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UX Work in Startups: Current Practices and Future Needs

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Abstract. Startups are creating innovative new products and services while seeking fast growth with little resources. The capability to produce software products with good user experience (UX) can help the startup to gain positive attention and revenue. Practices and needs for UX design in startups are not well understood. Research can provide insight on how to design UX with little resources as well as to gaps about what kind of better practices should be developed. In this paper we describe the results of an interview study with eight startups operating in Finland. Current UX practices, challenges and needs for the future were investigated. The results show that personal networks have a significant role in helping startups gain professional UX advice as well as user feedback when designing for UX. When scaling up startups expect usage data and analytics to guide them towards better UX design.

Keywords: user experience, startup, lean

1 Introduction

A startup is a team of people that try to find a scalable business model, and is also defined to be only a temporary organization [3, 17]. Startups are getting a lot of attention and are seen as a way to create new opportunities for work and business. Startups offer an interesting domain for research to understand what methodologies and ways of working are helping the success of these small teams with limited resources. Startups work in a fast-changing environment and what matters to UX work is that they do not have the possibility to spend a lot of time working on design when the whole product might still change significantly.

Software development practices in startups have gained some attention [16] but research on UX practices is lacking. The traditional approach to UX design based on the principles of human-centered design [10] has a lot of upfront work before starting the implementation. Some books [12, 8] have been written to offer tools for UX design in lean startups but the past academic research is limited to some case descriptions with UX practices [15, 18].

Research that would recognize the best practices for UX work in startups is missing. It could offer valuable information on how startups could optimize the

resources put to UX work for creating UX that would enable growth. It is also of interest to understand if these ways of working are transformable to be used in established companies when they need to innovate fast. This paper presents the results of our research that aimed to understand the role of UX work in startups developing ICT products. UX work includes user needs gathering, designing UX and user tests for feedback collection. Designing UX covers both choosing the right functionality and designing the user interface for the product. In this research we wanted to understand (1) what practices startups currently have for UX work, (2) what challenges startups have in UX work and (3) what kind of needs the startups expect to have regarding UX research and design in the future when they scale up.

To address these questions, we conducted an interview study with eight startups on their approaches to UX work. As a conclusion, we will propose implications for startups on how they could incorporate UX practices in their product development. The results can be used to further investigate and develop UX practices that would help startups succeed.

2 Related Work

Previous research on the specific topic of UX work in startups is very limited. In this section we briefly go through the related work on UX practices in industry, lean UX and product development in startups.

2.1 UX Practices in Industry

Practical work towards good user experience – often also referred to as usability – is rooted in human-centered design (HCD) approach, as defined for example by the ISO standard [10]. This approach emphasizes upfront user research and design activities, strong user involvement, iterative design and multifunctional design teams. While such approach has been well adopted in the research of user experience, industrial product development projects have often used more limited practices.

In their survey of user-centered design practice in industry [20], Vredenburg et al. found out that iterative design is a widely used used approach and that usability evaluation is the most commonly adopted user-centered method in industry. Analysing user tasks and conducting field studies were also often used in user-centered design. A survey by Gulliksen et al. [9] conducted in Sweden revealed that usability professionals appreciated low-fidelity prototyping, field studies and think-aloud tests with end-users the best methods to use. The survey furthermore indicated that management support is essential for the usability professionals and that user involvement often has low priority in the projects. In a more recent study in Italy, Ardito et al. [1] found out that that several companies still do not conduct any form of usability evaluation, because they require a lot of resources in terms of cost, time and people. The advantage of usability work for the usability of software was still clearly recognized in the studied companies.

In summary, while the value of user experience work is in general well understood also in industry, it is still often neglected when other pressures of product development are considered to be more important.

2.2 Lean UX

Lean development is used to describe a philosophy that concentrates on removing waste from the process while delivering value to customers. It started with manufacturing but has since been adapted to many other fields as well. One of these adaptations is the concept of Lean Startup that emphasizes fast learning with small risks while building new businesses [17]. Academic research on the topic is very scarce.

Lean UX book [8] identifies three parts for the Lean UX philosophy: the design thinking movement, Lean startup method [17] and Agile software development. Lean UX aims to produce a product extremely fast and with little resources but without compromising the customer satisfaction. According to Gothelf [8], Lean UX applies the four principles of Agile development to product design [2] and 15 principles for Lean UX. The Lean UX Manifesto [19] was published in early 2014. It was composed by collecting ideas from UX professionals including and forming them into a list much like in the Agile manifesto [2]. The Lean UX manifesto [19] has six principles: (1) **Early customer validation** over releasing products with unknown end-user value, (2) **Collaborative design** over designing on an island, (3) **Solving user problems** over designing the next "cool" feature, (4) **Measuring KPIs** over undefined success metrics, (5) **Applying appropriate tools** over following a rigid plan and (6) **Nimble design** over heavy wireframes, comps or specs.

