

Building a Team to Champion User-Centered Design Within an Agile Process

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Abstract. The marriage of Agile development processes and User-Centered Design (UCD) has been increasingly attracting interest within the field of software development [1]. Integrating the two can identify the benefits of each in terms of efficient work processes to achieve useful and at the same time usable products as results. While the user-centered design process has a defined structure [2], the understanding of user experience and user interface teams vary significantly across organizations [3]. Similarly, design processes are defined differently per organization without a universal model. For certain teams the User eXperience (UX) team means an entity of all user-related and design-related activities, including user research, benchmarking, creating information architecture, projecting user needs into wireframes, creating user interface visual designs and evaluating with usability testings. Other organizations have differentiated User Research specialists (involved in user insights and usability topics) from User eXperience teams (specified on translating user needs into screens) and User Interface (visual representations of tasks) teams. To our knowledge, very little research has been done regarding such intricacies of team structures when discussing user experience teams in the Agile and UCD integration frameworks. Our paper provides a review of different UI/UX team structures in organizations and their implications in the implementation of projects. With our analysis of different team and role structures we hope to contribute to better understanding of UI/UX teams in design agencies and the influence of this understanding on the success of projects incorporating UCD and agile approaches.

Keywords: User-centered design · Agile methodologies · Software development process · Lean UX · User experience design · HCI in business

1 Background

In recent decades, the software development industry has experienced a shift from traditional approaches towards Agile methodologies, as a result of the growing complexity and size of projects. Traditional, or heavyweight methodologies, in the software development process are characterized by a sequential series of steps, such as defining requirements, planning, building, testing and deployment [4]. Documentation plays a major role in the process: the detailed visualization of the finished project is to be completed before the building starts. Some examples of such methodologies include Waterfall, Spiral Model and Unified Process.

In contrast, Agile methodologies (Fig. 1) evolved as a response to the eager business community asking for lighter weight along with faster and nimbler software development processes. Agile approaches involve smaller and shorter releases, parallel programming, and iterations as core of their process [5]. Examples of agile methodologies include Extreme Programming (XP), Scrum and Feature Driven Development (FDD) among others.

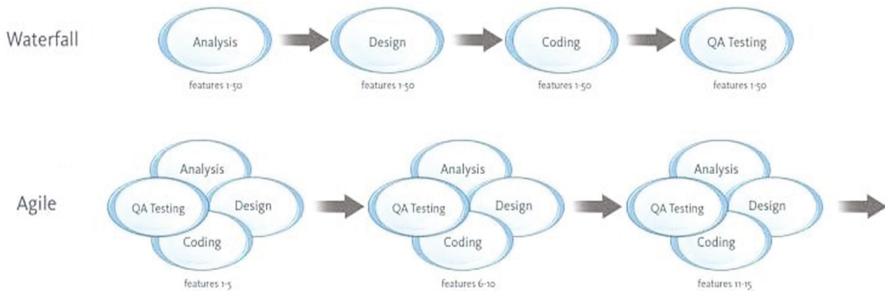


Fig. 1. In a waterfall development cycle, the analysis, design, coding, and quality assurance testing are separate stages of a release that **extends over** months or years. In Agile development, each set of incremental mini-releases (each created in 2–4 weeks) has these stages [5].

Google’s design sprints are one of the popular examples of integrating agile development and design thinking in the creative communities and serve as a structured brainstorm for project teams to learn from doing. Divided across five days, these design sprints are performed to answer critical business questions through design, prototyping, and testing ideas with customers [6]. Lean UX is another process embodying agile principles, designed for fast user-centered software development. The philosophy of Lean UX is comprised of three principles: design thinking, Lean production and Agile development [7]. The model works on the “think-make-check” feedback loop (Fig. 2).



Fig. 2. Lean UX and the “think-make-check” feedback tool emphasize on early validation and faster development cycles [7].

