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Dissertation
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Web-based co-design

Social media tools to enhance user-centred design and innovation processes

Pirjo Friedrich

VTT SCIENCE 34

Web-based co-design

Social media tools to enhance user-centred design and innovation processes

Pirjo Friedrich (née Näkki)

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Web-based co-design
Social media tools to enhance user-centred design and innovation processes

Yhteissuunnittelu verkossa: Sosiaalisen median välineitä käyttäjälähtöisen suunnittelun ja innovoinnin tueksi. **Pirjo Friedrich.** Espoo 2013. VTT Science 34. 185 p. + app. 108 p.

Abstract

User involvement is generally regarded to be useful in information systems design. However, when designing online services for consumers, it may be difficult to reach the potential users and involve them in iterative development processes. Social media provides new possibilities for interacting with users on a daily basis, since it has become a natural method of communication for many people.

The aim of this thesis is to study how social media tools can be used to support user participation in the design and innovation processes, and how social media affects the elements of user participation. Theoretically the thesis is based on user-centred design, participatory design and user-driven innovation. By combining these three approaches, the research resulted in tools and methods for web-based co-design that were implemented as the Owela (Open Web Lab) workspace. It consists of blog-based discussion tools, user diaries, chat, questionnaires and polls that can be combined for different innovation and design purposes. This thesis presents results from six case studies in which consumers participated in web-based co-design throughout the innovation process or in some phases of it.

Social media tools proved to be most useful in the early exploration and ideation, which were inspiring and meaningful activities for the users as well. During the concept design, a lot of users can be cost-efficiently involved in evaluation and development of the concepts. Shared user diaries and real-time chat sessions can be used for collecting quick user feedback from the real use context during iterative software prototyping.

Web-based tools do not substitute face-to-face methods, but complement them by enabling more constant interaction with users and lowering certain users' participation thresholds. Via online tools, users can participate whenever they have time to do so. Transparency of the design process helps users to see their impact on the final product or service. Interestingly, participation in the process as such can be a rewarding experience for the users, if it offers a channel to be heard and express their own creativity.

However, individual contributions in social media tend to be small and occasional, or really active people may come to dominate the co-design process. Online communication skills affect users' abilities to express themselves, and participants cannot take the backgrounds of anonymous users' into account when interpreting other people's comments. If co-design has too open a goal and participants lack a common vision, users may become frustrated. Too big a task is not motivating for users who participate voluntarily.

In web-based co-design, the boundaries of different participant groups get blurred. Users also become designers and may participate even in decision making, whereas designers become facilitators of the co-design process. The researchers' role is to provide users with light-weight tasks and guidelines that help them to analyse their own needs, as well as involving their friends in the design process. The facilitation requires a lot of time and resources for continuous participation and regular updates of the online workspace. Text-based tasks need to be clearly formulated, and various types of activities are necessary in order to motivate different kinds of people with different motivations.

Keywords co-design, social media, user-centred design, participatory design, user innovation, online services, Owela

Yhteissuunnittelu verkossa
Sosiaalisen median välineitä käyttäjälähtöisen suunnittelun ja innovoinnin tueksi

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Tiivistelmä

Käyttäjien osallistumista tietojärjestelmien suunnitteluun pidetään yleisesti hyödyllisenä. Kuluttajille suunnattujen verkkopalvelujen potentiaalisia käyttäjiä voi kuitenkin olla vaikea tavoittaa ja ottaa mukaan suunnitteluprosessiin. Sosiaalinen media tarjoaa luontevan kommunikaatiokanavan ja tarjoaa uusia mahdollisuuksia näiden käyttäjäryhmien kanssa toimimiseen.

Tämän väitöskirjan tavoitteena on tutkia, kuinka sosiaalisen median välineitä voidaan käyttää tukemaan käyttäjien osallistumista suunnittelu- ja innovaatioprosesseihin ja miten sosiaalinen media vaikuttaa käyttäjäosallistumiseen. Väitöskirjan teoreettinen perusta on käyttäjäkeskeisessä suunnittelussa, osallistuvassa suunnittelussa ja käyttäjälähtöisessä innovoinnissa. Näitä menetelmiä yhdistämällä työn tuloksena syntyi työkaluja ja menetelmiä verkkopohjaiseen yhteissuunnitteluun, jota toteutettiin Owela (Open Web Lab) -työtilassa. Owela koostuu blogipohjaisesta keskustelualustasta, käyttöpäiväkirjoista, reaaliaikaisesta verkkokeskustelusta, verkkokyselyistä ja gallupeista, joita voidaan yhdistellä eri innovaatio- ja suunnittelutarkoituksiin. Tässä väitöskirjassa esitetään tuloksia kuudesta Owelassa tehdystä tapaustutkimuksesta, joissa kuluttajat osallistuivat verkkopohjaiseen yhteissuunnitteluun koko innovaatioprosessin ajan tai sen joissain vaiheissa.

Sosiaalisen median työkalut osoittautuivat hyödyllisimmiksi alkuvaiheen kartoituksessa ja ideoinnissa, jotka olivat myös käyttäjille mielekkäimmät vaiheet. Konseptisuunnittelun aikana sosiaalinen media mahdollistaa suuren käyttäjäjoukon osallistumisen konseptien arviointiin ja kehittämiseen. Jaettuja käyttöpäiväkirjoja ja reaaliaikaisia verkkokeskusteluja voi puolestaan käyttää iteratiivisen ohjelmistokehityksen aikana nopean käyttäjäpalautteen keruuseen todellisista käyttötilanteista.

Verkkopohjaiset työkalut eivät korvaa kasvokkain tapahtuvaa suunnittelua, mutta ne täydentävät sitä. Verkkotyökalut mahdollistavat jatkuvan vuorovaikutuksen käyttäjien kanssa ja alentavat tiettyjen käyttäjien osallistumiskynnystä. Käyttäjät voivat osallistua suunnitteluprosessiin haluamaansa aikaan, ja suunnitteluprosessin läpinäkyvyys auttaa heitä näkemään osallistumisen vaikutukset lopulliseen tuotteeseen tai palveluun. Osallistuminen suunnitteluprosessiin voi olla käyttäjille jopa palkitseva kokemus, jos se tarjoaa mahdollisuuden tulla kuulluksi ja ilmaista omaa luovuutta.

Toisaalta sosiaalisessa mediassa yksittäisten ihmisten panos voi olla pieni ja satunnainen, tai sitten erittäin aktiiviset henkilöt hallitsevat suunnitteluprosessia. Käyttäjien kyvyt ilmaista itseään riippuvat heidän vuorovaikutustaidoistaan verkossa, eikä käyttäjillä ole tiedossa nimettömien osallistujien taustoja, jotka auttaisivat

tulkitsemaan heidän kommenttejaan. Jos yhteissuunnittelu on liian avointa eikä osallistujilla ole yhteistä tavoitetta, käyttäjät voivat turhautua. Liian vaativat tehtävänannot eivät innosta vapaaehtoisesti osallistuvia käyttäjiä.

Verkkopohjainen yhteissuunnittelu hämärtää osallistujaryhmien välisiä rajoja. Käyttäjistä tulee myös suunnittelijoita ja jopa päätöksentekijöitä, kun taas suunnittelijoista tulee prosessin fasilitoijia. Tutkijoiden roolina on antaa käyttäjille kevyitä tehtäviä ja ohjeistaa omien tarpeiden analysointiin sekä omien ystävien osallistamiseen. Fasilitointi vaatii paljon aikaa ja resursseja jatkuvaan osallistumiseen ja verkkotyötilan säännölliseen päivittämiseen. Tehtävät täytyy muotoilla selkeästi, ja niissä pitää olla valinnanvaraa, jotta ne innostavat erilaisia ihmisiä osallistumaan.

Avainsanat co-design, social media, user-centred design, participatory design, user innovation, online services, Owela

Preface

I have been privileged to be able to study a topic that has not only been topical, but also practical, inspiring and continuously evolving. During the work on the thesis I have learnt a lot, and there are many people to thank.

I want to thank my supervisor Professor Marko Nieminen, who helped me to focus the thesis, made the process feel doable and encouraged me at various stages. I also want to thank my instructor Eija Kaasinen for her help especially in formulating the research questions and for reviewing my articles and thesis. I would also like to thank Professors Sampsa Hyysalo and Toni Robertson for their thorough and insightful pre-examination comments that helped me to improve the thesis.

This piece of research is a result of group work over several years. I am happy that I have been able to work together with so many talented and inspiring people. First of all, I want to thank Magnus Melin, Teemu Muikku and Timo Hintsa for implementing the Owela platform and constantly configuring it, based on new needs. Equally, I want to thank the colleagues with whom I had the pleasure to design Owela features and research methods over the years and co-author the articles in this thesis: Kaisa Koskela-Huotari, Maria Antikainen, Asta Bäck, Minna Pikkarainen and Tytti Virjo. Kaisa, I am especially grateful for your support and encouragement that made this process much more comfortable for me.

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During my dissertation process I had the pleasure of spending time abroad, three times, which is thanks to several people. I want to thank Professor Susanne Bødker for her guidance and encouragement in doing research, and the Aarhus University HCI team including Matthias Korn, Pär-Ola Zander, Nikolaj Kandrup Borchorst and Morten Bohøj for helpful discussions and peer support. I also want to thank Ferdinand Greger, Maria Friedrich, Stefanie & Benjamin Reeh and Susanne & Simon Siegert for offering me places to work when writing the summary part. For the most inspiring and efficient environments for writing I want to thank VR and Deutsche Bahn. In the final phases of the process I was happy to be able to share an office with the RWTH Aachen University TIM research group, for which I am grateful to Professor Frank Piller and all the colleagues in the group.

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I dedicate this dissertation to my dear mother Raija, who gave me the motivation for this work, encouraged me during the hardest phases of the process, and was the one most looking forward to this book. You are no longer among us to see this completed, but I know that you rejoice where you are.

Aachen, 4.3.2013

Pirjo Friedrich

Academic dissertation

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List of publications

The following papers are included in this thesis. The publications (except Paper VI) are written under the author's maiden name Näkki.

I Näkki, P. and Antikainen, M. (2008) Online Tools for Co-design: User Involvement through the Innovation Process. In: Karahasanovic, A. and Følstad, A. (Eds.). The NordiCHI 2008 Workshops: New Approaches to Requirements Elicitation & How Can HCI Improve Social Media Development? Trondheim: Tapir akademisk forlag. Pp. 92–97.

II Näkki, P., Koskela, K. and Pikkarainen, M. (2011) Practical model for user-driven innovation in agile software development. In: Thoben, K.-D., Stich, V. and Imtiaz, A. (Eds.). In: Proceedings of the 2011 17th International Conference on Concurrent Enterprising (ICE 2011).

III Näkki, P. and Koskela-Huotari, K. (2012) User participation in software design via social media: Experiences from a case study with consumers. AIS Transactions on Human-Computer Interaction, 4(2), pp. 128–151.

IV Näkki, P. and Ropponen, T. (2011) Multicultural participatory development of a civic social media service. In: Proceedings of Participatory Innovation Conference. Sønderborg, Denmark. Pp. 179–185.

V Näkki, P. (2010) Challenges of Open Online Design Spaces – Case Monimos. In: Proceedings of the 2nd International Workshop on Open Design Spaces (ODS 2010) Aarhus, Denmark. International Reports on Socio-Informatics, 7(2), pp. 8–16.

VI Bäck, A., Friedrich, P., Ropponen, T., Harju, A. and Hintikka, K.A. (2013) From design participation to civic participation – Participatory design of a social media service. International Journal of Social and Humanistic Computing, 2(1/2), pp. 51–67.

VII Näkki, P. (2012) Service co-design using online ideation and face-to-face testing: Case City Adventure. In: Proceedings of the 3rd Service Design and Innovation conference, Espoo, Finland.

Author's contributions

Paper I "Online Tools for Co-design: User Involvement through the Innovation Process" describes the process of using Owela tools in online co-design and a case study. Näkki designed the Owela process and methods, implemented the user study and was the main author of the paper.

Paper II "Practical model for user-driven innovation in agile software development" describes the user participation process that resulted from the Mobideas study. The case study was planned by the three authors and mainly implemented by Näkki and Koskela. Näkki was responsible for the user-centred design methods and online tools and was the main author of the paper. An earlier version of the user-driven innovation model in agile software development was published by the same three authors at the annual conference of the International Society for Professional Innovation Management (ISPIM) 2009.

Paper III "User participation in software design via social media: Experiences from a case study with consumers" presents the Mobideas case study and participants' experiences based on interviews and questionnaires. The case study was implemented and analysed by Näkki and Koskela-Huotari, who contributed equally to the paper. Also the interviews were planned, carried out and analysed collaboratively. In the paper, Näkki was mainly responsible for related research, methods and discussion.

Paper IV "Multicultural participatory development of a civic social media service" describes the Monimos case study in which a civic social media service was developed for and with immigrants. Näkki was responsible for the user involvement methods, facilitation of the online participation, collecting user data and keeping the research diary during the study. Participant interviews were planned, carried out and analysed collectively by Näkki and Ropponen. They planned and wrote the paper together. Näkki was mainly responsible for related research, the co-design process and conclusions. She participated in writing all other chapters as well.

Paper V "Challenges of Open Online Design Spaces – Case Monimos" presents the Monimos case study from the viewpoint of co-design in an open online platform. Näkki planned and wrote the paper alone. The same case study is described in papers IV and VI.

Paper VI “From design participation to civic participation – Participatory design of a social media service” brings social sciences perspective to the Monimos user study. Friedrich was responsible for the user study and data collection (described in Papers IV and V). Data analysis for this paper was carried out collectively by the five authors. The paper was mainly written by Bäck, Friedrich and Ropponen, whereas Harju and Hintikka participated in data analysis, paper planning and the writing of selected parts. An earlier version of the paper was presented by the same authors at the Mindtrek 2010 conference.

Paper VII “Service co-design using online ideation and face-to-face testing: Case City Adventure” compares online ideation in Owela and face-to-face service testing in a case study that was part of a bigger research project. Näkki was responsible for planning the case study, implementing it together with other researchers, collecting data and analysing the results. Näkki planned and wrote the paper alone. An earlier version of the paper was presented by Näkki at the SEM Summer school in services 2011.

Contents

1 Introduction

Social media has changed the way people, communities and companies interact over the internet. Professional media cannot any longer control what is being published, but all citizens can broadcast their opinions via social media services (Shirky, 2008). Social media supports the emergence of temporary communities of interest (Fischer, 2001) and citizens' self-organization (Fuchs, 2003) around issues that are important for them. In the same way, companies cannot control what is being discussed about their products and services. Both negative and positive customer experiences spread quickly to wide audiences on the internet. Seen positively, open collaboration with online communities provides new opportunities for innovation and the design of new products and services (Sawhney et al., 2005).

Companies are increasingly interested in collaborative innovation with customers and users (Greer and Lei, 2011). Different methods of user participation in new product development have been developed for decades, for example in the fields of information systems research (Iivari and Hirschheim, 1996; Kujala, 2003), human-computer interaction (Preece et al., 1994; Sharp et al., 2006), product development (Kaulio, 1998), marketing (Prahalad and Ramaswamy, 2004; von Hippel, 2005) and service science (Alam, 2002). However, most of the user participation methods allow either rich face-to-face communication among a small group of participants or limited feedback from a large number of people, for example via online surveys (Markus and Mao, 2004). Social media could potentially help to combine a large number of participants and rich, qualitative feedback as well as helping users to become partners in the innovation process (Nambisan, 2002). In the same way as physical design spaces support mutual learning and collaborative design among different stakeholders (Buur and Bødker, 2000), virtual spaces provide opportunities for collaborative design. As a new and evolving area, there is need for more research into how the potential of the social media tools can be best utilized in design processes.

Viewed from the perspective of people – whether in the role of citizens, consumers or participants – social media has become a part of everyday life. People use social media for communication among friends and family, organizing events, sharing opinions and collecting power of individuals to act together. People feel more empowered whether it comes to media, consuming, innovation or civic participation (e.g. Shirky, 2011). Social media thus challenges the traditional methods of user-centred and participatory design (Björgvinsson et al., 2010; Hagen, 2011;

Johnson, 2013). Users do not accept the role of passive consumers, but look for opportunities to contribute towards a better world and better products (Aalto, 2011). In order to utilize the innovation potential of the users and to give them opportunities for meaningful contribution, new methods have emerged for active user participation in product and service design processes.

1.1 Challenges in user involvement

Despite the known benefits of user involvement, integration of real end-users in innovation activities remains a difficult task (Schumacher and Feurstein, 2007). For companies, it is challenging to find the customer innovators and establish links with them in a cost-effective manner (Nambisan, 2002). According to the study by Heiskanen et al. (2007), small and medium enterprises have a great deal of interest in utilizing user information in design, and in involving users in evaluating products, but they lack time and financial resources as well as competences for applying user involvement in practice. Owing to limited resources, not all the stakeholders who would have an interest in and ideas for the design process can be directly involved in design activities. Often only some representatives of each user group can participate in the design process, and bigger user groups can only be involved in quantitative research methods, such as surveys (Markus and Mao, 2004). User research in the global context is a particular challenge (Heiskanen et al., 2007).

The success of the creative process also depends on the ability and willingness of developers to engage with different user groups, which is often extremely difficult (Hyysalo, 2010). User participation is lacking especially in the early phases of the innovation process (Følstad, 2009), although early user involvement would be most beneficial (Gardner, 1999; Madsen and Borgholm, 1999) and reduce costs later (Damodaran,1996). Companies in business-to-business markets involve their customers more often in early idea generation than do companies in the consumer market (Business Decisions, 2003).

Online innovation tools seem attractive in the context of developing online services for consumers, since a large number of geographically dispersed users can be reached easily, quickly and cost-efficiently. However, even if users' ideas can be gathered via online tools, it remains a challenge to organise and use the ideas efficiently in the development process (Ainasoja et al., 2011). There is a need for affordable methods that enable distributed interaction between users and developers in the early phases of the innovation process and are linked to the product development process (Heiskanen et al., 2007).

1.2 Social media – tools and practices for participation

Social media is a broad concept also known as social technologies (Hagen, 2011), social software (boyd, 2007; Følstad et al., 2011) and social web services (Jones, 2012). They refer to web services that include user-generated content and the possibilities of communication and networking. Typical examples of popular social media

services are Facebook, Twitter, YouTube, Pinterest and blogs. The content types can vary from status updates to user-created videos. Many users participate by sharing, commenting, liking or rating others' content or just watching it.

In the literature, social media has a variety of broad definitions, such as

- Web-based tools and practices enabling participation and collaboration based on individuals' activities (Storey et al., 2010)
- Tools that people use to share content and to interact, and the process that this interaction creates (Erkkola, 2008)
- Web 2.0 tools that allow the creation and exchange of user-created content, as well as building communities and networks (Kaplan and Haenlein, 2010; Kangas et al., 2007). Web 2.0 refers to technologies, such as AJAX, Flash, and RSS that enhance interaction and the interlinking of services. User-created content means digital content that is produced outside professional routines by "ordinary people", and either published on a publicly available web-site or shared with a group of people on a social networking site (OECD, 2007).
- Internet-based solutions that support mutual sharing and open dialogue between users, meaning that people other than the active participants in the communication can also see the shared content or discussion and can join in (Følstad et al., 2011).
- "Web- and mobile-based technologies to support interactive dialogue and to introduce substantial and pervasive changes to communication between organizations, communities, and individuals" (Wikipedia, 2012)

Social media is a natural evolution of earlier interactive online services such as discussion forums and Internet Relay Chat (IRC), but the more recent web technologies and especially the general adoption of the easy-to-use web services enable new forms of communication and the real-time collaboration of a broader spectrum of participants. As a result of affordable computers and internet subscription rates the transactional costs of information sharing have fallen, and new forms of sharing and collaborative action have now become practical on a large scale (Shirky, 2008; Spinuzzi, 2009). Social media can in broad sense be understood as the practices of many-to-many broadcast (O'Reilly, 2005) and a collaboration by masses that is also called the "wisdom of the crowd" (Surowiecki, 2005) or crowdsourcing (Brabham, 2008). Social media provides anyone, regardless of technical competency, with the opportunity to connect, communicate, and interact with each other (Correa et al., 2010) as well as continuously modify content in a collaborative fashion (Kaplan and Haenlein, 2010). Typical characteristics of social media services are openness, immediacy, and connectedness (Postman, 2009).

As a natural platform for participation, social media provide new opportunities for companies to involve consumers in innovation and product development. Users can be involved as innovators and design partners continuously connected with the developers via social media. An open and transparent design process that allows more people to participate with their knowledge and skills may lead to higher

quality in design, even if individual participants only make minor contributions (Tapscott and Williams, 2006; Surowiecki, 2005). In certain conditions, large groups of people can produce collectively smarter decisions and predictions than a few experts.

1.3 Research domain and goals

This thesis investigates user involvement in information systems design in the era of social media. Technically, the opportunities for online collaboration have been available for decades, but broadband Internet and modern user interfaces have led to new opportunities for reaching average citizens. The main motivation of this work is to help companies overcome the challenges of involving users in product development and to utilize users' innovation capability.

The scientific background for this work comes from human-computer interaction (HCI), which is an interdisciplinary field studying the design, evaluation and implementation of interactive computing systems for human use (Hewett et al., 1992, p. 5; Dix et al., 1993; Sharp et al., 2006) and more specifically from user-centred design. User-centred design (UCD) is an established approach to user involvement throughout the iterative information systems design process (Gulliksen et al., 2003; ISO 9241-210, 2010). The work has also been influenced by the Participatory design (PD) approach that gives users an active role in the design process and pays attention to different roles, power structures and democracy that are involved in systems design, especially at workplaces (Schuler and Namioka, 1993; Greenbaum and Kyng, 1991). User-driven innovation (UDI) provides a supplementary viewpoint to user involvement from economics and marketing research. It defines a process of developing new products and services based on users' knowledge, either based on identifying consumers' true needs or using lead users' as sources of new ideas (Wise and Høgenhæven, 2008).

User-centred design methodology was developed mainly in the 1980s, and participatory design originates from the 1960s. They were developed at a time when computers were used at work only, and the user involvement methods are based on face-to-face contact with users. Social media could solve some of the challenges of user involvement presented in Section 1.1., but – as with any technology – they also affect the social system and practices around their use. Therefore, it is equally important to investigate the consequences of using social media tools in design. The objectives of this thesis are to research:

- how social media tools can be used to support user participation in design and innovation processes, and
- how social media tools as a collaboration channel during the design process changes user participation.

In this thesis, I follow the interpretation of Erkkola (2008) who defines social media both as web-based tools that people use in order to share content and to interact, and the process that this interaction creates. Although many iconic examples of social media services, such as YouTube and Facebook, have millions of users,

similar tools and interaction practices can be used with smaller communities as well. Especially in design and innovation processes, public social media platforms are not always the most suitable options for the specific purposes, and many companies have developed their own design platforms based on social media tools.

As distinct to the research on social media as a subject or context of design (Hagen, 2011; Johnson, 2013), my perspective is to study how social media tools and practices of open dialogue and sharing could support the design process of basically any kind of products and services. I restrict my study to the pre-launch design processes of online services that are targeted to average consumers or citizens outside workplace. By online services I mean information and communication services that are accessible online, e.g., via a PC or smartphone. Social networking services are one example of online services, but others include e.g. news sites, online bookmarking, route planners and internet security services. Some of them can be used alone, whereas others are targeted on particular groups of people. I focus on consumer services whose target group is not clearly specified. The users can be basically anyone and remain unknown to the service provider. I restrict the study to consumer context, since consumers are forerunners in social media and can, therefore, more easily participate in a social media-based design process than would be required in a business context.

In Chapter 2, I first present the research background to this thesis and the current development directions in the fields of UCD, PD and UDI, especially from the social media point of view. Chapter 3 then introduces web-based methods and tools that have been used in those fields and experiences of using them to involve users in design and innovation processes.

The more detailed research questions in this dissertation will be formulated in Chapter 4, based on the gaps in previous research. The objectives of the practical part of this dissertation are:

- to develop web-based methods and tools for involving users in design, and
- to evaluate the developed methods and tools in certain design contexts within multiple case studies.

Chapter 5 presents the online design platform Owela that was developed and analysed within this research. The validation of the Owela tools and methods was carried out in multiple case studies that are presented in Chapter 6. Even if social media services are not the object of this research, most of the case studies are about social media services: web or mobile services that enable creating and sharing user-generated content and networking with other users. Online services provide a good testing platform for web-based development, since they can be prototyped and modified quickly online.

The results of the use of different methods are then described in Chapter 7, followed in Chapter 8 by an analysis of user experiences of the web-based design process from the perspective of participants and facilitators. Answers to research questions are given in Chapter 9, and the broader significance of the results is discussed in Chapter 10.

2 User involvement in innovation and design

The reasons for involving users in innovation and design processes can be viewed from different viewpoints. In information systems design, user involvement is expected to lead to more accurate user requirements, features that meet users' needs, a greater acceptance of the system, and enhanced ease of use (Kujala, 2003; Mao et al., 2005). When users are involved in the early phases, costly problems can be avoided later (Damodaran, 1996; Norman, 1998). User participation can also be given a value as such: users have a right to be involved in making the decisions affecting their lives (Ehn, 1993).

In the marketing and service research literature, customers are seen as value co-creators of services, which means that services cannot exist without interaction with users (Vargo and Lusch, 2008; Grönroos, 2011). Customers add value to the product or service when they are involved in the co-creation even in the early phases of the innovation process (Piller and Ihl, 2009; Prahalad and Ramaswamy, 2004). The greater role of consumers' in the innovation process is expected to increase product quality and the likelihood of its success, since consumers' own ideas are more likely to be valued by them (Hoyer et al., 2010).

There is no single methodology for user involvement in system design; instead, there are various approaches stemming from different disciplines. Different approaches to user involvement can be identified by looking at the direction of interaction: bringing the users to the developers as participants in the design process, or bringing the developers to the users to study and understand the context of use (Heiskanen et al., 2007). Kaulio (1998) categorizes user involvement methods based on longitudinal and lateral dimensions. Longitudinal dimension refers to the phases of the design processes in which user involvement takes place, such as during the specification, concept development and prototyping (Kaulio, 1998) or during use (Botero et al., 2010). The lateral dimension refers to how deeply users are involved in the design process: whether the products are designed for them, with them or by them (Kaulio, 1998). Sundbo and Toivonen (2011) use a similar categorization for approaches to user involvement: understanding the needs of users, collaborating with users, and seeing users as innovators (Sundbo and Toivonen, 2011).

In this chapter, I present three approaches to user involvement that have affected my thinking and that are the foundation for this thesis:

- User-centred design (UCD): design *for* potential users
- Participatory design (PD): design *with* real users
- User-driven innovation (UDI): design (ideas) *by* users.

Although the three approaches can overlap and be present in the same project, there are some differences in the mind-set and role of users. Figure 1 illustrates the three different approaches to the users' role in relation to a company developing a new product or service: as a subject of study and informers in UCD, collaborative partner in PD and sources of ideas or even the driver of the design process in UDI. Both UCD and PD are led by professional designers in a company that defines the innovation target. In UCD, the users do not necessarily have any contact with each other, whereas in PD users participate in design workshops and thus meet other users as well as designers and developers. User-driven innovation differs from both in the sense that the user community can start innovating alone, typically with the help of web-based tools, and possibly bring the product idea to the company later.

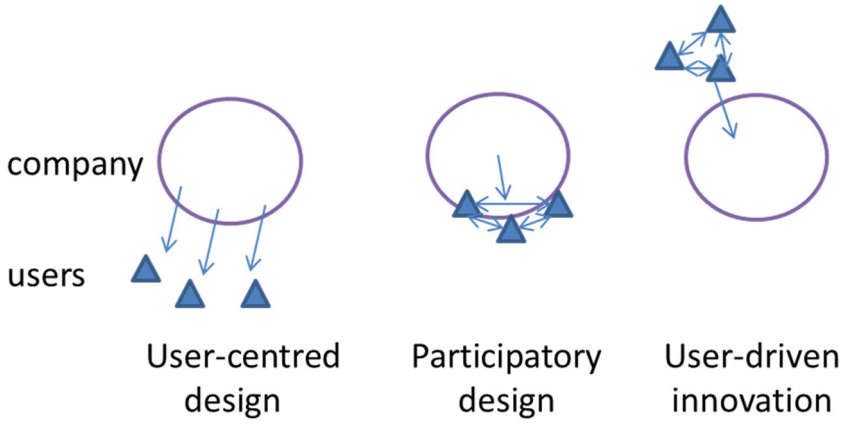

Figure 1. Different approaches to user role in design.

The boundaries between the different approaches to design research (Blessing and Chakrabarti, 2009) are vague because of the multidisciplinary nature of the field and increased interest in some of the concepts in other fields of research. Business researchers use partly different terms (user-driven innovation, customer involvement, living labs, co-development) to refer to similar issues from HCI (user research, user-centred design, participatory design) and the same concepts (co-creation, user-driven innovation) to refer to different issues. The relationships between the different concepts are illustrated in the domain landscape by Sanders and Stappers (2008) in Figure 2. The two main areas are user-centred design on the left, and participatory design on the right. UCD is a broader, industrial approach, whereas PD has originally focused on collaborative design at workplaces (Karat and Karat, 2003; Buur and Larsen, 2010).

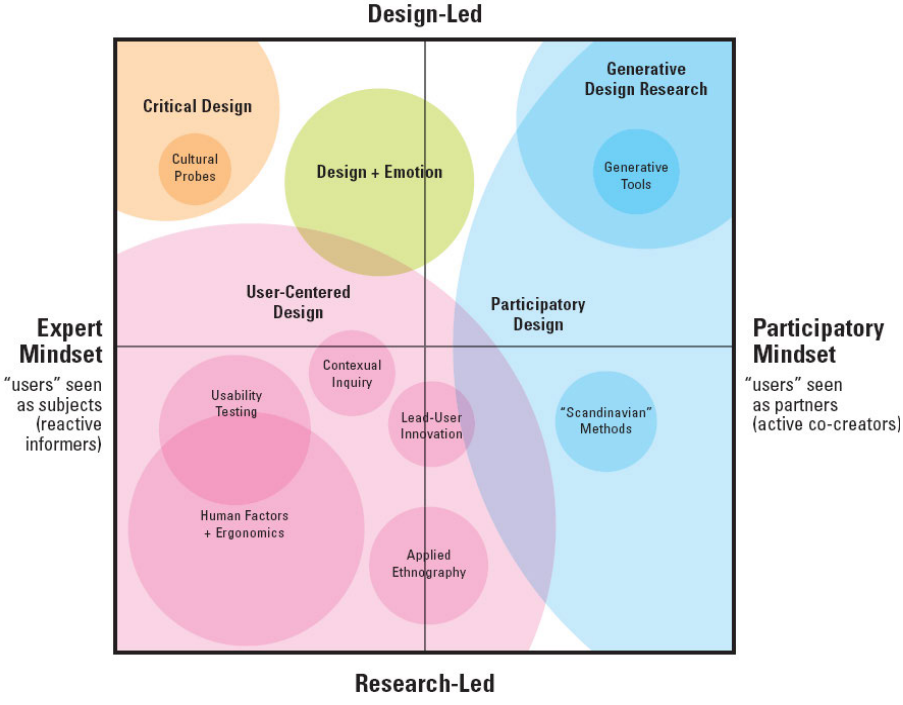

Figure 2. Domain landscape of human-centred design research by Sanders and Stappers (2008).

At the end of this chapter, I present the challenges that the changing nature of design present to traditional methods of user involvement. The subject of design is changing from single products to social systems and services. More recent approaches to user involvement, such as co-design and service design, are presented as examples of how to respond to the changing context of design. The new approaches also lead to changes in the roles of participants and the facilitation of the process.

2.1 User-centred design

User-centred design (UCD) of interactive systems is a process focusing on usability throughout the development process (Gulliksen et al., 2003). Human-centred design (ISO 9241-210, 2010) and iterative interaction design (Sharp et al., 2006) bring some special focus to the same issue, but are in practice used as synonyms for UCD.

2.1.1 Process and methods

The UCD process starts by defining the usability goals and analysing the use context, users and tasks that are used for specifying the user requirements. Alternative design solutions are then developed iteratively and their usability and user experience is evaluated throughout the process. (Gould and Lewis, 1985; Mao et al., 2005; Sharp et al., 2006; ISO 9241-210, 2010)

Gulliksen et al. (2003) present 12 more detailed principles for user-centred systems design, including, for example, prototyping, holistic design and user-centred attitude in addition to those previously mentioned. Users' tasks and goals are the driving force behind the development, and users are consulted throughout development (Sharp et al., 2006). Users' activities are especially studied in the context of use (Iivari and Iivari, 2006) where they should also be evaluated (Gulliksen et al., 2003).

In user-centred design, professional designers and developers lead the process, collect the user data, analyse it, and make design decisions based on the data. Users are involved in the process, but only when the professionals need their input. Since users cannot easily express their needs directly (Hyysalo, 2010; Sanders and Dandavate, 1999), researchers need to understand their capabilities, characteristics, goals and practices in order to develop solutions to help users achieve their goal more effectively and produce a more enjoyable experience (Sharp et al., 2006). The users' role, however, does not need to be restricted to evaluation and commenting the designer's ideas, but they can be intimately involved in the implementation process and affect the result, including social and technical aspects of design (Preece et al., 1994).

The phases of the traditional UCD process are suitable if there is already an idea of the product to be developed. In that case, the system requirements can be defined based on user and context research. However, if totally new products are developed, creative methods need to be used for creating the idea for the new product. The user-centred product concept design (UCPCD) process describes the whole chain from finding new product ideas based on justified user needs and developing them into concepts and products that are evaluated with users (Kankainen, 2003; Salovaara and Mannonen, 2005). As can be seen in Figure 3, it is also based on user research, but has additional phases of generating concept ideas and prototyping before the product to be developed is defined.

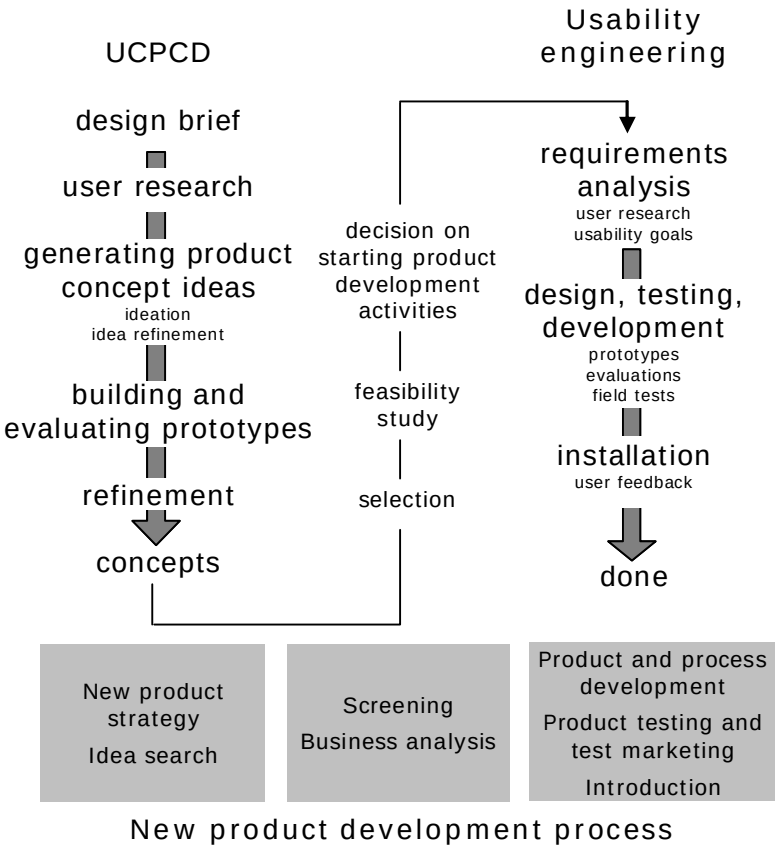

Figure 3. User-centred new product development process as described by Salovaara and Mannonen (2005).

A variety of UCD methods have been developed for different phases of the design process (Maguire, 2001; Sharp et al., 2006). Some of the methods require user participation, whereas others can be used by researchers without direct interaction with users. Table 1 summarizes the methods by which users are involved in at least an informant role. They are here categorized according to the main phases of the user-centred product concept design process: user research, ideation, concept design and evaluation, and software development and testing. User research can be used in multiple stages of the process as in Figure 3.

Contextual interviews can be used at the beginning of the design process to identify real user needs by observing and interviewing people in their work context (Beyer and Holtzblatt, 1998). If direct participation is not possible, user diaries and cultural probes can be used to gather information concerning users' everyday lives (Gaver et al., 1999). Probes are often used as a form of material packages, tasks and cameras that help the users to provide information that can inspire the de-

signers and help in empathizing with the users' situation (Jääskö and Mattelmäki, 2003). These kinds of projective methods help users express their action, feelings and thoughts (Nikkanen, 2001). Focus groups, interviews and surveys can be used in need identification (Sharp et al., 2006) as well as in ideation. In the exploration phase, researchers can also use expert-oriented methods such as context of use analysis and task analysis as well as study documentation and research similar products (Maguire, 2001; Sharp et al., 2006).

After user and context studies, the insights can be analysed e.g. in the form of affinity diagrams, personas and scenarios of use (Maguire, 2001). If the goal is to develop a totally new product or service, creative methods are needed for generating ideas about the new product. Brainstorming can be done either by researchers based on the user research data or together with the users. Users can also be involved in design workshops (Westerlund, 2007).

In different phases of the concept and product design process, ideas can be tested with users in the form of scenarios, storyboards, mock-ups and prototypes (Norman, 1998; Maguire, 2001). Low-fidelity prototypes, such as paper prototypes, can be used in laboratory settings for testing ideas and scenarios, whereas interactive prototypes simulate the real use of the system in the real environment (Kankainen, 2002). Usability testing (Nielsen, 1994) of the real system has been one of the most commonly used ways of involving users in the software design process, albeit only in an evaluator role and in a later phase of the development process. Field tests are important, especially when designing mobile services (Isomursu et al., 2004). If real users are difficult to reach, researchers can use heuristics to evaluate the usability of a system (Nielsen, 1994). Satisfaction questionnaires can be used to collect user feedback even if the researcher is not present in the testing situation.

Table 1. Examples of user involvement methods in different phases of the UCD process.

Design phase	Methods	User role
Exploration, user and context research	Contextual inquiry	responsive
	User diaries	productive
	Cultural probes	productive
	Focus groups	responsive/productive
	Interviews	responsive
	Surveys	responsive
Ideation	Brainstorming	none/ productive
	Workshops	productive
Concept design and evaluation	Interviews	responsive
	Workshops	productive
	Paper prototyping	responsive
Software development and testing	Software prototyping	responsive
	Usability test	responsive
	Field test	responsive
	Satisfaction questionnaires	responsive

In most methods, users respond to researchers' questions and tasks. User diaries, probes, brainstorming and workshops are examples of the methods in which users can have an active role in producing content and design suggestions.

2.1.2 Challenges and development directions

Users should be involved early and continuously throughout the system design and development process (Gulliksen et al., 2003), but in practice it is difficult for developers to gain direct access to users and observe them, and to meet the users (Butler, 1996). Furthermore, user research is most effective when developers directly participate in it, but it is seldom easy to arrange (Hyysalo, 2010). The same applies to designers who have not typically worked directly with users in workshops or focus groups (Bruseberg and McDonagh-Philp, 2001). If the developers or designers do not have the time or inclination to meet the users, it is challenging for the researchers to effectively communicate the results of the user research and fieldwork (Kujala, 2003).

UCD methods typically produce overwhelming amounts of raw data as well as requiring the researchers to spend a great deal of time on arranging and conducting user studies, travelling, communicating and managing data (Kujala, 2003). For small companies, user research can seem too expensive, especially when potential customers are dispersed globally. For this reason, lightweight UCD methods have been developed (for example Millen, 2000; Holtzblatt et al., 2005).