The use of lean principles in UX work has been reported by [15], [14], [5]. [14] and [5] report positive overall experiences when adapting lean philosophy in established companies. May [15] reports a case of a startup where experienced UX designers were involved. She emphasizes as one of the lessons learned the early planning of UX planning, design and customer validation, which was something that they failed to do. May [15] also stresses continuous testing in every step of business idea and product development.

Agile-UX methodologies have been studied more thoroughly [11] than Lean UX. The academic research on Agile-UX serves as a basis for Lean UX research. Different aspects such as making the UX work more efficient while also paying attention to management and sales aspects [13] should also be understood in startup context.

2.3 Product Development in Startups

The term startup is used inconsistently [16] but some characteristics have been recognized to be common in describing startups. Giardino et al [6] have listed recurring themes in software startups such as lack of resources, innovation, rapidly evolving, small and low-experienced team, and time pressure. The product development is there by effected by these factors. The constant change makes the processes in startups evolutionary and software development practices are adopted

only partly and in later stages [16]. Members of a startup team are often able to have different roles and affect significantly the outcome of product development. The background of persons involved in creating the software development process influence the most the adopted process [4].

The Lean Startup method [17] suggests startups should base it's activities on validated learning with constant cycles of Build-Measure-Learn (BML). Experimenting ideas with little risk involved helps the startup reach a sustainable business model. With experimentation, a startup should be able to find the right problem/solution fit. Giardino et al [7] report that the learning seems to slow down when awareness of competitive environment increases.

3   An Interview Study of UX Work in Startups

The aim of this research was to gain insights of the current practices and future needs of startups in their UX work. We interviewed 11 participants from eight startups. The qualitative research was conducted in Finland over a period of two months (October-November 2014). In this section we first describe the startups that participated in the interviews and then the research methods used.

3.1   Participating Startups

Eight startups operating from Finland participated in study. Two of the startups had team members also in other countries. Altogether 11 persons were interviewed - in three startups two persons participated in the interviews. The interviews were semi-structured. We aimed at having startups at different stages, and with different products and markets. The participating startups were required to have a software component in the product or service they were developing. The startups were found through a local startup community by advertising the interview request them and by asking the participating startups to recommend other teams that might be willing to take part in the interviews. A summary of the startups is presented in Table 1.

Table 1. Summary of the startups

Startup	Interviewees	Company established	Size of startup	Product
SU1	I1 (CEO), I2	2014	3	Web service
SU2	I3	2014 (To be established)	3	Mobile app
SU3	I4 (CEO)	2013	3	Mobile app
SU4	I5	2013	5	SaaS
SU5	I6 (CEO), I7	2014	3	Web service
SU6	I8 (CEO), I9	2014	3	Web service
SU7	I10 (CEO)	2014	4	Software
SU8	I11 (CEO)	2013	3	Mobile app

The persons participating in the interviews were CEOs of the company who also had had the initial business or product idea. Only exceptions were SU4 from which the person responsible for online marketing and customer acquisition participated, and SU2, which was not founded and did not have a CEO. Four startups had people with experience or training in human-centered design (SU3, SU4, SU6, SU8). The size of startups varied between 3-5 people and five startups (SU1, SU4, SU5, SU6, SU8) had had someone leave the company since they started. Startups were small enough for everyone to know what others were doing and interviewees were able to answer questions about all the activities of the startup not just about their own.

All the startups but SU8 had started with a different product idea than the one they were currently developing. Startups SU1, SU2, SU3 and SU4 needed users and user-generated content in their product or service for it to bring value to users. This proposed a problem on how to generate enough content for the launch so that even the early adopters would gain enough value to keep using the product or the service. Startups SU2, SU3 and SU8 had a mobile application as their product. Startup SU7 had a technical solution that did not yet have a user interface that would be visible to users. Other startups (SU1, SU4, SU5, SU6) were offering SaaS or web applications.

3.2 Method

The semi-structured interviews consisted of three parts. The first part was about understanding the business and product ideas, the team structure and the current stage of the startup. The second part of the interview was about the practices involving understanding the end user, user data collection and designing UX. This part also covered the challenges they had in these fields. The last part of the interview was about the future of UX practices and needs when scaling up. The interviews lasted 45-90 minutes. The interviews were done by one researcher and they were all recorded. One of the interviews (SU3) was conducted over Skype using a webcam. The recordings were then transcribed for analysis. Altogether, the data consisted of 71 pages of transcribed interviews. The analysis was done by iterative thematic coding of the qualitative data. The themes were formed into the main sections of the results, and populated with subtopics and individual findings from the data.