The idea is to innovate quickly, by choosing lightweight research methods and creating prototypes to test out the concepts and validating this through usability testing. The core point of the process is to reduce cycle time, not build time - hence the amount of time it takes to move through the think-make-check loop. The process emphasizes designers working closely in collaboration with the team, demoing their work often, to get feedback from the team and putting it into practice. Therefore, the designer should be completely integrated with the team.

Projects using Agile methods include a set of standard roles and responsibilities, including a scrum master (or project manager) who organizes the workflow and communication, teams of designers, developers, and quality assurance testers, among others. As much has been discussed in academia and the industry, regarding the general aspects of the methodologies [8], the focus of this paper will concern the usability and user experience specialists of the team. In software development, the team of user-experts responsible for researching user needs and incorporating them in the product, are called User eXperience (UX) teams. Nielsen Norman group defines “User experience” as that which encompasses all aspects of the end-user’s interaction with the company, its services, and its products [9]. UX teams are responsible for ensuring the usability of the end-product, a quality attribute that assesses how easy user interfaces are to use. In the current research, we will use the term User Researcher to define professionals involved in identifying user needs and evaluating usability of designs. On the other hand, the UX Designer is defined as a specialist responsible for translating user needs into screens, before the graphical representation or code has been implemented. Another term that must be mentioned when discussing the design of a product is the user interface (UI) design, which can be misleading as it is often used interchangeably within UX design sources, while representing a different aspect of the design. Unlike UX design, which is about the overall feel of the product, user interface design refers to how the product is laid out. UI designers are in charge of designing each screen or page with which a user interacts and ensuring that the UI visually communicates the path that a UX designer has laid out [3]. The umbrella term “design team” will be used as encompassing a wide range of responsibilities, from user research to wireframing, visual design and usability testing.

These variations of tasks and responsibilities within design teams are only briefly explored in existing literature about UCD and agile integration. While the general literature refers to user and interface specialists in agile projects as the design team, there is not much evidence for how specific structures of design teams influence project results, in terms of collaboration. This research aims to analyse and understand the implications of design team structure for collaboration and end-results within agile projects. The overall goal is to discover the best practices for achieving effective results in such collaborations, and how to build a design team that can champion user-centred design in agile processes.

2 Research Design

The research methodology of the current study is explained in detail in this section.

2.1 Methodology

The research approach of this study is qualitative. A semi-structured interview method using the principles of Grounded Theory [10] was implemented for data collection. The data from eight participants was collected in verbal form (in person or via a video-call) and for the two remaining participants in written form (via electronic mail), depending on the distance with the interviewee. The interview questions were:

- What is your role within your current organization? What role do you play in your current project team(s)?
- Can you tell us about the projects you are working on (in terms of industry, size, scope, work and deliverables expected)?
- What process does your team follow to organize workflow?
- Do you work agile? If so, which agile methods do you use? And which tools do you use (for task assignments, communication, collaboration, etc.)?
- What is the design team structure in your project?
- What are the roles and responsibilities within the design team? Do you differentiate a user experience (UX) designer from a user interface (UI) designer and a user researcher (UR)? What are the skillsets of each, if you do?
- What problems do you (have you) encounter(ed) in your project? Specify by daily basis vs. overall basis.
- What are the strengths of having this structure in terms of efficiency and effectiveness of the end-results?
- How is the interdisciplinary collaboration between the design team and other teams involved in the project?
- What are the satisfaction levels of the design team members (evaluated in objective or subjective manners, in terms of engagement, ownership, personal and professional growth, etc.)?

The interviews were collected and transcribed. The answers were analysed for emerging patterns, structures and interpretations of different task allocations in relation to the collaboration and overall success of agile projects.

2.2 Participants

This study incorporates ten UI/UX specialists from ten companies of various sizes, in which five are male and five are female. All participants are part of the creative team in respective companies, involved in projects which incorporate the agile approach, with user-centered design. The names of the projects and involved clients are omitted for confidentiality reasons. In order to have a rational pool of data, selected participants varied in terms of their work experience: junior designers (n = 3), medior to senior designers (n = 4) and head of design teams (n = 3); size of the design team within their project teams: the only designer (n = 4), one of the two designers (n = 4) and one of the three designers in the project (n = 2); and their organizations: ranging from product-based start-ups (n = 2) to design agencies (n = 2) and large corporations (n = 6). Geographical diversity included designers working in the Netherlands (n = 6), United Kingdom (n = 2), Germany (n = 1) and Spain (n = 1).