The UCD process has also been challenged by the agile software development approach, which has a similar goal with UCD but also significant differences (Blomkvist, 2006). Agile software development methods are lightweight processes for software development that emphasize customer involvement and requirements prioritization and verification based on continuous communication (Boehm and Turner, 2003). It has been widely used in software companies to enable iterative development and rapid changes based on customer feedback throughout the development process (Larman, 2003). However, the real end-users are not typically included in the agile software development process (Hansson et al., 2006), or only a small group of users interacts with the developers in face-to-face meetings and possibly using some ICT tools (Kautz, 2010; Hansson et al., 2003).

Chamberlain et al. (2006) have identified three different tactics of integrating user-centred design with agile software development: undertaking large scale user studies before the actual development cycles ("iteration zero"), undertaking user studies independently of agile development cycles, or involving user representatives in the development team. All of these approaches have some limitations. For example, fixing user requirements before development is contradictory to the principles of agile development (Agile manifesto, 2001), and user representatives in the typical agile project are rarely the real end-users.

UCD process and methods have originally been developed in a workplace context, in which users accomplish certain tasks with specific tools (Jordan, 2003). Particularly in the consumer context, there are no clear tasks that need to be

solved with a new system, and contexts of use vary. The UCD process has also been criticized for its focus on evaluation of the design instead of on finding the best ideas for the design (Greenberg and Buxton, 2008). Ljungblad and Holmquist (2007) claim that both idea generation and user research is needed to produce innovations that meet users' needs. The user-centred product concept design (UCPCD) concentrates more on generating new product ideas and developing them into concepts, based on justified user needs (Kankainen, 2003). Future-oriented information, such as company strategies and trends in users' lives and society, should also be combined with the results of user studies in the early phases of concept design (Salovaara and Mannonen, 2005).

When moving to the consumer context and services that people use in their leisure time, the evaluation criteria change from efficiency to enjoyment and from pure usability to user experience (Forlizzi and Ford, 2000). UCD has been criticized for its focus on the evaluation and laboratory research with a small number of participants instead of working in the real use context (Greenberg and Buxton, 2008). When developing mass products for consumers, there is no single context of use or a typical user, but new methods are needed to involve different kinds of users in the design process and explore new opportunities for innovations. Table 2 summarizes the challenges in the traditional UCD approach.

Table 2. Challenges in traditional user-centred design.

Limitations of time and place	Direct participation of different stakeholders is difficult
	Does not support working with globally distributed users (and developers)
Cost-intensivity	User research arrangements and data management make the methods time consuming and expensive
Timing of user participation	UCD conflicts with agile software development process and principles
Limited focus in innovation	Focus on tasks and specific contexts
	Starting from the phase where the product ideas exist already: where do they originate?

2.2 Participatory design

Participatory design (PD) has a long tradition in involving users in the design process of information systems, especially in the workplace context, starting in Scandinavia in the 1970s. Participatory design is not a strict methodology, but rather a mind-set and ideology of democracy and empowerment of workers in the decision-making affecting their daily (working) lives (Muller and Kuhn, 1993; Ehn 1993; Damodaran, 1996). It acknowledges that skilled users can make important contributions to successful design and high-quality products (Ehn, 1993). Since users are experts in the work context, the design can be effective only when they contribute to it (Dix et al., 1993).

2.2.1 Roles and methods

PD aims at creating a closer relationship between users and developers by offering a common space where the knowledge from both sides can be combined (Muller, 2002). Users become members of the design project and participate in co-design activities (Kensing et al., 1998). The workers come out of their work situation and share the design task with the professional designers, whereas the designer enters into the subjective experience of the workplace (Dix et al., 1993). The researchers' role is to create the conditions for participation (Bødker, 1996). Since the emphasis is on democratic participation, organizational and political contexts and power structures also need to be considered, especially in workplace settings (Kensing and Blomberg, 1998).

PD is context-oriented, collaborative and iterative. It aims at improving the work environment and task by the introduction of the design; it is based on the collaboration of designers and users who can contribute to every stage of the design process, and the design is constantly subject to evaluation and revision (Dix et al., 1993). Participatory design methods typically include future workshops, brainstorming, scenarios, storyboards, mock-ups, prototypes, role play exercises and organizational games (Ehn and Kyng, 1991; Schuler and Namioka, 1993; Bødker et al., 1993; Dix et al., 1993). A variety of other tools and techniques can be used for data gathering, analysis and presentation at various stages of the design process, such as review, hearing, document analysis, functional analysis, SWOT analysis, and company visits (Bødker et al., 2004).

The traditional PD methods stress the importance of face-to-face interaction between users and designers during the design process (Kensing, 2003). When users cannot be reached face-to-face, methods such as cultural probes can be used to gather information concerning their everyday lives and needs (Gaver et al., 1999). However, the main focus is not on the methods themselves, but on the democratic conditions of participation and roles between different stakeholders.

2.2.2 Challenges and development directions

Even if the ideal is democratic participation, often only a small group of users can be involved as (full-time) members of the design team. They gain a rich participation experience when measured by the amount and quality of participation and ability to influence design decisions (Hunton and Beeler, 1997; Saleem, 1996). A larger group of future users can typically participate only to a limited extent, for example, by answering a survey or providing input during beta testing (Markus and Mao, 2004).

More recently, PD has also been applied outside work contexts in everyday life and the public sphere (Syrjänen, 2007; Björgvinsson et al., 2010). Pragmatic benefits such as better products have gained more value in addition to the political agenda of democratic participation (Bergvall-Kåreborn and Ståhlbrost, 2008). Whereas the major barrier in a work context is the lack of time for participation

alongside full-time job responsibilities (Davidson, 1999), in a consumer or citizen context it is even more challenging to find users (Bergvall-Kåreborn and Ståhlbrost, 2008; Yndigegn, 2010) and get them involved, since participation is entirely voluntary (Kyng, 2010).

Interaction between users and designers is often limited to singular events that support short-term participation (Klammer et al., 2011). The limited timeframe for a workshop limits the time for sharing experiences and developing new ideas (Yndigegn, 2010). Since system development processes are nowadays often distributed geographically, temporally, or organizationally (Gumm, 2006b), Distributed Participatory Design (DPD) approaches have started to emerge (e.g. Obendorf, et al., 2009, Loebbecke and Powell, 2009; Gumm, 2006a). Distribution is easily seen as an obstacle to the design process, but it can also be an opportunity for more frequent and easier contacts between users and developers via instant online communication. However, most DPD studies have been made in a professional context in organizations or with expert teams (e.g. Titlestad et al., 2009; Obendorf et al., 2009).

Software design has radically changed since early PD projects, which also requires new design approaches. In particular, PD needs to be extended into the areas represented by social technologies (Björgvinsson et al., 2010; Hagen, 2011). The traditional division between workers and managers, or users and developers does not hold good in a network society, in which everyone can be a producer and collaborate with people who share the same interests (Benkler, 2006, Fischer, 2009). Consumer cultures have turned into cultures of participation, in which everyone is provided with the means to participate actively in the activities that are valuable to them (Fischer, 2009). Table 3 summarizes the challenges in the traditional UCD approach.

Table 3. Challenges in traditional participatory design.

Limitations of time and place	Only a small group of users can be involved
	The possibilities of participation by larger groups are limited
	Interaction is often limited to single events
	Face-to-face meetings are difficult in distributed development settings
Applying in a consumer context	It is challenging to find and involve consumers
Fluid roles	The division into users and developers does not hold good in a network society

2.3 User-driven innovation

User involvement in new product and service development has not only been studied by design researchers, but also within marketing and innovation studies. Von Hippel (1986; 2005) was the pioneer in studying the shift of the locus of inno-

vation from inside the company to the users. Many researchers have followed him and have also developed different concepts in order to study the same phenomenon from different viewpoints.

The term Open Innovation is used to describe a phenomenon in which companies utilize both internal and external ideas and knowledge in the innovation process (Chesbrough, 2003). Users are seen as an important source, though not the only source of ideas outside the company. The users' role in innovation can take many forms and, depending on the approach, it has been referred to as *user innovation* (von Hippel, 1986; 2005), *user-led innovation* (Sharp and Salomon, 2008), *user-driven innovation* (Botero et al., 2009a; Kaasinen et al., 2010) or *user-based innovation* (Sundbo and Toivonen, 2011).

A user-driven innovation concept is used in innovation politics to define a process of developing new products and services based on users' knowledge (Wise and Høgenhæven, 2008). User knowledge can be gained either by researching the consumers' true needs or using lead users as sources of new ideas (ibid). The term user-based innovation has been employed similarly to describe both 1) the acquisition of a deep understanding of user needs and utilising it in the development process, and/or 2) co-developing innovation together with users (Sundbo and Toivonen, 2011). Co-development may have many embodiments, such as users being the sources of innovation, partners in the innovation process, or further developers of the new service.

Botero et al. (2009a) have noted that user-driven innovation as defined above is, in reality, not always led by users, but can be reduced to traditional marketing research. They define a *user-driven open innovation* approach that considers users as equal partners who "innovate by themselves or for themselves". Companies do not produce "ready-made" services for the users, but users have an active role in influencing the development. In contrast, Holmquist (2004) uses the term user-driven innovation to describe a designer-led approach in which users inspire the designers but are not independent innovators as such. It is based on the assumption that people are not able to talk about their needs for things that do not yet exist, and therefore radical innovations require methods other than asking questions directly of users (Fulton Suri, 2008).

The different definitions of user-driven innovation may also stem from the differences in understanding innovation that is not always clearly defined when speaking about it. Innovation is often defined as an *implementation* of a new idea that can, for example, be a product or process (OECD, 2005; Amabile, 1996), but more general definitions exist, such as "an insight that inspires change and creates value" (Dubberly, 2008a). Buur and Larsen (2010, p. 123) define innovation "as the emergence of novelty that comes about in local interactions between people with different intentions" as distinct from goal-oriented effort.

2.3.1 User innovation

User innovation refers to products developed by consumers rather than manufacturers. Users are experts on user experience and thus as a significant source of innovation (Thomke and von Hippel, 2002). Typically, user innovations occur during the use of the product or service (von Hippel, 1986; 2005). “Lead users” are users that are ahead of a trend and encounter needs before others do (von Hippel, 2001). Since use-related information is “sticky”, that is, difficult to detach from its domain and context, lead users can better innovate themselves than express their needs to designers (von Hippel, 1994; Hyysalo, 2010). Companies can “outsource” innovation tasks to lead users by, for example, arranging lead user workshops (Herstatt and von Hippel, 1992) or equipping them with toolkits that help users to carry our innovation and design tasks (von Hippel, 2001; Franke and Piller, 2004; Jeppesen, 2005).

User innovation borrows some aspects from both UCD and PD. It is participatory in nature, but still trusts the expert view, since the innovation-capable lead users are the “experts” among the users (Sanders, 2006). Therefore, it is not capable of addressing the needs and dreams of the majority of “normal” people (ibid). Many examples of user innovation stem from professional or hobbyist communities, whereas it is more challenging to establish innovation communities with average consumers without a strong interest in a certain product (Heiskanen et al., 2010). Average consumers’ ideas often describe a need rather than solution (Magnusson, 2003), and they cover functionalities rather than emotional elements that are important especially in service design (Sandström et al., 2009). The sceptics claim that users cannot imagine the future and products that do not yet exist. It is difficult to even speak about radical innovations, since users do not have the vocabulary for them. (Heiskanen et al., 2007) Therefore, users often prefer familiar products or incremental improvements (e.g. Duke, 1994; Trott, 2001).

However, Heiskanen et al. (2007) believe that, when supported in a proper way in the ideation, users are able to recognize the possibilities for radical innovations. Methods like lead user workshops, empathic design (Leonard and Rayport, 1997), information acceleration (Urban et al., 1995) and metaphor elicitation technique (Coulter and Zaltman, 1994) have been suggested for studying the motivations, images and emotions that are difficult to express in words (e.g. van Kleef et al., 2005). Magnusson (2003) discovered that users’ ideas were more innovative and provided greater value for users than ones from professional product developers. Users’ ideas were just more difficult to implement, which would suggest that the professional developers tend to develop ideas that they know to be implementable. If good user ideas are not linked to actual business goals and strategies, it can be hard to integrate them into product development processes. The companies can also take the wrong direction if directly implementing the wishes of their customers (Füller and Matzler, 2007; Alam, 2006).

The ultimate challenge in all innovation is that the success of new ideas cannot be anticipated. Different research and design methods can be used to identify

opportunities for innovation and increase the speed of generating and testing new ideas, but the acceptance of ideas still depends on natural selection in the market or in political process (Dubberly, 2008a).

Companies can utilize user innovation by organizing online idea competitions (Piller and Walcher, 2006; Ebner et al., 2009; Blohm et al., 2011). Users are encouraged to propose ideas and possibly to evaluate them, something that is motivated by rewarding the most active participants or the best ideas (Ebner et al., 2009). The community typically participates only in idea generation, after which the company makes the decisions on further implementation.

Companies do not often use the full potential of user innovation, but limit user participation to idea generation, product testing and designing relatively simple products, such as T-shirts or logos, rather than letting users collaborate with the developers throughout the innovation or development process (Klammer et al., 2011). Companies are still concerned about the intellectual property rights (IPR) of the ideas, which reduce their willingness to open up the innovation process on the web (Luoma et al., 2010).

2.3.2 Community innovation

User innovation as such is nothing new: enthusiasts and hobbyists have always created their own solutions for their needs (Sharp and Salomon, 2008). The internet has made the phenomenon more visible and enabled collective innovation by a large number of people in an open process. User innovators can now swap insights and gain faster feedback from others online, which leads to shifting value networks and distributed capitalism (Sharp and Salomon, 2008). Distributed and networked user communities can also innovate without any companies (Botero et al., 2009b). Some examples of community innovation are the electric car community in Finland (Botero et al., 2009b) and Habbo fan sites created by user communities (Johnson and Toiskallio, 2005).

Open source software (OSS) development is a typical example of community-based innovation, where the community develops software whose source code is open to anyone to use, modify and distribute (von Hippel and von Krogh, 2003). Technically skilled individuals develop the software to serve their personal needs, but also share it voluntarily with others. The OSS community relies on Internet tools in the communication and coordination of their work (von Hippel and von Krogh, 2003; Rantalainen et al., 2011). While OSS has also become popular among consumers, not all users develop software themselves any more. The non-developer users can, however, participate in the innovation process by articulating their problems and imagined solutions in the community discussion forum, and hope that the developers react to them (Iivari, 2010). The developers do not necessarily appreciate non-developers' ideas, and OSS communities still remains rather restricted for average users without programming skills or an interest in development (ibid.).

Companies can also participate in innovation communities as enablers or facilitators, and bring users' ideas into production (Sharp and Salomon, 2008). Companies can also create their own online innovation communities that are targeted basically on any consumers (Schwab et al., 2011). Innovation communities are based on crowdsourcing, in which a company defines tasks for users who are expected to contribute for only a short time in the early stage of the development process (Huber et al., 2009).

2.4 The changing nature of design and user participation

The context and objects of design have changed in several ways. First of all, design is increasingly oriented from workplaces to everyday life and the public sphere (Bødker, 2006; Björgvinsson et al., 2010). The subject of design has changed from single, customized software systems supporting typical workflows within one organisation (Obendorf et al., 2009) into social systems and services. System design comes closer to urban design, meaning that new elements must be designed on top of the old and the design never becomes ready (Kuutti et al., 2007). The requirements are contradictory, and finally the users decide how they use the system. In order to involve voluntary consumers and citizens in the design processes, the participation in itself must be inspiring and rewarding. UCD and PD approaches could learn from user innovation and the social practices of internet participation that rely on people's own involvement and peer production.

Furthermore, the focus of design is moving from supporting productivity to supporting creativity (Shneiderman, 2007). On the one hand, this means a shift from controlled studies to long-term case studies, observation and data logging to understand the patterns of usage; on the other, the focus is on collaborative creativity and brainstorming (Shneiderman, 2007). Long-term studies during use could benefit of social media platforms that support user-designer interaction throughout the study. Design researchers must also consider their relation to user-driven design and innovation in other research traditions (Björgvinsson et al., 2010). User-driven innovation demands practitioners with open attitudes and the ability to deal with uncertainties and challenges.

Especially internet services as a subject and context of design have altered what and how designers design (Dubberly, 2008b; Hagen, 2011). Design and innovation activities have become distributed, and boundaries between citizens, companies, public domain and academia have become blurred (Björgvinsson et al., 2010). The goal of design is no longer a fixed and perfect product, but an evolving system that can only be "good enough for now" (Dubberly, 2008b). Instead of new product versions, the web-based services can be updated continuously. Customers have learnt to expect updates and accept their role as an extension of quality assurance teams, finding and reporting bugs that can be fixed in the next update (Dubberly, 2008b). Design and use are intertwined, especially in social software that is constituted through use (Hagen and Robertson, 2010).

When developing social media services, traditional assumptions of user-centred design do not hold good any more. The service cannot be designed beforehand, but is developed based on user-developer interaction during the use of the service (Johnson, 2013). Since social media must be designed to support collaborative actions, a community-centred approach is needed instead of studying users and user needs at an individual level (Brandtzæg et al., 2009). The designer must participate in building sustainable communities and encouraging social interaction and the co-creation of content (Vanattenhoven and Jans, 2007). The designers' role becomes to facilitate and encourage use as well as creating the conditions for participation: to "seed" content, community and connections that can continue after the project ends (Hagen and MacFarlane, 2008; Hagen and Robertson, 2010). Instead of recruiting research subjects or "users", designers need to work with a potential community of contributors (Hagen and MacFarlane, 2008).

2.5 Emerging approaches to collaborative design

As an answer to users' more active role in design processes, a variety of multidisciplinary approaches and new concepts have arisen, such as co-design, participatory innovation, Living Labs, service design and meta design. These are closely linked to user-centred design and participatory design, but emphasize different viewpoints and aim to update the traditional approaches regarding the changes in the nature of design.

2.5.1 Co-design

In design research, the term co-design has been used for the collaborative nature of design activities across the whole span of the design process from exploration at the fuzzy front end and ideation to concept development and prototyping (Sanders and Stappers, 2008). In marketing literature, co-design has been used in the more limited perspective of mass customization, meaning that users define, configure or modify their individual solutions from a list of options and components. Co-design means customer collaboration (in online communities) that allows them "to express their product requirements and carry out product realization processes by mapping the requirements into the physical domain of the product" (Piller et al., 2005). The term co-creation has been used similarly and defined as "a collaborative new product development (NPD) activity in which consumers actively contribute and select various elements of a new product offering" (O'Hern and Rindfleisch, 2009, p. 4).

Sometimes co-design and co-creation are used as synonyms for participatory design, but the newer concepts are less ideologically loaded and have a broader perspective to participation (Mattelmäki, 2007). Steen et al. (2007) understand co-design as a mixture of participatory design and empathic design – researchers empathising with users, their experience and emotions. In co-design the focus is on free-time services for consumers instead of workplace systems (Steen et al., 2007).

Co-design can aim at new practices for different kind of communities, and companies have a smaller role than in participatory design. One of the differences is that the discussion around participatory design and user-centred design has remained academic, whereas the co-design concept has managed to sell similar ideas to business people (Sanders and Stappers, 2008).

In co-design, special attention is paid to the early phases of the design process in which the product or service idea does not yet exist (Sanders and Stappers, 2008). Co-design is based on the belief that users can best determine what they need in order to shape their own environment, and that collective creativity can lead to more useful, relevant ideas via combinations of previously unrelated ideas (Sanders, 2001). Generative tools, such as design games (Brandt, 2006), probes and 3D mock-ups (Holopainen and Helminen, 2011) are used as a means for creative interaction.

The co-design concept has also been used at a general level to describe participation that is 1) collaborative, 2) transparent as regards methodology, inputs and outputs, goals and status, 3) leads to close working relationship through continuity of participants, and 4) welcomes input from a multiplicity of viewpoints (Bradwell and Marr, 2008). Co-design is a developmental and learning process that involves an exchange of expertise relating to both the subject of the design process and the process itself. Collective ownership and power is given to all who are involved. Co-design is practice-oriented, focusing on clarity of vision and a shared creative intent between all participants. (ibid)

2.5.2 Participatory innovation

Participatory innovation (Buur and Matthews, 2008) combines participatory design and design anthropology into a market-oriented lead-user approach. Participatory design tradition stresses that “ordinary” people are able to contribute to innovation and provides a variety of methods that organizations can use in order to involve users. Design anthropology, for its part, aims at understanding the users, challenges existing conceptualizations by portraying the familiar as strange. These two aspects provide deep understanding and new insights, whereas the lead user approach directly ties in to market opportunities. A participatory innovation project can be described as a dedicated activity in which people’s needs and practices are the starting point for generating business opportunities. (Buur and Matthews, 2008)

Participatory innovation differs from PD and UDI in that it sees innovation as being socially shaped. It is the emergence of novelty in often conflictual conversations (Buur and Larsen, 2010). Larsen and Bogers (2011) claim that many of the “user-driven” or “open” innovation processes are in reality limited by the boundaries set by organizations, which limits dialogue with users and thus the potential of user-driven and open innovation. The typical competitions, focus groups or idea platforms organized by companies do not represent a natural dialogue for people, who in reality communicate through stories. Participatory innovation activities will not happen as planned, but all participants bring their own perspectives to the interaction.

(ibid.) Improvisational theatre can be used as a creative method for gaining insight into the dynamics of how users, other stakeholders and company employees interact and why users voices are not always heard (Buur and Larsen, 2010).

2.5.3 Living Labs

Living Labs aim at creating real-world structures for co-creation among multiple stakeholders including in particular the potential users of new products and services (Eriksson et al., 2005; Følstad, 2008). Since Living Labs lack any clear definition, they have been seen from different perspectives: as a methodology, an environment and a system (Ståhlbröst, 2008). In this thesis, Living Labs are seen as a user-driven innovation approach in a real-life context as opposed to a laboratory setting. Living Labs support citizens, companies (solution providers), authorities and policy makers develop and validate new technologies and services in collaboration with researchers (Bergvall-Kåreborn et al., 2009a). Living labs facilitate user influence in open and distributed innovation processes, engaging all the relevant partners in real-life contexts, and aims to create sustainable values (Bergvall-Kåreborn et al., 2009b). Users do not just give feedback on designers' suggestions, but engage with one another and create things together. Users are seen as experts in their own area and most knowledgeable about their own processes (Gulliksen et al., 2009).

Living Labs have been used especially in the context of smart cities that integrate ICT services into urban development and user-driven innovation ecosystems (Schaffers et al., 2011). They typically apply UCD and PD methods, such as focus groups, field tests, future workshops, interviews and co-design workshops. Living Labs differ from the traditional UCD approach in that they stress the openness of the innovation process, are based on realistic real-life use situations often in certain territories, and see all stakeholders, including end users, as partners (Bergvall-Kåreborn et al., 2009a). The main role of Living Labs is to engage and empower users to participate in the creation of valuable assets based on their own needs and wants (Ståhlbröst, 2008).

2.5.4 Meta design and End-user development

The meta-design approach is based on the assumption that future uses and problems cannot be completely anticipated at design time. Designers should, therefore, not design complete solutions but open platforms that users can modify, based on their future needs and new problems that the same systems can be used for. (Fischer, 2009) Equally important, the designers must "design the design process" and create conditions that enable broad participation in design activities (Fischer et al., 2004). That means that users are provided with social and technical instruments so that they can create and modify the solutions themselves at the time of use and reshape the systems through collaboration. The goal is that all

participants, even ordinary users with no special computer skills, acquire ownership of problems and contribute actively to their solutions. (Fischer et al., 2004)

Ye and Fischer (2007) have identified the following requirements for facilitating continuous user participation in metadesign:

- embracing users as co-designers
- providing a common platform where users can share with each other and integrate the design solutions of others
- enabling legitimate peripheral participation for newcomers and recognizing their active contributions
- sharing control and giving authority in the decision-making process depending on the level of the user's involvement
- promoting mutual learning and support
- fostering a social reward and recognition system.

Metadesign is strongly related to End-user development, which means that the users develop or modify the system or parts of it themselves (Lieberman et al., 2006). The current web technologies offer new opportunities for end-user development where the end-user is without a knowledge of programming languages. Lightweight development processes and tools can help end-users to develop web mashups, i.e. applications that compose content and functions from various sources via the Web (Cappiello et al., 2011).

2.5.5 Service design

Service design is an emerging field that focuses on developing services instead of physical products. It is a holistic, multidisciplinary and integrative field that aims at innovating and improving services so that they are more useful, usable and desirable for clients (Moritz, 2005). Service design has applied many principles of participatory design in practice: Emancipatory objectives, cooperative approaches and involvement techniques are common to both approaches (Holmlid, 2009).

Service design consists of the design of the overall service experience as well as the process and strategy to provide the service (Moritz, 2005). Unlike products, services exist only in interaction with customers who co-create the value of the service (Vargo and Lusch, 2008), and therefore customers should be even more closely involved in the service development process. In service design, a variety of empathetic and generative methods are used, such as roleplay, mock-ups and service prototyping (Moritz, 2005).

2.6 Facilitation of user involvement

When users are involved in the innovation and design processes of a company, there is typically a need for *intermediaries* between the supplier and the users. Innovation intermediaries refer to "actors who create spaces and opportunities for appropriation and generation of emerging technical or cultural products by others who might be described as developers and users" (Stewart and Hyysalo, 2008). Innovation intermediaries are individuals or organizations that facilitate user innovation and link user innovations into supply-side activities. In the IS literature, these intermediaries are called *change agents*, whose role is to design and execute participation opportunities for the stakeholders (Markus and Mao, 2004).

In the UCD literature, the term *facilitator* is used to describe the role of an intermediator between users, designers and developers (Gulliksen et al., 1999). Group facilitation has been studied, for example, in the contexts of collaborative learning and computer-supported cooperative work (CSCW). Generally, a facilitator is an actor who assists the group in achieving its objectives (Viller, 1991). The facilitator's role is to manage group discussions so that the group can build a shared vision, effectively solve problems, learn and make decisions (McLagan and Bedrick, 1983, Schwarz, 1994).

When online platforms are used, the *mediators* need to manage technical issues and adapt the system to the specific context (Okamura et al., 1994). In collaborative learning or work, the tasks of online facilitators include, e.g. deciding the topic, setting the context, rules and agenda, inviting people, providing access and motivation, stimulating discussions, identifying new topics, recognizing contributions, maintaining participation, and wrapping up (Brochet, 1985; Feenberg, 1986; Salmon, 2000).

2.6.1 Facilitator in user-centred design

In the UCD process, facilitators are the individuals who intermediate between the users, designers and developers by coordinating the process (tasks and tools) and communication with different actors (Gulliksen et al., 1999; Macaulay, 1999). Facilitators can be designers, usability specialists, or external researchers who lead the participant team and facilitate its discussions. They choose who can participate and which methods and tools will be used (Markus and Mao, 2004). They are intermediators and matchmakers between different stakeholders, interpret users' input and translate it into software requirements. Therefore, they should understand the domain where new software is being used, be socially competent and able to communicate with people from various backgrounds (Gulliksen et al., 1999; Macaulay, 1999).

The facilitator can be an active problem solver – somebody who actively steps in and resolves conflicts – or a neutral observer. Neutrality has been considered as a goal especially in the participatory design tradition: a facilitator's task is to bring people together and ensure equal contribution of all participants without

influencing the decisions (Mumford, 1993; Macaulay, 1999). Brandt (2007), however, believes that the facilitator of a collaborative design process does not need to be neutral, but must enable everyone to be heard and deal with different viewpoints. The facilitator is often also a representative of others. When communicating with users, the facilitator speaks with the mouth of the designer, and when talking to the designer, the UCD facilitator is regarded to be a user representative. Therefore, facilitators need to be aware of power imbalances and conflicts between the different roles. (Gulliksen et al., 1999)

Draetta and Labarthe (2010) define mediation tasks that must be carried out within a user-centred innovation process. An organizer (or facilitator) needs to identify "good" users, choose the relevant characteristics to evaluate (context, meaning and situations of use), use the "right" methods and have good methodological and communicational skills. The facilitator of the user-driven innovation process is in charge of the user analysis and data collection as well as presenting the results of the analysis in a form that is understandable and easily applicable by the project leader, designers and developers (Draetta and Labarthe, 2010).

To summarize the various roles of a facilitator, Macaulay (1999) has presented a seven-layer model that consists of political, social, personal, method, activities, technology and environment layers (see Table 4). The facilitator operates at multiple inter-related levels simultaneously.

Table 4. The seven layers of the facilitation (Macaulay, 1999).

Political	Taking care of relationships with stakeholders, empowering the group, making the objectives transparent
Social	Building team spirit, encouraging creativity, identifying and solving communication problems and cultural differences
Personal	Being aware of one's own feelings and social norms, taking care of one's own behaviour and credibility
Method	Being an expert on the method, adapting the method, helping others to learn the method
Activities	Taking control of the agenda, activities and outcomes, making summaries and reviewing the process
Technology	Selecting the appropriate technology and controlling its use
Environment	Creating an environment that supports learning, organizing meeting logistics and ensuring an appropriate physical environment

2.6.2 Facilitator in co-design

When moving from user-centred design to co-design, the user researcher's role changes from that of a "translator" between the users and the designer into a facilitator who supports people's expressions of creativity (Sanders and Stappers, 2008). The facilitators need to keep participants motivated and focused, create and maintain a relaxed and creative atmosphere and provide concrete materials to begin the idea exploration (Lucero et al., 2012).

Designers can also change from authors who make decisions into facilitators who initiate a generative connection with potential stakeholders and communities at an early stage of a project (Hagen and MacFarlane, 2008) and build agreement (Dubberly, 2008b). Hagen and MacFarlane (2008) use the concept of seeding when designing social media services: the designers' role is no longer to design a ready-made system for the users, but to facilitate and encourage the use of the system and to create the conditions for participation: to 'seed' content, community and connections that can continue after the project ends.

Since not all users are willing to do the work that belongs to professionals (Fischer, 2002), the facilitators' role is to support the "prosumer teams" in producing content and building up the community. The facilitator must maintain the user group's interest and enthusiasm during the design period (Mumford, 1993). In addition to the traditional researcher skills, the facilitator thus needs knowledge of social interactions, indicating factors which can guide and inspire the design (Sanders and Stappers, 2008).

According to Sanders and Stappers (2008), the facilitator needs to take into account the different participants in the co-design process and support them in their different levels of creativity by 1) leading people at the "doing" level, 2) guiding people at the "adapting" level, 3) providing tools that support creative expression at the "making" level, and 4) offering open possibilities at the "creating" level. Buur and Larsen (2010) point out that, since conflicts and crossing intentions can be drivers of innovation, the facilitator should not take a role as a neutral consultant, but enter into constant relations with the other actors.

User researchers and designers do not research and analyse user needs any more or design ready-made products, but facilitate users in finding the solutions to their needs themselves (Sanders and Stappers, 2008; Dubberly, 2008b). The user role thus changes from a victim who needs support to a valuable source of inspiration (Kanstrup and Christiansen, 2006). The designers' relationship to the users becomes a conversation instead of a request for approval (Dubberly, 2008b). The change from an expert-driven design paradigm to facilitated collaboration and co-creation is presented in Table 5.

Table 5. Changing relationships between designer and audience (modified based on Dubberly, 2008b, adapted from Sanders, 2007).

	Past	**Current**	**Emerging**
Design paradigm	Expert driven	Human centred	Facilitated
Audience role	Customer	User	Participant
Activity	Consume • Shop • Buy • Own	Experience • Use • Interact • Communicate	Co-create • Adapt/ modify/ extend • Design • Make
Authority role	Designer	User researcher	Facilitator

3 Web-based methods for user involvement

Design is a distributed social process, a collaborative activity, in which communication plays a vital role (Erickson, 1995). Therefore, new communication and collaboration tools can enhance the design process. Web-based communication is a positive opportunity for collaboration, by making it possible to choose partners based on shared interests instead of physical location, and enabling the participation of more people than would be possible in face-to-face settings (Fischer, 2004).

Several research fields have contributed to the development of web-based methods for user involvement, namely remote user research and testing, distributed participatory design (DPD), open innovation (OI) and open source software development (OSS). Computer-supported co-operative work (CSCW) is a related field of research that has contributed by developing various online collaboration tools (*groupware*) and evaluating how they affect communication, group work and organization (Dix et al., 1993). However, these tools are typically developed for professional use instead of as a means of consumer involvement in the design processes.

Online tools can be used to involve users in the design and innovation process in a variety of ways, depending on what kind of role is given to the users. Users can be seen as informants, commenters, design partners or even innovators (Damodaran, 1996; Sundbo and Toivonen, 2011). In this Chapter, I present different approaches to using web-based methods for user involvement and summarize the opportunities that social media tools add to the previous methods and activities. The boundaries between different approaches are vague, but they are grouped here based on the main focus.

3.1 Remote user research

Online user research involves users typically as a source of information and inspiration for the designers. The process is driven by a professional researcher or designer who wants to understand the users, their contexts and activities. Online surveys, remote contextual inquiry, online focus groups and online diaries have been used as research methods in the exploration phase. Also, automatic data, such as usage logs, can be used as a source of inspiration and understanding users.

Remote contextual inquiry, as Rampoldi-Hnilo and English (2004) call it, is a method for observing computer users over the telephone or in web conferencing

and screen sharing in their real work context and seeing how the users really use certain applications. The think aloud method (Lewis and Rieman, 1993) and interviewing are used in order to understand why users do certain things. Sharp et al. (2006, 327) use the term 'online observation' for the same method. They stress that in online interaction we only see a part of another person's personality and context. The words thus get stronger in comparison to gestures: what you say (or don't say) and how you say it are central to the way others respond.

Online surveys have also been used as a cheap and fast method for creating personas. These kinds of personas are not representative but they do not need to be if they inspire the design and make possible problems visible. The social media mechanism of sharing can be utilized when asking people to forward the questionnaire. That can be an effective way of recruiting more participants, if social media users are in the target group (Apte and Hülsken, 2008). Social media tools can also be used for recruiting participants in interviews or design sessions.

Focus groups are typically used in social science and market research to obtain an in-depth understanding of participants' perspectives and opinions, as well as in brainstorming (Reid and Reid, 2005). The internet offers a lot of possibilities for focus groups, not only because participation is easier and cheaper, but because the visual anonymity and psychological distance from others can stimulate group participation. Online focus groups are a new opportunity especially for those individuals who otherwise hesitate to participate in face-to-face meetings. Reid and Reid (2005) compared synchronous online focus groups with face-to-face focus groups and found out that the online focus group allowed participants to generate ideas faster and more efficiently than face-to-face. The reasons why participants liked the online focus group were: more time to think, openness because of anonymity, the possibility to rehearse and think concisely, and being less self-conscious.

There are a number of qualitative online tools for diary studies and cultural probes. Vanattenhoven and Jans (2007) have used a blog to gather information about users in the early phases of the design process. They created accounts for users and invited them to join a private blog, in which there were questions and tasks for photo and video elicitation. Users were asked to comment on the blog posts and use text, videos and photos. In contrast to traditional interview and diary methods, users can access each other's data and are encouraged to communicate with each other. Separate applications were used for photo and video sharing, but the blog was the central access point to all content. (Vanattenhoven and Jans, 2007)

Hagen et al. (2007) have given users digital cameras, mobile phones and lo-fi video cameras to record images, audio, video and text to document certain aspects of their daily life. The intention of the mobile diary is to "provide a window into the lives of participants", a way for them to share their world with the designers. Mobile devices allow participants to document their experiences remotely and upload this information in situ. Participants can also be prompted via SMS or automatic reminders to take 'snapshots' of their current actions, thoughts or feelings in certain situations. (ibid)

Hammer-Jakobsen and Goldman (2009) have implemented online probes using the tool called Piipl. Piipl was used for gathering user requirements and wishes in the early phases of the innovation process (Hammer-Jakobsen and Goldman, 2009). Piipl provides closed sites that are hosted by a facilitator who invites participants, and asks them to submit videos, pictures and text about observations and insights around a given topic. The facilitator can initiate organized discussions and engage participants in tagging, organizing and commenting on the content that other users have posted to the site. The benefit of using an online tool for users' self-documentation is that the facilitator can redirect participants during the study, if the material that they collected does not seem relevant. The participants can share their insights and communicate with each other even when they are in different places. (Hammer-Jakobsen and Goldman, 2009)

Kaptein et al. (2009) created a tool for online context mapping, which is a procedure that combines cultural probes and focus groups in order to inspire researchers in the early design process. They compared the online and face-to-face methods and found that the data (user-generated collages and discussion) gathered online was as rich and useful as that in the face-to-face sessions. The online participants were even more inspired by the work of others, which showed that the online setting can also support a useful interaction between participants. (Kaptein et al., 2009)

3.2 Remote usability testing

In distributed software development (DSD), online tools like email, videoconferencing, chat, software libraries, version control systems, testing, bug reporting tools, and shared workspaces have been used to enhance knowledge-sharing, discussion, and the coordination of work among distributed teams and stakeholders (Farshchian and Divitini, 1999, Lings et al., 2006). Online tools have also been used to involve users in testing and giving feedback. Online services in particular can be tested independently by users who provide feedback via an online form or in a teleconference with the usability specialist.

Remote usability testing can be an online version of a moderated usability test (Thompson et al., 2004) or an automated test (Bolt, 2006). Moderated remote usability testing or facilitated remote research means a situation, in which one person (the researcher) is watching while another person use a computer, viewing the screen movements via screen-sharing software, talking over the telephone and recording the conversion and the participant's screen (Bolt, 2006). In the market, there is a wide variety of screen-sharing tools and recording software that can be used for remote usability testing (Bolt, 2006; Bolt and Tulathimutte, 2010). In automated or unattended remote usability testing, users report their own behaviour via, for example a browser frame during their use of a website. The testing software can record mouse clicks as well as individual answers to survey questions in different steps (Følstad and Karahasanović, 2012). This allows hundreds and thousands of participants and automatic reports (Bolt, 2006). Nowadays, there

are a variety of tools that enable the collection of user feedback from early visualizations to running websites (Følstad and Karahasanović, 2012).

The benefits of remote usability testing are the possibility of involving users from diverse geographical areas, cost savings, flexible schedule and the opportunity for more people (e.g. managers and developers) to follow the test situation without the restrictions of physical facilities (Gough and Phillips, 2003; Bolt, 2006). The research setting is also more natural in users' own environments, e.g. at home or at the office instead of in a lab, and therefore, there is a greater ethnographic element in the study (Gough and Phillips, 2003). One limitation of the remote testing is naturally the lack of the researcher's physical presence and the expense of the remote testing software and teleconferencing.

3.3 Distributed participatory design

Users can also be involved as design partners via web-based tools. Co-design sessions can be partly replaced or supplemented with video conferencing, video use-logs, blogging and groupware tools (Sanders et al., 2010; Gumm et al., 2006). Heß et al. (2008) replaced face-to-face meetings with virtual user councils. The remote "user parliament" used conference calls and wiki for communicating feedback, problems and suggestions for a new product version. All interested users of the product could apply for membership in the user parliament, but after the project started, no new members were admitted to the online forum. Sharp (2008) also used teleconferencing and wikis for customer participation in agile software development.

In their distributed participatory design project, Obendorf et al. (2009) used online surveys to reach larger user groups as a supplement to participatory design workshops with a limited number of user representatives. The challenge of online surveys is that you easily obtain incorrect data and cannot contact users for clarifying questions after the survey if users answered unclearly (Friman, 2011). Obendorf et al. (2009) also set up an online discussion forum to enable user participation between face-to-face workshops, but users did not start using it, since they considered it to have less immediate value than workshops. Face-to-face workshops with user representatives were considered necessary for creating a shared vision of the system and its development among users from various organizations.

Klammer et al. (2011) report a rare example of combining a user-driven innovation approach and participatory design methods to involve distributed stakeholders in the design process in a work context. They involved both healthcare professionals and patients in the design process of a video consultation system at medical clinics. In order to enable collaboration among participants and researchers, a private social network (on the Ning platform[1]) was set up as a platform for documentation. Researchers first conducted contextual interviews and introduced the social media platform personally to the participants. Users were asked to upload

[1] http://www.ning.com

their videos, photos and text entries of their daily work or life. They were used as a basis for generating new ideas, which were further developed into scenarios in face-to-face future workshops and tested in simulations of future work. Researchers used the blogs to comment on users' entries, but interaction between participants was rare in the first experiments. Since the simulations with lo-fi prototypes resulted in the strongest motivation to participate, Klammer et al. (2011) suggest that simulations should be carried out as early as possible in order to raise the motivation also to participate in a social media platform.