4 Results

The results are presented in three parts. The first part describes the current practices the startups have regarding understanding user needs, collecting user feedback and designing UX. The second part presents the challenges the startups have faced when collecting meaningful information about end users and designing for them. The last part addresses the needs that startups have for future and their plans for UX work.

4.1 Current Practices

Understanding User Needs. Interviewees from five startups described the product to be a direct solution to their personal needs (SU1, SU3, SU4, SU6, SU8). One startup (SU5) based their design on what they assumed the average user of the product to expect.

Startups used personal contacts and unofficial discussions to gain feedback about the product idea and the product design. Friends were mentioned as a reliable source of feedback (SU2, SU3, SU4) since the interviewees believed them to give honest feedback instead of only complimenting out of courtesy. The problem with testing the product and seeking feedback from friends was that they were not always the real users of the product so their opinions of the content were not seen as important. Other startups, investors and experts of various fields, including UX design were part of the local startup community and were used to get feedback and ideas. Discussions about how other people perceived UX of competitors' products also motivated some startups (SU1, SU2, SU5) to put effort in creating better UX.

Interviews to understand the needs of users and the context of use were conducted by five startups (SU02, SU04, SU05, SU06, SU08). The interviews were done for different purposes. Startup number SU2 had interviewed friends in a very light way to understand their current use of possible competing products whereas startups SU4 and SU8 had done thorough interviews with 15 potential users. Startups SU6 and SU7 had interviewed possible business partners but had not reached end-user customers before starting the implementation.

Gaining Feedback. Three startups (SU3, SU4, SU8) had **test users** for their prototype or beta version. Test users used the product the way they wanted or with some instructions but specific tasks were not given to them. Startup SU3 used friends (15 people) and potential end-users (15 people) found by visiting Meetup.com group meetings as test users. Startup SU8 had two test users who had the health condition their application was designed for. They were found from a support group. Startup SU6 had made a pilot with a partner that provided users for their online training. They collected feedback of the content with a survey but were not able to interview the participants. They also did a pilot with a master of psychology thesis worker who did research with real users and provided more qualitative feedback with open answers of a survey.

Startup SU4 had started by creating a **paper prototype** of their product that other startups could use in the common space the startups worked in. When they had a working prototype had made a campaign on betalist.com, a site for finding new startups. Through their campaign they got 500 signups for their beta version. Also startup SU6 had used paper prototypes to present their idea when interviewing potential business partners. Startups collected feedback from test users by email, surveys, Facebook page created for test users and informal discussions.

Log data and statistics collection was implemented in the product by startups SU1, SU4 and SU6. They all used Google analytics. Startups SU4 and SU6 used also Mixpanel. Analytics was used to understand from where people came to their site and how they interacted with the product. Startups SU4 and SU6 utilized data systematically during their product pilots. SU4 also followed how the behavior changed when the product version changed. SU6 had analyzed what kind of behavior lead to a positive feedback. Startup SU1 followed analytics occasionally.

Market research was used to understand the target market and the expected users by startup SU5. They had read about statistics from other countries on services that were similar to theirs and assumed that Finland as a market would be following the same trends. They did a survey with potential partners about the concept they had planned. They estimated the average user to be similar to whom it was in other countries' markets but did not conduct any user research. *"Until we have a working prototype of our product no-one is interested in us and we can't get useful feedback."* (I6) Startup SU6 had strong background in research on interactive technology and online training from which the product idea had come from. They also had experts of psychology working part time in their team. Experts gave advice and reviewed the product from a non-technical viewpoint.

Startups SU1 and SU8 had people who were very interested in their product and wanted to help them in making it better. SU8 had recently created a Facebook page for these people to share ideas on features and give comments on design ideas. SU1 was planning how to connect with these people and make it possible for them to help improve the product but also market it.

Practices for Turning User Feedback to UX design. The roles of team members were mostly described to be vague and that they evolved. Tasks were divided among team members based on skills and personal interests. The product development processes were different and not systematic for the startups. Startups SU4 and SU6 described having a leader for the product development. Two startups described having two week sprints. Four startups (SU1, SU3, SU6, SU8) described using a backlog to collect their ideas and tasks. The startups did not have a specific process for making design decisions or transforming user feedback into design rationale.

