User Participation in Software Design via Social Media: Experiences from a Case Study with Consumers

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Original Research

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Abstract

User participation has proved to have many benefits in software development. The traditional methods for participation rely mainly on face-to-face meetings and are therefore not easily applicable to designing online services targeted at distributed consumers. Social media have become widely used among consumers and could thus offer many opportunities for involving users in software design. We present a case study in which a group of users participated for over six months in the process of designing a new online service via social media tools. The users played an active role in the development of the system, tailoring it to their own needs. Our results show that social media provide real possibilities for user involvement in software design and also shape some elements of the participation process. In social media, user contributions are mainly small and dispersed over time, but users can be involved almost continuously in the design process, thus enabling them to have a more active role in decision-making. Software development practices need to be modified so that small user contributions fit into the process.

Keywords: User participation, social media, distributed participatory design, agile software development, user-driven innovation, Owela, case study

INTRODUCTION

User participation is a widely accepted practice in system development (Kujala, 2003). User participation can facilitate solution development and successful implementation; however, participation is neither necessary nor sufficient to ensure success (Markus and Mao, 2004). User involvement is expected to yield many benefits, such as more accurate user requirements, features that meet the users' needs, and better acceptance of the system, especially in the early phases of system development (Kujala, 2003). Involving users in the process at an early stage can prevent costly problems down the line (Damodaran, 1996).

However, user participation poses challenges, especially when developing consumer services for the global market. Nowadays, software development projects are often distributed by nature, and both developers and users are dispersed both geographically and temporally. End-users cannot easily be reached when there are millions of potential users rather than, for example, a well-known user group within a certain organization (Iivari and Iivari, 2006). Therefore, traditional participatory design methods that rely on face-to-face communication cannot be applied easily (Gumm et al., 2006).

Online tools provide a natural solution for distributed collaboration (Gumm, 2006a). Geographical distribution can even become an advantage, as online communication allows for collaboration between people who share the same interests rather than the same location (Fischer, 2004). This can also be seen in the consumer context, as ordinary people use social media services like Facebook and Google Docs to communicate and collaborate online. Social media services are typically simple and intuitive to use, and they are easily accessible to everyone. Social media have created new kinds of practices for participation, such as crowdsourcing (Brabham, 2008) and micro-contributions (Kittur et al., 2008). The individual contributions of a "crowd" of people, no matter how small (e.g., commenting, voting, liking), can have a great cumulative impact.

In this paper, we describe how users can participate in software design and development processes via social media. The paper builds on the framework of user participation by Markus and Mao (2004) and examines the impact of social media on the elements of user participation. We carried out a case study called Mobideas in which users were involved in a software design and development process over a six-month period. In our study, social media had a twofold role. Firstly, we used a social media-based method to involve users in the design and development process. Users were given a role as active design partners and decision-makers and were able to interact continuously over an online collaboration platform with other users, developers, and the researchers who facilitated the process. Secondly, the process aimed to develop a new social media service targeted at consumers.

The paper is structured as follows. First, we present the elements of user participation as described by Markus and Mao (2004) and discuss them from the traditional user participation point of view. After that, we define social media and give examples of earlier studies on distributed user participation. Then, we present the Mobideas case study and report the users' and facilitators' experiences of the approach. Finally, we discuss how social media shape the elements of user participation in software design.

ELEMENTS OF USER PARTICIPATION

User participation is an aspect of user-centeredness that can take many forms in software development (Iivari and Iivari, 2006). There is no single definition and methodology for user participation; instead, there are various approaches stemming from different disciplines (Kujala, 2003). In this paper, we refer to user-centered design, participatory design, user-driven innovation, and end-user development as examples of different user participation approaches.

Markus and Mao (2004) present a theoretical framework of user participation based on a critical review of previous studies. According to them, the success of information systems (IS) is influenced by actors, participation activities, and emergent processes related to both participation activities and solution development. Participation activities can be differentiated by their type, richness, methods, and conditions. In this paper, we do not examine the extent to which system success is affected by various factors. Instead, our study focuses on how social media affect the various elements of user participation described by Markus and Mao (2004). The elements of user participation consist of actors and activities that can be evaluated from the perspectives of participants (type and richness of participation) and facilitators (chosen methods and conditions). These elements are presented in Figure 1 and described in more detail below.
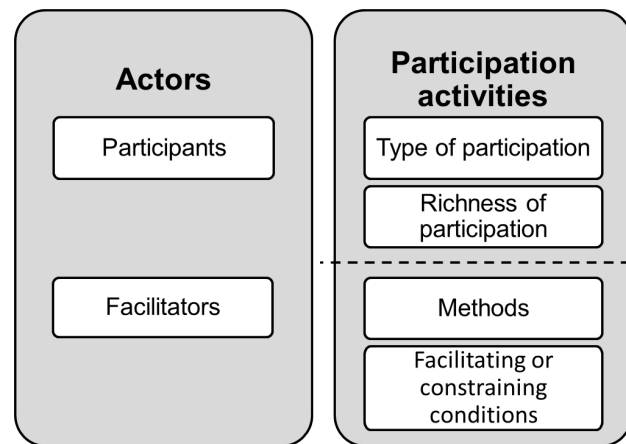
Figure 1: Elements of User Participation, Modified based on Markus and Mao (2004)

Actors

Software development and user participation theories have their roots in the work context. In traditional information systems (IS) theory, users are typically assumed to be employees of the organization engaged in solution development (Markus and Mao, 2004). In those cases, the user group is known and the participants can be selected from inside the organization. The actors involved in the elements of user participation can be divided into two groups, namely, stakeholders (including participants in the design process) and change agents (including IS specialists). Stakeholders are the people who are likely to be affected by the solution (Markus and Mao, 2004). Often, only a limited number of stakeholders can participate in the design process as representatives of the user group. Markus and Mao (2004) use the term change agents to describe the people who design and execute participation opportunities for the stakeholders.

Because we focus on online services for consumers, we use the terms *users* and *facilitators*, instead of *stakeholders* and *change agents*. Users are the individual consumers who could potentially use the service. Select users are involved in the design process as participants who represent all potential users. The facilitators are experts whose role is to organize the process to enable user participation; they do not take part in actual software development. Naturally, software developers and designers have an important role in the software design process, but they are not examined in this paper because our focus is on the elements of user participation.

Participants

There are several views on how active users should be in system development. Users can be considered to 1) be objects that provide information, 2) have a consultative role in commenting on design solutions, or 3) be able to participate in the process and decision-making related to the whole system (Damodaran, 1996).

In user-centered design (UCD), users are merely objects examined from the outside. An understanding of the users' activities and context of use is a central focus in user-centered design (Iivari and Iivari, 2006), but users mainly comment on design solutions rather than produce them.

In participatory design (PD), users participate not only in system design, but also in decision-making as active design partners (Druin, 2002). This approach seeks to create a close relationship between users and developers by creating a space in which knowledge from both sides can be combined (Muller, 2002). Users become members of the design project team and participate in co-design activities (Kensing et al., 1998). The emphasis is on democratic participation (Kujala, 2003). Organizational and political contexts and power structures also need to be considered, especially in workplace settings (Kensing and Blomberg, 1998). PD can also be applied outside work contexts, and ordinary people can be involved as local designers who are competent in the topics, everyday domains, activities, and IT in the relevant field of practice (Syrjänen, 2007).

