

**The NordiCHI 2008 Workshops**

**New Approaches to  
Requirements Elicitation**

**&**

**How Can HCI Improve Social  
Media Development?**

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## Foreword

We are witnessing rapid changes in use of World Wide Web technologies and ICT systems. New applications such as social-media sites, video sharing sites, referencing and recommendation services, and wikis appeared and affected the way people produce, consume and share information and media content. The context of use of these applications, as well as users' preferences and competences are a moving target. Furthermore, these applications serve not only individual users, but also offline and online communities.

These trends pose new demands on the various aspects of the software development process. To explore these, two workshops were organised at the NordiCHI 2008 conference:

- New approaches to requirement elicitation
- How can HCI improve social media development?

The workshops were held at the University of Lund in October 2008. In selecting the papers presented here the programme committees were particularly interested in papers focusing on the following issues:

- Potentials and limitations of traditional context and user-requirements analysis
- New methods and tools for user, context and social requirement analysis and experiences with them
- Social media design
- User-centred evaluation of social media applications.
- Future directions for advancing the state-of-the-art and state-of-the-practice in the areas of requirement elicitation and social media development

### Workshop papers

This volume contains the 12 papers from the two workshops. The first section is related to the workshop on user requirements elicitation; the second one to the workshop on social media and HCI. The papers and the review process are described in more detail in the introductions to each of the two sections. The copyright for the papers published in this volume is held by the individual authors.

### Workshop discussion summaries

Following presentation of all papers, the workshop included a session on future research challenges. The participants were divided in three groups; one group discussed research challenges related to user requirement elicitation, and two groups discussed research challenges related to HCI and social media. A summary of these discussions is given bellow.

## Research challenges in user requirements elicitation

The group identified four major challenges and discussed some ways of addressing them.

- **Keep the participants involved.** Active user involvement is a prerequisite of a successful requirement elicitation. This, however, is not easy to achieve in practice. We ask users to devote their spare time to our research. We should make it simple and efficient for them to participate in our studies. Users should be motivated to contribute by their opinions and suggestions. In the same time it should be clear for the users how they benefit from their participation. We believe that conducting research by using participants' community tools, instead of introducing separate tools would make it easier for users to participate. New online tools for collecting requirements should be interesting and rewarding to use. Furthermore, we should clearly communicate objective and duration of our studies and have a well defined and tested study material. Recruiting of the people that know each other might be a good way of getting in touch with motivated users. One should, however, be aware of the potential biases of such studies. It is important to clearly communicate to the users how they benefit from their participation. Presenting the study results immediately after the study is something that we usually promise to the participants. Nevertheless, it is not always easy to keep this promise due to the complicated analysis process. Rewarding of the participants was also discussed. Based on our experience we suggest (i) continuously rewarding the participants during the long-term studies, (ii) giving rewards that are aimed toward participants' interests, and (iii) considering different prizes such as contributions to humanitarian organisations.
- **Involve average and instrumental users (non-users).** In order to better understand users' needs we need to direct our research to different groups of users. We need better profiling of users to determine who the users are and to identify differences between different groups. In doing this we suggest use of online and offline methods together.
- **Use of reach media.** Whereas we as researchers think that use of rich media would help us in collecting user requirements, the users do not necessarily share our opinion. This might be due to the pure usability of current Web 2.0 applications. It might be also due to the privacy issues. About a third of participants don't want to share content online. Use of private (personal) blogs, providing anonymity and keeping identity private, as well as creating of fictive personas ('friend of mine has a problem with') were suggested as remedies.
- **Provide more empirical evidence on different methods.** A plethora of methods and tools for requirement elicitation is available and new methods and tools are under development. However, there is a lack of empirical evidence on advantages and disadvantages of different methods and tools. Which method should we use for which purpose? How a method actually works? Which procedure should we follow in different cases? Answering these questions would not only advance research in the field of requirement engineering, but also allow transfer of the research results to practice.

## Research challenges related to HCI and social media

The following challenges were identified as the most important by the two groups discussing HCI and social media:

- **Innovation and development of social media services.** Social media implies several innovation and development challenges. One challenge is to keep the research aligned with the fast changing state-of-the-art. A second challenge is related to user involvement:

How to involve the users in ways that are perceived by the participants as engaging and meaningful? A third challenge is related to the many areas in which social media development is conducted: In social media development, the development process includes the establishment of a community and content development and management, in addition to the development of new software solutions. This seems to require an improved dialogue between software developers, designers, and content managers, and the community members. Possibly, special purposes social media services may be developed to support this dialogue between designers, developers, managers, and users.

- **The integration of social media and real life context.** New social media applications and technologies enable a closer integration of social media and the users' every-day life in physical space, e.g. through the use of tag- and sensor-information and "life logging". Research is needed in order to exploit the opportunities associated with this integration. Also, this integration accentuates existing social media challenges related to democracy, digital divides, privacy and security.
- **Social media across individual platforms and services.** How can different platforms and services for social media provide a unified user experience for the user participating through social media? In particular, important research challenges are related to how social media services should be designed to be usable also on mobile/handheld devices.
- **User loyalty to social media services.** User loyalty is important for social media success. However, today we do not have sufficient knowledge in regard to how loyalty is generated and kept. Research questions include: What determines user loyalty to social media services? How to develop and maintain user loyalty?
- **Social media for professional users.** The most well known social media services are consumer market solutions. However, social media may have potential also in contexts of professional use, for example as innovation support, or to improve communication within or between industrial or government organisations. Research is needed to explore new professional social media applications, and to evaluate and improve existing services. Also, the use of social media for professional purposes implies challenges e.g. related to confidentiality and intellectual property rights.
- **Social media in socio-technical research.** Social media services and users may be seen as part of complex and dynamic socio-technical systems. It would be interesting to see research exploring how existing socio-technical models can be used to represent the complexity of these systems, and also whether a socio-technical approach can prove beneficial in the development of future social media applications.