3 Results

In this section, we present the results that emerged from interviews regarding UX roles in their organizations and other aspects of design team structures within projects. The data from the interviews is outlined in the following table (Table 1), with a summary of key findings from the data in the discussion afterwards.

Table 1. Participants

	01	02	03	04	05	06	07	08	09	10
Role	UX designer	UX designer	Interaction designer	Interaction designer	Head UX/Service design	UX designer	UI/UX designer	Head of design/UX	UX designer	Design Principal
Work experience	Junior	Junior	Medior	Senior	Senior	Junior	Senior	Senior	Senior	Senior
Company - business	Product (software)	Exact - Product (software)	Service design agency	TomTom - Product (soft/hardware)	Aegon - Financial services	Aal.care - IT	KPN - Telecommunications	AOL - Mass media	Software and hardware product company	383Project - Digital consultancy
Company size*	Small / start up	Large	Medium /agency	Large	Large	Small / start up	Large	Large	Large	Medium /agency
Project size**	Large	Large	Small	Large	Large	Medium	Large	Small	Large	Medium
Team size ***	Large	Large	Small	Medium	Large	Large	Large	Small	Large	Medium
Designers in scrum team	3	2	1	2	1	2	1	1	3	2
Process	Kanban	Lean UX	Lean UX	Lean UX No sprints	Adapted Spotify model	Lean UX	Spotify model	Lean UX	Lean start up	Lean UX
Collaboration	Scrum team: close	Scrum team: but no stand ups	Scrum team: close	Partially scrum team + Partially separate	Scrum team: close	Scrum team: close	Scrum team & UX chapter	Separate	Scrum team	Scrum team
Agile maturity	Low	Medium	Medium	Medium	High	High	High	Medium	Medium	Low
Satisfaction	Low	Medium	High	Medium	High	High	High	High	High	Medium
Research	None	Yes	Yes + separate research team	No. Separate research team	Yes	Yes	Yes	Yes	Yes, for small tasks. Separate team for larger research.	Yes
Wireframes and flows	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UI	Yes	Yes + visual designer	Yes	No, UI designer	Yes	Yes + visual designer	Yes	Yes	No, UI designer	No

* Small/start up = the company is a start up and has up to 40 employees. Medium / agency = the company is a design agency and has employees between 40 and 80 employees. Large = over 80 employees.

** Small = scope of up to 3 months. Medium = scope of 3 - 12 months. Large > 12 months.

*** Small <5, Medium = 5-10, Large >10

3.1 Designer Profiles

Although the participants identified themselves as UX designers (n = 7), interaction designers (n = 2) and a UX and Service designer (n = 1), there was a large overlap in terms of their roles and responsibilities. The literature search illustrated that there is no unified agreement for the definitions of the roles. To have a common ground, we decided to establish the following roles as involving the following tasks in Table 2 (in alignment with [3]).

Based on the tasks they perform in daily work, the participants were classified into various designer profiles, as described in Table 3.

For the majority of the participants, the UX and UI tasks were found to be intertwined. Participant 7 noted “I think it’s a bit hard to think about those two roles in isolation: they’re so complementary! One doesn’t work without the other. If the two roles are played by different persons: A UX designer will deliver outstanding results

Table 2. Definition of the User Research, User Experience and User Interface tasks

User Research (UR) tasks	User Experience (UX) tasks	User Interface (UI) tasks
<ul style="list-style-type: none"> - Discovery: collect user insights, analyse and draw conclusions. Interview the users. Identify if the problem that is being tackled is the correct one - Usability testing - Define and test assumptions 	<ul style="list-style-type: none"> - Translate user needs into wireframes of screens - Create user flows to show the interactions between screens 	<ul style="list-style-type: none"> - Create visual designs - Apply the design library or the style guide to the wireframes - Maintain consistency with the established brand identity