There is also a stream of user participation approaches in which users are granted an even more active role. End-User Development is an approach that does not involve users as either information sources or participants in the system design process, but actually allows them to develop or modify the system or parts of it themselves (Lieberman et al., 2006).

Facilitators

Facilitators intermediate between the users and designers/developers by facilitating the process (tasks and tools) and the communication between different actors (Gulliksen et al., 1999). They can be designers, usability specialists, or external researchers who lead the participant team and facilitate its discussions. Facilitators choose who can participate and which methods and tools will be used (Markus and Mao, 2004).

In user-centered design, professional designers and developers lead the process, collect user data, analyze them, and draw upon the results to make design decisions. Users are involved in the process, but only when the professionals need their input. The challenge of user studies is that they typically produce overwhelming amounts of raw data and require the facilitators to spend a great deal of time making arrangements for and conducting the studies, traveling, engaging in communications, and managing data (Kujala, 2003). It can be difficult to gain direct access to users so that developers may meet and observe them (Butler, 1996). If the developers and designers do not have the time and willingness to meet with the users, the effective communication of fieldwork results is also a challenge (Kujala, 2003).

The multi-faceted role of the facilitators poses a number of challenges as well. When communicating with users, facilitators represent the designers. When talking to the designers/developers, they are regarded as representatives of the users. Therefore, facilitators need to be aware of power imbalances and conflicts between the different roles (Gulliksen et al., 1999).

Participation Activities

The tradition of user-centered design stresses the importance of a structured process (ISO 9241-210, 2010). In contrast, Markus and Mao (2004) suggest that the nature of the participation process is emergent and cannot be controlled fully. They assert that participation activities can be examined based on the type and richness of user participation as well as the methods and conditions chosen by the facilitators.

Type of participation

Markus and Mao (2004) categorize the types of participation into participation in design, implementation, and project management. Users can participate in some or all of the phases of the software development lifecycle, from product ideation to the design, implementation, and testing phases, which are often iterative.

The iterative UCD process is led by professionals who interview and observe the users in order to understand their needs. Experts generate the new product concept, whereas users mainly participate in the evaluation of design solutions in various phases and give feedback on the suggestions (ISO 9241-210, 2010). In user-centered product concept design, user studies are supplemented with idea generation based on user needs (Kankainen, 2003), but users are not active innovators.

In innovation management research, user involvement is referred to with terms such as user-driven innovation and user innovation (von Hippel, 1986, 2005). In these approaches, the users are seen as the innovators, and the locus of innovation shifts from inside the company to the users (Thomke and von Hippel, 2002). In other words, the company equips its customers with appropriate toolkits for innovation and then "outsources" key need-related innovation tasks to them (von Hippel, 2001; Jeppesen, 2005). A user-driven open innovation approach, as defined by Botero et al. (2009, p. 6), considers users as equal partners that "innovate by themselves or for themselves." The service is not "ready-made" for the users, but they can have an active role in influencing development. In contrast, Holmquist (2004) defines user-driven innovation as an approach in which users inspire the designers but are not independent innovators as such.

Richness of participation

Richness of participation refers to the amount and quality of participation that result in the participants' experience of the participation. According to Hunton and Beeler (1997) and Saleem (1996), "true participation" involves the ability to make or influence design decisions. Markus and Mao (2004) posit that participating in a planning or decision-making role provides a rich participation experience. In traditional IS design, a small group of users can often be involved as (full-time) members of a software design team, thereby providing rich content, whereas a larger group can only participate to a limited extent, such as by answering a survey or providing input during beta testing (Markus and Mao, 2004).

Methods

The facilitators' task is to choose the appropriate set of user participation methods in each study. Contextual interviews can be used in the beginning of the design process to identify real user needs by observing and

interviewing people in their work context (Beyer and Holtzblatt, 1998). The traditional PD methods – like workshops, scenarios, and prototyping – also 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). Usability testing (Nielsen, 1994) is one of the most commonly used ways of involving users in the software design process, albeit only in an evaluative role.

Conditions

Facilitating or constraining conditions are elements that the facilitators can control in order to increase the effectiveness of participation. The conditions include, for example, the location of participation and both the time and resources required from stakeholders (Markus and Mao, 2004). For example, in contextual design, user studies are done at the users' workplace, which makes it easier for users to participate and provides richer data from the context of use (Beyer and Holtzblatt, 1998).

In a work context, the major barrier to stakeholder participation is that many people do not have time to participate because of their full-time job responsibilities (Davidson, 1999). In a consumer context, it can be even more challenging to get users involved because participation is entirely voluntary. Both monetary and non-monetary rewards can be used to elicit commitment from the users (Antikainen and Väätäjä, 2010).

DISTRIBUTED PARTICIPATORY DESIGN

User-centered design has its roots in the workplace context, where it is possible to reach the future users of products and even involve some of them in the participatory design process. In the context of online services targeted at consumers, both developers and users can be distributed. Online tools have been an effective solution to overcome the issue of geographical distance in various phases of the software design process. Online communication and collaboration was first used among software developers, but it has also gained ground as a means of involving users in the design process (e.g., Divitini et al., 1999; Hagen and Robertson, 2009). The emergence of social media has provided simple tools for collaboration, thereby giving everyone a new avenue for participation and the co-creation of content, no matter where they are.

We consider distributed user participation from two perspectives: 1) the online tools that enable user involvement over distance and 2) social media as a platform enabling new forms of collaboration and co-creation. A variety of online tools, like email, surveys, feedback forms, and workspaces, can be used to solve the challenges posed by geographical distance. At a more general level, online participation is a positive opportunity for collaboration, enabling the involvement of more people than would be possible in face-to-face meetings and making it possible to choose collaboration partners based on shared interests instead of physical location (Fischer, 2004). The Internet is an interactive medium that allows firms to overcome the trade-off between the richness of contribution and reach of users. It also enhances interactivity and persistence of collaboration even in long-term development processes, and increases both speed and flexibility in collaborative innovation (Sawhney et al., 2005).

Online Tools for User Involvement

In distributed software development (DSD), stakeholders can be dispersed geographically, temporally, or organizationally (Gumm, 2006b). Online tools like email, videoconferencing, chat, software libraries, version control systems, testing and bug reporting tools, and shared workspaces have been used to enhance knowledge sharing, discussion, and coordination of work among distributed teams and stakeholders (Lings et al., 2006). Online tools solve some problems of distribution, but not all of them. Furthermore, they also bring new challenges. The DSD literature discusses issues related to socio-technical problems such as the involvement of stakeholders, management across different sites, establishing relationships of trust, and the challenges of different cultures and languages (Lings et al., 2006; Gumm, 2006a).

User involvement in distributed software design has been studied especially within the field of distributed participatory design (DPD) (Gumm, 2006a). A variety of methods have been employed to reach the users. Some earlier examples are the use of websites and email for prototype testing online and collecting user feedback (Farshchian and Divitini, 1999) as well as discussion in email lists, internet relay chat (IRC), and forums in the context of Open Source Software (OSS) development (Barcellini et al., 2008; Terry et al., 2010). Nowadays, there are also various possibilities for remote usability testing (Thompson et al., 2004). Online services can be tested independently by users who provide feedback via an online form or in a teleconference with a usability specialist. Other frequently used online methods during software development are online surveys that help developers collect feedback and development requests from a wider user group (Gumm et al., 2006).