We hope the groups' thoughts on future research challenges, together with the papers presented in these proceedings, may serve to stimulate and direct future work on the requirements elicitation and the human-computer interaction of social media.

**Acknowledgements.** The work on organizing these workshops and preparing the proceedings was supported by the research projects CITIZEN MEDIA ([www.ist-citizenmedia.org](http://www.ist-citizenmedia.org), EU FP6) and RECORD ([www.recordproject.org](http://www.recordproject.org), RC of Norway VERDIKT program). The organising committees are deeply indebted to the reviewers for their helpful cooperation throughout the reviewing process, to the authors for their work on the preparation of the papers, to the workshop participants for fruitful discussions and to Jeroen Vanattenhoven, Petter Bae Brandtzæg and Jari Multisilta for summarising workshop discussions.



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## **NordiCHI'08 Workshop**

# **New Approaches to Requirements Elicitation**

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## Introduction

### 1 Workshop theme

The theme of this workshop is eliciting user requirements. Requirements elicitation is a crucial in any software development process. Understanding context of use and its associated user requirements is a key success factor in ICT systems development [3, 8]. Existing methods are however challenged by new application areas and fast changes in users' preferences. A range of well-known methods and techniques are supporting context analysis and user requirements specification, such as interviews and contextual enquiries, user workshops, field studies, personas and scenarios.

Existing methods are however severely challenged by three important trends:

1. New technology and application areas, such as new user-centric media, social networking applications and user generated content where end-users become a "major media producer and distributor" [4], make it difficult to apply traditional methods for context analysis. The context of use for these applications is fast changing, unpredictable, and highly dependent on the mass of users that may start using an application under development.
2. Users' preferences and competencies are a moving target. One of the best examples of this may be the broad-scale adaptation of online community services such as Facebook, Lunarstorm (Sweden) and Netby (Norway). Within the period of the last couple of years, user requirements to online social applications was fully changed due to widespread experiences with new application opportunities.
3. Many ICT solutions do no longer serve individual users, but cater to the needs and requirements of online and offline socialities. Developing new media services implies building communities and encouraging social interactions and co-creation of content [9]. We therefore need to go beyond user requirements and also include social requirements [2].

In response to these trends we see the emergence of new approaches for requirements analysis on the levels of the user, the context and the social interactions. Research has been conducted on the use of new tools and techniques such as on-line experience sampling [1], social media tools [5], and on-line tools for identification of end-users patterns of media use. Also, new environments for technology innovation such as Living Labs [6, 7] represent a promising new approach to user, context and social requirements analysis.

## 2 Submission and review process

The authors contributing to this workshop section were encouraged to focus on one or more of the following core issues:

- Examining potentials and limitations of traditional context and user-requirements analysis methodology
- Presenting new methods and tools for user, context and social requirement analysis and report experience with them
- Discussing future directions for advancing the state-of-the-art and state-of-the-practice in this area

All papers were blinded and reviewed independently by two reviewers from the program committee. The reviewers were:

- Asbjørn Følstad, SINTEF ICT, Norway
- An Jacobs, SMIT, Belgium
- Christof van Nimwegen, CUO, K.O., Leuven
- David Geerts, COU, K.O. Leuven, Belgium
- Erik. G. Nilsson, SINTEF ICT, Norway
- Karin Slegers, COU, K.O., Leuven
- Petter B. Brandtzæg, SINTEF ICT, Norway
- Weimin Ma, The University of Texas at Dallas, USA
- Wendy Van den Broeck, SMIT, Belgium

## 3 The papers of this workshop section

The seven papers presented in this workshop section cover different aspects of user requirements elicitation. The first three papers target development of Web 2.0 applications. Bram Lievens and his colleagues from IBBT-SMIT, present a multi-method approach for identifying social requirements and their experience with it. Jeroen Vanattenhoven from Katholieke Universiteit Leuven presents his experience with use of research blog in eliciting user requirements. Jan Heim and his colleagues from SINTEF ICT describe a norm based toolset for capturing user requirements and feedback.

In the fourth paper, Deepak Sahni and colleagues from Hasselt University, IBBT propose a framework that facilitates selection of appropriate tools for different development activities. The fifth paper, by Jan Derboven and Alex Uyttendaele from Katholieke Universiteit Leuven, describes a method for gathering requirements based on a combination of card sorting and personas.

Last two papers focus on motivation and emotions of users. Nachiket Apte and Frank Hülsken from Franhoufer present their investigation of motivation to share and produce video. Sarah Thew and Alistair Sutcliffe from Manchester Business School present their investigation of users' values and emotions.

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# Proxy technology assessment as a multi-method approach for identifying social requirements of co-creative media

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**Abstract.** The traditional user-oriented approach in technology design focuses on the individual user and context requirements, often only resulting in usability recommendations. However, this approach does not fully capture the social dimension, and therefore overlooks the social aspects that could have a strong impact on the use and adoption of the application under development. Hence we introduce the concept of ‘social requirements’ in the development process. In order to be able to get feedback from the users in an early phase of the development process and simultaneously study the social dimension, we apply the proxy technology assessment (PTA) in a living lab environment. This approach equips test users with proxy technologies (that resemble the technologies under development) in their natural environment. In this paper we illustrate the use of this method to detect social requirements for an online community platform.