Table 3. Designer profiles

User Interface (UI) designer	A designer focused purely on creating visuals and aligning with established design style and principles within the project	None of the participants
User eXperience (UX) designer	A designer purely focused on translating user needs into wireframes and flows	Participants 4 & 9
User Researcher (UR)	A designer purely focused on scoping the problem and the user needs, along with validating wireframes or visuals with end-users	None of the participants
UI/UX designer	A designer fulfilling roles of both UI and UX designers	Participants 1 & 3
UX/UR	A designer fulfilling roles of both UX designer and a User Researcher	Participant 10
UI/UR	A designer fulfilling roles of both UI designer and a User Researcher	None of the participants
UI/UX/UR	An all-round designer, responsible for all tasks across the creative process	Participants 2, 5, 6, 7 & 8

only if the involvement/communication with the UI designer is total, and the other way around.” Three out of ten participants mentioned that they had a dedicated team conducting discovery research and usability testing for them. Moreover, two participants stated that they would do informal usability testing themselves, whereas a usability expert did formal, larger testing.

Although some of the participants’ functions included secondary roles and responsibilities, such as project management and product ownership (participant 6), coding to speed up the process of handover to developers (participants 3, 8), and overseeing the design team or chapter (participants 5, 8 and 10), these were not included in the scope of the current research.

4 Discussions

The findings reveal that there are patterns for commonly found designer profiles within Agile project teams. In this section, the different team structures are analysed and evaluated from a collaboration point of view. Data analysis revealed some best practices for achieving effective collaboration in design teams, which will be discussed in this section.

4.1 Designer Profiles

Based on the tasks that every participant has attributed to themselves, these designer profiles were plotted against the 5 stages of the creative process: Discovery (“Think” phase of the Lean UX), Wireframes, Visual Design, Prototyping (“Make” phase) and User Testing (“Check” phase) [7]. The graphs within Fig. 3 demonstrate the extent to which each designer is involved in the tasks at hand. The participants who were the only designer in their team classified themselves as UI/UX/UR profile (chart 4 above), being responsible for all tasks across the creative process. A pattern established itself, showing that these designers (UI/UX/UR profile) were the most satisfied among the participants. Our assumptions are that the fewer designers there are in the project, the broader the scope of the designers’ role. Hence, the more control and ownership they have over the creative process, the more satisfied they might feel. An interesting stance is indicated by the User Research tasks. In the current research, six participants (one UX/UR profile and five UI/UX/UR profiles) were found to be doing user research with different levels of involvement. Three participants reported that there was a separate role or team, outside of their scrum team, who conducted research activities for the team. Schwartz [11] debates whether the Agile project should include a usability expert (the equivalent of user researcher in our research) in the scrum team. However, if the user researcher (or usability expert) is not part of the scrum team, it is important that they are always available on-call [12]. The approach suggested by Sy [13] implies separating user research tasks from the interaction design tasks; while the interaction designer is designing for the next cycle, the usability practitioner is performing tests on the previous cycle’s code, along with gathering customer data for two cycles ahead.

4.2 Satisfaction Levels

Participants who are executing tasks within the whole spectrum of Lean UX show higher satisfaction levels within their jobs (Participants 2, 5, 6, 7 and 8 were the UI/UX/UR profile).