Most DPD studies have been conducted in a professional context in organizations or with expert teams (e.g., Titlestad et al., 2009; Obendorf et al., 2009). In those cases, geographical distance can be overcome by organizing occasional face-to-face meetings. In their recent study, Obendorf et al. (2009) found that face-to-face workshops with user representatives were necessary for creating a shared vision of a system and its development among users from various organizations. They reached larger user groups using email and online surveys and set up an online discussion forum, which users dismissed because they considered it to have less immediate value than workshops.

Face-to-face meetings can also be replaced by virtual user councils, as reported by Heß et al. (2008). A remote "user parliament" used both teleconferencing and wikis to communicate feedback, problems, and suggestions for a new product version. Sharp (2008) also used teleconferencing and wikis for customer participation in agile software development. That is not to say that face-to-face and online methods are incompatible; in many cases, they can supplement each other. Groupware tools, which follow a facilitated process, can also be combined with face-to-face workshops (Gumm et al., 2006).

Social Media as a Platform for Co-Creation

Social media refer to Internet-based applications that build on Web 2.0 technologies and allow the creation and exchange of user-created content (Kaplan and Haenlein, 2010). They are a natural evolution of earlier online services, but Web 2.0 technologies like AJAX, Flash, and RSS enhance interaction and real-time collaboration on the Web. Social media do not only refer to specific online services but also a new type of communication. User-created content is produced outside professional routines (by "ordinary people") and either published on a publicly available website or shared with a group of people on a social networking site (OECD, 2007). Examples of social media services are blogs, wikis, content sharing sites, social networking sites, instant messaging, and virtual worlds.

Social media services are heavily used by ordinary people, even those who do not have any previous experience with computers. Most services offer one single feature with very simple and intuitive use (like commenting in blogs, updating status messages in Twitter, rating videos in YouTube, or tagging bookmarks in Delicious). Community services like Facebook combine multiple features into one service while keeping the single features simple.

Social media provide people with the opportunity to connect, communicate, and interact with each other (Correa et al., 2010), and can be seen as enablers for many-to-many broadcast (O'Reilly, 2005) and collaboration by masses and crowdsourcing (Brabham, 2008). Social media services support and promote collaboration based on individuals' activities (Storey et al., 2010), and allow many users to continuously modify content in a collaborative fashion (Kaplan and Haenlein, 2010). Openness, immediacy, and connectedness also play an important role, especially when using social media in a business context (Postman, 2009).

As social media services are built on user participation, content creation, and communication, they provide a promising means for involving users in software design and innovation. Since the tools are easily accessible and many users are already familiar with them, consumers can also be invited to the design processes. Table 1 shows how different attributes of social media can be applied in the context of user participation in software design. Social media provide platforms for user-developer collaboration with transparent and interactive tools that support real-time communication.

Table 1: Attributes of Social Media and their Applicability to User Participation in Software Design

Social Media Attributes	Meaning	Possibilities for Software 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 Haenlain, 2010; Correa et al., 2010)	Commenting, rating, liking.	User-user and user-developer dialogue and feedback.
Collaboration (Kaplan and Haenlain, 2010; Storey et al. 2010)	Content creation by discussion and co-production.	Co-creation of ideas and features.
Immediacy (Postman, 2009)	Real-time communication, short feedback cycles.	Constant (daily) development based on user feedback.
Connectedness (Correa et al., 2010; Postman, 2009)	Mechanisms for sharing and aggregating content between various services. User profiles, networking with other users.	Linking professional tools and user participation platform. User communities for co-creation, networking with potential innovation partners.

Social media can be used to open up the traditional user-centered design of software products (Hagen and Robertson, 2009) and outsource design ideas from the public. Crowdsourcing has gained much interest and has been used in both idea competitions (Leimeister et al., 2009) and small design tasks (micro-tasks) (Kittur et al., 2008). Nichols and Twidale (2006) report on the design-by-blogs approach that has been used in OSS development to get quick feedback on user interface screenshots. Public blogs make participation in the design process easy, transparent, and conversational in comparison to more formal bug reporting tools (Nichols and Twidale, 2006).

The emphasis on participation in social media challenges some of the traditional assumptions about the roles of users and designers (Hagen and Robertson, 2009). Gumm et al. (2006) stress the importance of facilitators in mediating the feedback from users to developers and vice versa in distributed settings. Since the use of social media in community settings is voluntary, designers need to facilitate the processes of participation as well (Hagen and Robertson, 2010).

RESEARCH SETTING

To explore the impact of social media on the elements of user participation in software design, we conducted a case study called Mobideas during fall 2009 and spring 2010.

Research Method

Our study builds on the action research approach. Lewin (1946) first introduced the term "action research" to describe a pioneering research approach that combines the generation of theory with changes in the social system achieved by the researcher acting on or in the social system. Rapoport (1970, p. 499) provided a more detailed definition of the aims of action research: "to contribute both to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework." Another viewpoint is to consider action research as a cyclical process with five phases: diagnosing, action planning, action taking, evaluating, and specifying learning (Susman and Evered, 1978).

According to Eriksson and Kovalainen (2008), action research is especially suitable when the research question involves describing an unfolding series of actions that are taking place over time in a certain group, organization, or other community. If the research problem is also related to understanding the process of change, development, or improvement, and the aim is to learn from it, action research is a particularly beneficial research approach. In the Mobideas case study, we created and evaluated a new way of developing software in constant interaction with the participating users, who were granted decision-making authority in the project. The researchers simultaneously facilitated the process and evaluated the impact of the new participation practices on the design process.

Data Gathering

We facilitated the whole process of user participation and examined it "from the inside." Our data therefore do not only consist of statistics and surveys but also of our own experiences and observations during the case study. As ethnographer Bate (1997) states, "insight always comes from the inside." Hence, we recorded our experiences as the two facilitators of the process. Data sources included a research diary, email, telephone discussions, and project meeting memos.

In addition to documenting our own perceptions as facilitators, we evaluated the suitability of social media in user participation from the users' point of view. The users' experiences of participation were studied using various data collection methods (Table 2). Before participating in the case study, each user answered an online survey about his/her use of mobile social media. During the actual software design process, all user-generated content and activities were recorded in the log of the used online platform, Owela. In addition, Google Analytics was used to gather usage data about the online platform. During the case study, users' experiences of the different phases and methods were collected through three online surveys.

Individual telephone interviews were conducted at the end of the process. Participation in the interviews was voluntary, as were all the activities during the case study. We motivated participants to take part in the interviews by positioning them as a requirement for obtaining the rewards for participation. Of the 33 users, 10 volunteered for the interview. The interviewees were mainly the most active participants in the project. They represented about half of the participants who remained active in the project until the end. Two researchers carried out the interviews separately based on a semi-structured interview protocol. The interviews ranged from 40 to 70 minutes. All the interviews were recorded, transcribed, and analyzed together by both researchers.