**Keywords:** Social requirements, proxy technology assessment, living lab, participative design

## 1 Introduction

In the search for product development recommendations the attention usually focuses on user and context requirements. Traditional usability research often only investigates those requirements in a lab environment and on an individual level. However, for many products on the developing table the social aspects -the intra and inter group aspects- of interaction are also of importance, especially for the so-called community applications. Since research focused on the user and context requirements sometimes omits to investigate those social aspects explicitly, we introduce in the participative designing process the complementary notion of social requirements. These can be defined as *‘the requirements that are extracted from the social background and everyday life of people, with an emphasis on groups or communities and the social practices within’* [9, p. 5]. In short, social requirements reflect the social relationships and how they influence the use of the application [3]. In order to be able to identify these requirements it is necessary that users can experience the technology under development in their everyday life usage during a certain period. For this we deploy the proxy technology assessment in a living lab environment.

The empirical part of the paper is based on our study as part of the CITIZEN MEDIA project, a European research project within Sixth Framework Program. This project researches both user-generated content and user-generated applications for average users (producing, distributing and sharing), and investigates possible ties with social change.

## 2 Method

In order to experiment with technology that does not yet exist and at the same time capture the social requirements for community applications, we combine two different techniques: proxy technology assessment and a living lab set up. This permits us to gain insight in the interaction between user and technology, as well as in the social structures within the community, and the association between both. It enables us to go beyond the traditional user or technical requirements and reach for the social requirements instead.

### 2.1 Proxy technology assessment (PTA)

The goal of the PTA technique is to stimulate reflection upon the possible everyday usage of technologies that are still in the development process. This is being enabled through the use of so-called proxy of probing technologies in the natural environment. Proxy technologies can be defined as '*existing technologies that resemble as much as possible the functionalities under development*' [7, p.2]. This approach stimulates the user's experience and practices, while at the same time making it easier to rationalize about them.

The use of the proxy devices, however, is not a one-way-process in which the user simply adapts the technology to his life. Starting from the notion of mutual shaping, the user as well as his surroundings changes at the same time. Through the use of proxy technologies, it is therefore possible to detect the practices, conflicts and meanings within the community [6]. In other words, PTA enables the researcher to get a grip on the social structures. This is an essential step in the process of participative design, since it aims at considering the end user as full participants in activities leading to both computer products and computer-based activities [4].

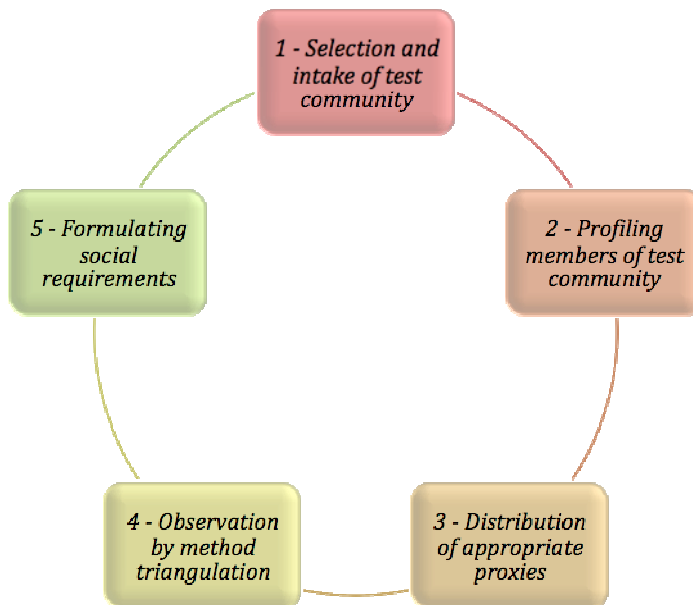
### 2.2 Living lab approach

As PTA is a method for initiating everyday life practices with future technologies and applications, it confronts the user groups in their home surroundings with resembling tools, making it a living lab approach. The concept of living lab refers to a people-centred test- and experiment platform, meaning that (large groups of) users in their natural environment are the central focus point. This setting enables the researcher to closely observe and monitor changes in user behaviour related to social structures and motivations. In other words, since the research activities are not performed in a traditional lab, but instead in the home and everyday world of the test users, it is possible to capture characteristics like human dynamics, tacit rules and social set up of the group. Users and communities become co-creators in the innovation process.

### 3 PTA research set up

The objective of our research is to detect social requirements for an online community application that could facilitate or even enhance the social interaction in an offline community. To ensure the iterative character, this study is conducted in two successive phases, each focusing on a different offline community. This approach permits us to process the remarks of the first community in the set up of the second community. The two participating communities are a neighbourhood committee (ca. 80 families) in the small sized Belgian town of Hasselt (70,000 inhabitants), and a gay community (ca. 50 members) based in the Belgian capital of Brussels.

In order to do a PTA, following steps are taken in the research project:



**Fig. 1.** Different steps we applied within the proxy technology assessment

#### 3.1 Selection and intake of test community

One of the most important steps in community research is - literally - choosing the appropriate community in order to assure relevant results that give an answer to the main research question. Before starting the recruitment process, we therefore need to carefully specify the necessary criteria for the test community, based on the associated research literature. This means that the selection of the community needs to be cautiously prepared and executed in a scientific grounded way, using different methods or techniques like purposeful sampling, theoretical variation, etc.

As our research required lively, active communities, the first criterion was that the community organized sufficient group activities on a regular basis during the research period.



Second, since we were working on a new online community application, the test communities should have (at least some basic) experience with online applications. Therefore, already having a website of its own was the second criterion. Thirdly, in order to observe and compare the influence of the new application (in combination with the use of proxy technologies) on the social group structures, we needed a group that was not restricted to weak ties<sup>1</sup>. Finally, as the CITIZEN MEDIA study investigates possible linkages with social changes, both communities had to have a social dimension and awareness.

Both the selected communities met the different criteria. They had both a high activity level and owned a (basic) website. Next to that, within each group the respondents had strong and weak ties. And finally there was a high level of social awareness.

For the recruitment various possible communities need to be contacted at the same time (we contacted twenty groups at once when looking for the second community) and we continued the parallel selection process until the researchers and one group confirmed their cooperation in the project.