Yndigegn (2010) also combined social media with a real world co-design session in a shopping mall. Users played design games. and the results were written as stories into a public blog. Users were encouraged to complement their stories as well as comment on others' stories afterwards, but only three users came forward and wrote a comment. Yndigegn (2010) supposes that the blog was probably too open and the meeting in the mall too transient to make people confident and involved enough to continue the participation on the web. However, the blog helped the project team to document the co-design session, and the project partners used the blog as a place for discussion during the first 48 hours after the event. The time frame was set to motivate people to contribute here and know.

Reyes and Finken (2012) conducted a three-week long Future Workshop on Facebook. Even if the original method was borrowed from participatory design approach, the study consisted only of a short-term design session with potential users who did not share the problem to be solved. They gave feedback on an existing web solution and generated new ideas for a related mobile application. User participation was divided into three topics, each of which were discussed for one week: critique, fantasy and implementation. Users participated eagerly at the beginning, but some also felt unconfident due to a highly professional discussion by others or were stressed because of the high volume of the contributions. It was found out that a social media service normally used for relaxing is not an optimal tool for tasks that feel more like work (Reyes and Finken, 2012).

3.4 Open innovation platforms

Online innovation platforms have been widely used for collecting ideas or feedback from the consumers. In comparison to remote user research and testing and distributed participatory design, users are typically involved only in the ideation phase and not considered as members of the design team. Users are seen as sources of new ideas, but the process is led by a company who formulates the idea challenges, rewards participants and decides, which ideas will be implemented. On the other hand, there are user-driven innovation communities that have been created, for example, by the fans of a company or people who share similar needs that are not met by current products. Some communities are targeted for one user group, like the customers of a certain product, whereas some innovation communities are general and open to all kind of ideas that users can suggest to different companies.

Worldwide, there were a couple of online open innovation communities that were used as benchmarks when starting this research work. Cambrian house was launched in 2006 as a crowdsourcing community based on a totally user-driven approach. Users were the initiators of new businesses and technology ideas that were then developed in the community (Cambrian house, 2013). VTT experimented with the Idea movement and collected 35,000 mobile service ideas (Alahuhta et al., 2006) as well as a further 4,300 ideas from aging participants (Leikas, 2007). The ideas were collected in face-to-face workshops and afterwards shared online for open use by all companies and citizens. As in many other open innovation cases, the challenge was how to analyse the vast amount of data and generate real businesses out of the ideas (Leikas, 2007).

Companies can utilize open innovation by building their own communities or using existing social media services such as Facebook or Twitter or other existing communities related to their products and services (Antikainen, 2011). Dell was one of the first to launch its own public innovation platform Ideastorm in February 2007, and many others followed (Tiki-toki, 2013). Starbucks, Nike, Lego and Nokia are other examples of companies who have their own online innovation communities open to all consumers to give feedback and suggest ideas for new products and services. In the Lego Factory, users do not only ideate but also create their own custom Lego models and share them with other users (Antikainen, 2011).

Examples of shared innovation platforms for several companies are OpenIdeo.com, Innocentive.com and eYeka.net. These platforms act as innovation intermediaries who utilize online communities in order to facilitate innovation management for their clients (Ahonen and Lietsala, 2007). OpenIdeo is structured based on a design process with clear stages, during which the users can take the concepts further by building on others' work (Paulini et al., 2012). Even if there is a clear time line, users are free to choose how they wish to contribute (ibid). Innocentive is an online innovation marketplace, where companies can seek ideas to their challenges and pay for the best solutions (Antikainen, 2011). eYeka arranges idea competitions based on the challenges faced by their client companies related to product development, branding, positioning, packaging and creative concepts.

Quirky.com is one of the few existing examples of a truly user-driven innovation platform, where individuals may suggest any product ideas that the community develops further into real business cases, including brand design. Every week the community votes one product to be placed in the Quirky online store. If the product gets enough pre-orders, Quirky starts manufacturing it, and the innovators get a share of the profits. (Walker, 2009)

3.5 Open design in software development

Open design refers to a design whose makers allow its free distribution and documentation and permit modifications and derivations of it (van Abel et al., 2011). It has been used in the context of designing physical products, machines and systems through the use of publicly shared design information. Open design is ideologically

rooted in open source software (OSS) development, which is a classic example of community-based design that utilizes web-based methods in the collaboration.

The OSS communities have traditionally utilized email lists, internet relay chat (IRC), and internet forums in coordinating the software development (Barcellini et al., 2008, Terry et al., 2010). The bug reporting tools and version control systems are used as collaboration tools by the developers, but they are too technical for the non-developer users (Nichols and Twidale, 2006). Therefore, the design process is not open to all users equally. User-developer communication works best during the open testing phase, but design and requirements construction still lack efficient communication support (Rantalainen et al., 2011).

To improve the user-developer communication and obtain quick feedback on user interface screenshots, many OSS projects have applied a design-by-blog approach for distributed design (Nichols and Twidale, 2006). Public blogs make participation in the design process easy, transparent, and conversational in comparison to more formal bug reporting tools (Nichols and Twidale, 2006). One example of open community-driven design is the Drupal 7 User Experience project. In that project, design work, such as wire-framing and usability testing, was crowdsourced openly for the public using various online tools, namely YouTube, Flickr, Twitter, online forums, IRC channels and multiple blogs (Reichelt, 2009a; 2009b). Wire-frame designs were asked for from users during the Iteration zero, and usability tests were conducted by the users throughout the project. The facilitators did not directly study users and test usability, but motivated and instructed the users to conduct light-weight usability tests among their peers as well as provided toolkits and guidance (Reichelt, 2009a). Video was successfully used to communicate designers' ideas, but also by the users to express their feedback (Reichelt, 2009b).

During the software development, a new prototype was released once a week via various online channels (Boulton, 2008b). The challenge in this open and "messy approach" is that the feedback was scattered and difficult to keep up with (Reichelt, 2009b). The designers' blogs were used as "the more safe" feedback channels for those who were not that active in the Drupal community and did not want to get "flamed" by the community (Reichelt, 2009b). The designers did not answer every single feedback, but looked at trends to discover which issues are most critical to work with (Boulton, 2008b). Generally, trends can be used for discovering the biggest problems in suggested design. However, good ideas and new suggestions can come from any single user and are not necessarily identified when looking at statistics (Ainasoja et al., 2011).

Also, some companies have experimented with community-driven commercial development. Lewis (2008) reports a study from IBM where an unrestricted number of users had access to the product throughout the entire development process and gave feedback, insights, suggestions and criticism in a dialogue with the developers. The benefit of the online community platform was that all discussions and technology decisions remained accessible and searchable on the site.

Social media systems in particular are often developed in an open beta state, since they cannot be tested without users and (user-created) content. The users of the service give feedback and development ideas during use, and the developers

participate actively in a discussion with the users. The developers can also release experimental “seed prototypes” into a community that participates in modifying and evolving the prototypes through use (Hagen and Robertson, 2009).

One possibility for obtaining a lot of user feedback is public crowdsourcing of design tasks or prototype testing. Amazon’s Mechanical Turk is an example of a service that can be used to allocate micro-tasks to a large number of users quickly and with low monetary cost. Based on a preliminary study by Kittur et al. (2008) in which users were asked to assess the quality of Wikipedia articles, Mechanical Turk proved to be a promising platform for conducting a variety of user study tasks. Kittur et al. (2008) suggest that it could be used, for example, for receiving a large number of survey responses quickly, involving users in rapid prototyping and acquiring quantitative performance measures for a prototype.

3.6 Social media as a new opportunity for design

Social media tools are familiar to most web users nowadays and easy to access as a part of everyday life. As comparison with earlier groupware tools (Dix et al., 1993), social media is affordable and attractive for ordinary people who can now participate in processes that were earlier limited to workplaces. Open communication platforms and simple user interfaces make collaboration and networking easy and enjoyable. People can also discuss and generate ideas together asynchronously, whenever they have time and interest.

Using social media during the UCD process also improves the relations and interaction between the users, designers, researchers and developers (Vanattenhoven and Jans, 2007; Kaptein et al., 2009; Yndigegn, 2010). More contact between the users during the research process is expected to contribute to a better user involvement and participation in the study and richer user feedback, because users can comment on others’ comments and discuss these among themselves (Vanattenhoven and Jans, 2007). Wolkerstorfer et al. (2009) also see digital tools as beneficial especially from the researcher’s point of view. The researcher can handle multiple design sessions at the same time, access users remotely, and allow multiple people to participate in the design sessions in the field. The benefits of using social media in user research and co-design processes are summarized in Table 6.

Table 6. Benefits of using social media tools in design process.

Benefits for researchers and designers	Benefits for users
The researcher as well as other stakeholders can monitor the process continuously (Vanattenhoven and Jans, 2007; Hagen, 2011; Gough and Phillips, 2003; Bolt, 2006)	Possibility of sharing insights and communicating with people, in different places (Hammer-Jakobsen and Goldman, 2009)
The researcher can intervene in the process if someone is dominating others, if passive users need to be inspired, or if new research questions arise (Vanattenhoven and Jans, 2007; Hammer-Jakobsen and Goldman, 2009)	Collective creativity and co-experience, when users can look at each other's content and become inspired (Vanattenhoven and Jans, 2007; Hagen, 2011; Kaptein et al., 2009)
Continuous contact between researcher and user, immediate interviews and specifying questions are possible (Vanattenhoven and Jans, 2007; Hagen, 2011; Yndigegn, 2010)	Increased user involvement through personal contacts and the creation of empathy (Vanattenhoven and Jans, 2007; Hagen, 2011)
Documentation of the process in digital form: easy storage and distribution of results (Yndigegn, 2010)	Possibility of gaining public recognition for their own contributions (Yndigegn, 2010)
Users produce longer, more elaborate responses than in face-to-face settings (Kaptein et al., 2009)	Users are more willing to use their time (Kaptein et al., 2009)
Possibility of involving large groups of users from diverse geographical areas, cost savings, flexible schedule (Gough and Phillips, 2003; Bolt, 2006;	Visual anonymity and psychological distance from others can stimulate group participation (Reid and Reid, 2005)
Effective network-based or automatic recruitment (Apte and Hülsken, 2008; Bolt, 2006)	Users have more time to think and formulate their answers (Reid and Reid, 2005; Reyes and Finken, 2012)
The research setting is also more natural in the users' own environments, and therefore, there is a greater ethnographic element in the study (Gough and Phillips, 2003; Hagen, 2011)	Anonymity facilitates self-expression (Reid and Reid, 2005)

Social media should not be used only for bringing the traditional methods to the web, but the potential for new ways of interaction and collaboration should be explored. Social media does not only provide new design tools, but it also creates a new context for design, meaning that social technologies enable mediated social participation that impacts on how participants can, and expect to, participate in design (Hagen, 2011). Many-to-many communication in social media allows it to overcome the trade-off between the richness of user contribution and reach of users. Internet tools enhance interactivity and persistence of collaboration even in long-term development processes, and increase both speed and flexibility in collaborative innovation. (Sawhney et al., 2005) Social media also challenges our traditional assumptions that research activities are somewhat private or discrete from a person's other life. Social technologies suggest that more public forms of participation are becoming the norm. (Hagen, 2011)

Table 7 shows how the different attributes of social media can be applied in the context of user participation in early exploration and concept design. Social media provide user-developer collaboration with transparent and interactive tools that support real-time communication. The possibilities of early exploration are adopted from Hagen (2011) who has identified seven experiential characteristics in which social technologies impact on the self-reporting of users as an early design research method, and the participation itself. These are layered representations, co-experience, life on the move, in the moment, continual interaction, shared windows, and experimentation (Hagen, 2011). Six of the characteristics can be mapped to the attributes of social media (Table 7), whereas experimentation is more related to the nature of the participation process that allows participants to play and learn new kinds of interactions. Experimentation with new tools and practices can become a motivation for participation (Hagen, 2011).

Table 7. Attributes of social media and their opportunities for user-centred design.

Social media attributes	**Meaning**	**Possibilities for early exploration, based on Hagen (2011)**	**Possibilities for concept design**
Openness (OECD, 2007)	Accessible publicly or to a selected group of people on a social networking site.		Transparency of design and decisions.
Interaction (Kaplan and Haenlein, 2010; Correa et al., 2010)	Commenting, rating, liking. Easy and attractive tools.	"Continual interactions" between participants and design researchers	User-user and user-developer dialogue and feedback.
Collaboration (Kaplan and Haenlein, 2010; Storey et al. 2010)	Content creation by discussion and co-production.	"Co-experience": collaboration in the creation of reports	Co-creation of ideas and features.
Immediacy (Postman, 2009)	Real-time communication, short feedback cycles.	"In the moment": immediate sharing of in situ activities	Constant (daily) development based on user feedback.
User-created content (OECD, 2007)	Content produced by "ordinary people" with multimodal tools	"Layered representations" of visual and expressive reports	Users create own ideas and design suggestions
Connectedness (Correa et al., 2010; Postman, 2009)	User profiles, networking with other users create communities.	"Shared windows": a continuous 'location' for reflection and exchange	User communities for co-creation, networking with potential innovation partners.
Device-interdependency (O'Reilly, 2005)	Mechanisms for sharing and aggregating content between various services.	"Life on the move": reporting ongoing, mobile, personal and social contexts	Linking professional tools and user participation platform.

Online tools naturally also have disadvantages in the design process. First of all, only those users can be reached who use the Internet (Kaptein et al., 2009), which can be a challenge, depending on the target group of the design process. Furthermore, facilitating an interactive and participatory website takes a lot of effort in mastering the platform and generating the digital material for interaction (Yndigegn, 2010). Since facilitation stretches over time and different media, it requires even more time (Reyes and Finken, 2012). Regardless of preparations, user participation is always unpredictable (Yndigegn, 2010; Obendorf et al., 2009), and the researchers cannot necessarily see when users are participating if they do not contribute themselves (Reyes and Finken, 2012). Users may also become disappointed for several reasons – if they do not get responses immediately, they can get bored, whereas too active a participation by others may feel too overwhelming (Reyes and Finken, 2012).

4 Research objectives

Research is never value-free. Values affect the selection of the problems, conceptions that are used to formulate the problems, and the course of the solution (Mills, 1959). As the following quote states, the worldview of the researcher affects the definition of the research problems.

> *"The problems we select for solution and the way we formulate them depends more on our philosophy and world view than on our science and technology." (Ackoff, 1974, 8)*

The starting point for this research is the belief that human beings are creative and have a right to impress their opinions on the issues affecting their life. Therefore the users of new products and services should be able to participate in the design of those products and services. Not everyone is willing to participate in the design process, but the threshold for participation should be lowered. From the company perspective, this research is based on the assumption that closer interaction with their customers and users helps companies to create more valuable products and services that survive in the market. Despite a lot of research in the field of UCD and user innovation, it still remains debatable, to what extent user involvement is beneficial (Norman, 2005; Holzapfel, 2008). Even if some companies have also successfully applied an expert-driven development approach (Skibsted and Hansen, 2011), this research is based on the notion that people are not only passive users but can also be valuable sources of radical innovations (von Hippel, 1986; Holmquist, 2004).

4.1 Research gap

Based on the research background presented in Chapter 2, there is clearly a need for procedures and methods that enable user involvement outside workplaces (Kyng, 2010). The context of design has changed since the introduction of UCD and PD approaches, and the current challenges include, e.g.:

- how to involve (a large number of) unknown consumers in a design process
- how to support direct participation among globally distributed users and developers
- how to integrate continuous user participation into agile software development, and
- how to include innovativeness into the UCD process.

The open innovation approach has offered examples of involving large consumer groups in innovation processes. However, there is only limited experience of combining participatory design and open innovation approaches, and the researchers lack both the tools and methods for distributed participation (Bergvall-Kåreborn and Ståhlbrost, 2008). We need a deeper understanding of users' commitment in participation as well as the development of strategies for managing user participation in open design processes (Hagen and Robertson, 2009).

There is also a growing interest in computer-supported methods for co-design with users (Schumacher and Feurstein, 2007). Social media offers a lot of inspiring opportunities for consumer and citizen participation, and has a lot in common with participatory design, but there are only few examples of using social media in a PD context (Reyes and Finken, 2012). Even if online tools are widely used for collecting user feedback, most of the current solutions are still based on individual responses (Følstad and Karahasanović, 2012). The benefits, limitations and risks of user participation via social media are not well understood (Storey et al., 2010).

When I was starting work on this thesis in 2007, social media was a new phenomenon and little was known about its possibilities in involving average consumers in user-centred design processes. At that time, web-based UCD methods mostly included communication tools for user-designer interaction or computer-support for synchronous collaboration. Examples of early methods are e.g. remote contextual inquiry (Rampoldi-Hnilo and English, 2004), online focus groups (Reid and Reid, 2005), using email for collecting user feedback (Farshchian and Divitini, 1999), remote usability testing (Thompson et al., 2004; Gough and Phillips, 2003; Bolt, 2006) and groupware tools to support face-to-face workshops (Gumm et al., 2006). These methods are straightforward applications of conventional UCD methods in which users have no or only limited possibilities of interacting with each other. The design-by-blog approach (Nichols and Twidale, 2006), online idea competitions (Piller et al., 2005), research blogs (Vanattenhoven and Jans, 2007) and mobile diaries (Hagen et al., 2007) are some of the few examples of open and asynchronous co-design that utilize social media tools and asynchronous open dialogue prior to this thesis work.

Also these methods involve users only in certain phases of the design process. There are only few reported studies of involving a user community in all the phases of the innovation or design process via social media. Within OSS, web-based participation is a standard, but there the participants are mostly software developers or enthusiasts. In the consumer context, internet tools are mainly used for involving users as informants or idea generators, but the full potential of collabora-

tive tools has not been utilized. In some long-term PD projects, online tools have been used as an additional communication channel to face-to-face meetings, but not as the main platform of co-design with users (Gumm et al., 2006; Klammer et al., 2011). Especially for the concept design phase, there are no computer-mediated tools for asynchronous co-design (Walsh, 2010), which would be useful for wider user groups that cannot participate simultaneously. Small-scale studies have also revealed challenges in user participation, for example when using blogs and discussion forums (Vanattenhoven and Jans, 2007; Obendorf et al., 2009). The recent work of Hagen (2011) and Johnson (2013) are rare examples of exploring how social media changes user-centred design. However, Johnson's (2013) viewpoint is in social media as the subject of design but not so much as a collaboration tool in any design process. Hagen (2011) studied social media also as design tools and examined the changes in the relationship between users and design researchers, but her studies were limited to users' self-reporting in the early phases of the design process. There is little knowledge of long-term web-based user involvement throughout the innovation process. According to Hagen (2011), the effects of social media in user participation and its relationship in participant roles should also be evaluated in other design phases and in more persistent online community forums.

We also need a greater understanding of the changing roles and facilitation of the web-based participation. When using social media as design tools, the boundaries between private and public participation blur, and the roles of the participants' change in relation to traditional design research, which needs new consideration by the researchers (Hagen, 2011). The close linkage of researchers and users is necessary in a creative co-design process, although it is in conflict with traditional design principles (Shneiderman, 2007). In addition to the roles, the manner of participation changes. Crowdsourcing (Howe, 2006) is a relatively new model for user participation in design context, and it leads to philosophical and practical questions with regard to contribution and authorship, as noted by Tomlinson et al. (2012). Piecemeal contribution makes participation easy but may lead to challenges in ownership and engagement. New concepts and methodologies are needed to utilize the social creativity of users as an active co-design community (ODS, 2009). The challenges include how to support the self-organization of an active community of co-designers, how to win users to become co-designers, and what kind of processes it requires (ODS, 2009).

The co-design processes have been developed from the developers' need to obtain user feedback and new ideas. Particularly when involving people in non-work oriented projects, attention must be paid to the reasons why they would like to participate in co-design activities. In order to involve users voluntarily in their spare time, they must be given a clear role (Iversen et al., 2004), the participation must be interesting in itself and users must gain personal benefit from their contribution. Just as the outcome, the participation activities should also be designed from a users' perspective. We need to better understand participants' motivations and aims in order to design a participation process that offers users a pleasant

experience and inspires them to volunteer their time and knowledge (Bergvall-Kåreborn and Ståhlbrost, 2008; Füller, 2010).

User motivations have been studied mainly from an online ideation perspective. Both monetary (like money and awards) and non-monetary rewards (privileges and public recognition) can motivate users of online innovation communities (Antikainen and Väätäjä, 2010). According to Aalto (2011), rewards only play a minor role in online user participation, and users would prefer more constant interaction with researchers. The topic of innovation and the possibility to exert influence are important reasons to participate, and some people like to express their own creativity (Aalto, 2011). It is worth studying whether similar factors motivate users to participate in long-term design processes or whether the co-design context differs from online innovation communities.

4.2 Research questions

The research goal stated at the beginning of this thesis was to investigate:

- how social media tools can be used to support user participation in the design and innovation processes, and
- how social media tools as a collaboration channel during the design process change user participation.

The concept of social media contains two different aspects: 1) web-based tools, and 2) practices of collaboration among individuals and communities. To make both these aspects explicit in this thesis, I use the concept *web-based co-design*, when referring to the use of social media in the context of designing new products and services. The concept is defined more in detail in Chapter 4.3.

Based on the research gap, the research questions of this thesis are formulated as:

1. How can social media tools be used to support the most common UCD methods during the pre-launch design of online services?
2. How do the users experience web-based co-design? What gets them involved and how do they benefit from participation?
3. What are the roles of users and facilitators in web-based co-design?
4. What are the benefits and challenges of web-based co-design?

These questions are answered by developing a tool for web-based co-design and applying it in practice. The scope of this thesis is web-based co-design with average consumers in the pre-launch phase of online services that are developed in a professional context as comparison to services that users develop themselves. By average consumers I mean any Internet users who do not need to have any specific knowledge or interest on software development. Since the goal is to provide companies with practical tools, the design process must be linked to professional software development processes and led by designers or other people who are responsible

for the outcome. After the launch of the service, the development and re-design can also continue using web-based tools, but this is not examined in this thesis.

4.3 Definition of web-based co-design

Web-based co-design means applying *social media tools* and *collaboration practices* in the context of *designing new products and services together with users*. It includes early ideation (user innovation), active participation by users (participatory design) and systematic design process and methods (user-centred design). The elements of web-based co-design are illustrated in Figure 4.

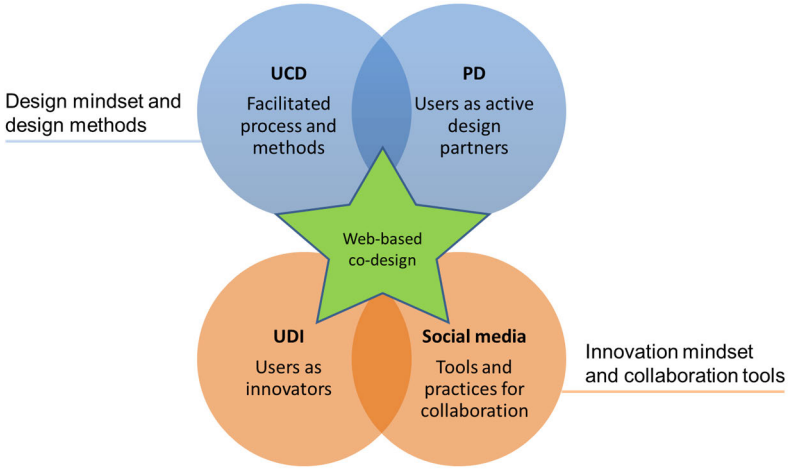

Figure 4. Web-based design combines user-centred and participatory design methods with social media-based innovation tools.

I use the term co-design instead of UCD or PD in order also to include the aspects of user-driven innovation and stress users' active role as design collaborators in the consumer context. Participants are not chosen to represent the real users (in PD) or possible users (in UCD) of the system, but they can be anyone who is interested in designing new services for them. Users can participate already from the early ideation and participate in some or all phases of the design process.

By social media tools I mean web-based tools that enable posting, commenting, multimedia sharing and user profiles. Rating, voting, instant messaging and networking are other frequent features that are supported in many social media services. By social media collaboration practices I mean crowdsourcing, user-created content creation and sharing, open collaboration and networking.

Web-based co-design is in this thesis used to describe a systematic and facilitated process for collaborative design in which users play an active role via online tools. The potential users of a new product or service collaborate with the designers and developers via social media-based tools that allow open sharing of con-

tent and asynchronous or synchronous interaction over distance during the whole innovation process. Web-basedness means that the web tools can be used as the only arena of co-design and thus support the whole design process. Social media is the enabler for active and continuous user involvement in a consumer context, but also other kinds of web-based tools can be used.

4.4 Research approach

This research stems from a pragmatist worldview in which the research is placed in a real-world situation and the research methods are chosen according to the problem (March and Smith, 1995; Hevner et al., 2004; Cole et al., 2005). The research approach is constructive research (Kasanen et al., 1993), in which theory building, experimentation, observation and systems development are interlinked (Nunamaker et al., 1990–1991). In constructive research, the aim is to construct artefacts (products, prototypes or designs) and evaluate them. Research results can be 1) the created and evaluated systems, 2) thinking models that describe the system, actions and situations related to them, or 3) tools that are useful for creating and evaluating systems (Järvinen and Järvinen, 1996). More precisely, the approach of this research is design science research (Iivari, 2007; Hevner, 2007; Peffers et al., 2008). Design science should consist of three research cycles: *the relevance cycle* links the research to the real use environment that is the source of requirements and the place of field testing. *The design cycle* consists of the iterative building and evaluation of the design artefacts. *The rigor cycle* links the research to the existing knowledge base: theories, methods, experience and other artefacts. (Hevner, 2007)

In this case, the constructed artefacts are the web-based co-design process and a tool called Owela that supports the process and related methods. The process, tool and methods have been developed and validated in multiple case studies. The research started by creating the first version of Owela and further developing the tool, design process and methods based on observations from the early studies. Two long-term case studies have been the most important foundation for this piece of research, but experiences of several other case studies are also used to supplement the experiences.

The two long-term case studies followed the action research approach, which means research in action with active intervention of the researcher. The research process was highly participative and focused on practical issues. The hypotheses were constantly applied and tested in practice with real cases, and companies and the experiences were used to develop the design method and process further. Action research is an iterative process that consists of the cycles of: defining the context and purpose, constructing, planning action, taking action and evaluating action (Coghlan and Brannick, 2010). The researcher is not an observer, but enters the field in order to change it.

The author participates in designing and implementing the case studies, at the same time observing and documenting them. By reflecting the observed practices

in previous literature from different fields of research, the author has gained a greater understanding of web-based co-design. The good practices have been applied in numerous other Owela projects that are not part of this dissertation.

5 Owela as a platform for web-based co-design

Owela (Open Web Lab) is a web-based co-design platform that has been designed and developed at VTT as a part of this dissertation. Owela consists of separate workspaces that are created for each design project as a collaboration and communication platform between users, developers and researchers. Owela is especially suited to designing digital media services that can be tested on the web, but it can also be used for any other products, and services can be discussed with users. Owela methods can also be combined with face-to-face user research or utilized as a communication channel during real world Living Lab studies.

Owela was originally created in the SOMED project[2] to involve users in designing new social software. The aim was to study the social media phenomenon, to understand users and their needs, as well as to test and validate social software with users. Another goal was to study the Owela concept itself and to use it to explore the possibilities and limitations of social media –based tools in user-centred design and open innovation. More recently, Owela has been used as a user research and co-design tool in in several other contexts varying from healthy eating to future housing.

The author has been involved in the Owela development process from the beginning in defining the methodological framework and requirements for the online tools (Näkki and Virtanen, 2007). Together with several other researchers she has designed the tool and the research practices related to it, and applied the tool in practice both in research projects and commercial settings. The author has also worked closely with the software developers who have implemented the Owela tool iteratively over the six last years.

Owela is technically based on the open source content management system WordPress[3]. Owela consists of multiple plugins that can be flexibly taken into use, depending on what kinds of features are required in each project workspace. The

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[2] "Social media in the crossroads of physical, digital and virtual worlds" (SOMED) was a research project funded by VTT in 2006–2008.

[3] http://wordpress.org

modules can also be changed during the projects. The Owela installation is on a VTT server, and therefore log data can easily be retrieved and modifications can be made for research purposes.

5.1 Design principles

Owela has been designed based on the principles of participatory design, user-centred design and user-driven innovation (see Figure 4). The basic values stem from the tradition of participatory design with the belief that every human being is creative (Sanders and Stappers, 2008) and has the right to participate in designing things that affect their life (Ehn, 1993). In practice, user involvement in software development is in Owela based on the user-centred design process (ISO 9241-210, 2010) that stresses starting the design process from an understanding of user needs and producing alternative ideas and designs to be evaluated early on with users. Open innovation approach is used to supplement the design process at the fuzzy front-end and also to involve the users in the ideation phase in a crowdsourcing manner. Owela combines these approaches, meaning that the users have an active role as innovators and design partners, but the process is still led by a facilitator whose role is to ensure that the users' ideas will be taken into account in the development process.

Owela[4] is an acronym that stands for Open Web Lab. These three words describe the philosophy behind Owela and are described here in more detail.

Open: Owela is based on open innovation, where customers and users develop products and services together with the designers and developers. As is common for social media services, it is open to anyone who is interested in contributing, and it is "always open", without time and space limitations. Even anonymous users can come to participate, whenever they have time and willingness to do so. The aim is that the co-design processes are open and transparent for the users who can follow the progress and see the effect of their input. People do not need to become official partners in the design process in order to be able to affect the process and its outcome. Similarly to "prosumers", consumers who produce content voluntarily as a leisure time activity, there are new kind of user-designers who can participate in the design or innovation process in the form of micro-tasks. The goal is that the participation is easy and fun for the users.

Web: Owela is a design space that is located on the Web – where the users also are, and in an environment with which they are familiar. It is based on the social media phenomenon, meaning that simple text-based communication tools, like commenting, rating and chatting, are used, and each user has an own profile in the service. As an online tool, Owela can be constantly developed without the need for separate launches or software installations on the users' side. It also

[4] "Owela" is pronounced similarly to the Finnish word "ovela", which means 'clever, astute or cunning.' Thus, it also refers to a characteristic that is helpful in innovation.

utilizes open source modules and interfaces with other web services, so that not everything needs to be developed from scratch.

Lab: Owela is a design laboratory – a platform for open collaboration among many stakeholders and exploration of future possibilities under commonly agreed conditions in a transparent process (see Binder and Brandt, 2008). As a continuum and extension to physical usability labs, it can be used throughout the user-centred design process from user studies to user testing. Owela has certain "equipment", that is, tools and methods that can be used for research and experiments. Records are kept in the form of online discussion history and a user log data. Unlike physical labs, the users and other stakeholders can participate in Owela studies in their own environment. Thus, Owela is also a Living Lab – a real-world research environment in which new services and products are co-created with different stakeholders in the everyday use context (Eriksson et al., 2005; Følstad, 2008). The original idea behind Owela was that new kinds of collaboration tools would enable the involvement of large groups of users with a qualitative research approach that has not been traditionally possible. Owela can also serve as a backchannel for physical living labs or be used as a living lab for developing online services, for which the web is the real use context. Owela is also used for studying the web-based co-design phenomenon itself, and it has thus been a platform for continuous experimenting and development.

5.2 Development path

Owela is an example of a social media platform that has been developed constantly during its use, based on user feedback as well as on the new features available in WordPress. It has followed the same principles of public beta development and open innovation that are typical of the services that are developed using Owela. This chapter presents the development path as well as the theoretical concepts and background thinking that led to different ways of using Owela and the development of different features.

Table 8 summarizes the Owela development in 2007–2012 and presents the different theoretical concepts that have directed Owela development and use. These are not strictly limited to specific years, but different fields of research and background thinking have influenced the Owela work at different times, which is also visible in the publications about Owela. The publications are listed in the table, based on the year the work was mainly done or on which theoretical concepts they rely on rather than the time of publication.

Table 8. Development of Owela in 2007–2012.

Year	2007	2008	2009	2010	2011	2012
Background concepts	User-centred design, Open innovation, Social media	Living Labs, Distributed participatory design	User-driven innovation, Co-design, Agile software development	Open design spaces, Participatory innovation	Service design, Co-creation	Facilitation, co-development
Focus in development and use	First launch in public beta: blog, Ideatube, Test lab	Restricted project workspaces in research use	Systematic tools for user research and long term co-design	Tailorable Multilingual user interface for commercial use	Long term user panels and short term service design	Technically modernized version, multiproject environment
Examples of new tools and features	Commenting with emoticons, thumbs up/down rating, user profiles, tag clouds, public chat, RSS feeds	New user interface, category-based structure for workspaces, user database management, test user search, lottery algorithm	User diaries, updates in the activity point system, idea chat, new evaluation mechanisms, integrated survey, idea linking, user roles, use statistics, mobile user interface, modifiable structure, data export	Multilingual content, polls linked to the posts, user account import from other online services	Embedded videos in surveys, automatic email reminders of new comments, visualisation of roles and new comments	Project setup wizard, enhanced options for facilitation and use statistics
Number (& examples) of projects		4 (Tilkut)	12 (Mobideas, Monimos)	18 (SuperF, Mobideas, Monimos)	11 (Events, City Adventure)	25
Publications	Näkki and Virtanen (2007), Näkki et al. (2008b), Vainikainen et al. (2011)	Paper I, Näkki et al. (2008a), Näkki (2010)	Paper II, Paper III, Koskela et al. (2009), Hakulinen (2010), Aalto (2011), Antikainen (2011)	Paper IV, Paper V, Paper VI, Ropponen et al. (2010)	Paper VII, Karppinen et al. (2011), Chang and Kaasinen (2011), Kaasinen et al. (2012)	Friedrich et al. (2012), Heikkilä and Kaasinen (2012)

5.2.1 Open user-centred design

The original value proposition of Owela was written in the Owela blog on April 18, 2007: “Owela is VTT’s open web laboratory, in which you can participate in the ideation, evaluation and testing of future products and services”. Owela served as an online user research laboratory that borrowed its methods from user-centred product concept design (Kankainen, 2003) in which users’ needs drive the early ideation of new product concepts. This was connected to the idea of open innovation, and thus the main tool of the first version of Owela was a totally public IdeaTube where anyone could browse ideas and scenarios of future products and comment on them. One of the aims was that users’ ideas in the IdeaTube could be used as sources for new product concepts and the innovations would be really driven by users.

The user-centred design principles were applied in the IdeaTube by presenting concepts there that are in different phases of the development process. Although users could also suggest new service ideas, the process was in the hands of researchers, who made the decisions and designed the service concepts. Users could answer questions about their needs in different situations, generate ideas on given topics, evaluate scenarios developed by the researchers and give feedback on online prototypes that they could test in the TestLab. The different types of tasks were visualised with a process model that suggested a simple path from users’ needs and ideas to real services (Figure 5).

Figure 5. The ideal IdeaTube process from the year 2007.

IdeaTube was inspired by YouTube, which represented the modern social media service in 2007. In Owela, users could browse and comment on ideas and concepts rather than videos. Additionally, the Owela blog was used for topical observations from social media, explaining new concepts and research approaches, conference reports, research results and news about Owela ideas and projects. Chat was also included in the platform from the beginning.

Typical social media features, such as public user profiles and avatar pictures, thumbs up and down ratings, and tag clouds were implemented from the beginning. The emoticons that are used for comments stem from the 9Faces method by Koskinen (2005). Their meaning was twofold – first, they help users to express their experience and feelings other than textually, and second, they help researchers

to visually get a big picture of the range of reactions. This was one of the ways of combining qualitative comment data with more quantitative data. Other examples of quantitative data were online surveys (first done with an external tool) and background information in user profiles.

5.2.2 Workspaces for structured projects

During the first year of public Owela service, open innovation and UCD process conflicted. It soon became clear that the constantly open IdeaTube could not be well utilized in project-based user research. The researchers did not have enough time to follow the online ideation, and the user ideas often could not be utilized in any project, since there was no schedule or shared theme. Therefore, the services were mainly developed by the researchers, whereas user feedback was requested mainly because of methodological interests in order to explore the Owela possibilities. In reality, no products or services were developed in the public IdeaTube based on the process model in Figure 5.

When researchers added new concepts to be evaluated in the IdeaTube, it became a mixture of many kinds of ideas that could constantly be commented on. The structure became confusing to the users, and they did unnecessary work when commenting on old ideas that were forgotten in the IdeaTube. Nor was there any feeling of community, when different users commented on different ideas and service concepts. The open discussion lacked confidentiality and any opportunity of personally contacting potentially interested users, since browsing the ideas did not require registration.

During 2008, Owela was, therefore, restructured to better support goal-oriented design and development projects, and its main activities were moved to separate project workspaces. Distributed participatory design was the guiding framework, when concentrating more on scheduled group processes with different stakeholders. Workspaces are individual instances of the Owela platform that are created for specific user research or design projects with a clear agenda, schedule and tasks. They can either be open to anyone or restricted to a specific target group.

Although Owela tools would allow large groups of participants, it was never intended for this. More important was that there is a group of enthusiastic participants who are committed to the design of a new service or product. The focus group style discussion works better if there are not hundreds of commenters and people can really discuss with each other. Therefore, the registration to each workspace was restricted to a maximum number of participants. Researchers also got new tools for user administration and searching participants with various criteria from the slowly growing user database (see Chapter 5.5).

The project workspaces enable better structured studies that also motivate users to participate for a restricted time frame with a clear aim. They consist of separate pages for different tasks, which helps to structure a longer term project and gives users a clear idea of their expected contribution. The main page contains an introduction to the project and the actual tasks, such as discussion topics in a blog

format. Ideas, evaluation of concepts and user testing have their own pages that may be opened at different times. On each page, the sidebar shows the most recent or most active participants and the most recent posts and comments. All users can be listed on a separate page with links to their profile pages. All elements of the workspace can be edited in each project, based for specific needs.

5.2.3 Towards co-design of services

The essential change in the Owela philosophy occurred around 2009, when users were allowed a more central role in the design projects. The term co-design was used to describe the users' role not so much as informants or ideators but more as partners in the design process. Users were given decision-making powers starting from the definition of the service concepts to be developed, and the innovation process can, therefore, be described as user-driven. The structure for the participation was taken from the Scrum software development process that provided the rhythm of short iterations. For the first time, Owela users were not just asked for ideas and feedback on certain project phases, but could participate throughout the design and development process and influence the direction of the work in daily basis.

Intensive long-term projects required a lot of new features in Owela. They included tools for linking the different project phases and showing which problem description led to which idea. In addition to a thumbs rating, more accurate evaluation mechanisms were needed for different purposes, such as multiple criteria for idea evaluation, a voting system for concepts and features, and traffic lights signalling the status of error repair. In long projects, there was also the need for real-time collaboration, and therefore a chat tool was developed for idea generation and collective testing purposes. When many different stakeholders were involved in the projects, there was also a need for visualizing the roles that different users represented, such as regular participants, researchers, company representatives and software developers. For easier administration of various types of projects, the project workspace was made tailorable. The facilitators were also given new tools for user data management, statistics and exporting the discussion data for analysis.

One practical need on the part of the researchers was to link users' answers to online surveys during different phases of the project to their qualitative comments in the discussion. Therefore, an integrated survey tool was developed in order to link the user IDs to their survey answers. This was contrary to the traditional way of carrying out anonymous surveys, but in line with Owela's general line of openness and sharing. However, only the researchers could see the identity of the survey respondents.

During 2010 and 2011, Owela was extensively utilized in several projects, especially in the public sector. Open design spaces, participatory innovation and service design, provided new frameworks to reflect on what Owela actually is. It was no longer only a user-centred design tool for the development of new products and services, but now also a more general collaboration tool between different stakeholders with shared interests. The iterative project structure was also brought

into the public service development. At the same time, Owela was used in commercial projects, in which new quantitative methods were also required in order to lower the participation barrier as well as to ease the analysis, especially when researchers were not involved in the project. New functions, such as email reminders of new comments, were added in order to keep people involved over long time periods. When all kinds of services were designed in Owela and these could not always be visualized with online concepts, videos were used to illustrate the real world services.