Table 2: Methods for Collecting Data from Users

Data Collection Method	Subject	Number of Users
Background survey	Mobile social media use, user background data	31
Owela logs	All activities, user-generated content, user background data	31
Google Analytics	Usage data	31
Survey 1	Experiences of idea generation (probe blogs, chat sessions)	11
Survey 2	Experiences of the software design and development phase (user stories, user interface sketches, testing)	7
Interview	All phases and the process as a whole	10
Survey 3	Experiences of the test chat sessions and the overall process	15

Participation Platform: Owela

As a platform for online collaboration, we used Owela (http://owela.vtt.fi). This tool enables communication between end-users, developers, and facilitators in various phases of the consumer-driven innovation process. Owela consists of a public innovation space and restricted project workspaces in which a limited number of participants are invited to join. The whole Owela platform has over 2000 registered members that may participate in various projects based on their own interests. Participants are often recruited to the projects via both the Owela community and other channels. For the Mobideas project, we created a separate project workspace in Owela by editing the layout of the Mobideas workspace and implementing several new features for Owela. These included, for example, bug reporting and an improved chat tool.

Owela is built on social media-type communication, where user-generated content (ideas, comments, and stories) play the main role, and multimedia content is used for visualizing ideas. Figure 2 shows an example of the user interface. Informal blog-style communication encourages users to make lightweight contributions, such as by commenting, rating, and voting. The communication is mostly written and asynchronous, but real-time chat sessions can also be held.

Users have public profile pages that enable them to build their own identities within each project workspace. Users receive activity points as rewards for their contributions, and top lists of the most active participants are shown publicly in the workspace. Owela is built on WordPress, an open source publication platform that has been modified for Owela's purposes.

Figure 2: Screenshot of the Owela Workspace Consisting of Concept Voting, Chat, and the Most Active Participants

MOBIDEAS CASE STUDY

The aim of the Mobideas case study was to involve end-users in the software design and development process of a new software service, starting from the ideation of the system and continuing throughout the development process until final testing. A group of users were invited to participate in the study via Owela. The goal of the development process was left very open: the users were initially only given the broad objective of designing a new "mobile social media service." During the project, the target solution assumed a more concrete form through several innovation and design tasks. In the end, the project created a prototype of an online service that allows people to pinpoint themselves on a map, add and find services and places in their surroundings, and locate and interact with other people.

Case Study Participants

The Mobideas case study was carried out in a consumer context. Before the actual study began, an open innovation experiment was conducted with 212 members of an online consumer panel who answered a questionnaire about their use of mobile social media and participated in idea generation on the Owela online platform. Of this group, 56 active users were invited to participate in the Mobideas case study. The users were selected based on the background information they provided and their interest in the target of the design process (i.e., a new mobile social media service).

All of these users were frequent users of different kinds of social media services. Hence, the participating users had a great deal of use knowledge (Magnusson, 2009) related to social media, comprising the user's needs and wants and his/her understanding of how the services create value for the user. Most of the end-users did not have any technical background or previous experience of participating in software development projects. Hence, they did not have much technology knowledge, such as an understanding of the opportunities and limitations of a given technology (Magnusson, 2009), and therefore differed greatly from the developers.

Of the 56 invited users, 33 joined the case study and participated in the ideation, design, and development of a mobile social media service. Users were included as active design partners and decision-makers. About 20 users remained active throughout the whole six-month project, whereas the rest only participated in the first phase of the study.

The invited user group was very dispersed, both geographically and demographically, and its members did not know each other before participating in the study. The participants' ages ranged from 19 to 80 years, and different kinds of educational backgrounds were represented (see Table 3). The users lived in different cities all over Finland. Therefore, it would have been challenging to organize any face-to-face meetings. Asynchronous online collaboration was also practical because the users had different schedules and preferences in terms of the times of day they would participate.

Table 3: Demographic Information about the Participating End-Users

	Frequency	Percent
Gender		
Male	22	66.7%
Female	11	33.3%
Age		
15-24	5	15.2%
25-34	12	36.4%
35-44	8	24.2%
45-54	5	15.2%
Over 55 years	3	9.1%
Education		
Elementary school	2	6.1%
Secondary school	9	27.3%
Lower college/ university degree	8	24.2%
Higher college/ university degree	14	42.4%

As a reward for their participation in the six-month project, users were offered a 50-euro gift voucher. In addition, a lottery for two netbooks was held among the users who remained active until the end of the project. The activity of the users was measured with activity points that users earned for all of the tasks they completed in Owela (e.g., adding ideas, commenting, voting, and answering surveys). A lottery for movie tickets was held twice among the users who had participated in certain project phases.

Software Design Process

We grounded our case study in a user-driven software design process that combines idea generation and concept design from the UCPCD (Kankainen, 2003) process and iterative software development and evaluation from the UCD process (ISO 9241-210, 2010). Users started participating in the idea generation phase (based on their needs) and had active roles as participants and decision-makers in concept design and prototyping. User participation in the different phases of the process is presented in Figure 3.
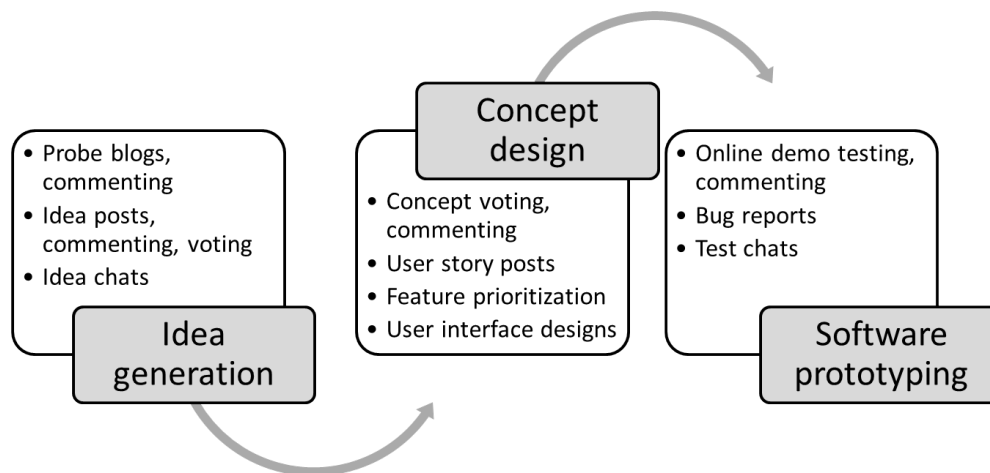
Figure 3: Phases of the User-Driven Design Process in the Case Study

In the idea generation phase, three types of activities were used to inspire the users to come up with ideas: blog postings about everyday life situations (including commenting), idea posting (including commenting and rating), and idea chat sessions. The concept design phase included activities such as concept mockup evaluation and voting, feature suggestions in the form of user stories and their prioritization, and user interface sketching.

A group of four university students developed the software prototype using an agile software development method called Scrum (Schwaber and Beedle, 2002). The software prototyping phase was done in six iterations, each lasting two weeks, during a four-month period (November 2009 to March 2010). After each iteration, users received a new working prototype to test. The prototype was then developed further based on the user feedback.

Facilitation of Participation

Two researchers took on overall responsibility for facilitating the process and mediating the communication between the users and the developers. As the users also acted in part as designers, it was 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. 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.

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. Facilitators typically updated the workspace 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 constantly. This made the facilitators' work different from that associated with, for example, face-to-face workshops, because they had to engage in more continuous involvement. Facilitators also acted as moderators and active participants in chat sessions in which users could generate ideas together with each other or give direct feedback to the developers and discuss the prototypes with them. The chat sessions were mostly held during evenings and weekends, as this made it easier for the users to participate.

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 (about 5-6 per month) was appropriate.