Once the appropriate community is recruited the intake is done, which can be seen as a kind of kick-off for the community. The objective of this activity is not only to introduce the project to the community, but also to get acquainted with the different participants and to introduce and distribute the different proxies. During this moment we also have a quick participative brainstorm session with the participants on how they would like apply the proxy technologies, also stating the objective. Finally the intake moment also offers the opportunity for respondents to ask questions and express uncertainties.

From our experience of involving communities as a research panel for experimentation, we noticed that it is important that the decision to participate in the project is supported by all participating members of the community, and not solely by the leader(s). Before the intake, the leader(s) should therefore ask the opinion and seek the approval of the members. After all, during the project the whole community will be asked to participate, generate and distribute content, give feedback, fill in questionnaires and attend to focus group meetings. Without the support of a strong basis, this is highly improbable. Apart from assuring the support of the community members, the intake is also important in order to get to know each other, create trust and to set the scene for the upcoming research activities.

### **3.2 Profiling members of test community**

After the selection and intake of the test communities, a profile is made of the participating members. This kind of profiling can be done by means of a questionnaire. The objective is to get a detailed overview of various general aspects, as well as on specific characteristics of the community. The general questions address the socio-demographic situation of the participant, his/her social environment and the use and possession of (new) media [1]. In addition different project-specific questions will be included. In the case of the CITIZEN MEDIA project we embedded a section to detect their community profile (ties strength, relation to the community...).

Within CITIZEN MEDIA the profiling questionnaire was offered at the end of a kick-off meeting. For participating members who are unable to attend to the kick off meeting, or who

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<sup>1</sup> ‘Weak ties’ are characterized by loose relationships that might provide a link between distinctive social groupings. ‘Strong ties’ on the other hand refer to strong connections, which are usually thought to be a characteristic of kinship relations and traditional communities (Granovetter [2] cited by Dreesen and Pierson [1]).

only decided to join later on, the questionnaire was made available on the new community website or by e-mail. On simple request, a paper copy was sent. The standard sections of the profiling questionnaire were supplemented with a specific community section. In the latter section the members of the neighborhood committee were asked about their social contact with the neighbors and their living environment. The members of the gay community were asked about how and to what extent their homosexuality is integrated in their everyday life.

However, it should be noted that the profiling process does not stop after this questionnaire. Instead, it continues and deepens through the observations and experiences during the whole research period, continuously extending the basic information gathered by the questionnaire.

### 3.3 Distribution of the proxy technologies

The next step in the PTA approach is to distribute the proxy technologies (or in short ‘proxies’) among the community members.

In the CITIZEN MEDIA research, the central proxy is a free dedicated online community platform. We chose for setting up a Ning online community website, since this Web2.0 tool is specifically aimed at the creation of dedicated easy-to-use community platforms for own purposes [5]. In order to support the use of this central proxy, we equipped our respondents with supportive technologies. The main reason for doing this is to remove as much as possible any potential technological barrier for participation and co-creation. For the selection of the supporting proxies, we ask the community members during a focus group session at the beginning of the project what user-generated content their social network site would ideally contain. After listing their suggestions and plans we identify the technologies that are required to achieve this. If these technologies are not yet available among the participants, we provide them. For example, if a community member wants to film something in order to share it on the Ning website, but does not possess a video camera, (s) he is given one and receives the necessary information about how to use the basic functions.

We distributed digital video cameras, digital photo cameras, editing software and high-end smartphones in both of the communities. The community members are able to use these proxies at home for three months, at their own chosen frequency and intensity. During and after this testing period, they are required to give feedback in order to ensure the participative design process.

### 3.4 Observation with data triangulation

When designing new social media applications, attention should be given to the social aspects on different levels. The objective is to thoroughly grasp the social interaction and structure of the community on the one hand and the interaction between the group and the proxy technologies on the other hand, in order to identify the social requirements for the product under development. From literature however, it becomes clear that the best way to discover this, is to *‘triangulate different data sources, to get a better understanding of the position of our subject. Conventional ethnographic research methods may be extended using novel techniques’* [8]. Within the living lab surroundings, the proxy technologies can be used in a multi-method research set up.

In the CITIZEN MEDIA research we combined PTA with various other interpretative methods. We kept a website logbook in which we noted the actions on the website on a daily base and combined it with the data from web analytics, while at the same time engaging in

specific moments of participative observation. By participating in selected offline community activities, we were able to study the informal communication patterns and non-verbal interaction.

We combined various other research methods as profiling questionnaires, five focus group discussions and ten in-depth interviews. Besides, we asked interviewees to draw a 'social circle' of the community as to visualize the strong and weak ties among the members. By integrating these various data, the information collected via metrics and participative observation could be checked and investigated more thoroughly.

### **3.5 Formulating social requirements**

The use of PTA in a multi-method research set-up provides an abundance of data, which has to be translated into usable guidelines for designers. This is where the researcher forms the connecting link between the everyday experiences and requirements of the test community, and the technical questions of the designers. As mentioned before, a social requirement is a requirement that reflects the social relationships and how these influence the use of the application [3]. Ideally it should inductively originate from the data and being validated by findings among the community members.

Within the CITIZEN MEDIA project, we detected various social requirements. However, they remain at a quite abstract level. The translation of the social dynamics into usable guidelines for development still proves to be a challenge. Merely briefing the developers about the suggestions and questions of the community, is not sufficient. The gathering of researchers and developers to discuss the social requirements and the possible technological answers to them is a much more efficient and satisfying way to proceed.