5.2.4 From a research lab to a commercial tool

Owela started as a research tool, and most of the projects have stemmed from the needs in research projects in which new service concepts have been developed. However, since 2008 there have also been commercial projects, the needs of which have also influenced Owela development. For example, quantitative lightweight data collection including polls and surveys serve company needs to gain a quick overview of the opinions and voting mechanisms that have been designed for the needs of software requirement management. Researchers have, for example, wanted a more flexible administration of the project workspaces, indicators for user activity and algorithms for reward purposes. Also, the users of Owela have suggested improvements in the user interface and features that are important for them, such as email reminders and a simpler registration procedure.

Since the amount of projects increased and programming resources for the setup of new project instances were scarce, there was a clear need for a quick web-based setup of new workspaces. In 2012, Owela was technically renewed and updated to a multi-project platform that enables the creation of new workspaces based on ready-made templates. The new structure enables companies' own Owela installations, and makes the administration of several simultaneous projects easier.

Besides the functionality, the user interface of Owela has changed many times over the years. Three different versions of the visual layout are shown in Figure 6. They illustrate the transition from a research lab pilot towards a more professional online platform used by companies and public organizations. The left-hand figure shows the first public beta version of Owela in 2007, which consists mainly of the IdeaTube and blog. The middle figure shows Owela in 2008, additionally comprising project workspaces and user lists. After that, the basic structure and visual layout of Owela remained the same for four years, and development efforts were targeted on the workspaces that are used in specific projects. The right-hand figure shows the most recent version of Owela in 2012, after a complete technical and visual update. The current Owela is targeted on companies and has a lot of enhanced features for the administration of the workspaces.

Figure 6. Owela main page in years 2007, 2008 and 2012.

5.3 Design process and methods used in Owela

Owela is an online co-design space that supports all phases of the user-centred design and innovation process: user and consumer studies, idea generation, concept design, prototype development and testing. By categorizing the past Owela projects, five different types of projects were identified that match the phases and methods listed in Table 1. Additionally, the co-design projects encompass all phases of the design projects. In Owela, we have used the methods that support asynchronous user participation and are appropriate for use in an online context or could be modified to that. User research and ideation are similar to the general UCD process phases. In its concept design and software development phases Owela is typically used for an evaluation of the first concept drafts or prototypes, and therefore these project types are called evaluation projects instead of design that can happen outside Owela. In the co-design projects users have a more active role also in the design phase. Table 9 presents the research and design methods used in different types of Owela projects.

Table 9. Methods used in different types of Owela projects.

Types of Owela projects	UCD methods used in Owela
1. User research	Online focus groups, surveys, user diaries
2. Ideation	Idea posting, online focus groups, idea chat
3. Concept evaluation	Scenarios, storyboards, visual mock-ups, voting
4. Prototype evaluation	(Online) prototypes, error reports, feedback discussion, test chat, surveys
5. Co-design (including 1–4)	All methods mentioned above, additionally concept and user interface design by users

User research can be used at the beginning of the innovation process for familiarization with the users and the context of use. An online focus group can partly

replace or complement the traditional interviews and questionnaires in learning about the users, their attitudes and needs. In Owela focus group discussions can be arranged either asynchronously using the blog structure or synchronously in a chat. The researcher creates the topics for discussion, and users comment either so that they directly see each other's comments or by first answering alone. Sometimes the study is enhanced with an online questionnaire that the users answer alone. To study the context of use, users can be asked to write in a shared blog in Owela about their everyday experiences of a certain product, service or context.

Open ideation is a part of almost all Owela projects. Brainstorming is carried out in the form of idea posting and idea chats. Typically, researchers and developers already have some draft ideas about a new technical solution or service concept that is presented to the users in a visual form. The users are then asked to comment on the suggestion and generate their own ideas based on the researchers' vision. Ideation can also start based on users' needs that they first report in Owela. In later phases, users can generate new applications and development ideas for a prototype that they have tested.

Concept evaluation can follow users' idea generation or are based on designer's ideas. As soon as there are some concrete ideas for a new service or product concept, they are visualised with scenarios, mock-ups or prototypes. They are used in a similar way to face-to-face workshops so that users can evaluate the concepts by giving feedback on them or by voting on different designs. Users can also give their own design suggestions. Sometimes the users are forced to write the first comment on each scenario or mock-up before seeing others' comments, if it is important to get the pure first impression of users.

During **evaluation** in the real world or with online prototypes, Owela has been used as a communication forum among test users. Error reports, feedback discussion and test chat are open and interactive forms of usability and field tests. The strength of an online channel is that developers obtain the feedback directly during the test phase and can ask further questions of the users if their error reports are not clear enough. Since the other users can see the communication, they are given answers to the issues that they have probably been facing, as well. In our case studies, the users have also helped each other during the test and answered other users' questions, which helps the work of the organisers of the test.

Co-design projects are long-term activities that include all the phases mentioned above. In the co-design projects the users collaborate with the designers and developers during the whole innovation process from early idea generation to real world testing. Users can be involved as design partners and are given tasks such as user interface sketching with online drawing tools and feature prioritizing by voting a list of suggestions in Owela.

5.4 Owela tools for co-design

Owela tools support focus group discussions, user diaries, surveys, brainstorming, prototyping and user testing. These common research methods are applied in

Owela by utilising social media features in their implementation. The basic elements in Owela are blog, chat, questionnaire and poll that can be used and combined to enable the use of all the different methods. The structure and elements of the workspace can be selected separately for each study depending on its purpose. Sometimes the studies are enhanced with additional techniques, like phone or Skype for interviews and usability testing, and face-to-face methods are often combined with the Owela studies.

5.4.1 Blog-based discussion

Owela is based on a simple blog structure that consists of posts (topics) and comments on them (see Figure 7). Posts can include text, images, videos or, for example, slideshows. Each blog entry also contains the picture and username of the author and the time of writing. Blog posts and comments can be rated in the way that is popular in video commenting, for example in YouTube. Posts can be rated either with a simple thumbs up or down symbol, giving votes, or with a more precise numeric valuation on different criteria. The comments consist of text and an emoticon that can optionally be used to describe the mood of the comment author. Also comments can be rated with thumbs as in public news site comments. All options for the style of rating (if any) are selectable separately for each study. Users can either see others' comments and/or ratings directly or after first answering themselves.

The blog-based discussion can be seen as an asynchronous online version of traditional focus groups. The blog posts can be written by a researcher as topics of discussion that the participants then comments on, whenever they want. The discussion is typically open for a longer time, varying from a couple of days to several weeks depending on the topic and the purpose of the discussion. Quantitative ratings complement the qualitative discussion data.

The same blog structure can be used for different purposes: consumer studies, idea generation, user story writing, feature suggestions and evaluation of scenarios, concepts, user interface mock-ups and prototypes. Depending on the purpose, the users may also be able to add posts. Users can, for example, write their own ideas, desires or observations as posts that other users can evaluate and develop further. The researchers facilitate the discussion by asking additional questions and writing summaries of discussions.

Users and researchers can follow the discussion via a RSS feed that can be received in the email program or in a specific RSS reader. Notifications of new comments to their own posts can also be sent directly to the email.

Figure 7. Examples of Owela blog posts including 1) a scenario with users' comments and thumb ratings and 2) a concept mock-up with votes, related ideas and users' comments.

5.4.2 User diaries

A modified blog structure is used in Owela for users' self-documentation in a diary form. In contrast to traditional user diaries, online diaries can be totally or partially public. User diaries can be visible for example within the user group that is participating in the same research. Thereby the users are able to comment on others' blog writings and share their experiences about the subject under study. Technically, user diaries in one workspace are a shared blog, but the visibility of the posts can be adjusted.

In Owela, the user diary template consists of tasks and questions that users are asked to answer daily or in certain situations. User diaries have been used to explore the context of use and to capture user requirements as well as recording user behaviour related to a certain topic for a longer period of time. Since Owela can also be used with mobile devices with a web browser, users can answer the diary questions directly in those situations that are under study. Users may also add to their diary entries links to other online communities and blogs that give valuable information about the online environment of the users. During prototype testing and long-term field trials, online user diaries are used to collect feedback

and record user experiences. Users can also add photos or videos of usage situations that help in describing how they have used the product or service and how it has affected their life.

5.4.3 Chat

Owela has a simple chat tool that can be used either as a continuous informal communication channel in a project workspace or at certain times that are communicated in advance to the participants (see Figure 8). During the specific chat sessions, there is a facilitator present who is responsible for leading the discussion.

The facilitator of the chat session (typically a researcher) can moderate individual comments and switch between individual and collective chat modes. During the individual chat mode, users only see their own and the facilitators' comments, and the facilitator sees everyone's comments. In the collective mode, everyone sees all the chat comments, which is the common function of a chat. Also, all comments written during the individual chat phase are shown in retrospect.

Figure 8. Example of an idea chat session.

5.4.4 Questionnaires and polls

Owela has a basic online questionnaire tool that can be used for collecting user background information or structured individual feedback. Since most Owela

methods are based on qualitative data, quantitative data in questionnaires can be used to supplement the results. Questionnaires have also been used as an easy-to-start method for newcomers in Owela. When recruiting new users, they can be given a link to an online survey instead of being asked to register directly in Owela, create a user account and participate in discussions. At the end of the questionnaire, there can be a link to a certain project workspace for those, who are interested in continuing the discussion about the topic with other people.

The special feature of Owela questionnaires is that selected answers can be also shown later publicly. As a part of the survey, users can be asked to relate, for example, memories or ideas around a given topic in a form that can be shown to other respondents. Users are informed in the question text that the answer to that question will be shown to other participants after submitting the questionnaire. The selected answers are copied to the blog format and shown in the workspace so that other participants can comment on them.

A poll is a simple questionnaire with only one question with multiple choices. Polls are used as single objects in the Owela workspaces or embedded in the blog posts. They can be used for simple measuring of opinions or the feelings of participants. If the polls are part of a blog post, users are typically asked to explain their answer more as a blog comment. In that case, the poll answers give a rough overview of different opinions and help the researcher to understand which of the verbal comments present the prevalent view and which are extraordinary. Polls are not always used as research tools but as enablers of light-weight participation that keep the users involved in the project.

5.5 User community

In order to participate in Owela discussions either publicly or in workspaces, users must register on the service by creating a user account. Until the end of 2012 more than 3,500 users have registered in Owela and thus have had the possibility to participate in one or more Owela studies. All registered users also have a profile page with statistics about their participation, links to their own ideas and comments, optionally a description and a photo of themselves, and interests based on tags of the posts that the user has commented.

Users are being recruited to each study using different methods. Targeted online advertisement on Facebook, Google and other websites, invitations in email lists, flyers and even newspaper advertisements have been used to find motivated participants. For small-scale studies, participants are recruited among existing Owela users who have given their permission for receiving email invitations to new Owela projects.

Common to Owela users is that they are internet users and mostly familiar with social media. Their ages range from 13 to 90 and the users' backgrounds are very heterogeneous, since different kinds of participants have been recruited for different studies.

Based on their activity in Owela, users receive activity points. The reward structure can be decided for each project, but normally one's own ideas are rewarded with more points than comments and votes on other people's ideas. Answering questionnaires and participating in chat session can also be rewarded. Typically, small gifts are distributed among all or the most active users, or all users with a certain minimum level of activity points are rewarded with movie tickets or products related to the project topic. Top lists of most active users are also typically shown in the workspace.

User administration tools are used for facilitation and research purposes. Users can be searched by their activity and background data, and emails can be sent to targeted groups. Typical use cases are sending email reminders to the more passive users, as well as choosing the most active ones to be rewarded at the end of the project.

6 Case studies in Owela

Until December 2012, there have been 68 design and innovation projects with more than 3,500 users in Owela. Most of the projects have related to digital media services, but there are examples also from consumer studies in the wellness sector and co-design of civic and e-participation services (Näkki et al., 2008b; Kaasinen et al., 2012; Chang and Kaasinen, 2011; Karppinen et al., 2011; Näkki et al., 2011). In the majority of the projects ordinary consumers and citizens have collaborated with companies and researchers in order to create new or develop better products and services. Most of the studies have been related to the early phases of the innovation process such as gathering need information, generating ideas and evaluating new product and service concepts. In addition, there have been encouraging experiments in involving end-users, and later innovation new product and service development stages, especially in software context.

6.1 Summary of the case studies

The main research data in this thesis comes from two long-term cases of co-designing social media services. In the Mobideas and Monimos case studies, social media has been both the subject of the design and the context of the design. These cases were chosen, since they encompass the whole innovation process from ideas to service (or prototype), and users participated as active co-designers. Of those cases participant experiences were also collected systematically via interviews and surveys. In addition, four smaller scale projects are used as examples of more traditional user-centred design projects, in which users were involved via Owela in some phases of the innovation or design process. Experiences of the methods used in Tilkut, SuperF, CityAdventure and Events projects are used when applicable as supplementary information. A summary of the case studies is presented in Table 10.

Experiences of other Owela projects have also influenced the analysis of the results, since the author participated in most of them as researcher, facilitator or technical support person. Most of the Owela studies have been part of research projects, but there have also been commercial projects that have utilized the expe-

riences of the earlier research and applied the Owela methods in commercial or civic innovation and development processes.

Table 10. Key elements of the primary and supplementary case studies.

Case study	Focus and objectives	Phases of the innovation process	Duration	Participants in online co-creation
Primary cases				
Mobideas	Co-design of a mobile social media service based on users' ideas and needs	Whole process: needs, ideas, concepts, features, prototyping	6 months	33 users online 4 software developers 2 researchers as facilitators
Monimos	Co-design of a social media service to support immigrant networking and civic participation	Whole process: needs, ideas, concepts, features, prototyping, launch	10 months (and on-going after the research project)	32 users online 8–14 users in the core team 1 designer 1 software developer 6–8 researchers
Supplementary cases				
Tilkut	Evaluation and further improvement of a social bookmarking service	Concept development and prorotyping	2 x 3 weeks	40 respondents in a survey 7 users in online testing
SuperF	Understanding of users' perceptions of cloud services and their security and collecting ideas for new services	Fuzzy front end: user needs, ideas, concept evaluation	1 month	47 end-users (in two groups) 4 company representatives 2 researchers as facilitators
Events	Development of a mobile event management service	Prototype testing	1 month	4 users 3 developers 3 researchers
City Adventure	Development of an adventure service based on a first concept	Ideation, concept evaluation and testing	2 weeks	47 users 1 company representative 1 researcher

Table 11 shows the tasks in which users participated via Owela in different case studies. The innovation processes are not linear, but, for example, ideation happened in most of the cases during the whole process. In the Events case study, the user-driven innovation process started from the testing of a technical prototype that was used to trigger ideas for new services and use cases. In the City Adventure case, ideation, concept evaluation and testing were simultaneous tasks that

were all used as a starting point for service concept development. Mobideas and Monimos are the only case studies in which users also participated in concept design. Software development (prototyping) was in all case studies carried out by researchers or software developers, and users only participated in testing the prototypes. In the Monimos case study, users were also involved in the service launch in more managerial and administrational tasks, such as marketing, content production and organizing a press conference.

Table 11. User participation during the innovation process in different case studies.

	Fuzzy front-end		**Development**				**Commer-cialization**
	Identifica-tion of needs	Ideation	Concept design	Concept evaluation	Proto-typing	Testing	Implemen-tation / Launch
Mobideas	x	x	x	x		x	
Monimos		x	x	x		x	x
SuperF	x	x		x		x	
Tilkut	x	x		x		x	
Events		x				x	
City Adventure		x		x		x	

6.2 Methodology and research data

Action research methodology was used in the Mobideas and Monimos case studies. The author participated in both of the cases and was responsible for facilitating the co-design in Owela: in Monimos alone and in Mobideas with another researcher. Research data was collected by observing and participating in the online discussions and in the Monimos case also in face-to-face meetings. The online discussion data as well as log entries of user activity were also available afterwards for analysis.

At the end of the both case studies, participants were interviewed and 1–4 online surveys were conducted during the co-design process. Interviews and questionnaires aimed at understanding participants' experience in different phases of the design process and web-based participation in general.

The questions were grouped based on the elements of user experience as defined by Kankainen (2002). In her view, user experience is "a result of motivated action in a certain context". The context refers to other people, tools and places that are linked to the action, and motivation means the need that drives users to act. A pleasant experience requires that users' expectations are met or exceeded.

- Motivation: What kind of expectations did users have? What motivated users?
- Action: What was the users' experience of participation in the different phases of the process and the usage of online tools?
- Context: How did users experience the interaction with other users and software developers? In what physical and social context did they participate? What would be an optimal way of participation in co-design processes?
- Result: Were users satisfied with the outcome? What did they personally gain?

As the facilitator of the case studies, the author also has an insider view of the events that are typical in action research. In order to make the observations explicit, the author kept a research diary during both case studies. Interesting issues, challenges and conflicts were recorded throughout the research process. The author also saved all emails that were sent in the case studies. Not all the emails were thoroughly analysed, but they were used in the analysis for checking facts or finding more information about the issues mentioned in the interviews or research diary.

The Tilkut case study followed a traditional user-centred design process, with requirements analysis via an online survey and concept evaluation via user testing and interviews. The author was responsible for the user studies and collected and analysed the data alone. In the SuperF case, the author only observed the online discussions externally and interviewed one of the facilitators. The author's role and data collection methods in each case study are presented in Table 12. Since this research is based on online discussions, the author has also worked closely with vast amounts of written text around new ideas for products and services. These discussions and their content are not analysed as primary research data, but the analysis is in the process level and in people's experience of the participation in online innovation. However, when observing the process or interviewing people, the online discussion itself forms a basis for understanding the context and a common ground that the interviewee and interviewer share.

From all projects, there was log data available via Owela and Google statistics. This could be used to count the number of posts and comments in different categories and by different users, each user's activity points, and the number of page views in a time scale.

Since this research is based on online discussions, the author has also worked closely with vast amounts of written text around new ideas for products and services. These discussions and their content are not analysed as primary research data, but the analysis is in the process level and in people's experience of the participation in online innovation. However, when observing the process or interviewing people, the online discussion itself forms a basis for understanding the context and a common ground that the interviewee and interviewer share.

Table 12. Research data collected in each case study.

Case study	Author's role	Methodology and research data	Papers presenting the case
Mobideas	Co-facilitator of the whole process, responsible for gathering user experience data and keeping records	Observation online Interviews (N = 10) 4 surveys (N = 30, 11, 7, 15) Log data (Owela, Google Analytics) Discussion data (296 posts, 1515 comments) Research diary (14 pages during 5 months) Email archive (340 emails)	II, III
Monimos	Co-facilitator of the whole process and mainly responsible for the online co-design as well as data collection and analysis	Observation in meetings Observation online Interviews (N = 7) Survey (N = 8) Log data (Owela, Google Analytics) Discussion data (99 posts, 261 comments) Research diary (39 pages during 12 months) Email archive (1198 emails)	IV, V, VI
Tilkut	Facilitator of the user studies both online and face-to-face	Observation online Interviews (N = 7) Survey Research blog (N = 7)	I
SuperF	External observer and interviewer of a facilitator	Observation online Interview of a facilitator	
Events	Co-facilitator of online user testing	Observation online Focus group discussion (N = 4) Log data (Owela, Google Analytics)	
City Adventure	Co-facilitator of the whole process, responsible for online co-design	Observation online Observation face-to-face	VII

6.3 Mobideas

A case study called Mobideas was carried out within a larger research project that studied the use of innovation technologies in software-intensive companies[5]. The aim of the Mobideas case study was to develop a model for web-based user-driven innovation that is connected to an agile software development process. A restricted Owela workspace was used as the main tool for communication and collaboration between users, software developers and researchers who facilitated the process. A lot of modifications were made to Owela based on the specific needs of this case study. For example, the project workspace structure was developed to support a long-term project with different types of content, the chat tool was given an administered version, and mechanisms were developed for evaluating ideas and bringing up unevaluated ideas for neutral elaboration.

The case was planned together with a software company that was interested in having demonstrations of social media services on their mobile platforms, for example on netbooks (internet tablets). Thus, the practical goal of the case was to develop a new social media service for mobile context. To make the process totally user-driven, the idea for the more concrete service concept was left to be developed by the users.

A brief introduction to the process, methods and participants in the case study is given in the following. The case study is described in more detail in papers II and III.

6.3.1 Participants

In order to find innovative and motivated users to participate in the study, we used the lead user methodology as described by von Hippel (1986; 2005). We started with the definition of the trend (mobile social media) and specified the measures for the leading position in the trend (Urban and von Hippel, 1988). We conducted an online survey and marketed it via an online consumer panel and social media services. Over 600 people answered the survey, and 212 continued after that to an Owela innovation space to generate ideas for new social media services, as well as to comment and rate the ideas of others. Based on the quality of the ideas gathered and lead user characteristics measured in the survey, facilitators identified 50 possible lead users of mobile social media and invited them to participate in the web-based design project.

33 of the invited lead users joined the Mobideas project in Owela and participated as active innovators and designers of the online service from needs recognition and idea generation to prototype testing. All users were frequent users of

[5] "Information Technologies supporting the Execution of Innovation projects" (ITEI) project 2008–2011 was part of the ITEA2 programme. The Mobideas case study was funded by the Finnish Funding Agency for Technology and Innovation (Tekes) and VTT Technical Research Centre of Finland. http://itei.vtt.fi.

social media but most of them did not have a technical knowledge in building such services themselves. Their ages ranged from 19 to 80, and educational backgrounds also varied greatly. 22 users were male and 11 female.

A group of four university students developed the software prototype and participated in the Owela discussions. The software development was part of a study project and they received external support in the development both from researchers and the representatives of the case company.

Two researchers facilitated the co-design process, scheduled the tasks, administered the Owela workspace and participated in the online discussions with users. During the study, the facilitators prepared weekly design tasks for the users, kept them informed via Owela and email, and communicated the conclusions of users' discussions to the developers and company representatives.

6.3.2 Co-design process

The Mobideas process was based on the human-centred design process (ISO 9241-210, 2010). Since the human-centred design process does not involve an idea generation phase, we applied the user-centred product concept design (Kankainen, 2003) to the first phases of the design process. Agile software development practices (Boehm and Turner, 2003) and more specifically the Scrum process (Schwaber and Beedle, 2002) were used in the software development phase. The original planned process (Koskela et al., 2009) was developed during the case study when it became more obvious which tasks were needed to achieve the goals in different phases of the process. Figure 9 shows the process phases and users' tasks in each of them.

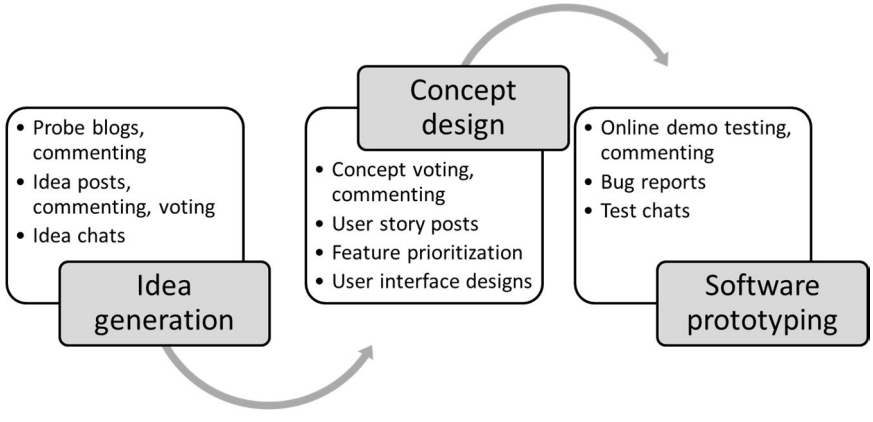

Figure 9. The Mobideas process consisting of idea generation, concept design and software prototyping.

The idea generation started with shared user diaries called "probe blogs" in which users wrote stories of their everyday situations with mobile phones, needs and

challenges with the current social media services. Based on the stories, users generated ideas for new social media services individually by posting them in Owela as well as by discussing them together in four idea chat sessions that were moderated by the two facilitators. The facilitators, company representatives and software developers selected from among the 30 ideas five service concepts that were developed into visual mock-ups.

The concept mock-ups were then posted in Owela as user interface slideshows so that the users could comment on them and vote for their favourite concept. The concept that got the most points (a map-based service for locating services and people based on user-generated content) was selected for implementation. The concept design phase continued by creating a list of desired features for the service. Features were collected both via general questions and user stories in the form of short scenarios describing an actor, goals and tasks as defined by Cohn (2004). Users commented and rated the suggested features and thus participated in the prioritization of the features to be implemented. Users also had the chance to post user interface suggestions for the service in Owela by using an online wireframing tool called Mockingbird[6].

Software development was structured according to the Scrum practices and consisted of six iterations. A new version of the service prototype was released in Owela every two weeks. The users tested the online prototype and gave feedback to the developers either by commenting in the Owela workspace or by participating in test chat sessions in which the users were able to discuss directly with the developers. In Owela, there was also a bug list that users could use to report problems they encountered when testing the demo. The facilitators analysed the user feedback and discussed it with the software developers in the iteration planning sessions that were held at the beginning of each of the software iterations.

6.3.3 Outcome

The outcome of the process was a functional prototype of a map service that was named MapMate. Figure 10 presents a screenshot of the final prototype version consisting of a zoomable map with people and their current locations and services inserted by the users. On the right hand side, there is a chat and functions for searching services by categories, adding new services to the map and updating one's own location or profile data. Since there was so little content in the service, it was tested on the web during the case study, although it also worked on mobile phones with touchscreens.

[6] https://gomockingbird.com/

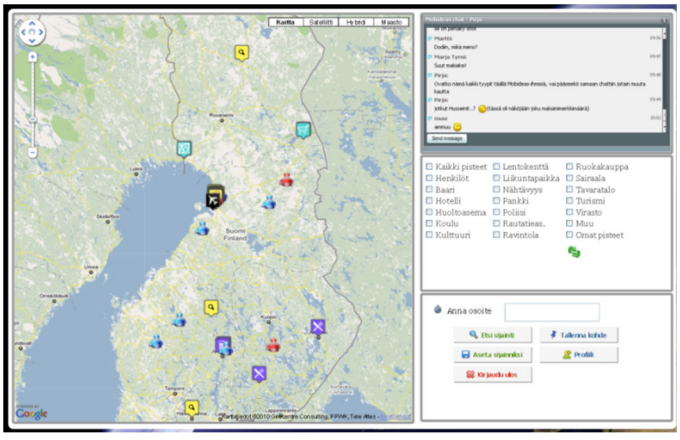

Figure 10. Screenshot of the final version of the MapMate prototype.

The service itself, however, was not the main interest in the research case, and due to the fact that it was programmed as a student project, there were no great expectations of its quality. Technical problems with the mobile platform of the case company did not allow the MapMate service to be published on the mobile device as planned. Unfortunately, the developed service could thus not be used or further developed. Open source development was seen as one opportunity, but it too would have required coordination work.

From the research perspective, the goals of the case study were reached. Since enough users remained active until the end of the project, research data about user participation could be collected and analysed. The fact that the service was finally developed only for research purposes somewhat limits the analysis of the value of user participation. It is not possible to evaluate whether the web-based co-design process results in better services than the ones developed in a software company internally. However, the same challenge concerns all user participation studies, since it is difficult to measure the differences in outcomes of different cases. In the Mobideas case, a model for web-based co-design could be created.

6.3.4 Analysis

The main research data comes from the user interviews that were held with 10 users, and the author's own research diary in which observations were entered during the project. Examples of the research diary considerations are shown in Figure 11. Owela log data and usage statistics provide additional information on the suitability of the method and tools used. From them it can be seen in which project phases users were most active, and what kind of different roles there were among users. Users also commented on different phases of the co-design project via four separate surveys that were held during the process. The surveys consisted of both quantitative and qualitative data. Survey answers were used as additional

data when analysing the interviews, since individual answers could also be tracked from the survey and partly the same topics were covered in both. The author also saved all the 340 emails sent within the case study and used them afterwards to recall certain project phases and to check how the tasks had been introduced to the users.

30.11.2009:

"There are now disorganised ideas in various places: idea chat logs, idea posts and in the probe blog posts.

I'm curious before the chat session, whether anyone participates today. The chat requires quite a lot of preparations from the researcher – ready written sentences help a lot. There must also be clearly formulated questions, if you wish to get concrete answers."

2.11.2009:

"In the probe blogs there are more interesting texts than in the idea blogs. Is it easier to write about one's own situations and in a more flexible form than exact ideas?

The users are worrying about the fact that we should not do anything that already exists for iPhone, but that we should really invent something new."

Figure 11. Examples from the Mobideas research diary.

At the end, all 33 users were invited to a phone interview, and 10 agreed to participate. The interviews were conducted in Finnish, which was the mother tongue of all the participants, and each interview lasted approximately one hour. The interviews were semi-structured, meaning that the questions were already formulated, but the exact wording and the order they were asked in varied. The questions were grouped into expectations, experiences of different stages and tasks, experiences of online collaboration, interaction with other people, physical and social context, satisfaction with the results and personal gains. There were also some optional questions that were asked if there was enough time. The whole list of questions is found in Appendix A (English translation in Appendix B).

Two researchers formulated the questions together, but conducted the interviews individually. All the interviews were recorded and transcribed as text by the researchers. The transcription was almost verbatim, but the level of accuracy varied a little from interview to interview. Texts were then analysed collaboratively by both researchers, so that anecdotes from user interviews were copied into a new list that was grouped based on the questions mentioned above. The EtherPad[7] tool was used for grouping of answers, and a summary of each theme was written in a text document.

The interview answers were grouped in the following categories: online participation, willingness to participate in face-to-face meetings, original idea posting,

[7] http://etherpad.vtt.fi

probe blogs, idea chats, user stories, user interface design, demo testing, test chats, and emails. In each category, the answers were further grouped into positive and negative comments about the specific method or phase of the process. A summary of each category was written, based on all the answers. In addition, answers were gathered on the following topics: most positive in the participation process, most negative in the participation process, feelings about participation, motivations, time allocation and Owela as a tool. Finally, the comments were grouped, based on the five aspects of social media that were presented in Table 7: openness, interaction, collaboration, immediacy, and connectedness.

In addition, the author analysed all the interviews for a second time by using the NVivo 9 software. The objective of the second analysis was to discover surprising new observations and therefore Grounded theory (Strauss and Corbin, 1998) was used. First one transcript was read thoroughly and coded carefully. Based on the open coding, two interesting issues emerged: using work time to participate in the project (that was not really a part of the work) and the notion of separating work and leisure time issues. Since the original goal of the case study was to examine participation as a leisure time activity, strong linking to the work context was eye-catching. Apparently, the topic of the project was close to some participants' work, and they also used their work time to participate.

Based on this notion, four other interviews were then analysed selectively, concentrating on three themes: the reasons to participate, time allocated for participation, and satisfaction with the project results and its rewards. The overall experience of participation and satisfaction with the project seemed to be interesting, since there were also links to the work context in those topics. After multiple refinements of code correlations, a division into receiving and giving was discovered as the ultimate reasons for participating that also affect satisfaction with the outcome. The relations between the original codes, second-order themes and aggregate dimensions are shown in Figure 12. The remaining five interviews were read through to check that the same principle of the orientation of contribution and experienced benefits fit them as well, but no exact coding was done any more.

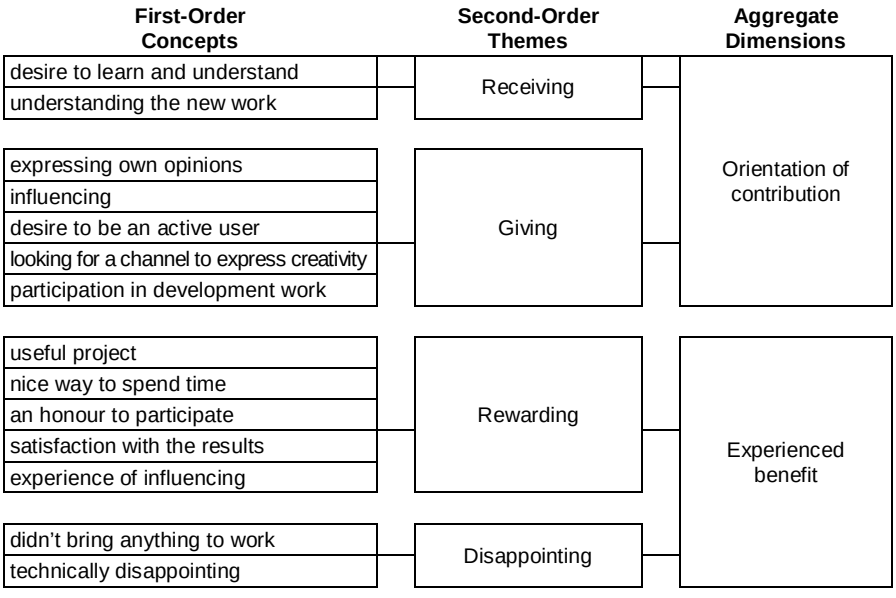

Figure 12. Code aggregation in the Mobideas analysis.

6.4 Monimos

The Monimos[8] case study was conducted as a part of a larger research project Somus[9] that studied citizen participation via social media. In the Monimos case, a multicultural social media service was created with and for the Moniheli network[10], which is a co-operation network of multicultural associations in the Helsinki region. The case study was conducted in collaboration with the EPACE[11] project.

The goal of the case study was to develop an information and knowledge platform for immigrant groups based on their everyday life needs and issues. Further goals in the case study were to enable immigrants' to participate in public discussion and to establish interaction between immigrants, multicultural associations

[8] The case study was originally called iMedia (immigrant media). The participants did not want to use the word immigrant. After choosing the name Monimos for the service, the name was adopted for the whole case study.

[9] "Social media for citizens and public sector collaboration" (Somus) project 2009–2010 was funded by the Academy of Finland and VTT Technical Research Centre of Finland. http://somus.vtt.fi.

[10] http://www.moniheli.fi

[11] "Exchanging good practices for the promotion of an active citizenship in the EU" (EPACE) project 2009–2010 was funded by the Fundamental Rights and Citizenship Programme of the European Commission.

and various government agencies. The idea and goals for the service were defined together with the user community, which had an active role in design and decision making throughout the development process.

The co-design process consisted of face-to-face workshops with selected user representatives ("core team") and public web-based co-design throughout the ten months-long design and development project. The core team continued its workshops within the research project a further six months after the launch of the service and handled issues like producing content, administrating the service and advertising it to new users. The web-based public co-design was limited to the design and development before the service launch.

The process, methods and participants are described briefly in the following and in more detail in papers IV, V and VI as well as in Näkki et al. (2011).

6.4.1 Participants

The online co-design process was open to anyone and it was advertised via project networks to interested participants. Most of the design work was, however, done by the core team that originally consisted of eight immigrants and two employees of the Moniheli network. One of the Moniheli project workers invited the immigrant members to join the core team based on their representativeness of various backgrounds (nationality, gender, professions) and personal interest in social media and new service development. The group decided to use English as a working language, which was not anyone's mother tongue.

During the process, some participants left and nine new ones joined the project. Some of the users only visited the group once or twice, whereas five people stayed in the team all the time. In addition to the future users of the service, one software developer and 6–8 researchers in different fields (social media, civic participation, immigrants' media use, participatory design and software business) participated in the core team. A user interface designer also joined the project after the broad concept idea was selected and stayed in the team until the layout was ready.

6.4.2 Co-design process

The process started by interviewing a couple of civil servants working with immigrants, as well as the head of an international leisure network, and by organizing a small workshop with foreign researchers at VTT in order to obtain knowledge about immigrants' needs and to generate tentative ideas for possible solutions. We then organized a public online discussion in Owela and an open workshop for Moniheli members in order to evaluate the initial ideas and choose the ones to be developed further. Based on the group discussions, we decided to combine two ideas and develop a "Solutions arena" extended by a "Multicultural event calendar".

The core team was then selected and it started to meet monthly in workshops, in which the vision of the service was articulated and decisions about design and management were made. Since participation was voluntary, not the whole core

team participated in all workshops, but only 4–10 users at a time in addition to the researchers and developers. In the early workshops, the focus was on idea generation, use scenarios and use case descriptions, whereas later workshops concentrated on evaluating the Monimos website that was iteratively developed throughout the development process based on participants' feedback. Co-design methods included, for example brainstorming, use scenario visualisation with picture templates and user story writing. Various online collaboration tools were used by the core team during the workshops (Skype, Etherpad and Bambuser for distant participants) as well as between them (Owela, Doodle, Etherpad, email). Figure 13 displays the structure of the co-design process.

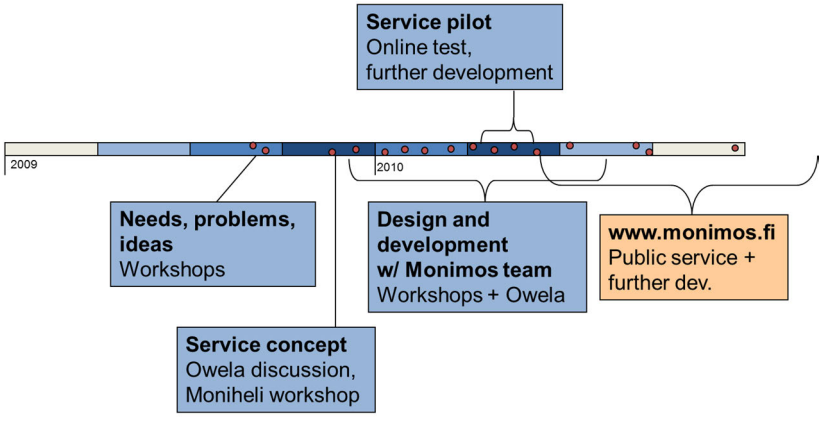

Figure 13. Monimos design and development process, workshops are marked with red dots.

Owela workspace was constantly open to participation by anyone within or outside the core team. Owela was most actively used in the ideation phase, before the core team was formed, and in certain phases when the opinions of the wider public were needed. In Owela, people were able to make suggestions regarding the service concept, features, layout and name of the service, and to discuss and vote on these. In the final stages, before the service release, three chat sessions were used to co-test the website with core team members.

6.4.3 Outcome

The outcome of the case study was the social media service Monimos[12], which aims to be "the multicultural voice of Finland". Monimos consists of public and private blogs, groups, an event calendar, polls and profiles for individuals and

[12] http://www.monimos.fi

organizations. The elements are similar to those in other social networking services, but a lot of content is visible also without logging on, and all the events and blogs of different multicultural associations are in the same service instead of separate websites. The main view that is showed in Figure 14 consists of a brief introduction, blog entries from Moniheli and other blogs, upcoming events, online users and recent entries.

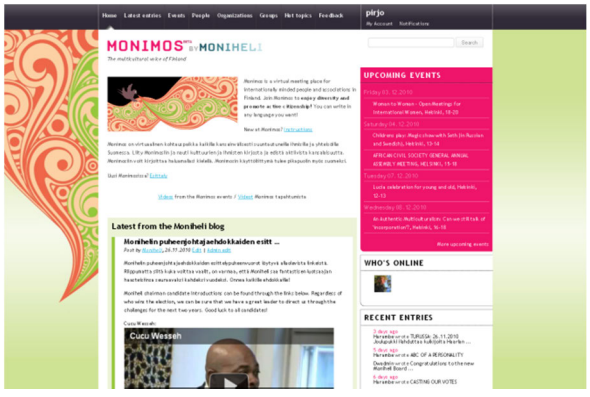

Figure 14. Main view of the Monimos service.

Six months after the launch of the service, there were around 200 registered users, and the service was used for announcements of Moniheli, discussion of issues that are of immediate interest to immigrants and event advertisements. Not all of the activity was visible to the public, but people also made contacts via private messaging. However, the number of users as well as the amount of content was smaller than expected during the development. The most active users were the members of the core design team, who had already become familiar with using the service during the co-design process.

Since social media was not seen as necessarily the only tool for participation and networking, the concept was enhanced with face-to-face events called Monimos Clubs. Moniheli continued to administer the Monimos service and club meetings after the research project was over, and a lot of effort was spent in handing over the service so that it can be used efficiently in the future. A few participants in the core design team created a new “Monimos team” and started to coordinate the development and administration of the service on a voluntarily basis.

