the related research.

6. Conclusion

This study was motivated by the notion that although the existing research has thoroughly investigated the combination of agile development methods and UCD practices, there has been insufficient consideration of the impact that agile development principles and mind-
set can impose through the medium of surrounding activities and parties, such as the clients and company executives. Therefore, the research question was posed as follows:

*How do the various parties involved in the agile development context affect conducting user-centered research and design, and how to overcome the obstacles for user-centeredness arising from these influences?*

To get a comprehensive overview of the situation in the field through the eyes of the practitioners, a set of semi-structured interviews with UX design specialists from Sweden and Estonia were conducted, the results of which were structured and interpreted through the lens of activity theory by using a network of activity systems to draw out the connections between. The results suggested the existence of a notable impact from the subsidiary parties and their activities on UCD practices, as they might interfere with the methods that are applied in the user research process as a result of deficient awareness of UCD benefits. This indicates towards a need for the empowerment of UX designers and for more efficient communication of UCD benefits and practices to all the parties involved in this network of activities to improve their awareness of the advantages of adopting a user-centered perspective. Furthermore, the data also pointed out the inconvenient nature of the user-centered research itself, as it requires a very clear deliberation of its aim and motivations to successfully integrate it in the agile development context. In order to gather propositions for alleviating the discovered issues, a group session with UX design practitioners was conducted following the NGT approach. The resulting suggestions – establishing interdisciplinary teams and using indicative questions to guide people towards thinking in the user perspective – once again emphasize the importance of mutual awareness of UCD benefits that could be improved by closer communication.

As an overall conclusion, the findings of this study clearly indicate towards a need for exhaustive investigations of the indirect impact that the context of agile development poses to user-centered research and design through the various parties involved in the context. By studying the influences of each of the parties – such as clients – in a more detailed manner, researchers could propose more concrete solutions to overcome the obstacles that may present themselves.
References


Appendix 1: Design and development integration model

Design and development integration model based on separated but interwoven tracks (Sy, 2007).
Appendix 2: Engeström's activity system model

Engeström’s activity model (Kaptelinin, n.d.).
## Appendix 3: Overview of the sample

<table>
<thead>
<tr>
<th></th>
<th>Experience</th>
<th>Position</th>
<th>Business model</th>
<th>UX design related education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tim</td>
<td>5 years</td>
<td>UX designer</td>
<td>Software and UX design service provider</td>
<td>No</td>
</tr>
<tr>
<td>Amy</td>
<td>8 months</td>
<td>UX designer</td>
<td>Product development</td>
<td>No</td>
</tr>
<tr>
<td>Eva</td>
<td>4 years</td>
<td>UI/UX designer</td>
<td>Product development</td>
<td>No</td>
</tr>
<tr>
<td>Pam</td>
<td>1 year</td>
<td>UX analyst</td>
<td>Software service provider</td>
<td>Yes</td>
</tr>
<tr>
<td>Sam</td>
<td>4,5 years</td>
<td>UX designer</td>
<td>UX design service provider</td>
<td>No</td>
</tr>
<tr>
<td>Bob</td>
<td>5 years</td>
<td>UX designer</td>
<td>UX design service provider</td>
<td>No</td>
</tr>
<tr>
<td>Mia</td>
<td>3 years</td>
<td>UX designer</td>
<td>Product development</td>
<td>Yes</td>
</tr>
<tr>
<td>Ron</td>
<td>1,5 years</td>
<td>UX designer</td>
<td>Software service provider</td>
<td>Yes</td>
</tr>
<tr>
<td>Ken</td>
<td>8 years in practice, 2 years in research</td>
<td>UX designer</td>
<td>UX design service provider</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Appendix 4: Guiding questions for the interviews

Personal background

• How long have you worked in the UX design field?
• How long have you worked at the current employer?
• Do you have any UX design related education (for example, HCI or interaction design)?

Company background

• What is the business model of your company? For example:
  o Developing software for external customers (Service provider)
  o Developing a company product for public use (Product developing)
  o Developing a company product for a specialized use (Product developing)
  o Providing UX services (UX service provider)
• How many people work in your company?
  o How many of those are developers and how many are UX specialists?
• What agile development approach/framework are you following?
  o If it doesn't apply (UX service providers), then what is the prevalent agile framework used by your clients?
• What type of UX specialists work in your company? For example:
  o Design oriented
  o Front-end development oriented
  o Research oriented
• Are the UX specialists integrated into development teams or do they work as a separate team?
  o If UX is separated, then describe the collaboration process with the development team?
• Is there any other role that performs tasks that are similar to the tasks of UX specialists?
• Are the UX specialists in your company also specially trained in agile methodologies?

UX Practices

• Could you please describe the usual process of a project in your company and emphasize the parts where your role is involved in it?
• Would you say that your company follows a user-centered design approach?
  o How do you justify it to the customers?
  o What obstructs consistent involvement of end-users in projects?
• Are the UX specialists involved in the project throughout the whole process or only at certain stages?
  o What obstructs consistent involvement of UX in projects?
• What UX practices do you follow in your practices?
Appendix 4: Guiding questions for the interviews

- How often do the UX specialists work with end users?
  - Or do they mainly work with client representatives/proxies?
    - If so, then what is your opinion regarding that?
    - Does this change over the course of the project?
  - How often are design decisions based on assumptions and guidelines instead of empirical evidence from users?
    - What is your opinion regarding that?