To illustrate this, two examples from the project are given. First, the display of the social heritage proved very important to the community members. This social requirement could be used in the future design of the co-creative network site by developing a special place where old content is collected, possible by use of a timeline. Second, besides the online content sharing, there was a need for sharing audio-visual material offline as well. This means that any online multimedia application would benefit from the affordance of exporting to different file formats, so that it would be easy, for example, to write content on a DVD [9, p. 7]

## **4 Conclusion**

When designing new social media applications for an offline community, the social dynamics are often not being investigated, although they are of great importance. Since the more traditional HCI research methods focus on user and context requirements, they have difficulties mapping the social requirements. For this we applied the proxy technology assessment (PTA) in a living lab environment. The combination of both methods offers the opportunity of mapping the real life context of users with their everyday practices, as well as studying their interaction with proxies that embody the same functionalities as the future devices. This enables to identify user, context and social requirements. In this paper we suggested a practical research set up, consisting of five phases: the selection and intake of the test community, the profiling of the members, the distribution of appropriate proxies, the observation with data triangulation and the formulating of the social requirements. The added value of applying PTA in a living lab research process is that it enables participative design

within a real life context. By doing so it is a very appropriate method to elicit social requirements.

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# Research Blog: Eliciting User Needs and Experiences

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**Abstract.** In this paper we evaluate the use of a research blog to elicit user needs and experiences by looking into four aspects: the social interaction between participants on the blog, the kind of content that was contributed (text, video, pictures), the contributions regarding quiz experiences, and the number of withdrawals. The main results are that contributions are mainly made in textual form, but pictures and videos are hardly used at all, and that more research is needed to investigate the high number of withdrawals during an online study, especially with participants with less ICT experience.

**Keywords:** online research, research blog, non-professional users, user analysis, requirements gathering, Web 2.0

## 1 Introduction

User analysis remains an important topic in HCI because insight into user needs and experiences is essential to develop successful applications. The work in this paper was carried out in the CITIZEN MEDIA research project which investigates sharing and co-creation of user-generated content (UGC) by non-professional users in the new media landscape [3]. In this new media landscape the role of the user has evolved from passive consumer of media content to active producer which is possible because of the widespread availability of technological devices and Web 2.0 application.

Besides users, researchers also benefit from having many Web 2.0 applications at their disposal since these applications offer new opportunities as research tools [4]. The use of Web 2.0 allows researchers and participants to use pictures and videos on the blog. Using pictures and videos can help researchers to get a better feel of the user's world and also help the user eliciting and remembering past experiences [1]. Also, we believe that when participants comment on each others contributions and engage in discussion, the results will be more accurate and richer than e.g. using the diary method which involves gathering individual accounts.

Heim and Brandtzæg [2] analyzed statistical data from Eurostat in Austria, Germany and Norway to identify patterns of media usage among European citizens (non-professional users). Five user groups resulted from that study: non-, average, instrumental, entertainment, and advanced users. Their study was also carried out in the CITIZEN MEDIA project. We aimed to provide a complementary view on these media patterns by means of qualitative studies. In this paper average and instrumental users were recruited from a large, senior

community (<http://www.seniorennet.be>), and entertainment users were recruited from a smaller, younger community that revolved around a blog (<http://www.pietel.be>). Average users do not use ICT on a regular basis and have quite low computer skills. Instrumental users mainly use ICT for utility (e-government) or for gathering information, have more ICT skills than average users, and have good ICT access and a higher education level. Entertainment users spend a lot of their time with ICT on entertainment such as games, score high on advanced usage, and PC and Internet use in general, are relatively young, have a high variation in education and income, and have good ICT access in general.

The main application for the method we describe in this paper, a research blog, is a blog on which participants contribute information regarding the topics of a study. The topics are communicated on the blog by the researchers, and they can engage in a dialogue with participants throughout the study.

We will look into four aspects of the research blog used in two pilot studies: social interaction (by looking at the number of comments participants made on posts), the kind of content participants used to contribute (text, pictures and video), insight into user experiences, and the number of withdrawals.

In this paper we first describe the method. Then we discuss two pilot studies. Finally, we formulate the main conclusions regarding the use of a research blog during these two pilot studies, and discuss future work.

## 2 Study I

The objective of the first study was to investigate the user needs of non-professional users in the new media landscape [3]. Two methods were used: the research blog and the diary method.

### 2.1 Method: Research blog

The first research blog study (n=19) involved participants from both the senior community (n=7) and the Pietel community (n=12).

For the research blog participants were first briefed via e-mail. We provided them with Google-accounts they could use to access all applications to prevent the participants to have to make all the effort in creating and setting up the accounts. This way they could just concentrate on contributing to the study. To stimulate participants to contribute, we also informed them the blog would remain private. To make the participants feel comfortable we introduced ourselves and asked that they would do the same. Our introduction to the participants included a picture of ourselves and a video illustrating one of the hobbies of one researcher. As indicated above, this was done with the objective of introducing ourselves to motivate the use of pictures and videos, since we wanted to receive rich accounts of the participants' experiences, and to reduce the possible personal distance between participants, and between participants and researchers. Then we inquired about user needs for Study I and quiz experiences for Study II by posting our main questions online and starting a dialogue about the participants' contributions.

The first research blog study was not limited in time since we did not know at the time which the optimal time frame was to conduct such a study. We did not want to stop too early and cut off participants still wanting to contribute, but also avoid to keep going and overburden them. In the end the duration of the study was nine weeks. Blogger was used as

the main application. Picasa for uploading photos, and YouTube and Google Video for uploading videos, were linked to Blogger via the user accounts.

## **2.2 Method: Diary**

The diary method was used in the first study in parallel with a research blog study. Participants (n=15) were recruited from both the senior and the Pietel community: nine women and six men with a median age of 32, ranging from 13 to 69.

Participants were contacted by phone to explain the purpose of the study, and to communicate the practicalities. A diary was prepared for each participant and contained the topics they should focus on during the diary study which lasted one week. The diary was sent to the participants, and afterwards received, via mail. Once the diaries were collected one researcher read the diaries and conducted a follow-up interview with the participants via telephone.