Online User Participation Methods

Probe Blogs

The idea generation phase started with writing probe blogs. Users were asked to post stories about their everyday use of mobile social media on a shared blog in the online workspace. Users were also asked to describe situations in which they needed certain kinds of social media services while on the move. The stories served as triggers to inspire new ideas about solutions to everyday needs. The task was inspired by cultural probes, which are packages of materials that help users to provide information about their daily lives (Gaver et al., 1999). In our case, no external probes were given to the users. Instead, the users wrote stories about their own everyday lives by observing their own use of mobile social media and that of the people around them, as well as deriving inspiration by reading the stories of other users.

Altogether, the users wrote 42 stories in two weeks. During this time, the users also had the opportunity to comment on and discuss their own and others' blog postings. In total, they wrote 185 comments. A few examples of the user stories are provided in Figure 4.

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 to my mobile phone!"
C: "I went to the yearly book fair, which had plenty of interesting programs on offer. I would have liked to have had a 'fair recommender' in my mobile phone that would recommend me a program that matches my interests and also surprises me."
D: "It's autumn again and dark in the morning. It's difficult to decide, how to dress for a business trip. Weather forecast on radio and TV are superficial and I cannot run to the street to check the weather. I wish there would be a service, in which I could have entered all my clothes with their qualities (warmness, waterproofness, color) as well as my daily living area. The system could suggest me proper clothing based on the weather and colors that fit together."

Figure 4: Examples of Users' Probe Blog Stories

Idea Posting

The actual idea generation phase began after the writing of the probe blogs and lasted three weeks. The ideas were posted in a way similar to the blog stories, but in a different section of the online workspace. The idea description had two separate parts. First, the user described the challenge or situation behind the idea, and then proposed a solution. Users had the opportunity to start posting ideas during the probe blog phase. Below each 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 related comments were obtained. The users also evaluated the ideas of other users using three criteria: newness, usefulness, and commercial potential.

Idea Chat Sessions

To further inspire and stimulate the end-users' innovativeness, four idea chat sessions were organized. In the chat sessions, the end-users could generate ideas collaboratively with each other. The chat sessions took 45-60 minutes each, and users could participate in one or more sessions. Both daytime and evening sessions were held to enable as many end-users as possible to participate. Between two and four users and one and two facilitators participated in each chat session. One facilitator led the chat and chose one of the blog stories with the most comments for each session as a basis for ideation. The users spent the first 15 minutes writing ideas privately, and then the ideas were presented to everyone. Approximately 30 minutes were spent on the discussion and development of the ideas.

Concept Mock-Ups and Voting

Based on the users' ratings, the facilitators and the developer team came up with initial concepts by combining features from different ideas and comments. Altogether, five concepts were selected for further development as paper prototypes. The paper prototypes were then posted as slideshows on the online workspace where the end-

users could comment on and evaluate them on a scale of 1-5. Altogether, there were 56 comments about the concepts. The concept that gained the most votes (76) was chosen for further development as a software prototype.

Feature Suggestions

The concept phase continued with the creation of a wish list of features for the service. Basic features were derived from the concept mock-ups and the comments on them. During this phase, the 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 (making 58 comments in total) and discussed the answers of other users. The service feature list was updated based on these comments and discussions.

Additionally, features were collected via user stories that described a short WHO, WHAT, and WHY scenario (Cohn, 2004). The users were asked to write sentences with the following structure: "As a user of this service I would like to do something in order to achieve something." Only three users wrote stories (altogether four contributions), but these did not strictly follow the given structure. Therefore, the facilitators updated the feature list by writing explicit user stories based on the requirements that had come up in the previous answers to their questions. Users commented on these stories (87 comments) and further discussed whether they really needed the suggested features.

User Interface Sketches

The users also had the opportunity to create their own suggestions for the user interface of the developed service. Two options for designing user interface sketches were available: users could draw a layout sketch either on paper or using their own software, and then upload the picture to Owela, or use the free online tool Mockingbird for online mockups. To make it easy for the participants to use Mockingbird, visual use guidelines were provided along with a password for a shared user account.

Only two users made user interface sketches, both of them with Mockingbird. Additionally, 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 5. Other users voted on it and submitted 28 comments.

Figure 5: Example of a User Interface Suggestion and Comments by Other Users

Demo Testing

At the end of the software iterations, a demo version of the service prototype was released as an online service on a separate web page. 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. The developers also requested suggestions for further development.

In addition to the informal test comments, a bug list was maintained 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 information about the bugs from other discussions in Owela. The developers were able to comment on the bugs and change their development statuses (either "error," "in development," or "fixed") which were indicated with "traffic lights." When a bug was fixed, the original reporter was asked to retest the feature and accept it by writing a comment in the bug discussion.

Test Chat Sessions

Users had the opportunity to engage in real-time test sessions with the facilitators and developers during which the users could provide direct feedback and obtain answers to their questions instantly. There were eight test chat sessions lasting 60 minutes each. The chat sessions were held at different times, both during the working day and in the evening, to enable different people to participate. No pre-registration was required.

FINDINGS

Despite the long duration of the development project, many users remained active until the end of the project. Figure 6 presents the page views in the Owela workspace during the case study. With the exception of the Christmas break from mid-December to mid-January, users' activity remained more or less consistent throughout the project. The first month, which was used for idea generation, was the busiest. Beginning at the end of January, new prototype versions were rolled out for testing at regular intervals, which kept participants active until the end of the project.
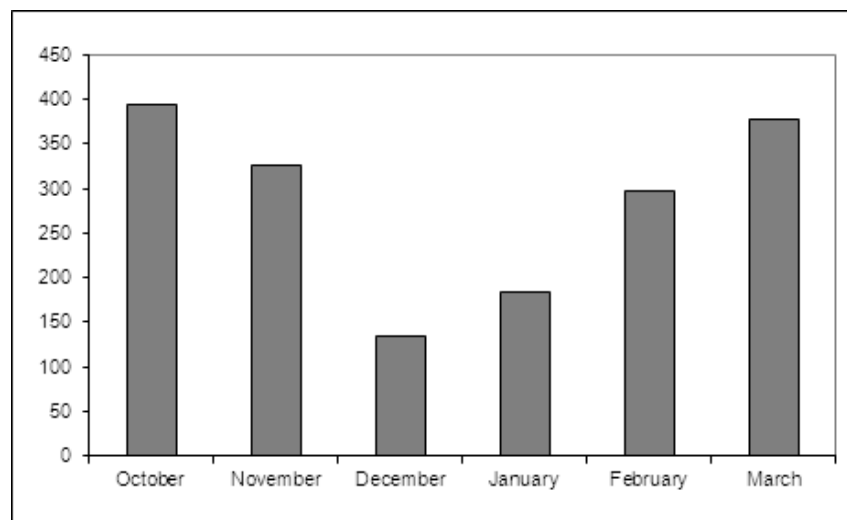

Figure 6: Page Views per Month in the Owela Workspace during the Case Study

Experiences of Participation via Social Media

The users reported a very positive overall experience with the participation process. They especially appreciated the ease and flexibility of participating via social media. Participation experiences may be grouped according to the attributes of social media, which were presented in Table 1 and include openness, interaction, collaboration, immediacy, and connectedness.

Openness

The social media-based workspace enabled an open decision-making process in which the users could vote for solutions and contribute to decisions on a daily basis. Development and decision-making processes were completely

transparent for all participants in the Owela workspace. Not all of the participants were active in the same project phases, but since all of the discussions were held on the same platform, asynchronous participation was possible. People could rejoin the discussions after taking a break and continue participating in the current phase.