6.4.4 Analysis

The challenges in the co-design process were first analysed from the research diary. The author had written her observations and consideration about the research process and working ways in a 39 page long diary during the whole 12 moths research process, starting already in the planning phase. A short example of the diary is shown in Figure 15. After the project, the author read through her

diary and wrote a summary in which similar observations were grouped instead of the timely order. Three other researchers also read the analysis and it was discussed together with the help of the online tool EtherPad that enabled quick sorting of short anecdotes. Based on that, different categories causing challenges in the co-design process were identified.

18.3.2010:

"According to (N.N.) the problem of our process is the actor-centricity. What are the topics that interest immigrants and how could we include them to the process? Notions from today's workshop: The position of camera is not good: not everybody is visible in the video. Skype etc. should be tuned before the meetings starts and have a separate manager for the technical stuff. Some of the collocated people also participate in the chat (with the distant participants). I feel that there are too many chats at the same time. It is difficult to concentrate. – Vivid discussion about the service name continues. – Participants took an active role: design suggestions. (N.N.) had tested the service with her friends. We got quite concrete suggestions from their comments – there are problems with logging in and joining the groups. The discussion feels fruitful. The participants wish more emails from (N.N.) about the progress in development."

Figure 15. An excerpt from the research diary.

To study users' experiences of the process seven participants were interviewed face-to-face (4) or via Skype (3) at the end of the case study. Each interview lasted approximately one hour. The interviews were semi-structured, meaning that the questions were readily formulated, but the exact wording and the order of asking them varied. The interview questions were formulated collaboratively by all researchers of the project and can be found in the Appendix C. They include questions from the following themes: expectations, experiences on different phases of the process, participation in workshops and in Owela, interaction with different stakeholders, project relationship to the Moniheli network and satisfaction with the project outcome.

Five interviews were held in English and two in Finnish based on interviewees own preference. Most of the interviews were conducted by two researchers, and one of them by the author alone. All interviews were recorded and transcribed verbatim by an external person. One interview had to be left mostly outside the analysis, since there were a lot of external noise and technical problems with the Skype call. However, this interviewee did not have much to say, since he had participated only in the last phase of the project.

Two interviews were first analysed collaboratively by two researchers using the collaborative annotation tool for qualitative data, called Saturate. Both researchers first started open coding (Strauss and Corbin, 1998), but since they saw each other's codes simultaneously, the used codes soon saturated and altogether 34 codes were used. They remained in a general level, such as "benefits", "learning", "motivation", "democracy" and "empowerment".

The author continued the analysis for the other interviews individually by using NVivo 9. New codes and categories were identified in addition to the previous

codes. Similarly, the research diary was also analysed for the second time using open coding in NVivo 9. The transcripts were coded with notions, such as “no one takes responsibility”, “challenging to find time for participation” and “concept definition was the most important phase”. Notions related to the new and possibly surprising ways to participate or experience own role in the co-design project were looked more carefully. Altogether there were 357 codes and anecdotal notes from all interviews. They were then looked as a whole, and grouped to 24 categories. These categories were refined and labelled such as “motivation”, “ownership” and “concept design”. Examples of the codes in those categories are given in Table 13.

Table 13. Examples of the categories and codes from the Monimos interviews.

Category	**Codes**
Motivation	Desire to learn
	Networking
	Becoming heard
	Helping the project with one’s own capabilities
	Feeling responsibility to represent others who cannot participate
	Making the world better
	Influencing in the society
	Citizen participation was interesting
	Representing own citizen group
	Interest in immigrant issues
	The project was an opportunity to get help
	The concrete outcome motivated
Ownership	The role of Moniheli is unclear
	The researchers did not understand how Moniheli works
	The participants make their interpretations about unspoken tensions in the project
	Conflict between researchers' and Moniheli's point of vie
	Conflicting interests between project coordinators
	Talking about "them" instead of "us"
	Monimos was felt as an own service; no need to give feedback
	Team members became product owners and did not criticize
	Solving conflicts was felt to be researchers' job
	No one takes responsibility from Monimos
	Low activity in Monimos is explained with team membership
	Difficulties to choose own role: user or developer
	Being in a developer or administrator role restrains use
	Interest in statistics and new users
Concept design	The early definition is important for the project
	Concept definition is the most interesting stage
	Ideation and different point of views are inspiring
	Concept definition is important
	The success of the service depends on the concept definition
	Concept definition and creation of a shared vision is difficult

6.5 Supplementary cases

The four supplementary case studies have been chosen in this thesis to represent different types of Owela projects and highlight different settings that have been used among the 68 projects this far. These studies have not been analysed in the same detail as the Mobideas and Monimos cases, but they are used to illustrate certain features of Owela or practices that emerged during those studies. The author was the main facilitator in the Tilkut and CityAdventure studies, and she analysed the results of those case studies. In addition, she participated in the Events study and analysed the use statistics of the Owela workspace. In the SuperF study, she observed the online participation and interviewed one of the facilitators.

6.5.1 Tilkut

Tilkut is a semantic bookmarking service that was created in a Täky project13. A group of users that were familiar with online bookmarking was involved in the development process of Tilkut. The user-centred design process consisted of need analysis, requirement gathering and two evaluation rounds of the software prototype.

First, general user needs related to tagging were studied via an online survey (N = 38) and interviews (N = 5). More precise requirements for the service were collected in a user test (N = 7), in which a combination of existing online services was tested. Test users were recruited from Owela users, who were thus familiar with the online feedback tools in advance. A second user test was done to evaluate the Tilkut prototype (N = 6). Both test phases consisted of individual interviews at the beginning and end and an online test period of three weeks. Three users also participated in a light-weight usability test during the initial interview.

During the online test period, the participants were asked to use the service daily and to report their experiences in a blog that was open only for the selected group. In the blog, the participants discussed their experiences, ways of using the services and problems they had encountered. Software developers participated in the blog discussions, which made it possible to fix some reported problems in the software even during the test period. Users also shared their ideas for further development of the service and received hints on different features from other test users.

At the time of the Tilkut case study, Owela workspaces did not yet exist, and a normal WordPress blog was used for sharing the experiences during the test period. The blog was integrated into Owela so that the users could log in with the same user account, but the content was not visible to other people. The method was similar to that in later Owela workspaces: the researcher added new topics to the blog, and the users wrote their experiences as comments on them. The Tilkut co-design pro-

[13] "User created metadata as meaning indicator and part of the user experience" (Täky) project (2006–2008) was funded by the Finnish Funding Agency for Technology and Innovation (Tekes), VTT Technical Research Centre of Finland and four Finnish companies.

cess is discussed in Paper I. User tests and their results are discussed in more detail in Näkki et al. (2008b), Bäck et al. (2008) and Vainikainen et al. (2011).

6.5.2 SuperF

In the SuperF case study, Owela was used to study users' previous experiences and expectations related to cloud software services and their security as well, as to develop new service ideas and to gather feedback for some service concepts developed by the case company.

47 internet users participated in the case study via Owela. The participants were divided into two identical workspaces based on different background data. Two researchers facilitated both workspaces and in addition, four company representatives followed or participated in the discussion in both workspaces. The study period was four weeks, and every week had its own theme in Owela. Co-design methods consisted of discussions based on researchers' questions, user blogs on given topics, ideation related to different themes, polls and chat sessions.

The facilitators participated actively in the Owela discussions, for example by asking additional questions and sharing some of their own experiences. They also activated users with weekly emails consisting of the introduction to the theme and tasks of the week and an invitation to the weekly chat sessions. The details of the case study have been presented in Karppinen et al. (2011).

6.5.3 Events

In the Events case study, four users tested a mobile prototype of an event management system for one month. A face-to-face workshop was organized at the beginning and end of the testing period. During the testing, the users reported user experiences via Owela, using a structured way of reporting the current situation, aims of using the service, problems that had occurred and development ideas for the prototype. The software developers participated in the Owela discussion, asked clarifying questions about the problems and made changes in the prototype based on the reported error situations during the test period. Three researchers facilitated the online discussion, added new discussion topics and every now and then reminded the test users about their tasks via email.

6.5.4 City Adventure

In the City Adventure study, Owela was used to develop an agent adventure service based on an early prototype as well as to develop new ideas for adventure concepts. Users participated in two different ways: online ideation, and testing the service prototype in a real world situation. Online ideation was divided into an individual part that aimed at inspiring and stimulating ideas around the adventure topic, and a collective ideation part with other users in the form of online discus-

sion facilitated by a researcher. 36 Owela users joined the online discussion, which was open for two weeks, and six people volunteered for the service testing session, which took three hours. The details of the case study are presented in Paper VII.

7 Experiments with web-based methods for user participation

This chapter describes the implementation of the case studies and findings about web-based co-design methods in different phases of the design process. Traditional UCD methods were used as a basis and developed further in order to utilize the possibilities of web-based tools. Some of the methods have been refined throughout the case studies, whereas some methods have been used only in certain case studies.

7.1 Exploration

User studies are used at the fuzzy front-end of the innovation process for analysing user needs and drawing inspiration for ideation. According to the principles of Contextual Design, it is important to look at the practices behind user needs and not believe what users state to be their problem (Beyer and Holtzblatt, 1998). The user-driven innovation viewpoint takes the user studies as a source of inspiration for the researchers (Holmquist, 2004).

7.1.1 Asynchronous focus groups

Many Owela discussions have a similar structure to focus groups: there is a facilitator, participants and a topic to discuss. The facilitator opens the discussion with a set of questions or scenarios that are enhanced with visual material. Users typically have several days, or even weeks, to comment on the topics.

The SuperF case was structured around weekly discussion topics. Some people came to comment on each topic only once, whereas others visited the workspace daily or several times a day, which enabled more in-depth discussion when the users continued their deliberations based on other participants' thoughts. The facilitators commented on the discussions and asked for more details when needed.

In the CityAdventure case study, the focus group discussion was based on an online survey about past experiences and memories of adventures. 36 participants first answered the survey individually. Some answers (86 stories in three categories)

were copied as blog posts to the Owela discussion area, where other participants could comment on them. 18 users wrote altogether 143 comments. The survey proved to be an effective way to start a discussion: people could carefully formulate their own ideas first and then continue the discussion with others.

7.1.2 Shared user diaries

In Owela user diaries are used as a self-documentation tool in user and consumer studies and as a trigger for inspiration in the ideation phase. They can be private for each user, but in the Mobideas and SuperF cases they have been used as a shared blog.

In the Mobideas case, user diaries were called probe blogs, since they were used for "probing opportunities for new solutions" in the everyday lives of the users. The method was inspired by cultural probes (Gaver et al., 1999), but users were only given a relatively open assignment instead of clearly directed tasks and material packages. Users were asked to tell stories about daily situations in which they had used internet or social media services with different devices or in which they would have wished to have some new service while on the move. Both negative and positive experiences were welcome.

As distinct from traditional user diaries, all entries were shared by the participants, and the stories of other users served as triggers for recognizing similar or different situations in their own life that could be reported in the user diary. Researchers did not analyse the diary entries, rather their purpose was to inspire users to generate new ideas and solutions for their own and others' situations. As Erickson (1996) suggests, users' stories contain essential information for designing good interfaces, but the storytelling process as such is the most valuable contribution to design. When people write stories, they are drawn into a discussion of ideas about which they were not conscious before telling the stories. Thus, storytelling catalyses communication in the design process and allows different stakeholders to be equal collaborators, since no expertise is needed for this method. (Erickson, 1996)

Probe blog writing was originally allocated for one week, but some users continued writing in the following week. 17 users participated in the task and they wrote 1–4 blog entries each. Altogether, users wrote 42 stories and 185 comments on them. A few examples of the blog stories are given in Figure 16. The stories were relatively short and often included a concrete suggestion or idea, although the task description was to describe situations and needs. However, even a short description of the situation or event provided a better understanding of why a certain service would be valuable. The facilitators also participated in the discussions and asked for more details about the events that had triggered the blog entries. However, at that time, users did not receive automatic email notifications from Owela and they did not necessarily see facilitators' additional questions and thus did not supplement the stories.

A: “I was walking in the city early in the morning and didn’t know where the nearest public toilet was. It would be useful to know if there are free toilets nearby.”

B: “The train came late – again! I’d like to get a message on my mobile phone!”

C: “I went to the annual book fair, which had plenty of interesting programmes on offer. I would have liked to have had a ‘fair recommender’ on my mobile phone that would recommend me a programme that matches my interests and also surprises. me.”

Figure 16. Examples of users’ probe blog stories.

The participants felt that a shared user diary was a good method to start generating ideas. This method in particular inspired a couple of users about the project and motivated them to participate actively in the entire process. Informal storytelling, that is writing about use situations in the form of short stories, was appreciated. However, some users found it challenging to decide which use situations to write about, because they constantly used social media during the day. The burden of choosing the relevant issues to be captured has been reported also by Palen and Saltzman (2002) and Mattelmäki (2005). No one wrote stories daily and a two-week period felt too long time for coming up with new stories without any new questions or different viewpoints.

7.2 Ideation

Different methods for triggering new ideas were used in the case studies. Sharing user diaries (Mobideas) and answers to online surveys (Mobideas, CityAdventure) were used to base ideation on users’ own stories and needs. In some phases, facilitators had a more active role in addressing themes and specific questions (Tilkut, SuperF, Mobideas) or providing videos (CityAdventure) to trigger ideas. Blog-based discussion was used in all cases. Two specific methods – idea posting and chat sessions – are described in more detail.

7.2.1 Idea posting

Free ideation based on given themes was used in SuperF, Mobideas, Monimos and CityAdventure cases. In the Monimos case, the initial ideas were generated in two workshops with altogether 24 people, based on participants’ own knowledge of the current problems in the integration and civic participation of immigrants. These ideas were then posted to the Owela workspace, which was open to everyone. At that point, the core design team had not yet been chosen, and the Owela workspace was advertised among all member associations of the Moniheli network, previous workshop participants, foreign researchers at VTT and a couple of

discussion forums for internationally minded people in Finland. 17 users other than researchers registered for the Owela discussion, and gave 41 comments on the 16 ideas. All ideas were written both in Finnish and in English, and both languages were allowed – and used – in comments. Users were also asked to post new ideas, but no new ideas were written. In addition, users could rate ideas by giving each ideas a thumbs up or thumbs down. Based on the ratings, the three most popular ideas were selected to be presented in the face-to-face workshop at Moniheli, where the final service idea was to be chosen.

In the Mobideas case, idea posting was open in the week following probe blog writing. The idea description had two separate parts. First, the user described the challenge or situation behind the idea and then the actual proposed solution. Below each probe blog posting, there was a button enabling the user to add a new idea based on the problem or situation described in the story. Many of the service ideas were triggered by the user needs described in the blog postings, as well as the real-time chat sessions described below. Altogether, 30 ideas and 120 comments related to them were obtained. 18 ideas were posted by one user; other ideas came from seven users who added 1–4 ideas each.

Users were also asked to evaluate each other's ideas by giving ratings in three criteria: originality, usefulness, and commercial potential. A few researchers and company representatives additionally evaluated the technical feasibility of the ideas, since an important selection criterion for the service was that it must be implementable within the project time limit with the given resources.

The benefit of the asynchronous idea posting method is that users could add ideas whenever they had them. However, some users mentioned that they missed the real time feedback on their ideas.

7.2.2 Idea chat sessions

Idea chat sessions enable interactive idea generation. Owela chat sessions are scheduled events hosted by a researcher and focused on a clearly defined topic. Chat sessions may consist of both individual brainstorming and interactive idea generation, which stresses the social side of innovation based on others' ideas.

In the Mobideas case, four idea chat sessions were organized, and the users could participate in one or more sessions. Daytime and evening sessions were organized to enable as many end-users as possible to participate. Two to four users and one or two facilitators participated in each chat session. One facilitator led the chat and chose one of the most commented blog stories for each session as a basis for ideation.

The sessions took 45–60 minutes each. Users spent the first 15 minutes writing ideas privately, after which the ideas were presented to everyone, and approximately 30 minutes were spent on the discussion and development of the ideas. Individual writing time was appreciated by the users, since it enabled concentration and free idea generation. Some users appreciated the chats as an opportunity to obtain instant feedback on ideas rather than having to keep visiting the discus-

sion channel to look for updates. 7 out of 11 respondents in the ideation feedback questionnaire stated that it was more pleasant to ideate together with others in the chat than alone. Two users also said that the chat sessions were more effective for ideation than face-to-face meetings, because everyone could comment at the same time. The following quote from a Mobideas user shows that other users' comments in the chat helped in developing the ideas.

> *"Idea chats were the best part of the project. I am a person who can better crystallize his ideas based on others' comments. When I can perceive the context, I can better clarify my ideas and learn from others." – Mobideas user A5*

The downsides of the idea chats were that the reserved time went quickly. Therefore, in the SuperF case, 1–2 hours was reserved for each of the ten chat sessions. The sessions started with focus group type of questions and continued with individual and collective ideation just as in the Mobideas case. Users did not have to register for the chats in advance, and since the chat times were that long, people joined and left the chat at various times. The late-comers commented on both earlier questions and the topic at hand, which meant that the discussion was not well structured. However, in an idea chat this was not a problem, since the goal was just to receive as many different ideas as possible. The fact that they were not chronologically linked can be seen as an inspiring source for new connections between comments.

Sometimes the pace of chat discussions was fast. Especially when many people were participating, it was challenging to keep track of everything. Hence, when planning idea chats, it is important to keep the number of participants in one chat down to just a few. Facilitators also need to pay attention to clear guidelines that are written correctly, since earlier texts cannot be edited and the quick pace of the discussion does not allow the explanation of the same things multiple times. Other participants will most probably read all the other comments, and therefore unnecessary things should not be written to avoid the burden of reading long texts.

7.3 Concept design and evaluation

In the concept design phase, asynchronous focus groups are the basic Owela method for evaluating design drafts made by the designers or researchers. Users can comment on the scenarios, storyboards and mock-ups with text and give votes to their favourite concepts. In the user-driven case studies, such as Mobideas and Monimos, users also participate in writing user stories, suggesting new features and sketching user interfaces. Concept evaluation is also a source of new ideas, and many Owela projects start by evaluating a preliminary concept, based on which users start to ideate new use cases and variations of the concept.

7.3.1 Concept mock-ups

The paper prototypes were posted as slideshows on the online workspace where the end-users could comment on and evaluate them on a scale of 1–5. Altogether 56 comments were made regarding the concepts. The concept that gained the most votes (76) was chosen for further development as a software prototype (see Figure 17).

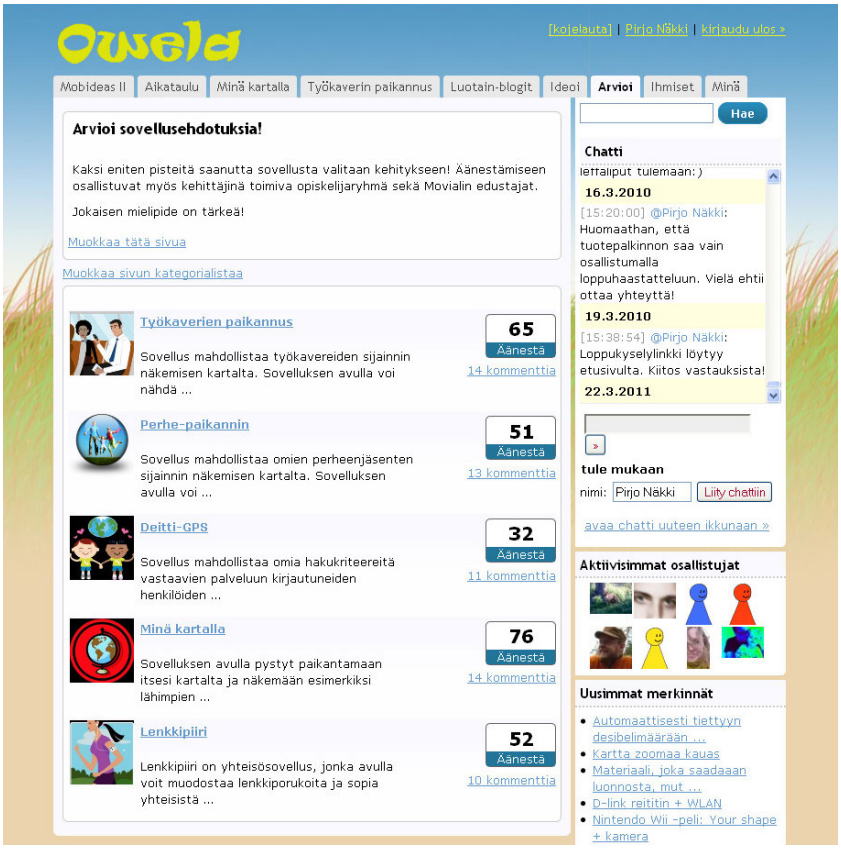

Figure 17. Voting results for concept mock-ups.

7.3.2 Feature wish list

To analyse user requirements and possible features, users were asked to write user the Monimos case, the stories were written in a face-to-face meeting and in the Mobideas case in Owela. The most important part of the stories was the goal (“in order to” field) that revealed users’ needs better than the suggested features. However, the stories were still not concrete enough to create a basis for requirements analysis.

In the Mobideas case, only three users wrote stories online and they did not strictly follow the given structure. Therefore, facilitators posted some specific questions to obtain users' opinions on those features that had sparked discussion among the developer team. The questions concerned logging in, elements of the main view, and desired ways of adding content. Users answered actively (58 comments in total) and discussed the answers of other users, based on which the feature list was updated by facilitators. Users still commented on these stories (87 comments) and further discussed whether they really needed the suggested features. Even though the users found it challenging to write the actual user stories, they appreciated the opportunity to vote for the suggestions (see Figure 18). The list of features was iteratively updated, based on the users' suggestions, and prioritized based on their voting. Klammer et al. (2011) made a similar finding that users could not individually write future scenarios online but more easily answered specific questions posed by the researchers.

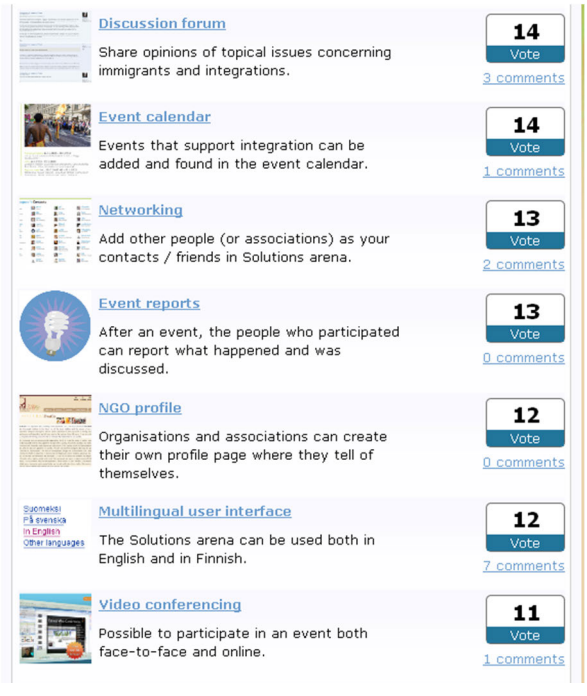

Figure 18. Feature suggestions and their votes in the Monimos workspace.

Writing feature suggestions in the form of user stories seemed to be a challenging task in the early phase, when users did not as yet have a shared understanding of the service being developed. More facilitation was needed than was expected. Although users were expected to write user stories based on their own needs, one user felt that feature suggestions required technical knowledge that he did not have, which is illustrated in the following quote from him.

> *"I feel that in this phase the project went beyond my capabilities.* I mean that I am not a programmer and I don't know the technical constraints.*"* – Mobideas user A5

In the Monimos project users reported that the feature list was too long (33 items) and that it was not possible to go through them all. Online voting procedure was therefore confusing, since users did not want to vote before knowing all the options.

In later phases, more precise questions about certain features that were put into Owela did not raise any discussion. They were too theoretical and thus difficult to answer without testing the service in practice and seeing what the different options meant; people were already tired to go to Owela; or the questions asked were not issues that the users wanted to influence.

7.3.3 User interface sketching

In the Mobideas case, users were also asked to sketch their own suggestions for user interface using the online wireframing tool Mockingbird. However, only two users made a user interface sketch. In addition, the developers made one paper prototype that was shown as a slideshow. An example of a user interface suggestion made by a user can be seen in Figure 19. Other users voted on it and submitted 28 comments.

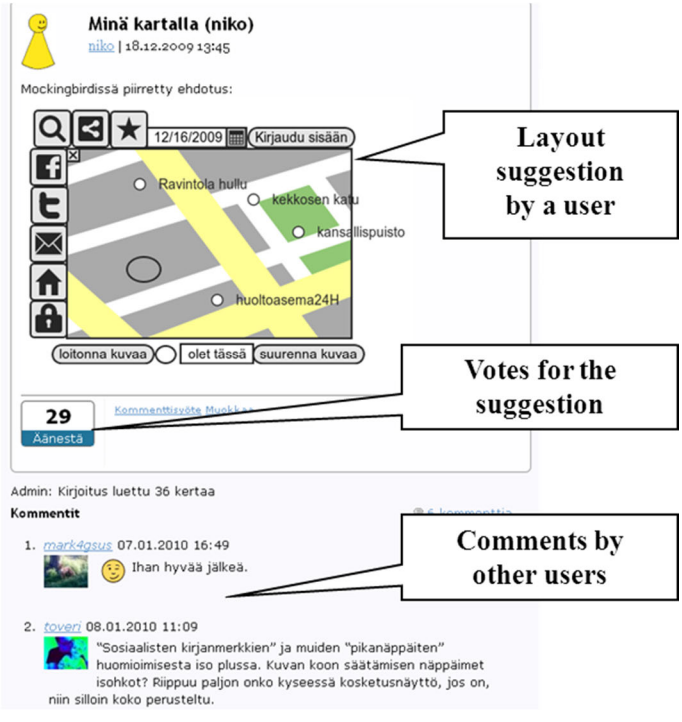

Figure 19. Example of a user interface suggestion and comments by other users.

User interface sketching is an example of a task that not many users participated in, and the layout suggestions were not useful as such. However, the two users who participated in sketching interfaces liked the task. One of them mentioned that it was inspiring to see how other users started to comment on his sketch. He also started to think about other users' needs and how these needs differed from his own. Although the sketches were not useful as such, the discussion that they sparked off helped the developers to understand which features and tasks are important for the users.

In the Monimos case, users were asked in Owela for comments about different layout colour schemes prepared by the designer. Hardly any comments were received, which may be for various reasons: the timeframe for commenting was short, the layout options were rather similar and differed only in the colours, there were altogether too few participants in the online discussion, users did not regard the colours of the user interface as important for them or they did not want to criticize the designer whom they knew from the face-to-face workshops.

7.4 Software development and testing

During the software prototyping phase, three methods have been used for collecting user feedback: asynchronous user testing (Mobideas, Tilkut, Monimos), test chat sessions (Mobideas, Monimos, SuperF), usability tests (Tilkut, Monimos) and public beta testing (Monimos).

Prototype testing is an essential phase in the design process, since it provides hands-on experience needed for real user participation (Bødker and Grønbæk, 1991). Prototypes can also be used as props to discover how the services could be used in the future (Mogensen and Trigg, 1992). The challenge in testing web-based services is that they cannot be tested in one-time usability tests; their value can only be experienced in use over time (see Dubberly, 2008b). In the Monimos case, users were able to test the online service during the development process and at the same time discover which purposes they would use it for, which furthermore contributes to requirements analysis for the future use cases.

7.4.1 Asynchronous user testing

In the Mobideas case, the link to the online demo was published in the Owela online workspace, and end-users were asked to try out the service on their own. Users were asked to report all problems and bugs they found during testing by posting comments in Owela.

Users could report the bugs themselves, but only three users did so. The bug list was mainly updated by the facilitators, who collected the bugs from other discussions in Owela. The developers were able to comment on the bugs and change their development status, which was indicated by "traffic lights": error, in development, and fixed. When a bug was fixed, the original reporter was asked to retest the feature and accept it by writing a comment in the bug post.

Demo testing was mainly considered to be easy and interesting, because users could follow the way the application evolved over time. Users felt that they were able to influence the outcome and see how the service was developed based on their own comments. The development of the application was slow in the beginning, as the student programmers first needed to familiarize themselves with the development techniques and overcome some technical problems. Some users therefore became frustrated, and the fact that they constantly found problems in the early prototypes discouraged them from participating in further testing.

Monimos users gave feedback about bugs directly by email to the developer or to the whole core design team, or via the online feedback form in the Monimos service. It was not clear to all users that the pilot test could have been used for active development of the service. The test phase was seen as checking that everything works instead of actively looking for shortcomings and developing the service. A significant amount of feedback was about issues that were already known in the development team. Simple bugs sometimes took too much attention if they were not fixed right away and users were not sure whether anything was happening with those issues. The descriptions of the problems were not always accurate enough to understand in which situation the problem occurred. Clear guidelines for individual testing are thus needed.

In the Events case study, four users reported user experiences of a mobile service prototype during a field trial. Users were asked to write a use experience report via Owela every time they tested the Event Management service. The report template guided users to report the goal, situation, result, problems and wishes related to that use situation.

7.4.2 Collective real time testing

In the real-time test chat sessions, users could give direct feedback to the developers as well as getting answers to questions instantly. Chat sessions typically took 60 minutes, and they were organized at different times, both during the working day and in the evening, to enable different people to participate. No preregistration was required. In the Mobideas case, six users participated in the chat sessions: 1–3 users, two researchers and 1–4 developers in each session. In the Monimos case, eight users participated in test chats.

In the interviews, the Mobideas case participants reported only positive experiences of test chats. Testing the service together with others was considered more pleasant and more fun than testing alone. One user commented that he felt as if he had been “more active and participative than when working alone.” Developers’ participation in the chats was appreciated. The participants mostly felt that testing together with the software developers was more meaningful than testing alone. The participants with a technical background in particular provided a lot of improvement suggestions for the user interface and service features.

Three Mobideas users reported that the chat discussion was too quick to follow, but other users felt that it was easy to participate in testing via a text chat. Howev-

er, the chat session gave a good structure to the testing. Instead of just playing around with the service, it was appreciated that certain tasks and questions were provided by the facilitator of the chat.

Some Monimos users found them time-consuming or difficult or did not find themselves as “chat persons”. One of the Mobideas users, who did not participate in test chats, reported that she normally feels more confident, when doing things alone. Both individual and collaborative testing options should be provided in order to get different people involved.

There were also technical problems that limited quick typing. Although there were commonly agreed schedules for the chat sessions, people came at different times, which made the facilitation of the session challenging. The collaborative chat session, however, at least motivated people to test the service that they did not do alone.

7.4.3 Open beta testing

Monimos users wanted to invite their friends to come and test the prototype even at an early phase, but there was not yet any content in the service, and it was kept restricted to the core design team. One challenge was how to brief the newcomers in beta testing so that they would understand the nature of the evolving service and pay attention to the right things. If potential users get a wrong image of the early version of the service, it may be difficult to change later.

The Monimos service was finally developed as an open beta service that was launched to the public. In an open beta, it was difficult to communicate that the service was not yet ready, but people are still welcome to use it. New users mostly criticized the language of the user interface (English), although it had already been decided to add the other desired language (Finnish) which just needed some volunteers for translating it. Continuous, even daily updating of the service in the beta testing phase would have been important to give the impression of an evolving service. A closed beta could have been a better approach in that situation, but it is difficult to test social media without going open.

7.5 Statistics of use

In the Mobideas case, the most active phase of the study was the beginning, which included writing probe blogs and generating ideas based on them (Figure 20). Users also actively commented on the feature suggestions, even though they did not propose so many features themselves. However, more than half of the comments on features were made in later phases of the project, as new features were also added during the demo testing phase.

Based on the number of comments, the least active phases were user interface sketching and demo testing. During the demo testing, users also participated in the chat sessions and made most of their comments there. Concept selection based on mock-up voting and commenting was a short phase, which explains its

relatively low activity in comparison to other tasks. In addition to posts and comments, users could also vote on different suggestions, for example users actively voted rather than commented on concept mock-ups.

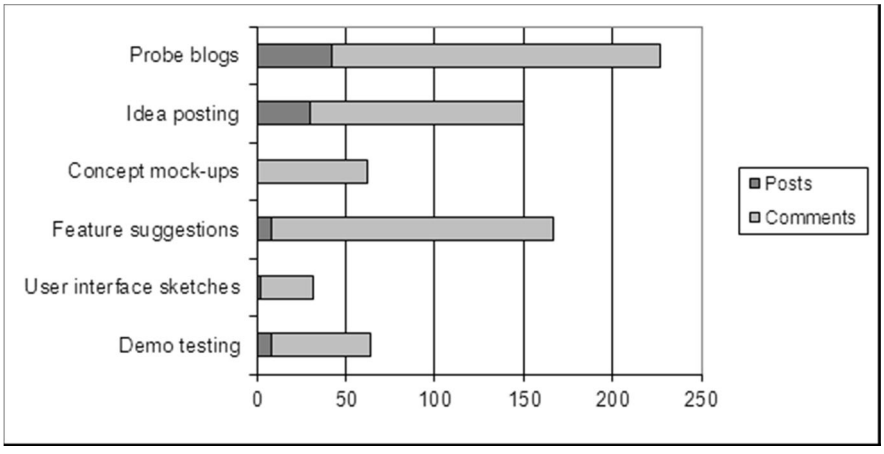

Figure 20. The number of users' posts and comments in various phases of the Mobideas case.

In the Mobideas case study, 25 users, 3 developers and 2 facilitators participated in the discussion, at least in some phases. The largest number of users (17) participated in the probe blog writing and commenting (see Table 14). The same number of users was still active in the ideation phase, especially in commenting the ideas, whereas only eight users wrote their own ideas. The number of participants became smaller during the project: altogether 14 users participated in concept design and evaluation tasks, and 12 users were still commenting on software prototypes in the test phase. In the Monimos case study, the original ideas as well as further concepts were developed face-to-face, and the Owela workspace was mainly used for commenting on them. The most active online participation was in commenting ideas (11 users), features (10 users) and name suggestions (11 users).

Table 14. Number of users participating in different stages of the Mobideas and Monimos studies.

	Mobideas		Monimos	
	Users who posted	Users who commented	Users who posted	Users who commented
Probe blogs	17	17	-	-
Idea posts	8	17	0	11
Idea chat sessions	9	-	-	-
General discussion			3	6
Mock-ups	-	14	-	-
Concept questions	-	14	-	1
Feature suggestions	4	12	1	10
User interface sketches	2	9	-	3
Developer blogs	-	2	-	-
Test comments	-	12	-	-
Bug reports	3	3	6	-
Test chat sessions	6	-	8	-
Name suggestions	4	6	5	11

The users were not equal when it comes to available time, courage of expression or verbal talent. The number of active contributors shrank during both Monimos and Mobideas projects in the course of time, which was disappointing for some remaining users. There were also major differences in the participation by different users. Figure 21 presents the number of users' posts and comments in the Mobideas case and shows that the most active user wrote 34 per cent of all posts, and half the posts were written by the three most active users. Interestingly, there are two users (numbers 12 and 16 in Figure 21) who were very active in commenting briefly on others' ideas and stories, but hardly wrote any new ideas themselves. Of the 33 users who joined the project, eight never wrote anything, and additionally seven users wrote no more than three comments.

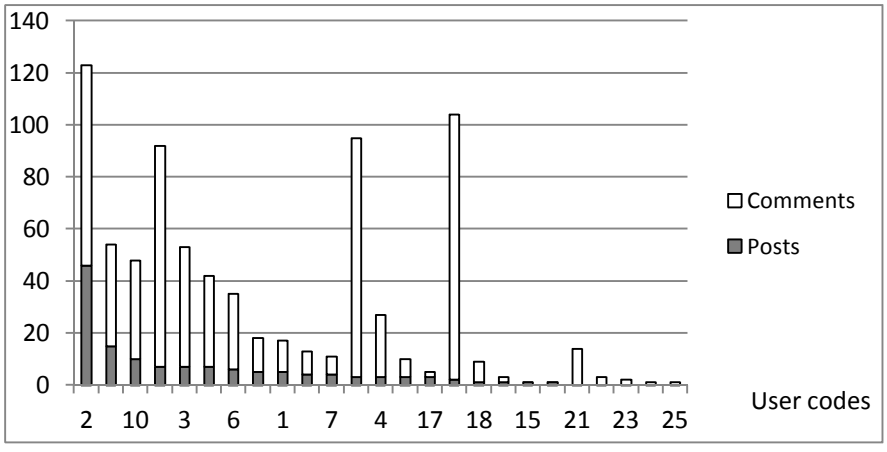

Figure 21. The number of each user's posts and comments in the Mobideas workspace.

The Events case study was different from the others in the sense that only four users participated in the project, but researchers and developers were actively reading their input. These test users were the most active participants, with 84 posts and comments in Owela. Three researchers wrote 22 comments and three developers 9 comments. Two researchers and two developers followed the discussion without writing anything. The number of comments posted by each user is illustrated in Figure 22.

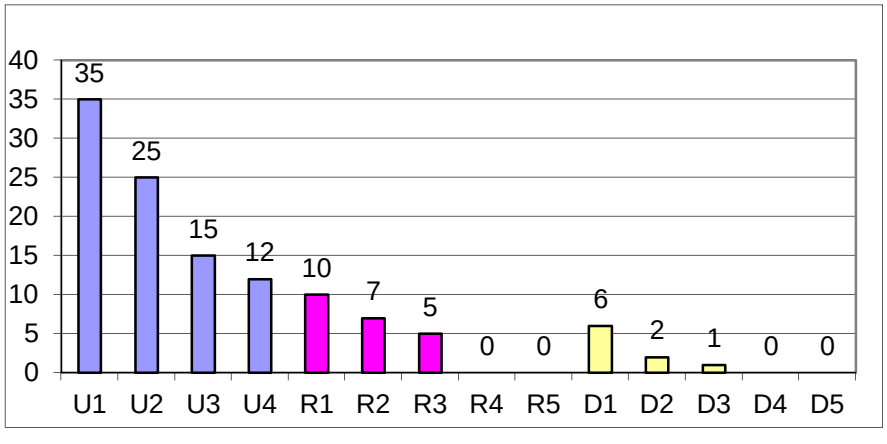

Figure 22. The number of comments per participant in the Events case study (U = test user, R = researcher, D = developer).

8 Experiences of web-based co-design

This chapter presents the users' and facilitators' experiences of the web-based co-design projects in Owela. According to van der Haar et al. (2001), participants evaluate the experience by comparing their anticipated and perceived benefits. Therefore, I first present the different goals and expectations that participants had regarding the co-design process, then their experiences during the process, and finally the perceived value of participation. Users' experiences during the design processes are divided into experiences of the co-design approach and of the web-based participation in Owela. At the end of the chapter, I present the facilitators' tasks and their experiences of the web-based co-design processes.

Participants' experiences mainly stem from the interviews at the end of the Monimos and Mobideas case studies and questionnaires during the Mobideas project. The interview answers are grouped, based on the categories that emerged during the analysis. When quoting users' interview comments, Mobideas users are referred to by an A and an individual number, and Monimos users by a B and a number. In addition to interviews, some quotes from the Monimos participants are from the face-to-face workshops and emails sent during the project.

8.1 Participants' goals and motivation

In the Monimos project, participants joined the project for various reasons from idealistic ("making a better world") to individual aims ("looking for connections to other immigrants" and "being heard"). People wanted to share their own know-how for good purposes or to learn more. Some people wanted to represent their association or "the voiceless" who do not get invited to participate in such design processes.

Motivation for participation came from the goal of the project that was similar to the personal goals of enhancing civic participation and improving the immigrants' situation. The common idealistic goal and team spirit kept people going through the process. However, more concrete goals varied from finding a job to making an impact on politicians or helping the integration of professionals in Finland.

During the design process, these personal goals and agendas were not explicit, but people still evaluated the solution from the perspective of their own wishes and needs. The positive aspect of this is that the service can at its best fit in with multiple needs. The risk, however, is that if there is no shared understanding of the

product or service; it becomes a mixture of multiple features that do not build a coherent whole and fit only partially with any use cases.

In the Mobideas project, personal goals varied as well. Some people wanted to express their opinions or creativity and influence the future, whereas others were just curious or interested in learning new things that were also related to their work. Participation in a real design process as an active user was also found to be interesting. There were some rewards (movie tickets, products and lotteries throughout the project), and all participants were somewhat motivated by the rewards. However, there were clear distinctions between people, who were inspired by the participation itself, being able to influence future products and express their creativity, and those who were merely expecting to learn something related to their work.