## **3 Study II**

The second study was conducted to gain insight into the quiz experiences of non-professional users; in this case the research blog and observation were methods used in parallel.

### **3.1 Method: Research blog**

Study II only involved participants from the senior community (n=15). The procedure was similar to that of Study I. The only difference were our research questions (gaining insight into quiz experiences), and the duration of the study. Since we noticed that participation declined significantly after four weeks for the first study, we limited our second study to four weeks (Figure 1).

### **3.2 Method: Observation**

An observation was carried out in addition to a research blog study. The objective of the second study was to gain insight into quiz experiences. Therefore, four researchers participated in a music quiz held in a local community hall during a whole evening. Researchers had to take notes during observation since recording video was not allowed. 34 teams of four people played the music quiz that evening; this includes the four researchers. Since we could not obtain all details regarding age and gender of the quizzers, we could only rely on our own estimates: the age range was broad (young, middle-aged and seniors), and as for gender we only counted a few female quizzers. Results were analyzed by all four researchers using Affinity Diagramming.

## 4 Results and discussion

### 4.1 Social interaction

One of the original goals of our setup [4] was to stimulate social interaction, because this could enhance the results of the study. Comments on posts and on other comments were made by entertainment users, but hardly among average and instrumental users (Figure 1). The comments consisted of discussions regarding the participants' contributions to the research questions and personal communication.

However, a clear difference is present for both contributions (posts) and social interaction (comments) between average and instrumental users, and entertainment users (Figure 1). The most plausible explanation regarding the difference in social interaction is the size of the communities: the Pietel community is quite small, and therefore members are more likely to have had contact with each other. Another explanation, for both social interaction and contributions, could be based on the different user profiles [2]. Average users just use a computer now and then, and have low ICT skills; instrumental users have somewhat higher ICT skills but mainly use technology for utility or information acquisition. Conversely, entertainment users use ICT for entertainment purposes such as joining social networks and playing online games and therefore might be more likely to engage in conversation online.

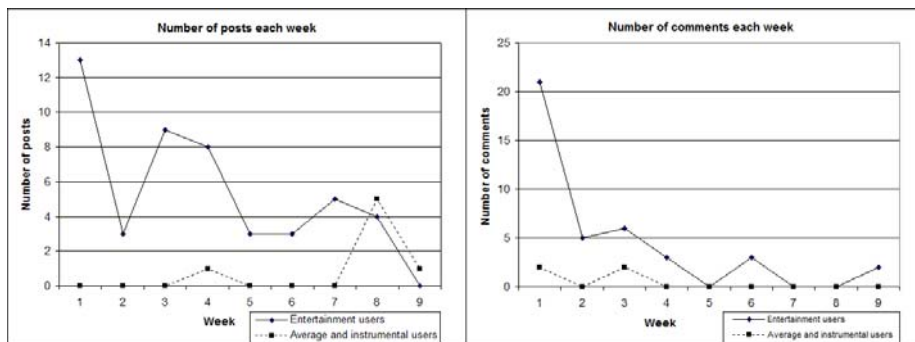


Fig. 2. The number of posts and comments per user profile on the first research blog per week.

### 4.2 Contributed content: text, pictures and videos

We encouraged participants to illustrate their contributions by using pictures and videos for both the research blog method as the diary method. However, not a lot of photos and videos were used. Two entertainment users illustrated their contribution with pictures. Two average and instrumental users uploaded a picture but not to augment their contributions; their uploaded pictures were “dummy” pictures and the result of following the photo upload tutorial which was provided to the participants. Videos were never posted. This leaves text as the main form of contributed content.

Despite the advances of Web 2.0 in providing possibilities to upload and share user-generated content in all forms, non-professional users do not make use of these possibilities. Especially participants with lower ICT skills and higher age (average and instrumental users from the senior community) have great difficulty in uploading pictures and videos.



### 4.3 Insight into user experiences

The objective of the second study, involving both the research blog and observation methods, was to gain insight into the participants' quiz experiences. For the research blog these experiences were described on the blog in the form of anecdotes and descriptions. For the researcher these anecdotes seemed very recognizable as they contained some humorous, real-life experiences as illustrated by following quotes from a senior woman who played quizzes while on vacation together with befriended couples (the translation is made by the author): "We spent a weekend in the Ardennes together with befriended couples, but one friend was feeling ill; this meant we couldn't do a lot of outdoor activities as planned and as we did in previous years, but this gave us all the more reason to play some games.", "On the second day three friends started playing Scrabble and it didn't take long before we were all standing around the board arguing about spelling and whether or not to allow a certain word.", "There were two teams consisting of two men and one team consisting of two women. Especially sports-related questions were not our cup of tea, which lead to great joy by the men when we didn't know who scored the winning goal in the final of the World Cup soccer in 1974".

### 4.4 Withdrawals from the studies

An important note has to be made about the number of withdrawals by participants. The two communities not only appear to differ in amount of social interaction during our study (Figure 1), but also in amount of withdrawals. The drop out rate for the first research blog study was 8.3% for entertainment users and 42.9% for average and instrumental users. For the second research blog study, involving only average and instrumental users, the drop out rate was 60%. For the diary method in the first study there were no withdrawals.

Some reasons why average and instrumental users dropped out can be found in the motivations five participants some communicated to us after withdrawing: the questions/assignments seemed too difficult, and some indicated that they would prefer answering a list of questions instead of writing a report or anecdotes.