Another aspect of the openness of social media is the voluntary nature of participation. All users joined the project because of their own interest in either the topic or innovation in general, and intrinsic motivation maintained their interest in the project. However, one disadvantage of the voluntary structure was the lack of official time allocation for participation, which made it more difficult for participants to find time to work on the project. Many users reported that they would have wanted to devote more time to the project.

Although the project was not confidential and the idea generation and software development could have been carried out completely publicly, the closed workspace proved to be beneficial. When users joined the group, many of them felt committed to being involved in the whole development process. Some users even apologized if they were not able to participate in certain process phases.

Interaction

Social media are generally based on intuitive textual communication with simple features like commenting and rating. Some users explicitly stated that they prefer written communication over face-to-face discussion, for example, because textual discussions are automatically recorded and thus can be read later:

> *"If the discussion is too fast to follow, you can open up the chat history after it's over to read other people's comments at your leisure." – User M1*

Those participating in the real-time sessions reported appreciating the chat format because the online chats did not require as much focused concentration as conference calls or even face-to-face meetings would have. For example, one participant commented:

> *"When you are at your computer, you can formulate your ideas more freely based on the comments than in a face-to-face situation in which you also have to follow the discussion. Now, you can see all the comments at once." - User M4*

Online participation was also preferred because of the anonymity it provided for the users.

In addition to these benefits, written communication also posed some challenges. It was more difficult to keep the discussion focused than would be expected in face-to-face meetings. Some users also had technical difficulties in the testing phase, and if the service that is to be tested does not work it is frustrating to be isolated from the group.

Collaboration

In the beginning of the process people proposed their own ideas, but a strong sense of co-creation emerged, especially after the service concept was chosen. The Owela platform enabled different forms of collaboration either asynchronously or synchronously. Even when the users were participating alone at home, they could see the other users' avatars online, and this served to foster a feeling of collaborative action. The users typically used a nickname and only a few added personal photos to their profiles. This may have emphasized the goal of collaboration as opposed to the goal of creating a personal reputation.

The participants did not know each other before the case study began; therefore some of them reported perceiving the others as somewhat "faceless." Some stated that one face-to-face meeting in the beginning could have helped them to understand matters such as the other users' styles of communication. However, the users determined that it would have been unrealistic to organize face-to-face meetings, explaining that it would have taken too much effort to find a suitable date and that travel would have been required. Furthermore, they would have wanted greater compensation for face-to-face participation. Some users did not feel any need to meet the other participants in this type of relatively short process.

Immediacy

One characteristic of social media is their immediacy. Although the communication in our case was mostly asynchronous, there was a feeling of continuous connection between users and developers. The developers could get feedback on their suggestions over a weekend, and the users commented on each other's ideas quite promptly. Continuous communication is a very different experience compared to other online methods like surveys and feedback forms. Users also appreciated the fact that they could expect a prompt answer any time they had a question concerning some aspect of the project.

The chat sessions enabled even more instant feedback and commenting between the participating end-users and the developers in charge of implementing the solution. Users could also see how their own feedback was incorporated in the new prototype every six weeks. This was made possible by incorporating social media tools into the agile software development process.

Connectedness

Users appreciated the ability to participate from their own computer in any location. Parents of small children and people with irregular working hours especially appreciated that they could submit their ideas and comments whenever they had a bit of extra time, for example, late at night, during short breaks during the working day, or via mobile phone on the bus.

> *"Online participation is more realistic when you have a family, e.g., you can participate even when you have to take care of a sick child." - User M7*

Some users also reported that it was acceptable to be a "hang-around" member and only participate occasionally when their schedule permitted:

> *"Online participation also allows for a more hang-around role. You can participate even though you cannot give your full commitment to the project." - User M4*

Thus, users could feel that they were part of the project even if they could not participate regularly. However, some users thought that the breaks between certain phases in the process were too long, and as a result they could forget about the existence of the project. The project was not tied to their daily practices, and they had to have a reason to visit the Owela workspace. However, they could receive notifications of new discussions via RSS feeds as well as the emails sent by the facilitators.

Experiences of different methods

Several different methods for online user participation were used during the case study. Figure 7 presents the number of users' posts and comments in each of the process phases. The most active phase of the study was the beginning phase, which included writing probe blogs and generating ideas based on the blog posts. Users also actively commented on the feature suggestions even though they did not propose 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 offered 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 contributing via posts and comments, users could also vote on different suggestions. For example, users often actively voted rather than commenting on concept mock-ups.
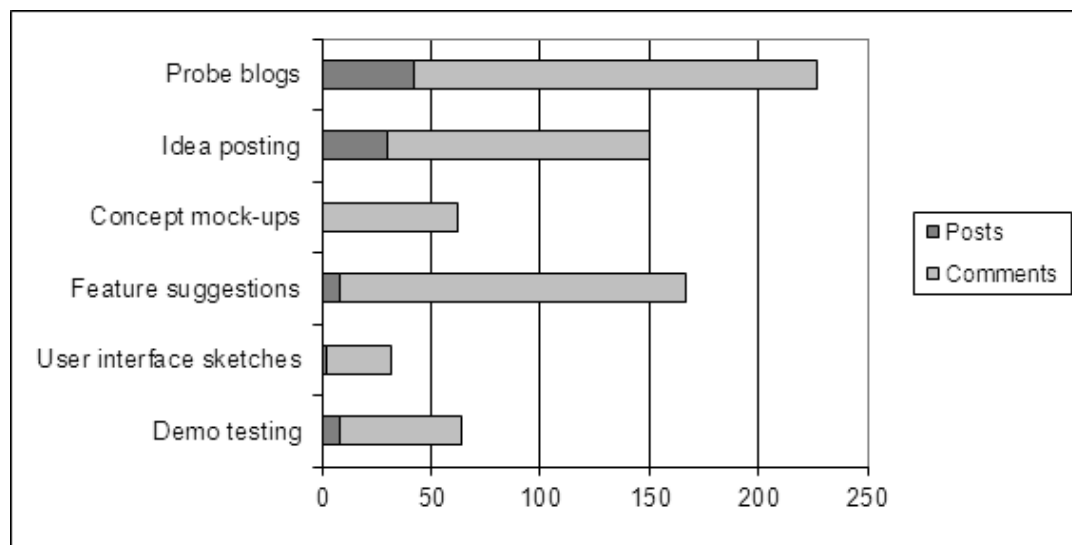

Figure 7: Number of Users' Posts and Comments in Various Phases

The participants reported that the probe blogs were a good method to start generating ideas. The probe blogs inspired and motivated some of the users to participate actively in the entire process. Informal storytelling (i.e., writing about use situations in the form of short stories) was appreciated. However, some users found it challenging to decide on which use situations to write about because they constantly used social media during the day. As time went on, some users felt that coming up with new stories every day for two weeks seemed a bit artificial.