**Personal assessment to UX Integration**

- How would you rate the effectiveness of user-centered design approaches in agile development processes? Why?
- How would you rate the user-centeredness of your processes on a similar scale?
- Have you noticed any issues in the integration of UX and specifically user-centered practices in the agile development environment?
  - If there were any issues, how did you try to solve them?
    - Were the solutions effective?
- Are all UX activities kept in the same backlog as development tasks?
## Appendix 5: Example of code generation

<table>
<thead>
<tr>
<th>Interview excerpts</th>
<th>Codes</th>
<th>Refined codes</th>
<th>Categories</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clients don’t often realize the meaning of UX and that’s where the main difficulties and obstacles come from. They want UX and after seeing the estimations they are not sure about the efficiency of it anymore.</td>
<td>UCD constrained by clients’ lack of awareness</td>
<td>Client’s lack of UX awareness</td>
<td>UX is incomprehensible</td>
<td>Knowledge, awareness and attitude</td>
</tr>
<tr>
<td>Generally I think that our clients come to us mainly for the UX keyword in our name and therefore are more aware of the meaning of it. But I admit that clients of mainly software development companies might not understand clearly what it is about. In that way I think that our clients are approaching us with an already existing awareness which is good for us and them.</td>
<td>Low awareness if clients turn to software developers</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>When you’re doing UX design you are not just choosing a font and picking a colour as many people still seem to think. In Estonia it is usually so, that people just assume that any kind of designer is intended to do everything from calling cards to interviewing users and everything in between.</td>
<td>Expectations for designers are misguided</td>
<td>Misinterpreted meaning of UX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>There is still a lot of confusion for some people regarding what is UX and what is UI. A lot of people think that good UX is just a beautiful UI.</td>
<td>UX is misinterpreted</td>
<td></td>
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<tr>
<td>In the beginning the UX maturity was really low and people didn’t know what UX was about. They just knew they wanted good UX but didn’t know what it actually means process- and content-wise.</td>
<td>UX is not comprehensible</td>
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<td>The teams that have</td>
<td>Vain attitude</td>
<td>Distrust in</td>
<td>Distrust in users</td>
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experienced a fail because of bad UX, they realize that it is important to start researching as early as possible. But there are a lot of those who don’t have this experience first hand and then they think: “What does the user know anyway? We know way more from developers users.

In the end it all comes down to the clients and if they are willing to pay for UX or not. We could try to convince them, but if they say “But it all looks nice” and claim to not need any usability testing with users, then it is difficult to actually reach usability testing.

The most resistance for user involvement in research was from the customers, because they have usually prepared the project for so long and as I said they sometimes have the documents on what the project has to be like.

Clients sometimes think that they know more than the users and it might be difficult to explain the value of user involvement to them.

For some clients we have just created the visual designs. They don’t want to involve the users, as they consider us to be the experts of design and handle it ourselves.

Sometimes when conducting usability testing the developers just ignore the results. First you involve 3 users in testing and even when the developers are overseeing the process, they might just say “These were wrong users, you can’t make assumptions based on them” and ignore the results.

Unfortunately I have to admit that I don’t know much about the development side. Scrum sounds like a familiar word, Lack of knowledge of agile.

<table>
<thead>
<tr>
<th>Resistance to user involvement from clients</th>
<th>Clients impede user involvement</th>
<th>Clients consider users incompetent</th>
<th>Users considered incompetent</th>
<th>Experts trusted over users</th>
<th>Arguments to ignore users</th>
<th>Lack of knowledge of agile</th>
<th>Agile goals and concept misunderstood</th>
<th>Agile goals and concept misunderstood</th>
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<tr>
<td>Resistance from clients towards users</td>
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<td>Users considered incompetent</td>
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<td>Experts trusted over users</td>
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<td>Arguments to ignore users</td>
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<tr>
<td>Lack of knowledge of agile</td>
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but I don’t know much about it.

<table>
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<tr>
<th>Appendix 5: Example of code generation</th>
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</thead>
<tbody>
<tr>
<td>Misinterpretation of agile concept</td>
</tr>
<tr>
<td>This is one of the main problems when you join a team where you have to support the development locally and everybody keeps talking saying that they're using agile, but in the end it's just the waterfall method that they follow.</td>
</tr>
<tr>
<td>I haven’t received any training in agile, and it’s quite likely that the others in the design team haven’t either.</td>
</tr>
<tr>
<td>The new company where I work at, they just adopted agile without training the employees. Just said that &quot;Now we’re agile, we’re going to use these Scrum boards and have such meetings&quot; and that was it.</td>
</tr>
<tr>
<td>I don’t exactly have a certificate or anything, but one of the managers has one and they at least gave an in-house overview.</td>
</tr>
<tr>
<td>It is weird, but we learn by doing. We have some general background information and will receive some tips in the beginning, but I had to learn it myself and work it out how to fit UX into it.</td>
</tr>
<tr>
<td>No agile training</td>
</tr>
<tr>
<td>Agile implemented without training</td>
</tr>
</tbody>
</table>