## 5 Conclusion

Our main conclusion is that more research is needed to investigate how online research studies such as a research blog can be improved. We noted two important issues that have to be improved in future studies: the high withdrawal rate, especially among average and entertainment users, and the low usage of rich media such as video and pictures, in the contributions. Regarding the first issue feedback from participants suggest that using rich media on blogs is not that straightforward for people with lesser ICT skills. Future research could also look into the way the questions are asked; some participants argued a list of questions would suit them better. Additionally, other forms of incentives might motivate users better to keep contributing for the whole duration of the research. Where we used a more classic form of incentive, a voucher at the end of the study, more personalized, and continuous smaller incentives are ideas that can be explored in future research. This high withdrawal rate has an important impact on the reliability of the results and is therefore important to look into. Regarding the second issue we believe that picture and video possibilities are insufficiently tailored to the needs of non-professional users with lower ICT skills. Since pictures and videos offer a very rich account of user needs and experiences, future research should focus

on how to motivate participant to contribute this kind of content more, and to make these Web 2.0 application easier to use by participants with lower ICT skills.

**Acknowledgements.** Thanks to all partners involved in CITIZEN MEDIA research project (funded by FP6-2005-IST-41), to Greet Jans who helped me with the coordination of the first online study and carried out the diary study and to Alex Uyttendaele and Bieke Zaman who aided by reviewing this paper.

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# Capturing User Requirements and Feedback for Web 2.0 Applications using a Norm-Based Questionnaire Toolset

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**Abstract.** Objective of this research was to improve the design process of Web 2.0 applications by providing a norm-based questionnaire toolset for capturing user requirements and feedback. Web 2.0 applications are characterised by fast changes in users' preferences and competences. Existing methods for capturing user requirements and evaluation are not flexible enough to capture these changes. Therefore, we wanted to develop a cost-effective method for collecting data on users, their requirements, and their level of satisfaction. We formulated four sets of questions about (i) the computer literacy of individual users or group of users, (ii) community requirements, (iii) community usage, and (iv) community satisfaction, and conducted a study of five samples in Norway. The study had 5723 participants in total, taken from four online communities and one national representative study of Internet users. Using the results of this study as a norm base, we developed a questionnaire toolset that supports designers and developers.

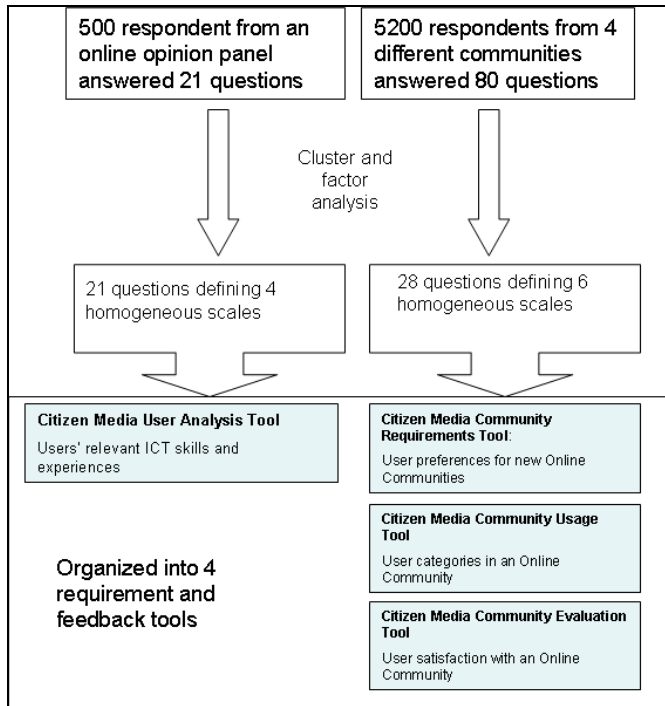
**Keywords:** Requirement elicitation, User-Centred Design, Web 2.0 Applications

## 1 Introduction

It is widely accepted that understanding users' requirements is a prerequisite of successful software development. Although figures differ, most researchers agree that the costs of attending to changes that are later made to the original requirements specification are much greater than the costs of fixing errors that arise later in the development process [1]. Web 2.0 applications, such as social-networking and community websites, video sharing sites, blogs, and wikis have been used by an increasing part of the population [2] and have a large impact on their work, education, and daily life. The diversity of users and the contexts in which they are going to use the applications, fast changes in their preferences and competences, and community dynamics pose new challenges for the development process.

User-centred design (UCD) methods have been suggested as a means for improving the usefulness and usability of software systems. These methods are based on the active end-to-end user involvement of users, and iterative design and evaluation. While it has been reported that developers consider UCD to be generally useful [3], it has also been reported that resource constraints are a major obstacles to its being used successfully. Some common characteristics of an ideal UCD process were not found to be used in practice; namely,

focusing on the total user experience, end-to-end user involvement in the development process, and tracking user satisfaction [3]).



**Fig. 3.** Development of the toolset. ICT means Information and Communication Technologies

Numerous techniques are available for eliciting user requirements and feedback [1, 4]. However, there is a danger of overwhelming users with questionnaires, interviews, and focus groups. It is, and increasingly will be, a key challenge for research on users to avoid overloading users with questionnaires. As questionnaire overload is reduced, we will need a technique for capturing data that is effective, easy, and interesting to use from the perspective of users. Further, the technique should have a clear role in the development process. Further, it should be easy for designers and developers to summarise the results in different ways. In addition, the technique should include an empirically determined baseline, which makes possible to compare a particular result with what people usually respond. In order to improve development of online communities' applications, we conducted a study investigating: (i) who the users are, (ii) what they expect from an online community, (iii) how they use it, and (iv) whether or not they are satisfied with their community. Using these results as a norm base, we developed four tools for collecting data on users that support designers and developers of Web 2.0 applications (Figure 1).

The work reported herein was carried out in the framework of a research project called CITIZEN MEDIA ([www.isticitizemedia.org](http://www.isticitizemedia.org)), which unites leading experts on creativity and technology from across Europe to enable multiple non-professional users to co-create networked applications and experiences based on their own user-generated content.