Two different kinds of orientations in the reasons for joining the project were identified: receiving and giving. The "receiving-oriented" participants were the ones who saw the project as a part of their work. Also, some of the "giving-oriented" participants joined the project ultimately because it was related with their work, but they wanted to participate, since they found the theme interesting and were willing to contribute themselves. In the Monimos project, users did not receive any monetary rewards, and the reasons to join were mostly giving-oriented. However, some Monimos participants also came to learn or to network and thus to benefit themselves. The identified motivations to participate are listed in Table 15 with examples from user interviews.

Table 15. Users' motivations to participate in co-design. Mobideas users are referred to with A and Monimos users with B.

Orientation of attitude	Motivations to participate	Examples of users' answers in the interviews
Receiving	desire to learn and understand new things	"I had just started at my new work place, and I thought I could learn more about the map user interfaces." (A1) "I came to learn new things, how to do in practice the things I have learnt at school" (B3)
	networking	"I am going to be moving to (city X) this year so I figured it would be the right time for me to meet people who are also interested in the same things that I'm interested in" (B1)
	becoming heard	"You were giving attention to the people who were not getting attention" (B6)
	experimenting with social media	"I wanted to participate because of the new kind of social media experimentation, and to in order see how research is done" (A4)
Giving	expressing own opinions	"The main reason (to join the project) was to be able to participate in development and express my own opinions. I'm interested in making life better." (A3)

	expressing creativity and influencing	"I like to generate ideas. It's rewarding to see if my ideas are useful." (A2) "I use [social media] a lot, and it would be nice to be able to influence people so that the services would become even better." (A8)
	helping the project with one's own capabilities	"I had a feeling that I might have something to give to this." (A5) "I thought I had something to contribute to the project as well, that I had a bit of know-how as well." (B6)
	feeling responsibility to represent others who cannot participate	"I thought I could make an impact by bringing my issues to the fore on behalf of those who probably wouldn't have a chance to be called to a forum like this" (B4)
	making the world better	"I'm interested in making life better." (A3) "I started to feel like I should get involved, I should participate in everything, also making a better world for all of us" (B5)

In the beginning of the design process, most users expected that the ideas developed in the project could become real services, whereas one user was mainly curious to see whether his own ideas would be chosen for implementation. Other expectations included the idea that the project would be entertaining or educating for the participants.

8.2 Users' experiences of co-design

When analysing the interviews, four themes emerged relating to users' experiences of participating in a co-design process in which they were regarded as active partners. Users' experiences are here grouped into user-drivenness (role as innovators), commitment to the process, decision-making and relationship to other participants. The interview answers are supplemented with answers from the Mobideas questionnaires.

8.2.1 User-drivenness

The goal in both Monimos and Mobideas projects was to design new services in a totally user-driven manner, meaning that the users participate in ideating solutions to their own needs and decide which of the solutions should be implemented. However, both projects were initiated by the researchers, who then invited the users to participate in a facilitated process. Therefore, users' had different opinions of who they felt drove the process.

In the final questionnaire of the Mobideas project, the users evaluated their role in the project and their ability to influence the outcome. Since there were only 15

answers, no statistical analysis of the results can be made. A selected set of answers describing the users' experience of their own role in the project is presented in Table 16 together with the log data of the number of users' posts and comments in the Owela workspace. The grey shading shows active participation or experienced importance in the success of the project (a significant number of posts or comments and totally/partly agree). The results are listed in the order of the number of written posts.

Table 16. Mobideas users' activity and experiences of the project. (1 = Totally disagree, 5 = totally agree).

	Log data		Survey responses			
User	The number of user's posts	The number of user's comments	"I was active in making suggestions" (1–5)	"I believe my participation was useful for the development of the application" (1–5)	"I could influence the project outcome" (1–5)	"I had an important role in the success of the Mobideas project" (1–5)
A2	46	77	5	5	5	5
A9	15	39	4	4	4	2
A10	10	38	4	4	4	4
A8	7	85	4	5	-	4
A3	7	56	5	5	5	4
A5	7	35	5	5	4	4
A6	6	29	5	5	4	4
A1	5	12	4	4	3	2
A7	4	7	3	4	4	2
A11	4	9	2	1	1	1
A14	3	92	2	3	3	2
A4	3	24	2	3	-	2
A13	3	7	3	4	3	1
A12	2	102	2	3	3	2
A15	1	0	3	2	3	2

The more active the users were, the more useful they experienced their participation. 10 of 15 respondents agreed totally or partly that their participation was useful for the development of the application, whereas only six of them felt that they had an important role in the success of the project. The most active users felt that they could "drive" the project and influence the outcome. As one participant stated in the following interview quote, it was also rewarding for the users.

> *"During the project it was rewarding to see, how my own idea was taken into implementation and that my comments were taken seriously." –A5*

The users who were not active in the project or were active only in commenting on others' ideas and suggestions (A4, A12, A14) did not value their usefulness for the outcome. Interestingly, the nine users who had answered the first questionnaire, had anticipated the importance of their role in the project to be the same when they answered in final questionnaire. Only one user (A2) felt afterwards that his role was even more important. This suggests that the participants could well foresee how active they would be in the project.

In the Monimos project, the main place for participation was in the face-to-face workshops. Although the researchers had been the initiators of the process, the participants generally appreciated that they were involved as real partners and decision-makers in the project. People felt empowered when they realized that the researchers were there to help them. The service concept was defined together in the group, which was considered as a meaningful activity. One participant felt that, although the process was led by the researchers, they wanted to help the participants in achieving their goals, as is illustrated by the following quote.

> *"One thing that I liked about the project was the consultative nature – the project came and wanted to find out what is it that the people need or immigrants need and what can be done" –B5*

Although the Monimos team members partly felt themselves to be owners of the service, one user described his role as giving feedback to the researchers and their project. The idea of user-driven development was not clear to everyone. The participants expected an even more bottom-up approach in which even the topic of development would not be given by the research project. Participants would have felt stronger ownership of the result, if they had been the initiators of the whole process.

However, when the Monimos service was launched publicly, the team members' role changed and they felt more that they were owners of the service. This became visible, when the team members felt slighted by the negative feedback, and started to defend Monimos from external criticism. When outsiders did not understand the purpose of the Monimos service, the core team members started to argue why the service is good and how it must be used, instead of questioning the quality of the design result. The launched service was no longer seen as a prototype that could be improved through other users' feedback, although the service was launched as a beta version for open testing. Not even all the team members started to use the service. They were interested in seeing how others started to use Monimos, but did not want to produce too much content in order not to overload the service. As one user put it, he felt himself to be an administrator of the service and not a user. The team members' role thus evolved during the design process from users to co-designers and finally to co-owners.

8.2.2 Commitment to the process

In the Monimos project, some of the team members were highly committed to the design process, and wanted to participate in the workshops whenever possible. However, not all participants found it necessary to participate, since no binding commitment was asked of them. Some people left the team without noticing others, which caused problems in later phases, when people were organized in smaller teams to work more concretely with various administrational and content creation tasks.

When involving volunteers in the design process, people naturally had other responsibilities that were more important than the co-design project. It was not always easy to arrange time for the workshops or online participation. The following two quotes from the Monimos team members show that participation in the Monimos project was considered time-consuming and a competing activity to other responsibilities in their lives.

> *"I would not like to make compromises between studies and Monimos, since studying is a first priority for me." –B3*

> *"It was very hard to take out that two, three hours of time knowing that it's all voluntary what you are doing. And people outside – wouldn't understand what you are doing. – We are just humans as well, and we have our own life." –B6*

Also, Mobideas users joined the project due to their own interest in either the topic or innovation in general. Their intrinsic motivation maintained their interest in the project and 8 of 15 respondents to the final questionnaire answered that they had participated more actively in the project than they originally thought. In comparison to the first phase of open innovation that was used for the lead user identification, the participation in a selected group was seen to be more binding. Also, the rewards were more valuable, which made people at least to some extent committed to participation, as the following quote illustrates.

> *"The reward and belonging to a selected group inspired and tied me more [than the earlier phase]." –A5*

One disadvantage of voluntarism was the difficulty of finding time for the project, since there was no official time allocation for it. Lack of time was the main reason for a lower level of activity than that wished by the users themselves. 11 of 15 Mobideas users would have wanted to devote more time to the project. This suggests that the users found it important and interesting to participate, but the voluntary co-design process did not have as high a priority as work, studies or families. Two users were also sick for a longer period during the process, and could therefore not participate as much as they wanted.

8.2.3 Open decision-making

In both the Monimos and Mobideas cases, users were involved in the open decision-making process in Owela. Users could vote for the solution to be implemented and have their say on various decisions on a daily basis, such as choosing the features, layout and name for the service. Mobideas participants generally felt that they were part of the decision-making; only one respondent (A11) in the final questionnaire answered that she did not influence decision-making during the project.

In the Monimos project, decisions were mainly made in the workshops. However, online voting in Owela was seen as a practical way to make decisions in situations where everyone's opinion was needed. The question of the name of the service was that kind of big issue that could not be decided in the workshop where everyone was not present. An open voting process also created the feeling of being heard, as one Monimos user stated it.

> *"I loved voting! Good way of discussing things. It's also the feeling of being heard. Putting something out there open and hearing how people react." –B1*

The rules of voting were not clear for all participants; one user stated that he did not know how many votes each user could technically cast and what users' role was in decision-making. In the name voting, there was also a suspicion that people changed their votes later on. Since new name options could be suggested also during the voting process, it was difficult to make concrete decisions.

> *"There was no strict control of the votes. The votes could be manipulated and changed, modified, based on one's fluctuating desire." –B4*

One Mobideas user (A6) also commented that the voting was not democratic, since the first suggestions probably received more votes. In general, the concept of voting raises expectations of a democratic process that is sometimes in conflict with the aims of the design process. If voting is used only to gather user input and the design decisions are finally taken by a researcher, this must be made clear to the participants. Otherwise, they may become disappointed if they feel that their votes did not count.

8.2.4 Users' relationship with designers and developers

Almost all active users in the Mobideas case stated that there was enough collaboration between developers and users, although not all developers were active in Owela. The main interaction channels were the test chat sessions, commenting in Owela and the developers' blog that some of the users read. In the questionnaire after the test chat sessions, the users either felt that the developers are close to users or that it would be easy to contact them. One user would also have been interested in meeting the developers face-to-face.

In the Monimos project, the core team members also met the designer and software developer in person. In that case, the professional designer had a

stronger influence on the service concept and user interface design, which was in conflict with the user-driven process. Before the designer's participation, decisions had been made based on negotiations in the core team, but the design decisions cannot just be made democratically. The designer had her justified suggestions and defended them, which users felt to be an attack on their earlier decisions. Since the designer did not participate from the beginning, she was not sufficiently aware of the context of the design and the earlier discussion. The designer's participation affected the workshop situations, in which users felt they were confronted with new proposals that did not match the earlier concepts developed or imagined by users.

The designer created a concept based on definitions by the core team. However, the participants felt that the designer's vision did not reflect their ideas. The way the concept was introduced to the participants did not encourage co-design anymore, but seemed to be a ready-made solution, which may have induced the experience of neglecting the participants' voice. One participant was a professional designer himself and had his own opinions about layout that were, furthermore, in conflict with the designer's work.

> *"In the beginning, I think, there was a time when – the designer had a vision of the whole of Monimos over there, which didn't – collide with the vision of the rest of the team. So, there was, I would say, a conflict of interest over there." –B6*

The designer took the online discussion seriously and answered the users' critique there. However, the she was not happy about listening to users on issues that should not be decided by users. The role division was not clear enough, which caused frustration. The designer saw users more as content producers than as service designers.

In the Monimos project, there was only one software developer. Since the users and the developer met regularly in the face-to-face workshops, they built a close relationship that may have reduced expressions of open criticism. Knowing that the developer is busy and already doing his best, the participants may have been more cautious in giving feedback on every little issue. For the developer, it was challenging that feedback was given via different channels: chat sessions, feedback form and face-to-face workshops. It was hard to keep the bug list up-to-date.

In the Events project, the test users would had expected more active participation from the developers, who followed the online discussion via RSS feed but did not comment so often. One user asked in the Owela forum that the developers would inform about updates in the software so that the users could easily see if there is something new to test and if the changes were done based on their suggestions.

> *"Could the software developers report, for example, here in Owela, if they do some updates to Events? It would be nice to hear about the updates and see if any of our suggestions have been implemented. We could then comment as to whether the change was like we wanted it to be. Now it feels a bit frustrating to test the application and see that nothing has changed." –Events user*

8.3 Users' experiences of web-based participation

Users' experiences of participation via Owela are analysed, based on the Mobideas and Monimos interviews. The main issues that were stated in the interviews were flexibility of time and place of participation, staying on track of what is happening, expressing oneself online, openness of the design process, and using Owela as a co-design platform. Some topics were stated in one of the case studies, and some in both.

8.3.1 Flexibility of time and place

Generally speaking, in all the case studies participants appreciated the possibility of participating from their own computer, wherever they were. This also lowered the participation threshold for those who lived in countryside. The Mobideas users felt that it would have taken too much effort to find a suitable date and to travel somewhere for a face-to-face meeting.

In the Mobideas case, parents of small children and people with irregular working hours particularly appreciated the fact that they could submit their ideas and comments whenever they had a little extra time, for example late at night, during short breaks during the working day, or via a mobile phone on the bus. One user referred to online participation as more realistic than face-to-face meetings, as stated in the following quote.

> *"Online participation is more realistic when you have a family. If your child is sick or something, it would be more difficult to participate face-to-face." –A5*

In the Mobideas project, there were active participants in each phase of the design process, but different people participated in different phases. Some users felt that it was acceptable to be a "hang-around" member and only participate occasionally when one's schedule permitted. Users could feel that they were part of the project even if they could not participate regularly.

> *"Face-to-face participation would require more commitment than this. Online participation allows for a more hang-around role, and you can fit the participation into your own schedule." –A4*

The long process enabled participation only in those phases that were interesting and meaningful for each user. For example, one user found user interface suggestions too technical, and did not participate in that task, but did not consider it to be a problem. As stated in the next quote, he felt it comforting not being forced to participate in everything, and the process was still going forward with the help of others' contributions.

> *"To some extent it is comforting that there are phases in which I don't need to have anything to say. I like to ideate, but I don't feel I am irreplaceable; sometimes others can be more active and take the process forward, so that it is*

> *not dependent on me. – For me, it was only good to have a more relaxed phase that supported my own "flow" [of participation]." –A5*

However, some users felt that the breaks between certain phases in the process were too long, and as a result one user stated that he had forgotten the existence of the project in some stages. The Owela workspace was not tied to their daily practices and they had to have a reason to visit it. However, they could receive notifications of new discussions via RSS feeds as well as the emails sent by the facilitators.

8.3.2 Staying on track

The Monimos project was more based on face-to-face meetings, and emails were also used to communicate within the core team. However, as the following quote shows, Owela helped the Monimos participants feel part of the team even if they were not able to participate physically in all workshops.

> *"You don't physically have to be present there and in some way you still feel part of the team, so I like [Owela] in that sense." –B5*

Online tools were seen as a good supplement to the workshops, and they helped participants stay on track especially in a volunteer-based project. Since all decisions and discussions were archived in Owela, it allowed for users to follow progress. Not all of the participants were active in the same project phases, but they were able to re-join the discussions after a break and continue participating in the current phase.

> *"Online tools are very good, especially in this kind of hobby project that is not my work. It is so difficult to keep up with everything, and whether there are updates and so on. I don't even read emails all the time, but this kind of web tool is good for checking on what is happening." –B3*

Although the communication in the Mobideas case was mostly asynchronous, Owela created a feeling of continuous connection between users and developers. The developers could obtain feedback on their suggestions over a weekend, and the users commented on each other's ideas quite promptly. Continuously available and interactive medium provides a very different experience compared to one-directional online methods, such as surveys and feedback forms. Users also appreciated the fact that, whenever they had a question concerning some aspect of the project, they were answered quickly.

8.3.3 Expressing oneself online

For the Monimos core design team, Owela offered another channel for expressing oneself and was a good supplement to face-to-face discussions. Some people even felt it more official and thus more influential than face-to-face meetings. The

following quotes from Monimos participants show that open Owela discussion helped in structuring their thoughts. When the ideas were written publicly, the participants had the feeling of being heard.

> *"It was healthy to express negative and positive points and discuss them openly. We had our place, our platform to express ourselves and we became heard." –B1*

> *"[Owela] was very helpful, because for me it was another tool to track and contribute your thoughts and ideas about the thing." –B5*

User activities in Owela are mainly based on textual communication in comments and a simple rating. Since the Mobideas participants did not know each other, a couple of participants mentioned that they felt the others to be somewhat "faceless". Some stated that one face-to-face meeting at the beginning would have helped them to understand matters such as the other users' styles of communication. However, some users explicitly stated that they prefer written communication to face-to-face discussion, since they can process their thoughts better when writing. One Mobideas user said that it is easier to formulate one's own ideas, if you can first read all the other comments and take your time to think about them without worrying that the discussion already goes to other directions.

> *"When you are alone at your computer, you can more freely formulate your ideas based on the comments [than in a face-to-face situation]. You can see all the other comments and they do not change there." –A4*

In the real-time sessions, chat was appreciated because it does not require as much focused concentration as conference calls or even face-to-face meetings. As the discussions are automatically recorded, they can also be read later. This was appreciated by an older user who had not had time to understand everything during the chat session as the following quote illustrates.

> *"The pace [of the chat] was quite hectic for me. – I tried to read but I did not have time to think or understand – I went through the discussion later alone. I find it good that it stays there and everyone can use it later." –A6*

Written communication also posed some challenges. Not everyone found it easy to express their own opinion in written form. Sometimes it was more difficult to keep the discussion focused than in face-to-face meetings. Some users also had technical difficulties in the testing phase: if the service that is to be tested does not work, it feels a little frustrating to be alone.

On the Monimos team, face-to-face contact with other team members was considered important for understanding others and dissolving tensions between team members. Not all core team members felt it important to give feedback online between the workshops. One person felt that he had already had his say in the workshops and expected some other people to comment online.

In the Monimos project, email was used in intensive decision phases, where Owela felt too slow since it was uncertain how often all team members would

check it. A restricted email list could also feel more confidential in conflict situations and easier to use as a communication channel that everyone was familiar with. However, the email discussion was also dominated by some participants, and not all felt comfortable writing their opinions to the whole list. Email did not reach all participants either. Some people gave secondary email addresses for the design project and did not check them regularly, or were just overloaded by the timely lively discussion on the Monimos mailing list and did not therefore read every message carefully.

8.3.4 Openness

The closed workspace in the Mobideas case proved to be a good choice. When users joined the group, many of them felt committed to being involved in the whole development process. Two users even apologized, since they were not able to participate in certain process phases due to illness. However, the participants did not want to be in too close collaboration with others. Online participation was also preferred because of the anonymity it provided the users.

In the Monimos case, the Owela workspace was open to anyone, which had both benefits and limitations. On the one hand, openness enabled different viewpoints in the design process, but on the other hand anyone could also come to criticize others' ideas without providing constructive suggestions. The possibility of new participants joining during the process enables fresh thinking and new ideas, but in fact, not many new people joined the project.

Not all core design team members enjoyed the public online discussions. Although writing ideas publicly in their own name was not necessarily a problem as such, one user mentioned that he was not pleased seeing Owela ideas in the Google search results for his name. Openness can be fine within one context, but the appearance of the same content in other contexts is not desirable. Open discussion also required getting to know the people first, as the following quote illustrates.

> *"People were not speaking their mind openly until we got to a point where we felt comfortable enough with each other." –B6*

Openness can be in conflict with effective coordination. In the Monimos case, there were a lot of practical and coordinative issues that were more suitable to be dealt with via email than on a public online workspace. Public posting would harm confidentiality in some team-related issues and conflict resolving, as well as unnecessarily overload those the issues did not concern.

Openness was also proportionate and selective. For the people outside the core design team, the design process was unclear and not welcoming. Not everyone knew about the online workspace and even if they knew, they did not necessarily acquire a good overview about the process based on the online discussion that was only one part of the whole process. One core team member suspected that there were so few other participants besides the core team members, because people did not want to reveal themselves. If people were to comment on the

design concepts from their personal perspective, it may feel too transparent, as the following quote shows.

> *"[Privacy] could also have been an obstacle for the people. How do they contribute without revealing themselves or if they do, do it anonymously." –B5*

Openness can also happen somewhere other than the planned location: people also discussed the same issues in other forums and in different peer groups that were not known to the researchers.

8.3.5 Owela as a tool

Generally speaking, Owela received good feedback from the users as an appropriate platform for co-design projects. In the Monimos project, Owela was mainly used by the core team members who quickly learnt to use it. Owela was considered simple enough in order to just start commenting even for a couple of participants who first came to Owela and only later joined in the core team meetings. However, one participant commented that Owela felt as if it were still under development (2010), and thus did not fulfil all expectations. He found it difficult to start using Owela because it was a new type of tool.

In the Mobideas project, 26 users out of 30 considered using Owela to be easy (grades 5–7 on the scale 1–7) after the first ideation round. The platform was considered to be helpful in generating ideas together with others, and feedback was received quickly from other users. The user interface was felt to be clear and nice-looking. The easiest functions were the most central ones, namely adding, evaluating and commenting ideas and following the comments that others had written on one's own ideas. Also registering and signing in were relatively easy, but four respondents out of 30 encountered some problems in those. Five people also found it difficult to find the correct workspace again and were confused by the general Owela platform.

The most challenging task was finding other interesting ideas, since there was so much content. Only 18 users of 30 considered it easy. Both in the Mobideas and Monimos case studies, the amount of content grew considerably during the projects and finding relevant content became still more difficult. The users wished, for example, for longer lists of recent ideas, alphabetical lists of all ideas and direct links to the right places in the reminder emails. Two users also suggested that bad ideas should be removed from the workspace in order to maintain better quality and avoid too much content.

After the Mobideas study, 13 of 15 respondents considered Owela to be a suitable platform for a long-term co-design project, but more structure and hierarchy in the workspace was requested. The Owela workspace structure is often based on the phases of the design process and categorized into probe blogs, ideas, concepts, requirements, user interfaces, testing and other minor topics. This structure was not self-evident to the users. One user in the Mobideas case, for example, wished that the probe blog content and ideas could all be in one place. For the

users, the boundaries between stories about their needs and solution ideas were not separate instances but strongly related. One user also suggested that it should be possible to move some comments into ideas.

8.4 Perceived value

Mobideas and Monimos users were also asked about what they gained from their participation in the co-design process. The answers are here grouped into the perceived value of the outcome and personal benefits of the participation process itself.

8.4.1 Outcome of the design process

In all the case studies except Monimos, only a prototype of a new service was developed. Therefore, the participants in the co-design process were not able to continue the use of the service after the research project. In the Mobideas project, a couple of users expressed their disappointment with the final service, since they had expected to get a real service for their personal use. The prototype developed by the team of students was not technically as advanced as one user had expected.

> *"I didn't find this very useful. The technical side was not really what I hoped." –A7*

One challenge with the open design process was that everyone commented on the service concept from their individual point of view. However, when the aims behind the suggestions were not clear, the final service became a sum of compromises. As the following quote shows, users could have very specific goals for the project, and did not necessarily pay attention to the big picture.

> *"I don't remember that [other idea] because I just had my bike trips in my mind." –A6*

In the Monimos case study, a real service Monimos.fi was launched at the end of the project. The public launch of the Monimos service was an important and exciting experience, and for some members the main reward for the work. As the following two quotes show, the core team members were satisfied at seeing the outcome of their own work.

> *"I think the launch to me was exciting because you saw something that was started when there was nothing, and then you saw something in place. So that was very satisfying just to watch." –B5*

> *"I have been following all the discussions in Monimos and through emails; it is amazing to see how people react and discuss things! Exactly how we hoped it would be!" –B1*

The Monimos service was seen as a highly valuable tool by the core team members. One participant used it to start up his own company; one learnt by reading other people's different views; one got new members for his association, and one

networked with other fellow-citizens. However, in the beginning there were only a few users in the Monimos service. As the following interviewee commented, it was not clear, what to use the service for, in order to utilize its possibilities.

> *"I feel that we have a really valuable tool, very expensive jewellery that we have in our hand. We don't know how to wear it or when to wear it." –B6*

Many of the participants had high expectations that the service would facilitate civic participation and dialogue between immigrants and the public sector, but the service did not match all the expectations. The service itself did not solve the problems, as stated in the following quote from a core team member.

> *"The whole idea was for people to be able to participate in social development, and community development, in political decision making influencing to make a change in their lives and the lives of community where they find themselves. That is still a challenge that we have to meet." –B4*

The Monimos project was also seen as the starting point of a longer process and therefore the impact should not be evaluated based on the success of the first prototype launched. Some members of the core design team continued the development process within the Moniheli association. The Monimos project created understanding about what really should be developed. Creating a common vision was one of the main challenges of the projects, as the following quote suggests.

> *"Sometimes people's visions [are] very different, even though you are looking at the same stuff. So, that was the most difficult part." –B6*

After all, the Monimos project was about designing participation processes, not a social media system, although that was the concrete goal of the project. We were innovating a new concept of doing things and acting in society – the software to be used for that was only a small part of the process. The online service served as a boundary object (Star, 1989), a shared object that helped different stakeholders to speak about the same phenomenon in different contexts and plan civic participation at a more concrete level.

The service to be designed served as a boundary object for something else: people wanted to achieve other goals through the co-design process or use the service for different purposes. The service as such is not necessarily the most important outcome of the project, but it is needed in order to have a shared goal and a point of focus for the collaboration. The collaboration is the most important part, but you have to have something tangible to work with. Concrete activities, such as co-writing the text for a flyer or organizing a press release, made the process more concrete for the participants and forced them to create a common understanding of the service.

8.4.2 Personal benefits of participation

Some Mobideas participants stated that the possibility of participating in an interesting project was a good experience as such. The final service did not meet all expectations, but as one user (A5) stated, "the process was more important than the outcome". It was rewarding to see that one could influence things. In that case, the possibility to express creativity was rewarding as stated by the user A2.

> *"I felt this was useful. I learnt something for my life. It was a positive experience. It worked well, and I felt that I could influence things." –A2*

Similar experiences were also reported by Monimos participants, who stressed the experience of being heard, and being able to give valuable input and to create something new. Participation was described as fun and meaningful even if it was exhaustive from time to time. Since project goals were in line with participants' own aims, participants felt their work to be important and thus satisfying. One member of the core team was proud of what the team achieved together.

> *"You are so proud that you created something together with a team; it was really nice. – The most important part was seeing – this volunteering energy they had and how much they wanted to do, to produce change and show that." –B6*

Many of the personal benefits of participation were not linked to the goals of the project. The co-design process also opened the participants' eyes to new ways of working in the associations and in meetings. The collaboration model in the project also boosted other collaboration within the participating organizations. The participants became familiar with social media-based collaboration tools and practices (EtherPad, Skype meetings, Bambuser broadcasting) that they could apply also elsewhere, for example in studies and association activities. Two participants especially mentioned feeling privileged at getting the chance to learn to use those tools. Participants also mentioned learning bottom-up team work in a diverse team, research work and methods, administration of online service and individual competences such as patience and thinking more openly. Networking and making friends were also mentioned as benefits of participation. Learning to use new social media tools and interaction techniques and adopting them in daily life were identified as motivation factors also by Hagen (2011).

8.5 Facilitation of web-based co-design

In all case studies reported in this thesis, researchers acted as facilitators of the web-based co-design process. Designers, software developers, and company representatives participated in the study planning and online discussion, but the researchers had the main responsibility for facilitation. This section describes their tasks and experiences of the process.

8.5.1 Facilitators' tasks

The facilitators had a central role in all the Owela projects, planning the co-design process and mediating the communication between the users and the developers. The facilitators were responsible for the schedule, and they had to ensure that the users' ideas and feedback were available for use in software development at the right time. Although developers were able to follow the online discussion constantly, facilitators ensured that all important aspects and ideas were taken into account in the development work. In the Monimos and Mobideas cases this was done in regular face-to-face meetings with the developers and designers, at which the facilitators represented the user point of view.

Figure 23 shows the different facilitation tasks before, during and after the actual online co-design phase. Long-term projects, such as Monimos and Mobideas, consist of multiple cycles of the same tasks. However, not all tasks were necessarily carried out in each iteration. The facilitation tasks can be divided into layers of methodology, technical administration, content, user interaction and results. Wang (2008) has defined similar roles for online facilitators: content instructors, social hosts, program managers, and technical assistants. Management is here divided into method and results.

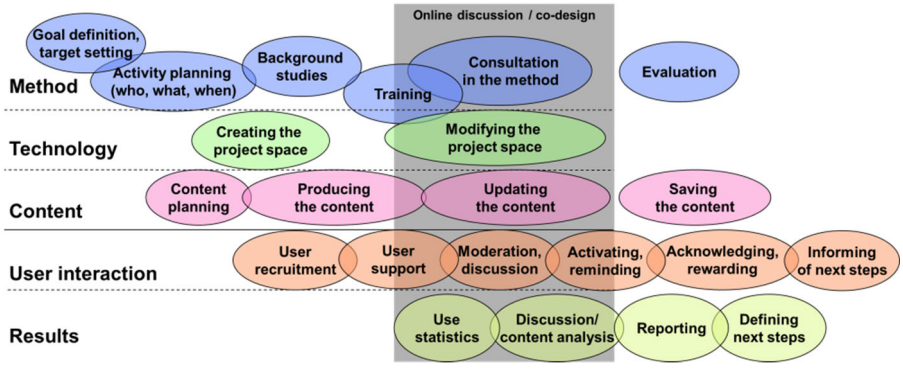

Figure 23. The facilitation tasks before, during and after actual online co-design.

The facilitators handled the structure, content, and updating of the online workspace, which was a separate instance on the Owela platform. Clarity of written expression in instructions appeared to be important, and greater efforts had to be made to ensure the exactness of the wording than would have been necessary in face-to-face settings. The workspace was normally updated once a week by posting new status information and guidelines for the users' next tasks. As the users could access the workspace at any time, it had to be kept up to date all the time. This also made the facilitators' work different from, for example face-to-face workshops, as they had to engage in more continuous involvement.

It was seen as important that all user tasks are strictly scheduled with a clear start and end. This was not only necessary in order to synchronise them with the software development schedule, but also to communicate clearly to the users, when their contribution is expected and how long it can still affect design decisions. In the long-term case studies, status updates and email reminders were sent to the users approximately once a week during the active project phases. Sometimes, different messages were sent to passive and active users. Based on the feedback collected from the participants, they appreciated the email reminders of new tasks and updates, and felt that the frequency of emails (approximately weekly) was appropriate.

In the long term co-design projects, facilitators often need to improvise the tasks in the course of the process. For instance, user interface sketching was not originally planned to be given as a task for the users in the Mobideas case. Since software developers had some technical problems in the beginning and the software development process started more slowly than anticipated, new tasks needed to be given to the users in order to keep them interested in the participation.

Facilitators also acted as moderators and active participants in the real-time chat sessions that were mostly held in the evenings and at the weekends, as this made it easier for the users to participate. Chat sessions needed to be carefully prepared. The facilitators designed the test tasks and wrote in advance the sentences to be copied to the chat. The agenda of the chat session needs to be posted to all participants and only one thing should be planned to do in one session, since people will in any case join the chat at different times, and having multiple tasks would be confusing. The rhythm of chat discussion and new questions should not be too rapid, so that everyone has time to read the questions. The chat sessions started by welcoming everyone and ended by thanking all participants and advising them where they could continue the discussion if they had new ideas after the chat session was over. During the chat session, the facilitators had their own backchannel for discussing organisational issues.

An important part of the facilitators' tasks is analysis of the user-generated content. A constant process of analysing and forwarding of the results to different stakeholders is needed. In the SuperF and Mobideas cases, the facilitators afterwards created a report on the most important issues for the companies involved.

8.5.2 Facilitation experiences

For the researcher, it was rewarding to get immediate answers to questions posted online. After the first responses, it was possible to clarify some questions that were understood differently than intended. On the one hand, it is exciting to follow what users are doing online; on the other hand, the researcher does not necessarily have time for a continuous online presence. Enough resources must be reserved for listening to users and discussing with them. As the users partly had the role of designers, it was also a challenge for the facilitators to give them enough latitude for active participation while still being able to manage the process

in a structured way. Since the researchers cannot force users to participate, it sometimes felt frustrating when participants did not contribute to some tasks at all. This led to more researcher-led design process in some phases.

In Owela, it was difficult to guide users to carry out tasks in the right order. In the cases with a lot of varying content (Mobideas, Monimos, SuperF, CityAdventure), it was challenging to create a workspace structure that guides people to answer all topics and find the discussions that they are interested in. Users can also understand the questions in so many ways, and do not always respond in the way that was expected.

Since users become one kind of colleagues of facilitators; it is also natural to have informal communication besides the formal design process. For example, if Skype has been used in co-design meetings and interviews, users may also contact the facilitators in the evenings and at weekends whenever they are online. Especially when designing social media services, the researcher must network with the users in the online service that is being developed. If the service is meant for personal instead of professional use, the researchers needs to decide how much they want to participate in the discussions and reveal about themselves.

The facilitators of the case studies felt responsible for how active and productive the online discussion was, although they could not alone influence users' participation. However, it was not always the facilitator who kept the discussion going, and in some cases enthusiastic users started to guide the discussion with their own questions to the other participants. In the SuperF workspace there was one very active user who actually started to facilitate the discussion and motivate others to participate by asking specifying questions and raising new discussion topics. For the facilitators, it was challenging to find a golden mean between supporting users' creativity with their own discussion themes and steering the co-creation strictly in the agreed direction.

In the Monimos case study, some users felt they represented all those potential users who did not participate in the co-design process. They found it important also to involve "real" users who were not privileged to participate in the core design team. One team member started a discussion about the service ideas in another online forum and started to do user research among her peers who were not involved in the case study. She interviewed her friends in the form of well organised free form prototype tests that resulted in concrete usability problems. Test comments were received face-to-face and by phone, but they were not forwarded to the design team via formal channels, but only occasionally mentioned in the workshops. Since "peer testing" was not planned in the project, no resources were directed to this, and the facilitators did not follow the discussions outside the Owela workspace. The active team member would have needed support from the facilitator team to plan how and in which phases to best collect feedback.

Figure 24 shows the tasks that users partly undertook. In the case studies, there were examples of user facilitation regarding all aspects of user interaction in the online workspace, including recruitment of further participants (Monimos), supporting other users during user testing (Tilkut), addressing new questions during the online discussions (SuperF), reminding and activating via emails to the

participants (Monimos) and rewarding others' participation via comments on their ideas (all case studies). In the Monimos case study, users also defined the next steps in the process and informed a broader group of participants of them. In the CityAdventure case, users produced part of the initial content, since some of their questionnaire answers were published as a basis for ideation. In the Mobideas case study, users' probe blogs served as a basic content for idea generation. Facilitators only needed to prepare the original tasks (survey and probe blogs), which then generated the inspirational material to the next phase.

To some extent, the participants also conducted content analysis from the online discussion in the Mobideas and Monimos cases, which was seen in the end interviews. Some participants had their own interpretations of what happened in the project, and what the motives of other users were, although they did not report those analyses. The more administrative and technical facilitation tasks were not attractive to the users, or they did not have the possibility to do them.

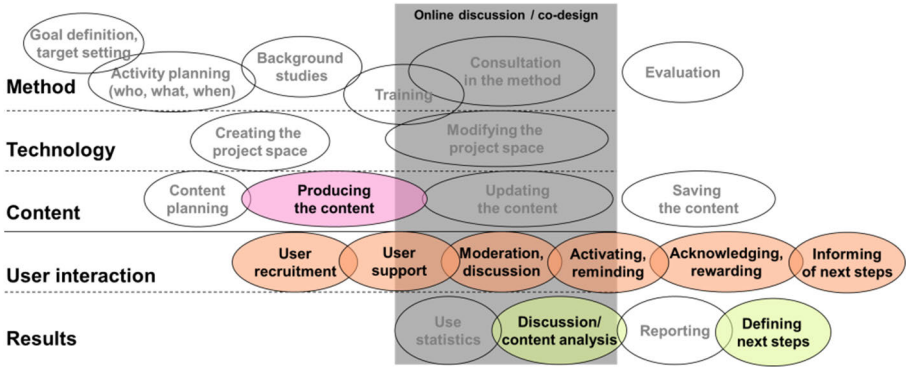

Figure 24. Facilitation tasks that the users partly undertook.

9 Conclusions

In this thesis I have presented a range of methods and opportunities for users to be active in the software design process in distributed settings and outside the work context. The methods support users' participation throughout the design process from exploration and ideation to prototype testing. The applicability of the methods has been evaluated in several projects, six of which are described in this thesis. This chapter analyses the findings by answering the research questions presented in Chapter 4:

1. How do web-based methods support user participation in different phases of the design process?
2. How do the users experience web-based co-design? What gets them involved and how do they benefit from participation?
3. What are the roles of users and facilitators in web-based co-design?
4. What are the benefits and challenges of web-based co-design?

Many research questions have been covered in multiple papers that are part of this work. When the conclusions are clearly based on a certain paper, it is referred to; otherwise the conclusions have been made based on the results presented in this piece of work.

9.1 Q1: How can social media tools be used to support the most common UCD methods during the pre-launch design of online services?

The case studies suggest that web-based tools can support user participation throughout the pre-launch design process of online services. Via Owela, users could participate in early exploration, idea generation, concept design and evaluation and software prototype testing. Table 17 summarizes what online tools enable in relation to each method and gives examples from Owela. The table includes the commonest UCD methods that are presented in Table 1. Contextual inquiry was not utilized in this thesis work, but other results stem from the Owela case studies.

Table 17. Summary of UCD co-design methods and how they can be applied online.

Design process phases	UCD methods	What do online tools enable? Examples from Owela
Exploration, user and context research	Contextual inquiry	Remote contextual inquiry: Users can be interviewed e.g. via Skype or phone when they are using or watching an online service
	User diaries, cultural probes	Shared user diaries: Users see each other's contributions; researchers can comment on diaries directly
	Focus groups	Asynchronous text-based focus groups: Users can choose the time and place of participation, text-based communication; more people can participate
	Interviews, surveys	Semi-open online surveys: Certain answers can be published as a basis for online discussion
Ideation	Brainstorming, workshops	Idea posting : Users can add ideas over a longer period of time; other participants' ideas serve as inspiration
		Idea chat sessions: Combination of individual and collective ideation, text-based communication, other online material as inspiration
Concept design and evaluation	Interviews	Feature wish list: Continuous updating of requirements, users can participate in collectively prioritizing features
	Workshops, paper prototyping	User interface sketching: Users can take more time in adding suggestions over a longer period of time and comment on other people's work
		Online concept mock-ups: Transparent decision-making is possible with more users
Software development and testing	Usability test, field test	Asynchronous user testing: Users choose the time and place of testing, interaction around test reports, users help each other
		Collective real time testing: Direct user-developer interaction, testing and reporting at the same time
	Satisfaction questionnaires	Open feedback discussion: Users can share their experiences with others

In the **exploration** phase, blog-based tools enable shared user diaries, collective commenting and new insights. Other users' stories serve as inspiration for new perspectives in users' own daily life experiences. Asynchronous text-based focus groups allow users to choose the time and place of participation, come back to the discussion after some time and also start their own discussion topics, which can bring new insights to designers. Users can participate with their own rhythm, and the discussion is not limited by tight schedules as in face-to-face meetings. For the facilitators, an asynchronous focus group offers the possibility to refine the questions during the study and refine the goals based on users' reactions and emerging new topics (Karppinen et al., 2011).

Text-based interaction on the Web provides new opportunities for **ideation**. Many users can be involved asynchronously in brainstorming; users are able to browse through all the other ideas and derive inspiration from them. A chat tool allows the combination of individual and collective ideation in a simultaneous session. Since idea generation is a common action on the Web, it can be easier for users to talk about ideas than report current challenges and needs. In that case, users' ideas can be used as a starting point for discovering the needs behind the initial ideas.