The designers working on projects where the main research is carried out by a separate team stated that they would like to be more involved in executing research. In fact, the current research argues that there is a correlation between how involved in research the participants were and their satisfaction level. The more involved they were in research, the happier they were at work. Our assumptions are that when the designer is involved in the discovery phase of the user research (understanding the user needs

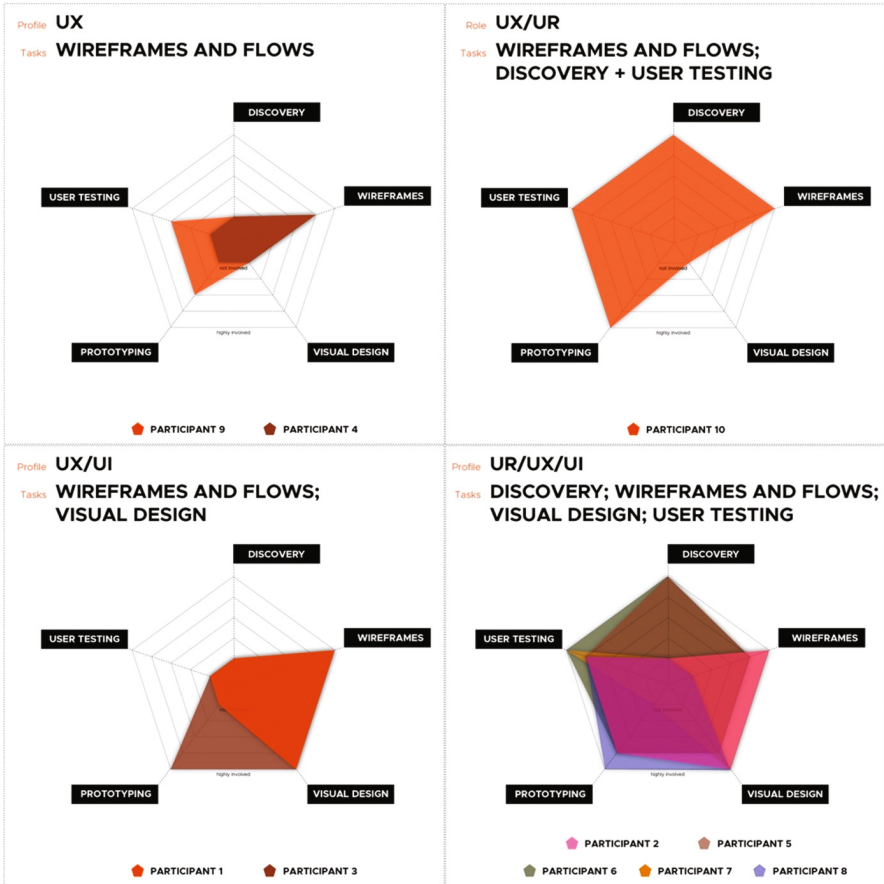


Fig. 3. Designer profiles and tasks

and defining the problem) then they are involved in determining exactly why this problem is important. Participant 3 (who had a separate team for research) mentioned that the “service designer decides if the problem we are solving is the right problem”. Being involved in identifying the core problem that the concept is being designed for provides designers a clearer vision (Fig. 4).

4.3 Length of a Cycle

Participants 3, 5 and 8 indicated that because their design process was fluid, they felt that the structure of two-week development sprints were too long. Participant 8 claimed that, “If you think about it, you only get 31 times to pivot in 365 days. It’s mad!” Designs may be created faster, but they would have to wait until the beginning of the next development sprint to be picked up. The designer would then have to wait for the