Startup SU4 was the only startup that had clear UX goals. They had used the information gained from interviews to create user journey maps. They had defined emotions that the user should get from the product and design was made to meet those goals. Other startups could describe a vision for the UX they were aiming at but had not written them down. The common idea was to build something and then collect feedback or log data to see if the product was good. *"Now we try to only do the things that either totally make sense or that people are complaining about."* (I1) Startups SU1, SU2 and SU5 used UX designers from outside the startup to get feedback and

ideas for the user interface. These UX designers were acquaintances of startup founders and helped them for free. "*We are such a homogenous team that we need to seek advice from people from other fields.*" (I7) Interviewee I7 mentioned that even though not all the ideas from designers were realistic to implement they helped in thinking differently and in gaining new perspective.

All the startups had had a lot of ideas for the product they were developing. They needed to decide what they would be able to implement with the current resources. Prioritization of features was discussed with the whole team. Ideas and issues that were commented on repeatedly by users caused four of the startups (SU1, SU3, SU4, SU6) to modify the product. Interviewee I11 said that in the end he decided what was implemented to the product based on what was important to him as a user. Startups SU6 and SU8 described the qualitative data from interviews and surveys to be very valuable although they did not use it continuously when developing the product. They described returning to it occasionally.

Startups SU3 and SU4 were implementing in their pilot only the features that enabled the user to do two core actions while leaving everything else to later versions. Prioritization was done by intuition and not by systematically evaluating which features produce most value to users. *"Basically what we're working for now is the launch. And anything that gets us closer to that is our priority. Unless there's a fix or a fire we have to put out."* (I4)

4.2 Challenges with Gaining Feedback and Using It

All startups told they had had challenges in collecting meaningful information from users or customers. Interviewees from startup SU4 said that they would not know what to ask from people. Startup SU4 was receiving positive feedback from discussions with users but they were not gaining many new users. "*I don't know what data we need and I don't know how to ask questions. So I think there is a bit of challenge.*"(I1) Interviewees from SU6 wondered if they were getting overly positive feedback since their product was the first one to help the users with the specific problem. They would have wanted constructive feedback to be able to improve the UX. Startups SU3, SU4 and SU5 said that they needed more users to be able to collect meaningful feedback and data about their current version of the product. SU8 told that they had gained 80 people signed up to be interested about their product but they were not prepared for it and could not utilize this user pool due to being so busy with other things. Limited resources affected all the startups and they needed to divide their time to balance between product development and business creation while still trying to learn if their focus was on the right product and market.

The product concept had changed for startups SU4 and SU6 after they had already conducted user research. The target market and end-users changed which resulted in them having user information that was not valid anymore.

Reaching the potential end-users in the planning phase was difficult for startups SU4, SU6 and SU7. Startups SU4 and SU7 were aiming to B2B markets so they were mainly discussing with customer representatives. Startup SU6 had problems to reach end-users because the product was targeted for people suffering from social anxieties

and they did not want to be interviewed. Even though SU6 could not directly reach the end-users, they managed to get feedback with a survey and through people who worked with the people from the challenging target group.

Startup SU3 described having major technical challenges in getting test users to download their application. The tool they used to distribute the application that was not yet published required multiple steps from users and from themselves. The interviewee I4 estimated having lost hundreds of test users due to technical difficulties after having personally asked them to become test users. He also described that while some users gave in depth feedback with some test users he had to remind them keep using the application and give feedback more than once. *"Especially the friends, they use it once and then I have to prompt them to try it again."* (I4) SU8 mentioned that if they had found the forum where their users interacted earlier it would have saved a lot of time.

The use of log data and analytics was challenging for startups SU1 and SU6. They had implemented the collection of statistics but were not gaining as much insight from it as they would have wanted. Startup SU4 was using data systematically to evaluate the behavior of users but they still found it difficult sometimes. *"The most challenging part is finding the meaning of data when it does not explain the reasons [behind actions]. And if we make wrong guesses then we won't learn."* (I5)

The challenges included finding relevant users for user research and testing, and having the right methods to get meaningful information. The interviewees did not mention having special difficulties in the actual UX design. In user tests, the product and UX need to be good enough for people to get some value. When the product relies on user-generated content it makes user testing difficult since the users might not be patient enough to wait for content to be created. Startups may not have enough resources to drive the creation of such content in the early phases of product launch

4.3 Needs for UX Work when Scaling Up

Startups that participated in the interviews were in different stages in their business and product development. When talking about the needs for UX work they would have in the future the answers varied. Startups SU3 and SU5 were preparing to launch the first public version of their product within a month and it was their first priority. They both mentioned that having perhaps one more person working on development and UX would be helpful but that they could also manage without one. They trusted that they would get enough user data after the launch which would then help them to improve the product. However, they did not have a clear plan on how to collect and analyze the feedback and data. *"The challenge with end-users might be that they just leave the site if they don't like it. We would need to know what made them leave."* (I6)

All the startups that currently did not collect log data and analytics (SU2, SU3, SU5, SU7) were planning to collect it from the upcoming versions of their product. They believed that it would enable them to understand users and react to it by improving the product. None of them had clear plans on how to gain insight from data but they trusted the tools available to help in it.