The concept design phase was more challenging for web-based user participation. Users could not contribute as independently, and researchers and designers had to do more work in defining good questions that users could answer, so as to benefit the design process. Both text-based communication and the nature of design tasks create challenges to web-based user participation. User interface design was not a popular task, which suggests that users are more interested in developing the broad concept idea than defining the details which feels too much like work. Professional designers are needed for concept development. However, as Geven (2009) also noted in his study, even if user-generated designs are not high-quality in themselves, the functionalities in users' drawings can be important and useful.

On the other hand, web-based tools support collective evaluation and transparent prioritizing of concepts that can be presented in various multimedia forms. The challenge in asynchronous evaluation is that people can interpret non-functional prototypes differently and also comment on irrelevant issues when not directly guided by the researcher. Therefore, simple and clearly formulated tasks are needed so that people pay attention to the correct things. Klammer et al. (2011) found out that specific task instructions are needed especially in the early phases of the innovation process, when people are unfamiliar with the future concept. Another possibility is to see misinterpretations as a source of inspiration for new points of view (Paper VII). Researchers need to tolerate chaotic feedback and be open-minded about discovering interesting notions that they were not expecting.

During **software development**, online tools offer new opportunities for collective user testing. All participants can test the prototypes at their own pace, but share test notes with other users and developers. The developers can react to users' reports and questions and fix the errors already during the test period. The boundaries between development and testing become blurred. Buur and Bagger (1999) have experimented with collective testing in physical settings in co-design workshops where up to eight users and several designers participate in testing the prototype and innovating new design possibilities. Web-based tools enable similar sessions where users and developers meet each other and explore the prototype together, but this can be done with less effort, and the dialogue can also be asynchronous. Buur and Bagger (1999) stated that designers' participation in test sessions is an effective way of communicating the observations without mediators. The same benefit was seen in Owela even in asynchronous settings, when designers and developers could discuss directly with users by commenting on their test notes.

In the Owela studies, simultaneous online testing was found to be motivating but also challenging. A chat is simple to use in collective real-time testing and works best with a small number of simultaneous testers. The chat tool as such

does not support summarizing, categorizing or valuating findings and development ideas from different users, which means that human facilitators are still needed. Teleconference could also be tested as a backchannel for giving guidelines during the test – however, the facilitator should assure that all notes are also written instead of saying them directly. In collective testing, there must also be room for concentrated individual testing without being disturbed by others' talking or writing. The benefit of web-based testing is that the users can choose a way of participating that they feel to be most convenient for themselves.

Web-based co-design tools can be best applied at the fuzzy front-end (early exploration and ideation), in which they are powerful in collecting large amounts of need-related stories and ideas. Concept development requires more facilitation and professional work by the designers, and average users find it difficult to come up with concept or user interface sketches on their own on the Web. A lot of users can, however, be cost-efficiently involved in evaluation and development of the concepts made by a designer. In the testing phase, collective real-time tests during chat sessions facilitated by a researcher resulted in more useful and concrete feedback than individual online testing. However, web-based tools allow collecting feedback during users' random exploration of the services and can reveal several usability problems with little effort.

Web-based user participation cannot totally replace face-to-face methods, such as interviews, observing, workshops and user testing. Face-to-face methods were also used in most of the observed case studies (Tilkut, Monimos, Events and CityAdventure) in certain phases of the design process. Klammer et al. (2011) also discovered in their study that the face-to-face interviews in the beginning were crucial for creating relationships for further collaboration online. However, for certain user groups that are familiar with online participation, web-based methods can be comfortable as the only space for participation, as was seen in the Mobideas case. Web-based co-design lowers the threshold to participate (Paper III) and enables continuous interaction between the face-to-face workshops (Papers IV, VI) or during the test period (Paper I). Online discussion can also be used as an inspiring recruiting channel for real-world tests (Paper VII).

9.2 Q2: How do the users experience web-based co-design?

The participant experience is based on goals, action and perceived value. A summary of experiences in the Mobideas and Monimos projects is presented in Table 18. The analysis was first carried out based on the Mobideas data (see Figure 12) to which the experiences from Monimos respondents have been added. Based on interviews with 17 people, two different attitudes to web-based co-design were recognized. One of them is the active participation directed with an attitude of *giving*, and the other is passive participation affected by the attitude of *receiving* (see 15). Most participants belonged to one of the groups, but some people had both giving- and receiving-oriented goals.

The experiences and perceived value of participation are grouped in Table 18 based on the same division of attitudes. Interestingly, the giving-oriented users who wanted to participate in order to make the world better, to share their own know-how and to express their creativity, experienced the participation process more positively than the ones who mainly joined in order to learn or just out of curiosity. The results suggest that the personal motivation to participate in the co-design project effects on the perceived value of own participation.

Table 18. Participant goals, experiences and perceived value of the "giving" and "receiving" participants.

	Giving-oriented participants	**Receiving-oriented participants**
Goal	Sharing own know-how Making the world better Being a voice for others Expressing opinions and creativity Influencing the future	Desire to learn (for work or studies) Curiosity Being heard Networking
Experiences of co-design	Commitment Empowerment Meaningfulness Ownership Team spirit Innovativeness	Giving feedback Being asked instead of initiating Lack of time Unfairness in decision-making
Experiences of web-based collaboration	Flexibility of time, place, rhythm and level of contribution Exerting personal influence Sense of co-creation	Staying on the track of others' actions Distinct from own everyday life Difficulty in following others (too slow or too quick) Facelessness of expression
Perceived value	Being able to influence Nice way to spend time An honour to participate Being heard Learning about the topic Learning about social media Growing as a person Networking	Learning aims were not fully achieved The end result did not meet own expectations High level goals were not met

There is no one single experience or co-experience of web-based co-design process. In the user interviews there were various different stories about the goals, meaning and outcomes of the co-design project. Interestingly, for some people the **participation was rewarding in itself** regardless of whether the end result matched to the expectations (Chapter 8.4.2). The co-design project was seen as a learning and networking process and as an opportunity to be part of something bigger. The biggest benefit was in that case a change in one's own thinking which was valued more highly than the actual product of design. Therefore, the co-design experience can be an adequate end result for the participants. (Chapter 8.4.2)

Ainasoja et al. (2011) identified similar motivational factors in user participation in service innovation, such as learning new things and sharing one's own knowledge. In addition to need-based motivations, users also had experience-based motivations, such as a curiosity to experience a new kind of opportunity to participate, self-expression and pleasure of participation. Although financial rewards do not play a significant role as a motivation, in long term co-design groups participants also expect compensation for their time and effort (Ainasoja et al., 2011).

Although a shared platform was used in the Owela co-design projects, people used it for different purposes and in order to reach different aims. Social media is also used for boosting one's own personality. The power game that is common in traditional participatory design in a work place context (Bødker et al., 1991) becomes even more dispersed: instead of a conflict of interest between employees and employer, there are countless types of interests. For example, in the Monimos case study people suggested features that they personally would appreciate. The goals behind these feature suggestions were not directly visible, which made it difficult to decide which direction the whole project should take. The personal aims should be made visible in order to understand the context of suggestions and evaluation. If a user has a strong expectation of the outcome and something else ends up being developed, the own contribution does not seem valuable. If a common vision is not clearly agreed, people do not know how they can influence the result.

Different users prefer different kinds of participation method. Some users especially like the chat sessions, whereas for some people they are too hectic and difficult to follow, and they therefore prefer commenting in a blog style. Different methods of decision-making are also preferred depending on the individual: online voting is the best way for one person, whereas another person wants to discuss face-to-face and a third wants to argue her corner via email. Since people have different habits of using the internet, different kinds of participation method should also be offered, in order to enable pleasant and motivated participation for different kinds of people – especially if the target group is heterogeneous.

Current internet users have got used to inspiring online services that constantly offer new features that improve user experience. Expectations of Owela are also high, and it feels partly too static and "old-fashioned" since it did not utilize the latest Web technologies. Owela was often compared to Facebook, which sets high standards for any other social software. In order to stay attractive, the web-based co-design platform needs continuous updates, which makes the method more demanding than, for example interviews in which users do not expect new "features".

9.3 Q3: What are the roles of users and facilitators in web-based co-design?

Via online tools, users and developers would be able to interact directly without a traditional user researcher in between. However, a facilitator is still needed for several reasons. First of all, web-based co-design needs to be well planned and focused if it is integrated into a software development process. Facilitation of

online discussion also requires a lot of work that would otherwise require resources on the developers' part. Expertise is also needed in asking the right things and finding the real needs behind users' ideas and wishes.

Researchers or designers who act as facilitators in web-based co-design acquire new tasks in comparison to traditional UCD facilitation, such as participating in continuous and informal discussion (instead of surveys or short-term sessions) and updating online space, which may require some technical knowledge. Continuous checking of the online workspace can take more resources than organizing one session to collect data (Paper VII). However, the goal of web-based co-design is not only to collect user data but **to establish a connection to users and to work together with them** (Papers III, V).

It can be claimed that the facilitators' role in web-based co-design is even more important than face-to-face, because it is more challenging to build a creative and encouraging team spirit online. On the other hand, some users feel freer to start discussions online than in face-to-face settings (Chapter 8.3.3), which are easily more strictly directed by the professionals. The co-design approach as such can promote **more equal roles among users and facilitators** in comparison with researcher-user relationship (Paper IV).

Examples of **users starting to facilitate the participation of their peers** could be seen in the Monimos and SuperF cases (Chapter 8.5.2). In the open software development, active users have been consciously utilized for example in the Drupal 7 project, in which user testing was crowdsourced to the open public (Reichelt, 2009a; 2009b). The facilitators of user involvement did not directly study users and test usability, but they motivated and instructed the active users to conduct light-weight usability tests among their peers. The facilitators provided the active users with toolkits and guidance. The active role of key individuals has also been reported in other contexts. Bakardjieva (2006) uses the term "warm experts" to describe the users who help newcomers in online environments. Stewart (2007) speaks about "local experts" who are more knowledgeable and experienced users who play a key role providing information and practical support in the adoption and use of new technologies. In web-based co-design, the user facilitators do not even need to be more knowledgeable, but they can, for example, use their social network to invite more participants into a design project that they find important. The more experienced users can also partly become researchers and designers. Professional researcher's role is then to support, guide and encourage the "community agents".

As Hagen and MacFarlane (2008) suggest, the nature of social media enables involvement of larger networks and communities that can be reached by building a strong relationship with a small number of individuals who again connect with their contacts. The facilitators facilitate involvement and participation by the active participant group which, furthermore, activates those of their peers who are not even directly involved in the co-creation project. Instead of communicating directly with all end-users, the facilitators need to coordinate the peer facilitation process and seed the user community by providing inspiring content to "set the tone" for further co-creation. The facilitators' role is to support users in their peer facilitation and to provide structure, guidance and toolkits for that.

At least two-level facilitation is needed: the “traditional” facilitation of user-developer communication in the actual development work, and the facilitation of the contribution by the crowdsourced masses, as in the Metropolis Model illustrating the levels of contribution in open source development (Kazman and Chen, 2009). Researchers no longer study users but **facilitate them in the process of analysing their own needs**. Users can share their needs, problems and ideas with other users who are able to develop new solutions addressing their needs. In this way, the most eager users design the solutions not only for themselves but also for their peers (Paper III).

When users take some tasks from the facilitators, the roles of both groups change (Table 19). User roles did not change radically in all the case studies, but varied within cases in different phases from passive informant to active co-researcher (Paper VI).

Table 19. Different roles of users and facilitators in web-based co-design.

	Role	**Examples of activities**	**Examples of cases and methods**
Users	Innovator	Suggesting ideas	All cases
	Story teller	Describing own life and challenges	Mobideas: probe blogs
	Informant	Answering surveys and direct questions	All cases: polls, surveys, discussions
	Encourager	Commenting on others’ views, giving thumbs up to others’ ideas	All cases, especially Mobideas and CityAdventure
	Co-designer	Actively suggesting new designs and evaluating the possible options	Mobideas: UI sketch-ing; Monimos, SuperF: evaluations
	Tester	Trying out software prototypes and giving feedback about them	Events, Monimos, Mobideas, Tilkut
	Decision maker	Voting on different concepts	Mobideas, Monimos
	Peer facilitator	Inviting friends to the discussion, facilitating user tests with peers	Monimos
	Follower	Reading others’ discussion, not contributing herself	Mobideas, Monimos, SuperF
	Ghost	Registering on the workspace and having a profile, never visiting	Mobideas, CityAdventure
Facilitators	Coordinator	Clarifying goals to all participants in asynchronous co-design	All cases
	Researcher	Planning appropriate and varying tasks, negotiating the tasks	All cases
	Designer	Providing sketches of the concept, modifying them based on feedback	Mobideas, Tilkut
	Web administrator	Creating, updating, archiving and closing the online workspace, supporting users	All cases

	Mediator	Facilitating interaction between users, designers and developers, ensuring the transfer of results	All cases
	Community manager	Inviting users, initiating and inspiring discussion, listening, participating, surprising, rewarding, reminding and activating users, moderating, informing about future actions	All cases
	Content producer	Creating online content and writing messages to stakeholders	All cases

When users become members of the co-design team, as in the Monimos case, a great deal of managerial and organizational issues come into play. The team needs to negotiate goals, set expectations, define processes, and communicate progress and changes in direction (Paper VI; Dubberly, 2008b). Team work is difficult to organize without meeting people face-to-face, which makes web-based co-design projects challenging. In web-based co-design, the goals and tasks must be clearly communicated to the participants. Most participants will not read complicated and lengthy instructions online, as noted also by Hagen (2011), hence they should be as short and simple as possible, but still contain all the necessary information. Assigned tasks should contain opportunities for micro-contributions. Also, tasks that require more intensive participation (e.g. idea chats) are possible, but they have to be carefully planned ahead. Most of the communication in Owela is text based; this has to be taken into account when analysing, for example end-users' ideas, as the text might lack some crucial information or be subject to misunderstanding for some other reason. (Papers III, IV, V)

9.4 Q4: What are the benefits and challenges of web-based co-design?

The benefits and challenges of web-based co-design were evaluated from different viewpoints: conditions for participation, users' own experiences of participation, support for user-centred design and software development process, and changes in researchers' work. First, I will present benefits of social media for the users participating in the process and for the design work. Then I describe challenges both in a more active user role in co-designing and in facilitation of web-based communication.

9.4.1 Benefits for the participating users

The use of social media enables an active role in co-design even for geographically dispersed participants. Users appreciated that the web-based participation **did not require full-time commitment or travelling**; they could be involved in the project even if they had devoted only little time to the innovation project (Paper III).

The typical social media functions of commenting, idea posting and voting were considered **easy and motivating** (Chapter 8.3.5). Participants could **choose their level of contribution** as well as the **time and place** for participation (Papers III, VII).

When users were given decision-making powers in the co-design process, they considered themselves to be **equal team members** (Paper IV), and felt capable of influencing the project outcome (Chapter 8.2.1). Continuous interaction and iterative software development enabled users to **witness how their feedback impacts** the development of the service (Paper II).

Web-based tools engender a certain positive distance between users and designers. Anonymous participation allowed users to **play with ideas freely** without losing their reputation (Paper VII) and to use enough time for thinking (Chapter 8.3.3). Users could also **criticize the concepts openly**, if they did not meet the designers in person (Paper VII). In a web-based environment everyone has theoretically equal opportunities to express their opinions, which may allow **the more silent voices to be heard** or help involve those who prefer textual communication and would not participate in face-to-face sessions (Chapter 8.3.3).

9.4.2 Benefits for the design work

When using web-based co-design tools, it was **easy to invite users** to participate at the beginning of the design process and to contact them at short notice whenever their contribution is needed (cases Mobideas and SuperF). However, in the testing phase a face-to-face meeting was often used before the online discussion (cases Tilkut, Events, Monimos and CityAdventure). Web-based co-design could in particular be **integrated into agile software development** which is based on short iterations and continuous feedback (Paper II). Via web-based tools, developers could receive user **feedback overnight**, which made the feedback applicable in rapid development and at the same pace as software development instead of trailing one iteration behind (Papers II, III).

In earlier studies, face-to-face interaction between users and developers has been found to be valuable, since developers remember best the feedback they have received face-to-face and are more eager to apply it in practice (Heiskanen et al. 2007). These studies showed that at its best, social media can support similar **direct interaction between users, developers and designers** and even more **regularly** (Chapter 8.2.4, Paper II). Contact is not as strong as face-to-face but it is more continuous, as Vanattenhoven and Jans (2007) also noted. When developers and designers had a constant access to users' comments, **user goals became the basis for decision making** (Paper II).

According to Buur and Bødker (2000), design should be carried out close to use context "to give the users a home base advantage and the stakeholder group a real life experience of use context" (pp. 301–302). When developing online and mobile services (especially in Tilkut, Events and Monimos case studies), web-based co-design methods enabled users to test the prototypes and give **feedback in the real use context** instead of laboratory settings, which also enhanced the

spontaneity of users' reports (Hagen, 2011). Web-based methods are particularly useful when designing social media services, since the future users become familiar with online collaboration even during the design phase (Paper VI; Hagen, 2011).

9.4.3 Challenges in co-design

Web-based participation can be seen as democratic in the sense that all participants have equal possibilities to contribute – without a time limit or dominating speakers. However, users are not equal even on the web as the **power game** also works in the online workspace and opinions can also be dominated textually. **Not all users have equal time** available for online participation, and not everyone is equally good at **textual expression**. The participants are most likely more active internet users than the average citizen and are therefore **not representative**.

If participants do not know each other, forming a community that can work towards a common goal is challenging (Paper I). In a user-driven process, the goals **can be quite abstract** in the beginning. Although an open process offers great opportunities for users' own wishes, the development slows down if there is no common understanding of the aims (Paper VI). An open process **requires open-mindedness** also on the part of the participants who need to tolerate the blurry goals and work for a collaborative definition of the goals. **Decision-making** becomes challenging, if the ownership of the upcoming service is unclear or distributed to the participants (Papers IV, VI).

When the users become part of the design team and co-researchers, there is the risk that they **lose their neutrality and critical viewpoints** and start to protect the ideas that they have been developing themselves (Chapter 8.2.1). In some long-term user communities, participants are changed regularly in order to maintain their fresh viewpoints (Ainasoja et al., 2011). A bigger reference group could also be used every now and then to check the opinion of the wider public. The visibility of other users' input may motivate them to contribute, but if others have not been active one may not want to contribute either.

In the Mobideas and Monimos cases, the ideas were driven by the users themselves, who also took decisions on the services to be developed. In some aspects they had even more power than the facilitators, which was not only positive, since the **responsibility for the result was shared** among all participants and no one was personally responsible for the whole (Paper VI). Giving power to users may misdirect design decisions that should not be based on single users' or user group's wishes, but take the bigger picture into account (Schweikardt, 2009). Users can also **feel incapable,** if they are asked to contribute in issues that actually belong to professionals (Paper III). Not only the **efficiency** of work but also the **quality of results** is also at risk. For example, when usability tests were replaced by users' spontaneous bug reports, users mainly reported small issues and things that had not yet been implemented, instead of criticizing, for example the whole structure of the online service. Traditional user research is still necessary at some stages of the process (Paper I).

9.4.4 Challenges in online facilitation

Despite the hopes of making user participation more cost-effective via free online tools instead of travelling and organizing physical meetings, web-based co-design also requires **a great deal of resources in facilitation** (Paper V, Yndigegn, 2010). The study needs to be well prepared, and the **formulation of questions** and other texts requires more precision than preparation of verbal interviews and focus groups (Papers II, III, V, VII). Participants must be given realistic expectations of their possibilities of influencing as well as **communicating clearly** what is expected of them and when. This was a challenge especially in the Monimos case, when using the same workspace for the core design team and open public. It was difficult to communicate **relevant things to each user group** and a lot of communication was carried on via email, since it did not seem proper to be published (Paper V).

Web-based study requires the **facilitator's presence over a longer period** than do face-to-face workshops and interviews, since users' action is allocated to different times (Paper III). Although a constant online presence is not required, the facilitator must **regularly update** the online workspace and participate in the discussion with users to ensure that participants retain interest and confidence (Hagen, 2011). The working times can be also chosen more freely, but sometimes the researcher may need to **work at atypical times,** in the evenings or over weekends, when users have their leisure time and are able to participate, for example in chat sessions. (Papers II, III, V, VII)

Online discussion may result in vast amounts of data (Hagen, 2011), which means that **analysis is laborious**. If the researcher does not meet the participants face-to-face, the interpretation of users' opinions and ideas is based almost exclusively on their **textual self-expression**. Background data on users and quantitative measures can be collected as well, but quantitative analysis of the discussion data still needs human resources for analysis. One solution is to let users interpret the data themselves and start idea generation based on the problem descriptions of other similar users, something that was used in the Mobideas case study (Paper III).

An opposite challenge is to collect too little data. Since user participation is based on voluntarism, it is always **uncertain how many people will participate**, when and how actively. In comparison to a focus group discussion or usability test, the researcher cannot anticipate when the online user data will be received and whether enough content can be collected at all (Chapter 8.5.2). Vanattenhoven (2008), Geven (2009) and Yndigegn (2010) also faced with the small amount of communication in the research blogs they used for user involvement. The facilitator can somewhat direct users' participation during the study, by choosing an inspiring way of communication, actively sending reminders and promising new rewards for active users, but this kind of **intervention may risk the validity** of results. More users need to be recruited than in traditional studies, since not everyone will be active, and dropping out is not embarrassing for participants.

The anonymity of users is sometimes a benefit, when users are free to express themselves, and their ideas are rated based on their content and not their authors. However, even the **facilitator does not always know who the participants are**. Even if background data is requested, users can type **incorrect answers**, such as a false year of birth. Not everyone wants to publish their personal data on the internet, whereas some people may talk even too openly about themselves in their public profile. The facilitator should take the ethical responsibility of guiding users in **privacy protection** if they are not yet familiar with social media.

Facilitation of text-based communication is challenging in the sense that there is a high threshold for deleting users' comments even if they were highly negative about other users' ideas when the aim was to freely brainstorm new possibilities (Paper V). Even if the facilitator regularly followed the online discussion, in a short time one person can lead the discussion into an unwished direction which can be laborious to change afterwards.

Online communications also requires competences of its own: a sociable nature, good writing skills, and an ability to express technical issues in an understandable way, as well as to make interpretations based on other people's texts. The facilitator needs to learn to use the online media as an effective communication tool and to interprete cues about members' behaviour and attitudes from new sources (Macaulay, 1999).

9.5 Summary of contributions

This thesis extends existing knowledge of user involvement in design and researchers' roles in facilitating the design processes through the following main contributions:

- Introducing a group of methods for web-based co-design
- Providing a deeper understanding of:
  - The users' experience of participation in web-based co-design
  - The facilitator's role in the web-based co-design process
  - The positive and negative effects of web-based participation in design.

This thesis suggests that social media provide realistic opportunities for supporting user participation in design and software development. Various methods for different phases in the design process have been developed and tested in several case studies. Web-based co-design can be used as a method on its own (Mobideas and SuperF cases) or be combined with face-to-face methods, as was done in most of the case studies (Monimos, Tilkut, Events and CityAdventure). Based on the case studies, it can be concluded that web-based participation lowers the threshold of users to participate in design processes and allow constant interaction between users and developers. For certain users, web-based participation is an easy, convenient and rewarding way to participate in design processes, but not all users feel it is attractive to them. Facilitators are required in order to focus, inspire and intermediate the creative collaboration so that it can be linked to the software development process.

Social media also shapes some elements in the participation process, which are illustrated in Figure 25. The most notable effects of social media on user participation are: 1) the overlap in participant roles, 2) direct connection to participants, 3) empowering users as decision-makers throughout the design process, 4) varying levels of contributions, including micro-contributions, and 5) co-creation experience as a motivating factor. (Paper III)

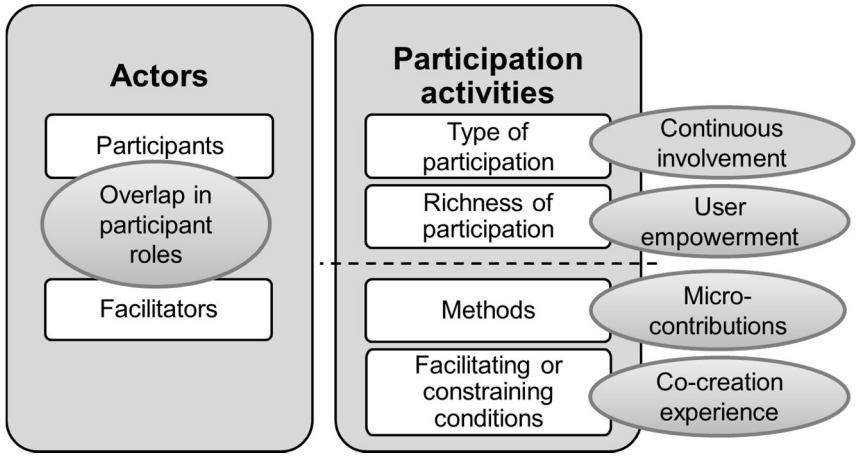

Figure 25. The changes in elements of user participation in web-based co-design (Paper III).

Overlap in the roles of participants and facilitators. Although the word "user" has also been used in this thesis to describe the non-professional participants in web-based co-design, they are not users in the traditional sense, for several reasons. 1) In the early phases of the design process, there is as yet no idea of a product or service, and therefore it is misleading to speak about users of something that does not exist. 2) People choose to participate in the online discussion voluntarily. Some of them might be "potential users" of a new system, but others join the project because of other interests in the topic or a willingness to learn. Not all participants consider themselves potential users, but they may want to join to present the "non-users" and their viewpoints. 3) Unknown online participants are a heterogeneous group of different people, of which only some are "average" users in the traditional sense: they are not developing the systems but just using them. Some of the participants may, however, be professional designers, software developers or managers, even if they do not work professionally on the project at hand. Therefore, their opinions may not correspond to those of the "average" potential users.

In web-based co-design, the participants take some of the tasks of the UCD facilitators by evaluating each other's stories, interpreting other users' needs, developing new ideas that match the needs, and participating in decision making on the

concepts to be implemented. The facilitator's role is not mainly to analyse users' needs and develop product concepts based on them, but rather to coordinate the process and tasks, facilitate online communication, and collaborate with the participants. The key users also act as *user-side intermediaries* helping in facilitating the innovation and design process, connecting new people to the project and communicating needs and requirements of users to the developers (Stewart and Hyysalo, 2008). The professional facilitators' role is thus to support community agents in their work, as well as encourage and challenge in the ideation.

Direct connection to participants. The basis for interaction is the asynchronous co-design workspace that enables continuous connection to different stakeholders, even if they are not active simultaneously. Web-based interaction means that the facilitators are able to follow users constantly and obtain information from users without actively asking something. They can also redefine the research questions and focus depending on participants' responses instead of planning all the activities in advance. Facilitators can monitor participation and detect issues early (Hagen, 2011).

Users do not need to travel to the researcher or send diaries or other material, but can report their experiences and ideas whenever they have them. Designers and developers can have a direct link to the users in the real context of use and discuss informally with the users instead of reading reports of formal tasks. Users become living personas instead of imagined ones. A sense of connectivity and reciprocity is created between participants and facilitators (Hagen, 2011).

Continuous participation is a possibility, but it does not happen automatically. Users can choose their own schedule of participation as long as it fits with the overall schedule of the process that needs to be made explicit to all. When users participate voluntarily, they do not necessarily check out the online workspace regularly and may even forget the project. Therefore, either automatic notifications or facilitator's emails are necessary besides the updated information in the online workspace.

User empowerment throughout the design process. Empowerment refers to a social process that helps people gain control over their own lives (Page and Czuba, 1999). In the Mobideas and Monimos case studies, the participants were able to influence their lives by ideating solutions to their own challenges and participating in the decision-making throughout the design process. The most important points for decision were selecting the concepts to be developed and prioritizing the features. The Monimos users in particular also felt it important to decide on the name of the service. Web-based tools were used to support all the decision-making phases, and the users also felt able to affect the outcome.

Giving real power to users and involving them from the beginning of the design process is, of course, a question of choice and not directly dependent on the used methods or tools. However, the case studies showed that web-based co-design tools enable an active user-participant role in the consumer context in a more realistic way than in face-to-face user involvement. Users can participate even in daily decision making, since no travel is required. Social media tools make the decision-making process open and transparent throughout the whole design process from early exploration to further development during the use of the product or service.

Continuous participation not only becomes affordable, but more people can participate. Qualitative methods also become usable with groups as big as 50 people, instead of the traditional number of six people in a usability test. The disadvantage is that the decision-making becomes more complicated, if there is no common vision in the group and everyone tries to influence the process towards their own personal goals, which was evident, for example, in the Monimos case study. Moreover, not all users are interested in playing an active role, and the decision-making may stay in the hands of a few enthusiasts.

Varying levels of contributions. Web-based co-design allows a combination of various types of user involvement: sporadic and long-term, qualitative and quantitative, small and large groups, personal and collaborative, and asynchronous and synchronous. Users have a lot of freedom in choosing when and how much they contribute, which makes the design process unpredictable for the facilitators. Irregular micro-contributions fluctuate with active real-time participation in chat sessions or face-to-face meetings. A few people can dominate the online discussion and be active in ideating new concepts, whereas others give just a couple of comments on those issues that are relevant for them. When allowing micro-contributions and making them inspiring for participants, the same people may also become involved more deeply and contribute to bigger tasks.

On the Web, the boundaries of participation become blurred, since people can use the co-design workspace for discussing other issues and discuss the design process in other forums as well. Via the enlarged discussion space, the designers and developers may gain a broader picture of the possible users, but there is also a risk of unfocused tracks that may for the participants become more important than the original plan.

The experiences from Owela show that even small groups can be beneficial and work effectively when people are committed to the process. Small studies with four to five people in the Events and Tilkut cases represented short-term intensive collaboration during prototype testing. In long-term projects a bigger participant group is needed, since the activity rates of people most probably decline in the course of time.

Co-creation experience as a motivation factor. Working in the consumer context with voluntary participants makes the motivations of participation an essential issue. Innovating must itself be fun (Antikainen and Väätäjä, 2010) and relevant for the participants from their personal point of view. The contributions expected of the users should be small enough to make participation feel fun and not like work. The participants in the case studies appreciated most of the tasks in which they were able to generate ideas and define concepts together with others. Some users in the Mobideas case reported that they even became slightly addicted to following the ideas and discussions in the online workspace. Addiction as a motivation factor in crowdsourcing communities has also been reported by Brabham (2010). Participation in the co-design process was valuable as such. Sharing and co-experiencing can also be a motivation for participants (Hagen, 2011). From the motivation perspective, it is also essential that the users can see the impact of their comments on the product or service as soon as possible.

In comparison with traditional user-centred design, in which single users are observed or interviewed and the data is kept private, social media tools ask people to share and collaborate. Social media users have become familiar with open communication and also sharing personal details about themselves. Nicknames and avatars allow the sharing of even delicate information more freely than face-to-face, since this cannot be connected to their real personality.

Here again, it is noteworthy to remember that there is no one group of social media users, but different kind of personalities and preferences. The reasons for participating in the project vary and something that is exciting and motivating for one user might be too difficult or boring for another. In addition, some tasks seemed to be important for several users, impacting on their motivation and sense of collaboration, even though these tasks did not provide very valuable data for the development process. Different possibilities must be offered, and the tools must be so easy to use that participation is inspiring for all those users who want to make contributions.

10 Discussion

In this chapter, I discuss the theoretical and practical implications of the research, evaluate its strengths and weaknesses, compare Owela to other current services for web-based co-design as well as give recommendations for future development and research.

10.1 Emerging paths to user participation

In comparison with face-to-face methods, web-based methods allow wider user groups to participate in the design process. Asynchronous commenting and networking mechanisms facilitate discussion by people who have never met but nevertheless have similar interests. Simple voting and rating options enable decision-making among an unlimited number of people. As the case studies in this thesis show, social media tools do not require thousands of users, but can also be helpful for smaller groups: in this case 4–47 people in the case studies.

Also, many previous studies using web-based methods have involved a relatively small number of users (Vanattenhoven and Jans, 2007; Hagen et al., 2007; Klammer et al., 2011), which reflects applying the UCD methods in a similar researcher-driven way previously in face-to-face situations. If a researcher needs to analyse qualitative data produced by users, the number of participants must be limited. Crowdsourcing is another approach that utilizes statistical methods and automatic analysis of large amounts of user data. For example, remote usability tests allow automatic reports based on the log data of thousands of participants (Bolt, 2006). Boulton (2008a) even claims that the benefits of social media can be utilized fully only with large communities of users. In relatively small groups, like 15 stakeholders, everyone has a strong opinion and there are one or two strident voices, which makes it challenging to reach common ground and take decisions without a leader. When hundreds of people participate, the vast amount of content can be used for analysing significant trends in user feedback (Boulton, 2008a). The designer has the ultimate power of decision but user voices help in directing the work.

Based on the experiences of the case studies in this thesis, it is also possible to combine the participation of both an intensive but small user group and a larg-

er ”crowd” of users. In the Monimos, Mobideas and CityAdventure case studies, there were two kinds of participant groups: an inner circle of either carefully chosen or personally motivated participants and a bigger interest group who participated less intensively or more seldom. In other cases, the bigger group was also restricted to certain people, but in the Monimos project it was open to everyone. Different groups were active in different phases of the design process, for example, ideation with a big group, design decisions in a smaller team, and testing publicly.

Figure 26 shows how the design space grows and participation becomes dispersed to central and peripheral participation in web-based co-design. In traditional user-centred design, the researcher contacts the users and mediates their feedback to the designers and software developers, who do not necessarily meet the users. In co-design, users are considered to be part of the design team and may participate also in decision making.

In the web-based co-design, the *design space grows* even more. Web tools enable more people to participate in the team work. The designers, developers and users can be in direct contact even without travelling. The design space also grows to other environments, as user participation can be integrated with other services that are part of the users' life. User feedback and ideas can be collected directly using the same service that is being developed. Also, more developers can interact directly with users. Even if the developers do not have more time for user interaction than previously, they can nevertheless choose to follow the discussion e.g. on certain features that they are currently developing, and gather user feedback on those. The researcher becomes a facilitator.

The participation becomes dispersed; some people belong to the central design team, whereas others participate only peripherally. *Peripheral participation* means that some people participate in a community of practice to a limited degree and do peripheral tasks with limited responsibility for the ultimate product (Lave and Wenger, 1991). The co-design process is one thing among many other interests in the users' lives, and they can freely choose their own level of contribution. Not all users are committed to a particular contribution level or schedule, but they can flexibly switch between active and passive participation. Therefore, the facilitators cannot predict how different tasks will be received, and designers and developers no longer know all the participants. They can, however, utilize the networks of the active users. As in open source development, users can have different kinds of roles in the design process (Kazman and Chen, 2009). Active users can work as “user agents” who collect feedback from their peers and advertise the participation process in their own networks. They partly take on the role of researchers in the traditional UCD process, whereas the facilitator's role is to support, guide, inspire and empower the user agents.

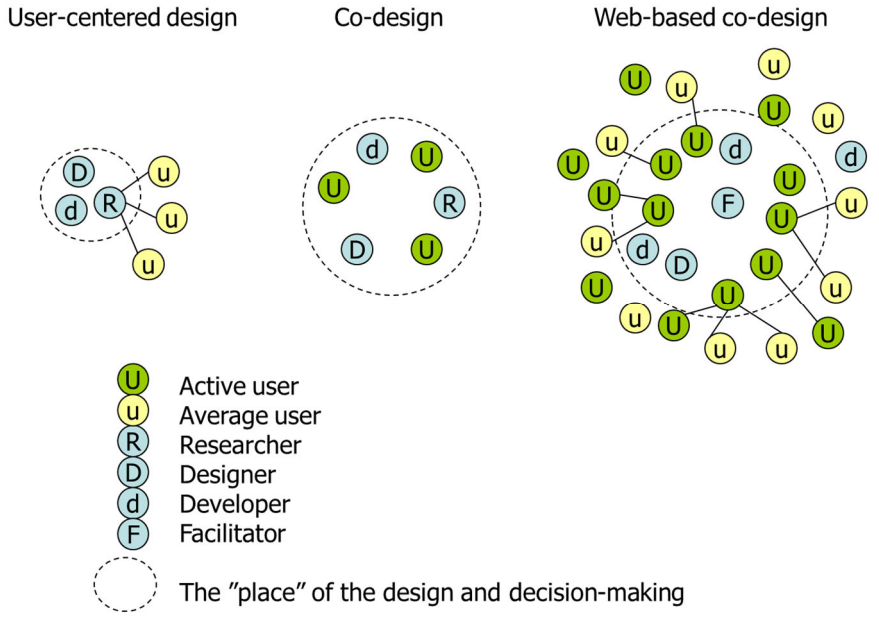

Figure 26. From UCD to web-based co-design.

Even if the nature of participation may change dramatically in comparison to traditional user-centred design, the four UCD principles (ISO 9241-210, 2010) still apply and can even be reinforced.

1. Starting from user needs: instead of careful analysis, users start analysing their own needs with the help of given tasks. The quality of professional user research is compensated with more individuals and their creative potential.
2. Active involvement of users: users can be involved even more constantly and interact directly with the developers.
3. Iteration of design solutions: social media allow even more frequent and more interactive testing of design solutions. Light-weight user feedback can even be collected daily.
4. Multi-disciplinary teams: bigger user groups allow also more diverse participants. Users are not only users of the service but they may represent many disciplines and can provide valuable insight from different perspectives. They are also programmers, business people, entrepreneurs, students, house wives, content producers, journalists, etc. Users are not recruited because they “use” certain systems, but because they are enthusiastic about developing something new.

10.2 Guidelines for facilitators

The practical contribution of this thesis was the development of the Owela tool and method for web-based co-design with users. This work also contributes to the practices of facilitating web-based co-design and provides suggestions for the improvement of the method and tools.

The web-based co-design process should be planned from the users' perspective so that it makes sense to them. In order to keep users as active participants from one case study to another, users should be valued as partners and not just asked questions when designers need some answers. The design process should be made transparent to users, and they should be provided with regular opportunities to contribute. Facilitators also need to ensure that users know what happens to their earlier feedback.

The key components of web-based facilitation of co-design are presented in Figure 27 and explained below. Similar suggestions have also been made by Füller (2010) in relation to virtual co-creation.

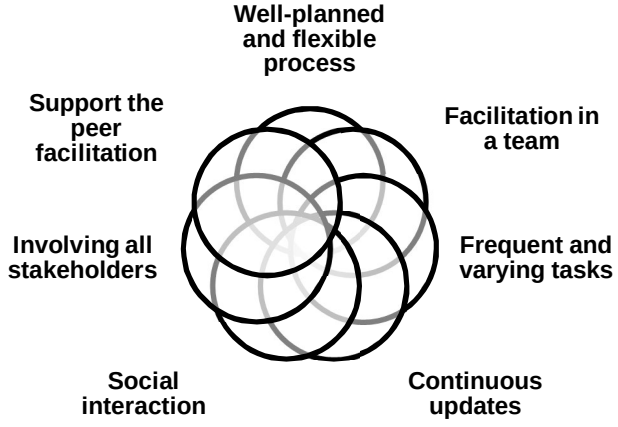

Figure 27. Key components for successful facilitation of web-based co-design.

Well-planned and flexible process. Define the goals and the big picture of the co-creation process in advance. Plan the first phase of long-term studies and the whole process of short-term projects thoroughly before starting. Use the general plan flexibly and schedule the user tasks so that they support the dynamics of the development process. Review progress regularly and change the process, methods and way of communication if necessary.

Involving all stakeholders. Involve company representatives in direct online discussion with end-users. Express the hidden goals and different roles of each participant. Create a shared vision early and remind people of it continuously. Stay in touch with the designers, developers and other company representatives also

via other means, as a shared understanding of the goals and progress is highly important. (Paper VI)

Facilitation in a team. Create pairs to help in the planning and enable continuous process also in the case of sick leave and vacation. However, since the facilitators must be able to communicate closely with each other, too many facilitators will not be useful.

Frequent and varying tasks. Keep the tasks simple, but provide them often in order to maintain the activity of the participants. Help users also to participate with quick micro-contributions, but give the active ones tasks that are sufficiently challenging. Give an opportunity for various levels of participation, for example from simple rating or commenting to idea generation and chat sessions.