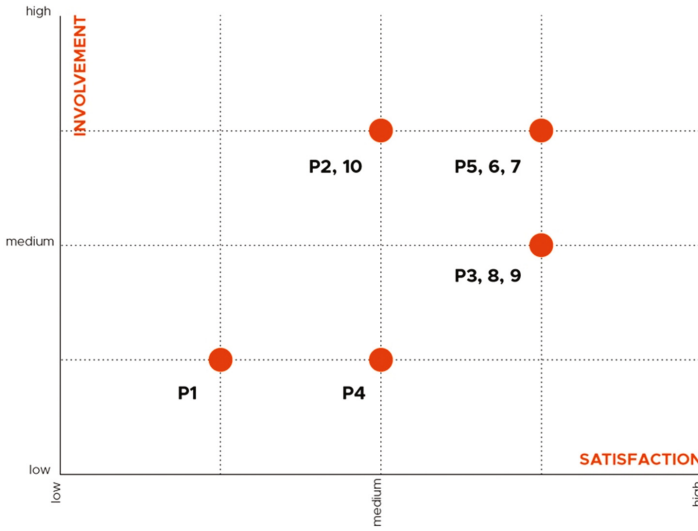


Fig. 4. Designers’ involvement in research vs. their satisfaction level

developers to implement this to move forward and test the design, and arguably this seems to be a waste of time. Consecutively, as the Agile philosophy was designed by developers and for developers, with mainly information technology (IT) in mind, this brings up a need for an optimisation in the methodology. In fact, as the original Agile Manifesto [14] did not accommodate the user-centered design process, the community has proposed the Lean UX manifesto to adapt the principles. The Lean UX manifesto puts out six key principles to describe the Lean UX way of working: emphasizing early customer validation, collaborative cross-functional design, solving user problems as opposed to adding new features, measuring key performance indicators, and applying appropriate tools and nimble design [15].

4.4 Project Size

The results, as can be seen in Fig. 5, have revealed that in small projects, the UX designer was not involved in the discovery phase of the cycle. One of the participants reported that differentiation between service design (those involved in discovery and testing) and Interaction Design (focusing on the wireframes and user flows) was good as it helped designers to focus on the strengths of their respective roles. In addition, within small projects, the UX designers are also found to be specialised in visual design. Participants working in small projects report that it is advantageous for such a project to attain versatile designers, as it simplifies the process and enables closer communication with the developers. The same result was found for the prototyping phase of the cycle.

In medium-sized projects, the responsibilities of the UX designer extended from usual wireframes to include both discovery and usability testing.

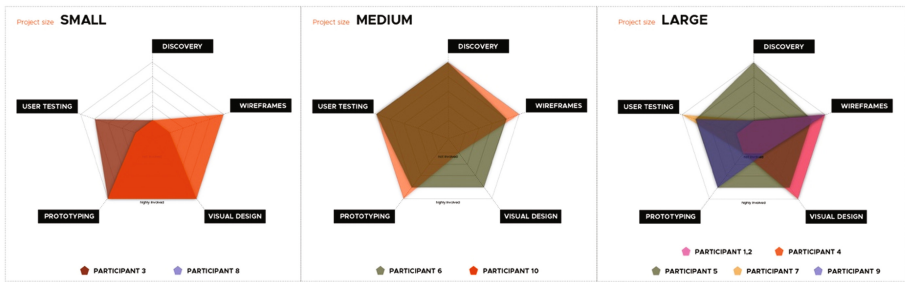


Fig. 5. Participants plotted according to their projects' sizes

Among the participants in large projects, the majority (five out of six designers) reported that the discovery phase is completed by a designated research team outside of their scrum team. In addition, it was found that within large projects the UX designers were specialized in the task of wireframing. This confirms the theory that in larger projects, where more than one design role exists, the designer can be more specialized on one role, while having an overview of other aspects of the creative process. design. In fact, the CEO of IDEO, Tim Brown has used the term “T-shaped stars” to describe people who have the depth of skills and expertise in one aspect of the process, represented by the vertical stroke, while also having breadth of skills and expertise across other disciplines, represented by the horizontal stroke. These attributes allowed for greater cross-functional collaboration [16]. Following this logic, the UX designers in large projects can be defined as “T-shaped designers” who have deep knowledge and expertise in creating wireframes and user flows, while also having an overview of other tasks.

4.5 Agile Approach

The Agile philosophy was originally developed as a method for programmers to improve their implementation practices. Today, there exists a great choice of different agile software development frameworks, all of which support a broad range of stages within the software development life cycle. The current research shows that two thirds of the participants are yet to fully figure out how to effectively embed UX Design methods within the Agile Software Methodology, and how to unify developers and designers in the Agile process of product development. These participants report that the organizations they work for are still going through an Agile transition, and have started working in Agile less than three years ago. These findings are in line with those of Loranger and Leibheimer [17], who show that highly effective Agile projects usually belong to organizations that have practiced Agile for over three years on average.