Users had two choices for presenting their ideas. They could post individual ideas in Owela for other participants to comment and vote on, or participate in idea chats during which users worked together to shape their ideas. Some people preferred to post ideas, as they could do so at their leisure any time they thought of an idea. However, they reported that it sometimes took too long to get feedback on posted ideas. Therefore, some users strongly preferred the idea chats, particularly because they appreciated the opportunity to obtain instant feedback on ideas rather than having to repeatedly visit the discussion channel to look for updates. Some users also found the chats to be more effective than face-to-face meetings because everyone could comment at the same time:

> *"Idea chats were the best part of the project for a person who is used to crystallizing his ideas based on others' comments. When you can perceive the context and learn from others, it's easier to generate ideas." - User M7*

The only minor negative comments on the idea chats were that the chats could have been longer, and that sometimes the pace of discussions was fast, especially when many people were participating, making it challenging to keep track of everything. Hence, when planning idea chats, it is important to keep the number of participants engaging in one chat down to just a few.

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

> *"Since I am not a programmer, I did not understand about the technical constraints and felt that the task [of giving feature suggestions] was beyond my capabilities." - User M7*

However, though the users found it challenging to write the actual user stories, they appreciated the possibility to vote for others' suggestions. The list of features was iteratively updated based on the users' suggestions and prioritized based on the number of votes each suggestion received.

User interface sketching is an example of a task in which few users participated, and the layout suggestions were not useful as such. However, the few users who did participate in sketching interfaces liked the task. One of them mentioned that it was inspiring to see how other users began to comment on his sketch, and that it enabled him to think about other users' needs and how these needs differed from his own. Although the sketches were not useful as such, the discussions that they sparked helped the developers to understand which features and tasks were important to the users.

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

DISCUSSION

The results of the Mobideas case study demonstrate that social media provide real possibilities for user involvement in software design and also shape some elements in the participation process. The most notable effects of social media on user participation are: 1) the overlap in participant roles, 2) the continuous involvement of users, 3) empowering users as continuous decision-makers, 4) the possibility for micro-contributions, and 5) the co-creation experience as a facilitating condition. The implications are presented in relation to the elements identified by Markus and Mao (2004) in Figure 8.
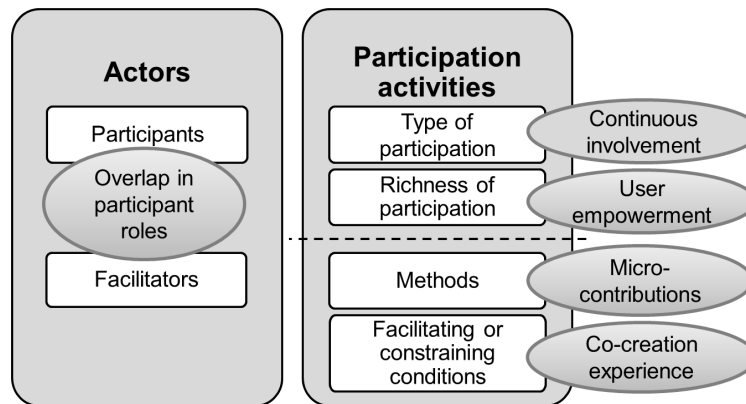
Figure 8: The Possibilities of Social Media in User Participation

Actors – Overlap in Participant Roles

In social media, users not only consume content but also become producers of it. In the same way, users are no longer pure informants, but assume the status of more equal co-designers and even co-researchers in a social media-enhanced participation process. In the Mobideas case, users partly took on some of the tasks of the UCD facilitators by evaluating each other's stories, interpreting other needs, and developing new ideas that addressed those needs. Users also decided which concepts to implement by voting on them. The main role of the facilitators was not to analyze users' needs and develop product concepts based on them (like in the traditional UCD process), but rather to coordinate the process and tasks, facilitate online communication, and collaborate with the users.

The participants found it challenging to suggest features and sketch user interfaces because they felt that performing these tasks well would have required them to have greater technical knowledge. Although the users were expected to participate in these tasks as representatives of end-users without any technical expertise, as was also the case in the other tasks, some of the users thought that they should have been able to think about the software in terms of the big picture and also consider technical restrictions and understand other users' needs. In this sense, they partly assumed the role of designers in the project and thus felt responsible for the implementation.

In the context of consumer products, facilitators as individuals also belong to the potential user group. Therefore, the traditional challenge of power imbalances and conflicting roles (Gulliksen et al., 1999) in participatory design remains a relevant issue, as the facilitators may have their own preferences for the solution. That said, the nature of social media encourages co-creation in which users and facilitators work together toward a common goal.

In spite of the overlapping roles, it seems that some tasks still need to be undertaken by professionals. Because users participate voluntarily, they are not motivated to do tasks that are too difficult or time consuming, such as gathering formal requirements. This was observed in the Mobideas case study; users were more eager to answer specific questions about their preferences than to suggest specific features in the form of user stories.

Type – Continuous Involvement

Social media tools enable consumers to be continuously involved in the design process regardless of the time and place. Users can especially be involved in the early phases of the design process and be active participants in idea generation. In addition, social media users can participate in decision-making on short notice on a daily basis, not only in organized events such as face-to-face workshops. User participation can therefore be well integrated into an agile development process in which user responses can be received quickly when needed. Even though the users participate in an online setting, they are aware of the others' presence, for example, during chat sessions and simultaneous commenting. Features like avatar pictures and user profiles give participation a personal touch and create a sense of a community.

In our case, the participating users already had ideas for new social media services based on their own needs. Perhaps this is why the idea generation phase was the most inspiring part of the project for many of the participants. The collaborative idea generation and, especially, the chat sessions were pleasant experiences in which users could learn from each other. Most likely, the participation experience would have been very different if a predetermined product idea had been presented to the users at the beginning of the project and they had only been involved in developing the idea further and testing the prototype. As the ideas and the prototypes were under continuous development, participation was rewarding and interesting for the users. In the development phase, the users were delighted to see that their ideas were really being turned into a functional prototype and that their feedback affected the end result.

For the facilitators and developers, an online presence also poses challenges, since they are expected to be able to respond to the users' input at short notice – sometimes during evenings and weekends. In the Mobideas case study, the boundaries between facilitators' work and leisure time became somewhat blurred. On the other hand, having online discussions with users did not necessarily feel like work for the facilitators who were part of the co-creation team. Additionally, the opportunity to participate continuously could be challenging for the users. Some participants dropped out of the Mobideas case study because they had been inactive for a long time (due to health issues or lack of time), and upon their return no longer felt willing to make contributions to a solution that the others had developed on their own. Continuous connection is needed to strengthen one's feeling of ownership of the solution. If occasional micro-contributions are welcome, they must be planned so that participation in earlier phases is not required and users feel encouraged to contribute whenever they can.

Richness – User Empowerment

In the traditional UCD process, the facilitators' interpretation of user needs is considered to be more trustworthy than the users' own. Even if there is willingness to engage in participatory decision making, it may be impossible in practice to involve all of the possible users in the decision-making process. Our results show that social media tools enable users to be actively involved even in a long-term development process. Since co-creation is a basic element of social media, users were viewed as authentic team members rather than subjects. Users made the decisions on their own instead of relying on specialists and their analyses. The typical features in social media allow simple ways of empowering the users. In our case study, tools like idea rating and feature prioritization provided quick aids for decision-making, even on short notice. Every user had an equal vote, which could be considered a democratic mechanism supporting the empowerment of the users.

In traditional IS development, there is an expected tradeoff between the number of participants and the type and richness of their participation (Markus and Mao, 2004). Only some participants could represent the end-users in the development team (e.g., Damoradan, 1996) and participate in design workshops and testing, whereas less intensive input could be collected from wider user groups, such as via surveys. Our results suggest that the richness of the contributions and the number of participants are no longer contradictory. Through the use of social media, a wider group of users can easily participate in decision-making and provide rich qualitative input throughout the design process.