Continuous updates in the online workspace. Choose adequate tools and communication channels according to the participant group. Always keep the central online workspace up to date. Document the process and decisions for the members who join the process later. Communicate clearly and check the texts with someone else.

Social interaction. Pay attention to the differences in previous experiences, when you do not know the participants. Participate in online co-creation according to the "rules" of social media. Be personal in online communication (own name and picture) and build a personal relationship with the users, even if you have not met them face to face.

Supporting peer facilitation. Provide tasks and guidelines for active users to involve their peers in the co-design project. Coordinate the analysis of user input at various levels and from various channels.

10.3 Strengths and weaknesses of the research

The theoretical aim of this research was to generate understanding of the phenomenon of web-based co-design and its impact on design methods and participation experiences. The research is qualitative by nature and the main research data is participants' experiences of the co-design process. The validity of this kind of qualitative research can be defined as the accuracy and credibility of representing the participants' realities of the phenomena (Creswell and Miller, 2000; Stenbacka, 2001). Another criterion for the quality of qualitative research is its generalizability. In qualitative studies generalizability can be defined as "fittingness", the degree to which the situation matches with another situation or the extent to which the results can be applied in other situations (Schofield, 2002).

10.3.1 Validity

According to Gummesson (1991), first-hand pre-understanding based on one's own experience of the phenomenon under study is a valuable basis for a qualitative study. The author had previous experience of using traditional methods of UCD, and had experienced many kind of social media and open innovation plat-

forms, which all contributed to her previous understanding of the phenomenon of web-based co-design. Creswell and Miller (2000) state that the more the researcher stays in the field, the more pluralistic perspectives will be heard from participants and the better the understanding of the context of participants' views. Since the author participated in the case studies as an active facilitator, she was able to compare interview data with observational data. The author also had direct access to the Owela workspace and its developers and was thus able to modify the methods and tools based on the research needs and acquire the necessary data.

The observations are, of course, subjective, but most of the cases were worked on in collaboration with other researchers and Owela facilitators, among whom experiences were also reflected collaboratively. All the interviews were also designed and implemented in collaboration with at least one other researcher. Interview questions were developed together; most of the interviews were done in pairs, and the transcripts of interview data were coded and analysed collectively. Most of the papers that are included in this thesis were also written together with other researchers, which makes the analysis more objective. The interview data from the Monimos and Mobideas cases were also analysed for a second time when writing this thesis, which helped the author to withdraw from her own personal experiences, which were predominant right after the studies.

The quality of qualitative research can also be enhanced with continuous reflection upon the phenomenon under study in the process of generating understanding (Stenbacka, 2001). The author reflected her actions and experiences continuously by writing a research diary throughout the Mobideas and Monimos case studies. General reflection about web-based co-design was also done with other Owela facilitators in researcher workshops.

The disadvantage of the method used is that, not all participants were interviewed but only the ones who volunteered. Therefore, it is also probable that the less active users did not participate in the interview, and their experiences are lacking from the research data. This research thus gives more answers on the motivations and experiences of the active participants, and the viewpoint of non-users or passive users remains open. The active users could, however, better analyse the different tasks and activities in the co-design process, and their viewpoint was valuable when trying to understand how web-based participation is experienced.

It is also difficult to evaluate the outcome of the co-design process in the sense of whether better design solutions were achieved in the web-based process than in a face-to-face design process. Since social media has gained such a dominant role as a communication channel in people's everyday lives, it can be argued that it is useful to utilize that medium, even if the results were not better as compared to face-to-face methods. A pleasant participation experience and easy access for more people are values as such, even if the outcome might have benefitted from other kinds of co-design methods. For example, in the Monimos case it would have been bizarre to design an online community service without the possibility of participating in the design via online tools.

It is also challenging to evaluate whether web-based tools make the co-design process more cost-efficient, since no exact comparison was made between web-based and other methods. Recruitment and documentation takes less time online, but preparation of the tasks and constant communication with the users probably take more time for the facilitators. This also means that the facilitators can concentrate more on interaction with the users, which can be seen positively. Finally, the aim of this research was not to evaluate whether web-based co-design produces better results than design-led design with face-to-face workshops, but to explore what kind of methods can be used in web-based co-design and how the participants experience it.

10.3.2 Generalization

The results of this research are limited to the Owela workspace and the way the specific facilitators (including the author) designed the studies and interacted with participants. However, all six case studies were conducted in different contexts, with different users and with different kind of services that all contributed to the increased understanding of the phenomenon.

It must be noted that Owela was continuously developed during its use. On the one hand, this enabled quick changes in the methods and adaptation to the specific needs of the case studies. On the other hand, experiences of some methods may be too negative, based on the fact that the user experience of using the method in Owela was for the first users not yet at its best. Exact comparisons between case studies and user groups are not possible, since the tool and the ways of using it also changed during its development.

Both the Monimos and Mobideas case studies were carried out in research projects in which new types of user involvement in the design process were studied. Only one designer participated for some time in the Monimos project, whereas in other studies researchers or software developers have also played the designer role. Therefore, the setting does not equate with the industrial system design processes, and further challenges may occur between different roles and working schedules when applying the methods in a company context.

Constructive research can also be evaluated from the viewpoint of its practical relevance: the developed web-based methods are valid if they work. The method presented has been applied in dozens of other projects, both in research and commercial projects. At VTT it has become a state-of-the-art method for involving users in design projects. Therefore, it can be stated that the method has proved to be valid in contexts other than the case studies presented in this piece of research.

10.4 Current services for web-based co-design

Owela was one of the first web-based co-design platforms to offer users the opportunity of participating in digital service development from the early ideation to online testing. Nowadays, there are plenty of other commercial platforms or user

communities that provide tools and mechanisms for web-based co-design. In Finland too, several similar tools have emerged during work on this thesis. Many of them use similar methods and tools, but there are differences in the focus areas and operation models.

Interquest offers participatory service development via consumer communities where customers and companies can participate and share input and ideas. The size of one community is 20–200 participants. Consumers are involved in 2–5 week long periods involving discussions, observation, ideation and co-creation tasks. (Interquest, 2010) The focus is on market research and concept design, instead of user participation during the software development process.

Patio[14] is a test user online forum managed by the Oulu Urban Living Labs (OULLabs) (Laizane and Haukipuro, 2012). It is integrated into Living Lab activities and utilizes both real life usability tests and online discussion. Anyone can join in the test user community and collect points that can be exchanged for rewards. There are also innovation communities, like Suuntaamo[15], in which the online user community is only used for recruiting and user database management, whereas the actual ideation and testing is carried out in face-to-face meetings. Both in Patio and Suuntaamo, companies and other organizations initiate the projects, and the users' role is to give feedback and ideas.

In addition, many companies have experimented with their own innovation or co-design platforms that can either be open to anyone or restricted to a specific customer group. For example, Itella has its public IdeaPosti[16] platform for ideas related to postal services, and TeliaSonera used the Aivo crowdsourcing platform in 2008–2011. Interestingly, some of the early companies that created open innovation and co-design communities have changed their business model to provide open innovation platforms for companies. One of the first innovation crowdsourcing communities, Cambrian house, became a Chaordix[17] tool, and Redesignme changed its focus from an open design community to CMNTY Corporation[18] tool.

In Finland, there is also an active open innovation community Avainklubi[19], where consumers can freely suggest new product ideas for the almost 30 Finnish companies participating. Besides writing and rating ideas, users have only a limited role to participate in the companies' design projects. Member companies can also create challenges with a focused theme for ideation or do traditional market research via questionnaires. Sometimes decisions on product details are crowdsourced by letting users vote on different options before the product launch. The ideas and questionnaires in Avainklubi mainly relate to material products or real life services instead of information systems.

[14] https://www.patiolla.fi
[15] http://www.suuntaajat.fi
[16] http://ideaposti.posti.fi
[17] http://www.chaordix.com/
[18] http://www.cmnty.nl
[19] http://www.avainklubi.fi

Owela differs from the previously mentioned services in that it is closely connected to iterative software development. Owela tools have been developed and used for long-term studies in which users play an active role as initiators and decision-makers. The same users can participate from early exploration and ideation until the final testing of online services, and all phases can be carried out online. Researchers facilitate the participation using a systematic process and UCD methods in order to help users to recognize their needs and formulate their experiences.

10.5 Opportunities for future work

This thesis explores how social media changes user participation in design mainly based on users' and facilitators' experiences. The research indicates that several elements of participation and participants' roles change in web-based co-design, but several questions need further investigation when evaluating the benefits and challenges of the approach.

10.5.1 Improvement of the method

There are two possible lines of improvement of the Owela tool and working methods. One is to develop tools for researchers for more comprehensive analysis and user understanding, and the other is to enhance users' opportunities for creative collaboration.

To help researchers in building a broader understanding of users, user needs and use context, user data from various sources could be combined into more comprehensive user profiles. For example, users' individual survey answers could be used to define possible personas, from which users can choose the one that they can identify themselves with. Mobile video diaries and probes could be linked to the web-based tool so that users could easily participate directly in the use situation and be prompted during the day to answer certain questions.

Online methods produce vast amounts of content, the analysis of which needs a lot of resources. Automatic tools for qualitative content analysis could help in highlighting trends and critical incidents. Visual analytics could be integrated to the Owela workspace so that the facilitator could see some background information of the users in the same context with the discussions and thus better understand, what the users mean with their ideas and to how many people they could be relevant.

To help users in expressing their creativity, more visual elements could be used in ideation. In Owela, the current interaction methods are mainly based on written text. Pictures and videos have been used as triggers for ideas, but more creative methods for co-design could be developed. Such methods are, for example collaborative storyboarding, sketching and video editing. The chat tool could also be improved, so that the comments written during the individual brainstorming would not be shown in chronological order, but grouped by authors or topics, to which the comments would be linked by the facilitators. During the idea chat session,

systematic innovation methods, such as six thinking hats (de Bono, 1985), could be used in addition to relying on users' natural creativity.

10.5.2 Future research topics

The participants of the co-design process are, of course, a main source of success or failure. The design methods and web tools can only help, but the quality of the work depends on the people. Important questions are: How to select the right participants? Should they be representative of the potential user group, or is a lead user approach more beneficial in co-design? Who are the non-users, and why do some people log in to the project workspace but never contribute?

The online co-design space is also an online community that can also be examined from psychological viewpoint. What kind of roles emerge and are needed in web-based collaboration? What kind of conflicts are there, and how can they be resolved? Should the group be cohesive or diverse? What is the link between individuals' values and their innovativeness? What kind of phases are there in the collaboration, and how do the participant's roles evolve over time? How does web-based co-design differ from face-to-face design sessions?

The **changing roles** between users and facilitators were discovered in this thesis, but the relationship and distribution of work between **professional designers** and users requires further examination in commercial design projects. How do designers experience their decreasing power if users are collaborative designers? Is user participation a threat to their work? What are the benefits of user participation from the designer perspective? Does the mindset of the designer change when users participate actively? Could participant roles be allocated based on users' interests and talents instead of their formal position in the process? For example, some of the "users" may be professional software developers and could have a stronger role in that work. What kinds of changes are needed in company processes?

One open question in web-based design is the reliability of the **user input**. The researchers have no guarantee as to who the participants are, how truthful they are and how seriously they have contributed. The challenge is how to present user tasks online so that they produce useful results. A great deal of data is collected about ideas, user needs and feedback that could also be useful in other contexts. Is it possible to generalize some parts of the data and use it for discovering the need for other products?

Although Owela has been used in different kind of consumer research and service development processes, almost all of the case studies in this research aimed to develop online services. The **application of the method** to the development of physical products or intangible services needs further investigation. More research is needed to evaluate whether and if so how online tools can be used to replace experimenting in the real world. Simulations of the service could be presented as storyboards and videos online in order to recruit more people to contribute in that phase, even in a more limited way.

It can also be questioned whether the web-based design process should follow the UCD process at all, when more and more services are developed during their use. For example, social media services cannot be designed within the scope of a development project (Johnson, 2013), and the developer-driven design can be a valid approach (Holzapfel, 2008). How does the method presented in this research apply to co-design **during the use** of a system or service? Is a separate online workspace needed, or should users be able to give feedback and ideas directly in the service that they are developing? Could the same web-based co-design process be applied directly to the social media services where the users already are? How might one bring the co-design project to the level of systemic infrastructures instead of single products and services?

This research as well as that of others (e.g. Brabham, 2010; Antikainen and Väätäjä, 2010) suggests that participation in a co-design process has an intrinsic value for some participants. In Owela case studies, people are looking for opportunities to develop new services that make life better, are inspired by affecting the future, or gain personal benefits by participating in the process. Especially in the Mobideas and Mobideas cases, some participants stated that the participation process was more important than the outcome of the design. This raises the question of whether a co-design process could really be **driven by the participants** without linking it to any product or service development process. User-driven development is already a reality among hobbyists in user innovation and open source development, but average consumers have fewer opportunities to start to develop new products or services for themselves. Online idea platforms like the former Cambrian house have offered one kind of opportunity for that (Steen et al., 2007), but they do not work without good teams and active facilitation (Schonfeld, 2008). The question is how researchers could support normal people in achieving their aims and involve companies later on if needed.

The co-design process might be examined from the point of view of Service-dominant logic, which stresses the role of customers as value co-creators (Vargo and Lusch, 2008). It would mean seeing the users and service providers as equal partners that both have valuable resources for the service, and concentrating on the value that each party can gain. This would turn the research questions upside down: How can one involve companies in people's value creation processes? In what ways can companies help users: what gets companies involved and how do they benefit from participation?

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Appendix A: Interview questions in the Mobideas case (in Finnish)

Esittely

1. **Kerrotko hieman itsestäsi?**
   - Ammatti? Oletko ollut ohjelmistokehityksen kanssa tekemisissä?

2. **Kerro itsestäsi sosiaalisen median käyttäjänä (tarinan muodossa).**
   - Milloin aloit käyttää, miksi, miten käyttö on kehittynyt? Esim. käytätkö sosiaalista mediaa mobiililaitteen kautta? Miten aktiivisena sosiaalisen median käyttäjänä pidät itseäsi, mitä sovelluksia käytät
   - Saatko usein ideoita sosiaalisen median sovelluksiin liittyen?
   - Asiantuntijuus?

   Odotukset

3. **Mitä odotit Mobideas -projektilta?**
   - ideointivaiheessa elokuussa
   - varsinaisen kehitysprojektin alkaessa lokakuussa
   - (tuote, ratkaisuja joihinkin omiin ongelmiin, uteliaisuus, uusi kokemus, vaikuttamismahdollisuus, ihmisten tapaaminen, ideoiden saaminen, tiedonvaihto...)

4. **Vastasiko projekti odotuksiasi? (Miten/miksi?)**

   Osallistuminen ja kokemukset (vaiheittain)

5. **Osallistuitko Mobideas -projektiin (1. 2. ja 3. vaiheisiin) aktiivisesti?**
   - Millä tavalla? Jos, et niin mistä syystä?
   - Olisitko halunnut osallistua enemmän?
   - (Mitä käyttäjiltä mielestäsi odotettiin?)

6. **Miltä seuraavat vaiheet tai tehtävät tuntuivat (mielenkiintoinen/ hyödyllinen/ selkeä/..)?**
   - Miksi osallistuit tähän vaiheeseen?
   - Koitko voivasi vaikuttaa lopputulokseen osallistumalla ko. vaiheeseen?
     1. Alkukysely ja ensimmäinen ideointi Mobideas I -työtilassa
     2. Toinen ideointi Mobideas II-työtilassa
        a. Luotain-blogit
        b. Ideoiden keruu

   c. Ideachatit

3. Kärkikäyttäjälähtöinen ohjelmistokehitys
   a. kehitettävien sovellusten valinta (viisi käyttöliittymäehdotusta + äänestys)
   b. ominaisuusehdotukset
   c. käyttöliittymäsuunnittelu
   d. demoversioiden testaus ja palautteen anto
   e. livetestaukset chatissa

7. Mikä vaihe oli mielenkiintoisin?

8. Mikä vaihe oli tylsin tai turhin?

9. Vaikuttiko siltä, että ratkaisut käyttäjien palautteen pohjalta, vai, että kehittäjät toimivat oman mielensä mukaan?

10. Tiesitkö, mitä tehdä missäkin projektin vaiheessa?

11. Olivatko ohjeet selkeitä ja riittäviä?

12. Yhteenvetona, miltä tuntui olla mukana tässä projektissa (tarina)? Millainen kokemus osallistuminen oli?

- Päällimmäinen tunnetila
- Fiilikset eri vaiheissa
- Oliko osallistumisesi palkitsevaa itsellesi?
- Arveletko osallistumisestasi olleen hyötyä tuotteen kehittämiseen?

Owela-osallistuminen

13. Miltä Owelan käyttäminen tuntui?

- Millä mielellä käytit sitä?
- Mitkä asiat ilahduttivat?
- Mitkä asiat häiritsivät sinua?
- Oliko Owelan käyttäminen helppoa?

14. Miten Owela soveltui tämän projektin ideointi- ja suunnitteluympäristöksi?

- Kirjasitko kaikki saamasi ideat Owelaan?
- Kun testasit tuotetta, kirjasitko kaikki huomiot ja ongelmat ylös Owelassa? Oliko virheiden ilmoittaminen riittävän helppoa?
- Olitko kiinnostunut seuraamaan kehityksen etenemistä (toteutetut ominaisuudet, korjatut virheet)? Huomasitko virheiden liikennevalokoodausta Owelassa? Oliko se selkeä?

15. Millaisia ongelmia Owelan käytössä oli? Mitkä asiat olivat vaikeita?

16. Tuliko sinulle mieleen, miten Owela-työtilaa voisi vielä kehittää?

Vuorovaikutus

17. Miltä tuntui tulla kutsutuksi aktiivikäyttäjäryhmään?

- Koitko olevasi oikeassa porukassa?

18. Miten kuvailisit omaa rooliasi aktiivikäyttäjien ryhmässä?

- osaaminen, aktiivisuus, asenne
- sivustaseuraaja, aktiivinen ehdottelija, kommentoija, tsemppaaja, kritisoija...
- osallistuin päätöksentekoon, tuotin tietoa, toteutin ratkaisuja, suunnittelin, kehitin, ideoin, kritisoin, testasin, kannustin, tein aloitteita, tarkkailin, osallistuin aktiivisesti

19. Millaista vuorovaikutus eri henkilöiden kanssa oli?

- ohjelmistokehittäjät: Millainen mielikuva heistä tuli? Miten yhteistyö sujui? Miten kommunikaatio kehittäjien kanssa sujui? Mitä hyvää siinä oli? Entä mitä parannettavaa? Oliko kommunikaatio riittävää, tarjosiko riittävästi informaatiota siitä mitä tehtiin ja mihin suuntaan kehitys eteni? Mitä jäit kaipaamaan tästä näkökulmasta tarkasteltuna (vielä enemmän lisäinformaatiota)? Kehittäjien blogi?
- tutkijat: Millainen mielikuva heistä tuli? Miten yhteistyö sujui?
- muut osallistujat: Millainen mielikuva heistä tuli? Vaikuttivatko muut osallistujat asiantuntevilta/idearikkailta? Miten yhteistyö sujui? Muodostuiko esim. kommentoinnin tai äänestysten kautta minkäänlaista suhdetta muihin osallistujiin? Katsoitko profiileja? Monta osallistujaa luulet projektissa olleen?

20. Miten vuorovaikutusta olisi mielestäsi voinut kehittää?

Fyysinen ja sosiaalinen konteksti

21. Millaisissa tilanteissa (missä, milloin, mitä tehdessä) osallistuit ideointiin ja testaukseen Owelassa?

- kotona, työpaikalla, matkalla
- päivisin, iltaisin, viikonloppuisin, lomalla

22. Kävitkö Owela-sivustolla itsenäisesti vai sähköpostiviestejä saadessasi?

23. Ovatko sähköpostiviestit hyvä tapa viestittää sivuston uutisista? Kuinka usein haluaisit vastaanottaa niitä?

- Olisiko joku muu viestitystapa parempi?
- Haluaisitko saada automaattisesti vietin mikäli joku kommentoi merkintääsi?

24. Esittelitkö projektia perheenjäsenille tai tuttaville?

25. Olisitko jossain vaiheessa halunnut kutsua muita ihmisiä mukaan ideointiin ja testaukseen?

26. Olisiko ideointi ja kehittäminen voinut tapahtua kokonaan julkisessa työtilassa ja avoimena kaikille?

Osallistumistavat

27. Mikä olisi sinulle mieluisin tapa osallistua tämän tyyppiseen projektiin?

- millä tavalla (offline/online), kuinka usein, missä vaiheissa (ideointi/ testaaminen)
- mitä työkalua käyttäen (Owela-tyylisellä sivulla vai jotakin yleistä sosiaalisen median sovellusta käyttäen, esim. Facebook, Twitter)
- miksi?
- Jos vastaava projekti olisi järjestetty niin, että kehittäjät, tutkijat ja käyttäjät olisivat tavanneet kasvotusten muutaman viikon välein, olisitko halunnut osallistua projektiin?

Lopputulos ja jatkokehitys

28. Oletko tyytyväinen MapMate-sovelluksen projektin aikana kehitettyyn versioon?

- Vastasiko se odotuksiasi?

29. Tässä projektissa tutkittiin erityisesti yhteiskehittämistä prosessinäkökulmasta, eikä MapMaten jatkokehittämiseen tai kaupallistamiseen ole vielä tarkkaa suunnitelmaa.

- Mitä sille pitäisi mielestäsi tehdä? Pitäisikö jonkun (yrityksen) ottaa vastuu tästä tuotteesta? Kenen?

30. Haluaisitko itse osallistua tuotteen jatkokehittämiseen?

- Millä tavalla?

Motivaatio ja palkkiot

31. Mikä sai sinut kiinnostumaan projektista alun perin?

32. Mitkä syyt saivat sinut olemaan mukana loppuun asti (mikäli olit)?

33. Olivatko palkkiot (miniläppäriarvonta, 50 € tuotelahja, leffaliput) kiinnostavia?

34. Millaisen korvauksen olisit kaivannut osallistumisestasi?

Yhteenveto

35. Koitko projektin hyödylliseksi? Mitä jäi käteen?

Aiemmat ja tulevat osallistumiset

- Oletko ollut aiemmin jollain tavalla mukana ohjelmistokehityksessä? käyttäjänä / kehittäjänä / asiakkaana..? Millaisia kokemuksia sinulla on niistä?
- Haluaisitko kuluttajana osallistua muihinkin vastaavanlaisiin projekteihin, joissa ideoidaan ja kehitetään uusia tuotteita ja palveluja? Koetko, että sinulla on siihen riittävästi mahdollisuuksia?
- Millaisia toiveita sinulla on tulevaisuuden tuotteiden kehittämistä kohtaan? (kuluttajien / käyttäjien mukaan ottamisen tavat)

Appendix B: Interview questions in the Mobideas case, English translation

Introduction

1. **Please, introduce yourself briefly.**
   - What is your profession? Do you have experience of software development?

2. **Tell us about yourself as a social media user.**
   - When did you start to use social media? Why? How has your use of the services evolved? Do you use social media with mobile devices? How active a user are you? Which services do you use?
   - Do you often get new ideas relating to the use of social media services?
   - Does your work relate to social media?

Expectations

3. **What did you expect from the Mobideas project?**
   - in the ideation phase on August
   - when the development phases started on October
   - (e.g. a new service, solution to certain problems, new experience, curiosity, an opportunity to influence, meet people, get ideas, share knowledge…)

4. **Did the project meet your expectations? (How/why?)**

Participation and experiences (in different phases)

5. **Did you actively participate in the Mobideas project?**
   - In what way? If not, why not?
   - Would you have wanted to participate more?
   - (What kind of participation do you think was expected of users?)

6. **How did you find the following phases and stages (e.g. interesting/useful/clear/..)?**
   - Why did you participate in that phase?
   - Did you feel that you could influence the final result by participating in this phase?
     1. Initial survey and ideation in the Mobideas I workspace
     2. Second ideation in the Mobideas II workspace
        a. probe blogs

   b. idea generation
   c. idea chat sessions

3. User-driven software development
   a. choosing the applications for implementation by voting on five suggestions
   b. feature suggestions
   c. user interface design
   d. testing the demo versions and giving feedback
   e. real-time testing in the chat

7. Which phase was most interesting?

8. Which phase was most unnecessary or boring?

9. Did you feel that the software was developed based on user feedback, or that the developers made their own decisions?

10. Did you know what to do in each phase of the project?

11. Were the guidelines clear?

12. Please summarize: how did it feel to participate in this project (a story)? What kind of experience was the participation for you?

- Your predominant feelings, feelings in different phases?
- Was the participation rewarding?
- Do you believe that your participation helped in the product development?

Owela participation

13. How did it feel to use Owela?

- In what mood did you use it?
- Which issues were pleasing to you in Owela?
- What disturbed you in Owela?
- Was it easy to use Owela?

14. How suitable was Owela as an ideation and design tool in this project?

- Did you write down all the ideas that you got in Owela?
- When you tested the application, did you write down all the problems and ideas in Owela? Was it easy to report the bugs?
- Were you interested in following the progress of development (new features, fixed bugs)? Did you notice the traffic light coding for bugs? Was it easy to understand?

15. What kind of problems were there in using of Owela? What things were difficult?

16. Did you have ideas on how Owela could be developed?

Interaction

17. How did it feel to be chosen for the active users' group?

- Did you feel that you were in the right group?

18. How would you describe your role in the active users' group?

- competences, activeness, attitude
- a passive role, making suggestions, commenting, cheering up, criticizing
- participation in decision-making, producing knowledge, implementing solutions, designing, developing, ideating, testing, making initiatives, watching, participating actively.

19. How was the interaction with different people?

- **with software developers:** What kind of image did you get of them? How did the collaboration go? What was it like communicating with the developers? What was good? What should have been improved? Was there enough communication? Did you get enough information about what was achieved and how the implementation was proceeding? What did you find wanting (e.g. more information about something)? Did you read the developers' blog?
- **with researchers:** What kind of image did you get of them? How did the collaboration go?
- **with other participants:** What kind of image did you get of them? Did the other users appear to be competent or innovative? How did the collaboration go? Did you build any kind of relationship with other participants e.g. through commenting and voting?

20. How could the interaction between different people have been developed?

Physical and social context

21. In what kind of situations and places (where, when, doing what) did you participate in the ideation and testing in Owela?

- e.g. at home, at work, on the way
- during the day, in the evenings, at weekends, on holidays

22. Did you visit the Owela workspace spontaneously or when you received email reminders?

23. Were email reminders a good way to communicate what is happening? How often did you receive email?

- Was there another better communication channel?
- Would you like to receive automatic notifications if someone comments on your post?

24. Did you talk about the project with your family members or friends?

25. Would you have liked to invite other people to ideate and test this service?

26. Could the ideation and development have been carried out in a totally public workspace and been open for anyone?

Ideal ways of participation

27. What would for you be the most pleasant way of participating in this kind of development project?

- in what ways (offline/online), how often, in which phases (ideation/testing)
- with which tools (Owela-kind of workspace or a general social media service, such as Facebook or Twitter)
- why?
- if a similar project had been organized so that the software developers, researchers and users had met face-to-face every couple of weeks, would you have liked to participate in the project?

Final result and further development

28. Are you satisfied with the version of the MapMate application that was developed during the project?

- Does it meet your expectations?

29. In this project, we mainly studied the co-design process, and there are no clear plans for the further development or commercialization of MapMate. What do you think should be done with it?

- Who should take responsibility for this product? Which company?

30. Would you like to participate in the further development of the MapMate application?

- In which ways?

Motivation and rewards

31. What made you interested in this project in the beginning?

32. What reasons made you stay active until the end (if that happened)?

33. Were the rewards interesting (lottery of a netbook, product gift of 50 Euros, movie tickets)?

34. What kind of reward did you expect for your contributions?

Summary

35. Did you feel that the project was useful? What did you gain from it?

Previous and future participation

- Have you participated previously in software development (as a user, developer, customer,…)? What kind of experiences do you have of those projects?
- Would you like to participate in the consumer role in other similar projects in which new services and products are being developed? Do you feel that you have enough opportunities for that kind of participation?
- What kind of wishes do you have for the development of future products? How should the consumers and users be involved?

Appendix C: Interview questions in the Monimos case

Bold questions were those prioritized; the others were used only if there was extra time.

1. *Joining and expectations:*

   How did you come to take part in the project, and at what stage?

   Why did you join the project?

   - Any other reasons?
   - What did you expect from the project?
   - (e.g. new service, solution to certain problems, new experience, curiosity, opportunity to influence, meeting people, getting ideas, sharing knowledge…)

2. *Team workshops:*

   As you see it, what was actually done within the iMedia [Monimos] team?

   - Tell your own story of what happened in this project

   How did the Monimos workshops work, in your opinion?

   How important did you find them?

   - Why?
   - What kind of reasons did you have to attend the workshops?

   How did it feel to be part of this team?

   What do you think about the team operation?

   - Which issues were important in making things happen?

   What kind of challenges were there in the team?

   - What other kind of people would have been needed in the team?
   - What kind of issues did you try to influence by your own participation in the team?
   - Why are they important for you?

3. *Online tools:*

   Owela was used as an online tool during the Monimos development project. How much did you use it?

   How did you use Owela?

   What was its meaning or significance for you?

How did you feel about using Owela?

Was it a suitable tool for this project, in your opinion?

What kind of problems were there with Owela?

How could Owela have better served the development project?

4. *Testing:*

Did you participate in Monimos testing before the launch?

How did you feel about the testing?

- Did you provide feedback? Why?
- Did you participate in the test chat sessions? Why?
- Do you think that you could influence the final website with your comments?

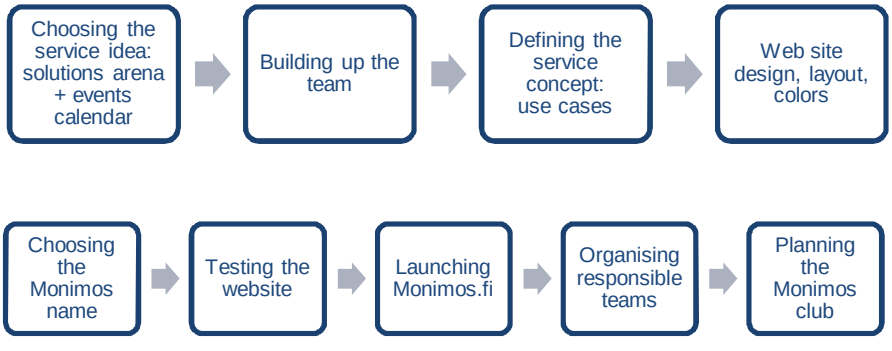
5. *Emails:*

How did you find the email communication within the team?

- Was there too little or too much communication?
- Was it easy to understand what was happening (based on emails)?

6. *Experiences at different stages of the process:*

In the Monimos development process, we had the following phases (shown on a timeline):



Which phases did you consider the most important for you?

Which things took too much time from your point of view?

In which project phases were you frustrated? Which issues caused that?

In which project phases were you excited? Which issues caused that?

Which things in the project disappointed you?

7. *Project as a whole:*

   Have you previously participated in similar collaboration projects in which users and researchers develop a service together?

   How did you find this project as a whole?

   – ...looking for adjectives, like meaningful, fun, boring,...

   Did the project succeed from your point of view?

   What did you personally get out of the whole project?

   – What did you learn on the project?

   If you could change one thing in the process, what should be done differently?

   – What else could be improved?

8. *Monimos, Moniheli & project (if the person is active in Moniheli):*

   How has the Monimos development project affected Moniheli processes?

   – Has something changed at Moniheli?
   – e.g. has the process brought up any issues as regards "internal processes"?
   – Are there any new activities, teams, etc. now?
   – Which?

   What is the relation between Moniheli and Monimos, in your opinion?

9. *Monimos service:*

   What does Monimos allow currently?

   – What kind of participation does it allow
   – How would you describe it?

   How is Monimos different from what you expected?

   What kind of a community is Monimos?

   - how does it differ from other social media services in which you are active?

   How have you used the Monimos service?

   – In what kind of discussions have you participated? Why are they important for you?

   How have you benefitted from using Monimos?

How do you feel about using the service?

10. Monimos – future use:

Who would you want to use Monimos?

What issues should be brought up in Monimos?

What is missing from Monimos?

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Title	**Web-based co-design** **Social media tools to enhance user-centred design and innovation processes**
Author(s)	Pirjo Friedrich
Abstract	User involvement is generally regarded to be useful in information systems design. However, when designing online services for consumers, it may be difficult to reach the potential users and involve them in iterative development processes. Social media provides new possibilities for interacting with users on a daily basis, since it has become a natural method of communication for many people. The aim of this thesis is to study how social media tools can be used to support user participation in the design and innovation processes, and how social media affects the elements of user participation. Theoretically the thesis is based on user-centred design, participatory design and user-driven innovation. By combining these three approaches, the research resulted in tools and methods for web-based co-design that were implemented as the Owela (Open Web Lab) workspace. It consists of blog-based discussion tools, user diaries, chat, questionnaires and polls that can be combined for different innovation and design purposes. This thesis presents results from six case studies in which consumers participated in web-based co-design throughout the innovation process or in some phases of it. Social media tools proved to be most useful in the early exploration and ideation, which were inspiring and meaningful activities for the users as well. During the concept design, a lot of users can be cost-efficiently involved in evaluation and development of the concepts. Shared user diaries and real-time chat sessions can be used for collecting quick user feedback from the real use context during iterative software prototyping. Web-based tools do not substitute face-to-face methods, but complement them by enabling more constant interaction with users and lowering certain users' participation thresholds. Via online tools, users can participate whenever they have time to do so. Transparency of the design process helps users to see their impact on the final product or service. Interestingly, participation in the process as such can be a rewarding experience for the users, if it offers a channel to be heard and express their own creativity. However, individual contributions in social media tend to be small and occasional, or really active people may come to dominate the co-design process. Online communication skills affect users' abilities to express themselves, and participants cannot take the backgrounds of anonymous users' into account when interpreting other people's comments. If co-design has too open a goal and participants lack a common vision, users may become frustrated. Too big a task is not motivating for users who participate voluntarily. In web-based co-design, the boundaries of different participant groups get blurred. Users also become designers and may participate even in decision making, whereas designers become facilitators of the co-design process. The researchers' role is to provide users with light-weight tasks and guidelines that help them to analyse their own needs, as well as involving their friends in the design process. The facilitation requires a lot of time and resources for continuous participation and regular updates of the online workspace. Text-based tasks need to be clearly formulated, and various types of activities are necessary in order to motivate different kinds of people with different motivations.
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VTT Science 34

Nimeke	**Yhteissuunnittelu verkossa** **Sosiaalisen median välineitä käyttäjälähtöisen suunnittelun ja innovoinnin tueksi**
Tekijä(t)	Pirjo Friedrich
Tiivistelmä	Käyttäjien osallistumista tietojärjestelmien suunnitteluun pidetään yleisesti hyödyllisenä. Kuluttajille suunnattujen verkkopalvelujen potentiaalisia käyttäjiä voi kuitenkin olla vaikea tavoittaa ja ottaa mukaan suunnitteluprosessiin. Sosiaalinen media tarjoaa luontevan kommunikaatiokanavan ja tarjoaa uusia mahdollisuuksia näiden käyttäjäryhmien kanssa toimimiseen. Tämän väitöskirjan tavoitteena on tutkia, kuinka sosiaalisen median välineitä voidaan käyttää tukemaan käyttäjien osallistumista suunnittelu- ja innovaatioprosesseihin ja miten sosiaalinen media vaikuttaa käyttäjäosallistumiseen. Väitöskirjan teoreettinen perusta on käyttäjäkeskeisessä suunnittelussa, osallistuvassa suunnittelussa ja käyttäjälähtöisessä innovoinnissa. Näitä menetelmiä yhdistämällä työn tuloksena syntyi työkaluja ja menetelmiä verkkopohjaiseen yhteissuunnitteluun, jota toteutettiin Owela (Open Web Lab) -työtilassa. Owela koostuu blogipohjaisesta keskustelualustasta, käyttöpäiväkirjoista, reaaliaikaisesta verkkokeskustelusta, verkkokyselyistä ja gallupeista, joita voidaan yhdistellä eri innovaatio- ja suunnittelutarkoituksiin. Tässä väitöskirjassa esitetään tuloksia kuudesta Owelassa tehdystä tapaustutkimuksesta, joissa kuluttajat osallistuivat verkkopohjaiseen yhteissuunnitteluun koko innovaatioprosessin ajan tai sen joissain vaiheissa. Sosiaalisen median työkalut osoittautuivat hyödyllisimmiksi alkuvaiheen kartoituksessa ja ideoinnissa, jotka olivat myös käyttäjille mielekkäimmät vaiheet. Konseptisuunnittelun aikana sosiaalinen media mahdollistaa suuren käyttäjäjoukon osallistumisen konseptien arviointiin ja kehittämiseen. Jaettuja käyttöpäiväkirjoja ja reaaliaikaisia verkkokeskusteluja voi puolestaan käyttää iteratiivisen ohjelmistokehityksen aikana nopean käyttäjäpalautteen keruuseen todellisista käyttötilanteista. Verkkopohjaiset työkalut eivät korvaa kasvokkain tapahtuvaa suunnittelua, mutta ne täydentävät sitä. Verkkotyökalut mahdollistavat jatkuvan vuorovaikutuksen käyttäjien kanssa ja alentavat tiettyjen käyttäjien osallistumiskynnystä. Käyttäjät voivat osallistua suunnitteluprosessiin haluamaansa aikaan, ja suunnitteluprosessin läpinäkyvyys auttaa heitä näkemään osallistumisen vaikutukset lopulliseen tuotteeseen tai palveluun. Osallistuminen suunnitteluprosessiin voi olla käyttäjille jopa palkitseva kokemus, jos se tarjoaa mahdollisuuden tulla kuulluksi ja ilmaista omaa luovuutta. Toisaalta sosiaalisessa mediassa yksittäisten ihmisten panos voi olla pieni ja satunnainen, tai sitten erittäin aktiiviset henkilöt hallitsevat suunnitteluprosessia. Käyttäjien kyvyt ilmaista itseään riippuvat heidän vuorovaikutustaidoistaan verkossa, eikä käyttäjillä ole tiedossa nimettömien osallistujien taustoja, jotka auttaisivat tulkitsemaan heidän kommenttejaan. Jos yhteissuunnittelu on liian avointa eikä osallistujilla ole yhteistä tavoitetta, käyttäjät voivat turhautua. Liian vaativat tehtävänannot eivät innosta vapaaehtoisesti osallistuvia käyttäjiä. Verkkopohjainen yhteissuunnittelu hämärtää osallistujaryhmien välisiä rajoja. Käyttäjistä tulee myös suunnittelijoita ja jopa päätöksentekijöitä, kun taas suunnittelijoista tulee prosessin fasilitoijia. Tutkijoiden roolina on antaa käyttäjille kevyitä tehtäviä ja ohjeistaa omien tarpeiden analysointiin sekä omien ystävien osallistamiseen. Fasilitointi vaatii paljon aikaa ja resursseja jatkuvaan osallistumiseen ja verkkotyötilan säännölliseen päivittämiseen. Tehtävät täytyy muotoilla selkeästi, ja niissä pitää olla valinnanvaraa, jotta ne innostavat erilaisia ihmisiä osallistumaan.
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Web-based co-design

Social media tools to enhance user-centred design and innovation processes

Social media provides new possibilities for interaction of companies and their customers. More people can participate in the innovation and design processes whenever they have time and interest.

This thesis presents web-based tools and methods that can be used for involving users in the design and development of online services. They were implemented in the Owela (Open Web Lab) platform as a part of this thesis. The author presents multiple case studies in which consumers participated in the ideation, design and testing of new online services in Owela. The results show that social media tools are useful and motivating especially in the early exploration and ideation as well as in collective testing.

Web-based co-design complements face-to-face design methods, lowers users' participation threshold and enables constant interaction between users and developers. Participation in the web-based co-design process can be a rewarding experience for the users, because it offers a channel to express their creativity. At the same time, facilitators are needed to guide, inspire and intermediate the creative collaboration of users and developers.

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