Startups SU4 and SU7 were preparing for a pilot with a B2B customer. They were expecting to get a better understanding of their customers and the user groups with the

pilot. Since they had no direct contact to the end-users, the collection of usage data was seen as the best way to learn from the users. Startup SU7 hoped to build trust with customer so they could later be in contact with end-users.

Startup SU6 was next planning to build a product for a new market outside of Finland. They estimated needing more background information of their users to understand them in the new market. This information would be, for example, the socio-economic background, how they heard about the product and what motivated them to come to the site.

The most common future vision regarding understanding users was collecting log data and analytics. Primary reason to collect data for SU3 was creating revenue with it by selling the data. As for feedback channels, SU4 was planning to implement a user support portal. SU1, SU3 and SU8 wanted to better utilize the people interested in developing the product with them. None of the startups mentioned currently having plans to conduct end-user interviews. Surveys were seen as a possible way to collect feedback in the future but none of the startups had planned them for now. In general, the startups did not have a clear strategy for future UX work.

5 Discussion and conclusions

Startups operate in fast changing environment and with fast changing practices. The eight startups that were interviewed provide some insight to what UX work has been seen useful and feasible to conduct in the startup context. For more thorough understanding and generalization of the results more startups should be investigated from different market areas. From the interviewed startups four had an international team working for them. This makes the results less tide to cultural differences but they were still operating from Finland. All but one (SU3) were also interacting and getting advice from same experts and investors within the local startup community.

The startups that had human-centered-design knowledge used a variety of ways to collect information on end-users. Some of them had conducted interviews, surveys and experimented with paper prototypes. This is in line with Coleman's [4] observation of software development processes which concludes that the background of people inside the startup has the biggest influence on how processes are formatted. These startups sometimes felt that they were not using the information as systematically as they could have but it still provided them support when they needed it. According to the interviewees, going back and reading the qualitative data was a good way to find ideas. Startups with no knowledge of human-centered design reported having difficulties in collecting meaningful information about users due to not knowing what to ask from users. Since the developers in startups are empowered to affect the UX design one option could be educating them to basic user research methods like in [14].

Startups change their product idea and market focus as they learn. This can result in startups doing user research on a user group that later is no longer relevant for them. For startups, it is important to have a set of lightweight methods to do user research. Finding potential users for interviews or testing can also be a challenge. The interviewed startups had used their personal networks to get feedback on their idea

and to test the product. Finding the right users for user research and testing is important. Some startups had found very enthusiastic people to get information and help from. With these "fans" they needed to be careful not to predict their positive feedback to be a representation of the whole target user group. Knowledge of user research methods and a more diverse or realistic user base could help them in getting more meaningful feedback.

UX work in startups needs to balance with different aspects. On one side, user research and testing need to be done as early as possible while at the same time the product, users and market might still change. Also the product that is tested should be minimally implemented but have enough features and UX design to keep the test users motivated to use it. This is relevant especially in products that require many users or user-generated content for it to provide value.

The limited sample of startups in this study does not represent all kinds of startups. Further research with a larger number of startups and following them up over a longer period will help determining more profoundly what kind of UX practices best serve the startups. Still, this study has provided new knowledge on how the startups approach different aspects of UX work and what challenges they face.

Startups should recognize the importance of UX when they are planning to enter markets with new, innovative products. Based on our research we suggest that startups would benefit from:

1) Having skills for user information gathering and analysis. This enables them to get more meaningful information and see past the generic feedback.
2) Applying lightweight methods for quick interviews, surveys and user tests that address questions arising in different stages of the startup's product development.
3) Putting effort in finding the right users for research and testing purposes, beyond the personal networks. This user base should be heterogeneous enough to present the user group and not just the early adopters. The size of the user base should be manageable to keep contact for a longer period of time and different product versions.
4) Preparing for the feedback and data that they will get. Log data and statistics might be challenging to analyze. Resources should be targeted in collecting what can be used afterwards, and for the analysis itself.
5) Creating UX strategy that would help keep focus and steer the product towards the wanted UX.

Addressing these issues from the very early phases of the product design and development will help startups create successful products with delightful user experience.

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