Between organizations, and even between teams within an organization, there exists many different approaches of how Agile frameworks are implemented. Participants came from different Agile environments such as a fully implemented Spotify model [18], or just taking best practices from it, involving lean startup versus lean UX, Kanban, and Scrum. In fact, participant 1 mentioned that, regarding the process, “now

we do Kanban. In essence, it is just putting a label on prioritizing works.” These ways of working are continuously shaped and improved to support a team’s needs. However, regardless of the broad variety of Agile environments, 9 out of 10 participants reported that they still prefer to conduct UX activities ahead of development sprints. Though, it is indeed necessary to be part of, or be very close to, the development team to maintain close communication and ensure control over the delivered product.

Working ahead of development, or “up-front interaction design”, is broadly discussed in Ferreira et al. [19]. Through their research, they found that the up-front design process contributed to mitigating risks and helped designers come up with the best possible design, due to better project estimation and prioritization. Schwartz [8] provided a detailed analysis of supporters for and opponents of “upfront design”, concluding that, “every team has to find its proper way to process Agile-UX because different challenges require different solutions”. This corresponds perfectly with Agile values, notably “individuals and interactions over processes and tools”.

The interview responses revealed a pattern among participants that the more mature and structured the Agile methodology in their project was, the more satisfied the designers were overall. Our assumptions here are that creating a structured process with good user-centered design principles will ensure a great deal of ownership for each member of the development team and create favourable conditions for collaborations.

5 Conclusions

The current study focuses on the best practices for achieving effective collaboration in design teams within the Agile methodology. Some of our findings are aligned with the literature, for instance, the advocacy towards a sprint zero (or iteration zero) for UX teams to get a head start ahead of the development team [9].

In the introduction, we argue that design processes are defined differently per organization, lacking a universal model. The results from the current study support that claim. The Agile methodology has come a long way and many organizations have effectively started implementing this way of working across their projects, however we have discovered that designers are still finding their way and are missing an agile framework that caters for all the roles within a development process. Overall, the current research indicates there is no unified agreement for the definition of roles, but that creative processes and the tasks executed within these diverse roles are aligned. We found that the focus of the designer depends on the size of the project. In the current study we focused on five stages of the creative process that are necessary to deliver a quality product. For smaller projects the focus of the designers is more on delivering visual designs, whereas, for larger projects, designers are becoming more specialized in wireframes and user testing. We argue that it is important that the format within a project allows their members to have control and ownership over the creative process and the product that they are delivering. Creating a structured process with good user-centered design principles facilitate a great deal of ownership for each member of the development team and create suitable conditions for collaborations. In fact, our research shows that the designers who are responsible for all tasks within the creative process are the most satisfied with their work. Particularly, the more involved the designers were in

research, the happier they reported to be at work. However, as one of the participants put it “this is the Jack of all trades, master of none” and we need to be aware that this can have a direct effect on the quality of the delivered product. Future research could reveal whether having a designer for each of the tasks separately leads to a higher quality product. Furthermore, as the current research only involved designers who classified themselves as user experience (UX) designers, the further research will look into analysing the roles of pure User Interface designers (UI) or User Researchers (UR).

In conclusion, our findings show the need to re-think team structures both within the design team and on the project-level. It is argued that UX specialists should not only be in close collaboration with development, but also with planning and strategy, as aligned with literature [10]. Future research will focus on the collaboration within the team as a whole, including the collaboration between all roles - from business analysts to testers, and designers to developers - needed to build a successful project.

Acknowledgements. We would like to express our gratitude to our interviewees Matt Zarandi from AOL, Charlotte Cavellier from Fjord Design & Innovation from Accenture, Karl Randay from 383 Project, David Guiza Caicedo from TomTom, Michel Jansen from cXstudio, Jingwen Yao from Exact, Niké Jenny Bruinsma from aai.care, Li Chiao, and two anonymous UX designers for their insights that served as the basis of this paper.

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