It is important to note that the tools as such do not ensure a democratic process, and social media also introduce new factors that can limit the equality of the users. As in all online communication, good writing skills can affect how much each user participates and whether his or her opinion is understood correctly. Because participation is voluntary, not all users have an equal amount of time to participate. In social media, there are no restrictions on the amount of participation, and active users can gain more power than others simply by commenting more. Open sharing of ideas among people who do not know each other also requires a certain readiness to communicate with strangers. As the participants in the Mobideas case study were chosen based on their previous experience with social media, they seemed to find it natural to share their ideas openly and comment on other users' posts. However, some users found it difficult to express themselves in the fast-moving chat discussions.

Methods – Micro-Contributions

Social media content typically consists of small contributions like status updates, comments, and "liking." Most users do not produce a large amount of content alone; instead, content is produced as the result of participation by many people. The end result is accumulated over time, and the process of content creation is chaotic and unpredictable. In the same way, when using social media tools for user participation, the final result is the sum of individual contributions. The users build on others' input by supporting and completing it.

The users of social media tend to be multitaskers who update their social networks or status messages during small breaks. Enabling users to participate at their convenience makes it possible to involve busy users who would not take the time to attend face-to-face meetings. In our case, some users participated in the project and even in the chat sessions while at work if their own tasks did not require full concentration.

The context of participation must be taken into account when planning the tasks to which users are supposed to contribute. Single tasks should not require too much effort and familiarization with the subject, but rather be considered as separate micro-tasks. The activity level of each individual varies during the project. Users can participate richly when they have time, and be hang-around members when more intensive commitment is not possible. The participation process should not be too controlled so that users may participate voluntarily in their leisure time (e.g., at home, during breaks at work, or on the bus). Facilitators need to ensure that participation does not start to feel like work with tight schedules and compulsory tasks. Different people prefer different kinds of tasks, so they should have the freedom to choose a way of contributing that appeals to them.

Furthermore, the technical capabilities of users and their devices must be taken into account; social media services can normally be used regardless of the devices, browsers, or installed software. All of the tasks in the participation process and demo testing must be simple enough that the technical requirements do not hinder participation.

Conditions – Co-Creation Experience

Social media services are mostly used voluntarily and, most importantly, during leisure time. The aspects of fun and enjoyment are therefore essential motivators for participation even when social media tools are used for more professional aims, as in this case study. According to Antikainen and Väätäjä (2010), innovating itself must be fun; this idea was also stated by the Mobideas participants. Most of the users reported that the best aspect of the project was the sense that they were participating in the co-ideation and co-creation of a new service that they could use themselves. The users were excited by the ideas, tasks, and opportunities to communicate with the other users and the developers, and felt involved in the process. Some of the users even reported that they became slightly addicted to following the ideas and discussions in the online workspace.

However, not all users enjoyed the same tasks, and reasons for participating in the project also varied. Something exciting for one user might be too difficult for another. In addition, some tasks seemed to be important to several users, impacting their motivation and sense of collaboration even though these tasks did not provide very valuable data for the development process. Therefore, different types of opportunities must be offered, and the tools must be so easy to use that participation is attractive to all users who want to make contributions.

Contrary to what Obendorf et al. (2009) reported regarding the less immediate value of online discussion forums, Mobideas users eagerly participated online. The difference is that in the Mobideas case study, the pace of development was fast and users could see the impact of their comments in a couple of weeks or even sooner. The contributions expected from the users were also small enough to make participation feel fun and not like work. Users participated most actively in tasks that did not require much time and familiarization. Idea generation, commenting, and chat sessions were the most appealing tasks according to most of the users. In those phases, users did not just ask questions or vote for the suggestions made by other users, but actively collaborated with each other.

LIMITATIONS AND FUTURE RESEARCH

In our study, we did not develop a real software product with clear business goals but rather a lightweight prototype of a potential online service. Therefore, the success of the final system cannot as yet be evaluated, and is also out of the scope of our study. We focused on examining participation activities and how they changed in social media-based participation.

Further research will be needed to determine whether social media-based methods result in higher-quality products that lead to greater customer satisfaction. In addition to enabling more extensive participation by a wider audience, social media also provide users with greater opportunities to participate in idea generation. This can potentially affect the quality and user acceptance of the final product.

Social media services of the kind developed in the case study often offer a single solution to a specific need. Thus, a limited number of features and functionalities help users gain a general view of the software and facilitate participation. Experiments with more complex information systems will be needed to evaluate how scalable the method is in an enterprise context. There may be a need for more sophisticated participation tools that are linked to the existing project management tools. Further research is also needed in cases where an online service has already been launched and is developed further during use.

The users in our case study participated in the process voluntarily and not as part of their work. In the leisure-time context, lightweight social media tools seem to be an appropriate way of communicating. The same design approach would not necessarily be considered professional enough when developing systems in a work context, for example. As social media tools become increasingly common in enterprise use, informal tools could probably also be applied in these contexts to round out more systematic user participation methods. All employees could be involved to some extent via social media, although there would be a core team of user representatives who participate more actively in system development. In this case, more attention must be paid to the decision-making mechanisms and user selection in different participation channels.

The success of the participation method also depends on the participants and their activeness. The participants in our case study were active social media users who found it natural to use social media tools in the design process. Whether or not the method would work as well with users who have no prior experience of social media is a valid question. Some people have prejudices against social media and have concerns about issues such as privacy protection. However, the strength of social media tools is that they are simple to use and require little or no training.

The vast growth in the use of social community services among ordinary people suggests that social media tools offer great potential for involving lay people in design processes. The kinds of tasks and participation tools that different user groups find motivating and engaging should be studied further. The division of power and the influence of heavy users should likewise be examined further.

CONCLUSIONS

In this paper, we presented a social media-based method for active user involvement in a software design process and its impact on user participation. In our case study, a group of active users participated in the design process over six months. All communication with the users occurred in an online workspace that was tailored to the needs of the case study.

The online workspace proved to be an effective and pleasant way to involve users in a new software development process. Users liked the social experience of idea generation as well as the ability to share their own wishes and possibly influence future products. A six-month development process was not considered too long or burdensome, as the users could make small contributions whenever they had the time to do so. As the users were used to communicating via social media, face-to-face meetings were not seen as necessary. On the contrary, users appreciated the ability to participate over the Internet whenever they had the time, wherever they were.

Based on the insights gleaned in the case study, we recognized that the social media-based working method shaped several elements of user participation. The social media design approach enabled an active role for users as innovators, as well as active collaboration between users and developers. Users could be the drivers of the design, sources of ideas, and decision-makers throughout the design process, which also changed the role of researchers and designers. Instead of studying users, researchers helped them to analyze their own needs. Users could share their needs, problems, and ideas with other users. Continuous collaboration enabled users to become co-designers creating solutions not only for their own needs, but also for those of their peers.

Social media-based user participation enables richer participation by a larger number of users than face-to-face settings. The individual contributions in social media tend to be small and occasional, but it is easy for developers to reach at least some of the users almost anytime when they need ideas or feedback from the users. The participation process must enable various types of contribution based on users' personal interests and available resources. Participation in the co-creation process should be a pleasant experience, like the other social media services that people use voluntarily in their leisure time.

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