The remainder of this paper is organized as follows. Section 2 describes the requirements that we imposed on the tools. Section 3 describes the tools. Section 4 describes how the tools

were developed. Section 5 concludes by considering the possible impact of our research and avenues for further work.

## **2 Requirements for the tools**

We needed a flexible and cost-effective set of tools for collecting data on users, their requirements, and satisfaction. The requirements we imposed on the toolset are described below.

### **2.1 Simplicity/usability**

User-centred design methods rely heavily on user involvement. Users are expected to complete many questionnaires and take part in a large number of interviews, focus groups, etc. To avoid questionnaire overload it is important that the tools we use for data collection are simple, effective, easy, and interesting to use from the perspective of the respondents. From the perspective of the researchers, the tool should be easy to use, it should be effective at yielding results, and the results should be easy to analyse, to reduce stress in increasingly fast development cycles.

### **2.2 Clear role in the development process**

It is important to ensure that the collected data is of the best possible quality and to avoid overburdening the same groups of users with too many requests for information. The data that is collected should specifically meet demands that arise during development and not simply be “nice to have”. The tools should therefore have a clearly defined role in the development process. Human-centred design processes identify the following four development phases: (1) understanding and specifying the context of the system, (2) specifying the requirements of the organizations and users, (3) designing solutions, and (4) evaluating the solutions. We wanted a toolset that will support (i) the first phase by collecting data on the computer literacy of users or groups of users, (ii) the second phase by identifying community requirements and community usage, and (iii) the fourth phase by evaluating community satisfaction,

### **2.3 Aggregated results**

When many users are exposed to a variety of questions, it is important that the results can be summarized effectively so that the users of the results (system designers and system developers) can choose between a high-level or low-level view of the results. If this is to be achieved, mechanisms must be in place that can aggregate the data in meaningful ways.

### **2.4 Co-creation in online communities**

The focus of the CITIZEN MEDIA project is on building online communities that support the co-creation of multimedia content. It is therefore particularly important to capture

requirements for building online communities that support these aims. We formulated a set of questions that capture these requirements.

## 2.5 Norms

It has been argued that a lack of empirical research prevents the transfer of the results of requirements engineering to practice [5]. We wanted an empirically determined baseline against which to compare our results. Norm-based questionnaires make it possible to compare a particular result with typical responses and are widely used in psychology. However, they are rarely used within the field of Information and Communication Technologies (ICT), except for the tools for usability evaluation WAMMI and SUMI<sup>2</sup>. One reason for this may be the fact that within the ICT field, what people know, expect, and want varies substantially from one user group to another and from one year to another. Therefore, it is important to have mechanisms that ensure that the norm base can be updated dynamically.

## 3 CITIZEN MEDIA Questionnaire Toolset

The CITIZEN MEDIA questionnaire toolset consists of four online questionnaires. Each questionnaire consists of a small number of questions. Answering the questions takes a couple of minutes. To make the questionnaires interesting for the users, they received immediate feedback that includes a comparison of their answers with the norm base. The questionnaire toolset can be found at

<http://85.196.86.250:8080/DemoFrontEnd/>

### 3.1 CITIZEN MEDIA User Analysis Questionnaire

This questionnaire collects data on the computer literacy of a user or a user group. This is important early in the development process when one needs to know what skills and experiences the users have. For example, when designing for a specific user group, it is important to know such things as whether or not they can download videos, or are familiar with chat and e-mail? The data provided by this questionnaire also gives an estimate of the user group's similarity to typical online community members with respect to ICT usage. The users are characterized along four dimensions: Entertainment use, Work use, Instrumental use, and Communication use.

### 3.2 CITIZEN MEDIA Community Requirements Questionnaire

There are typically two main reasons for joining an online community: getting in contact with other people and gaining access to content of interest. This questionnaire charts the user's main requirements along these two dimensions (Figure 2).

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<sup>2</sup> <http://www.ucc.ie/hfrg/questionnaires/index.html>

Norsk   
  English   
  Deutsch   
  Nederlands

**What do you want from an online community?**  
 By answering the following questions you can compare your preferences with other.

Male      Female  
 Gender       

How old are you?  
 I am  years

To what extent do you use the Internet to get in touch with others? Yes    No

To me, the Internet is important to keep in touch with other people    

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When I use an online community, it is important that I am able to...

...to get in touch with people I do not already know	<input type="radio"/>	<input type="radio"/>
...to keep updated on happenings where I live	<input type="radio"/>	<input type="radio"/>
...to keep updated on national and global news	<input type="radio"/>	<input type="radio"/>
...to create and share experiences with others	<input type="radio"/>	<input type="radio"/>

---

When I use an online community, it is nice if I am able to

...to be listened to and to participate politically	<input type="radio"/>	<input type="radio"/>
...to find a girlfriend/boyfriend	<input type="radio"/>	<input type="radio"/>
...to share my secrets/problems with others	<input type="radio"/>	<input type="radio"/>

**Fig. 2.** CITIZEN MEDIA Community Requirements Questionnaire

### 3.3 CITIZEN MEDIA Community Usage Questionnaire

When users participate in an online community, there are many things they can do. This questionnaire asks users about their typical behaviour in an online community, and classifies the user according to user type and usage dimensions (Social orientation, Factual orientation, Pastime.) This is useful for community designers that want to adjust the functionality of the system to support what the users actually do in the community.

### 3.4 CITIZEN MEDIA Community Evaluation Questionnaire

It is important for community owners to know how satisfied the users are with the community in which they are participating. This questionnaire measures users' satisfaction with their community. The factors that are covered are satisfaction with usability, user experience, degree to which the content is interesting, degree to which the people are interesting, and user involvement.

## 4 Development of the questionnaire toolset

The questionnaires in the toolset were based on our study of online communities in Norway [6], which will be referred to as the baseline study. In the development of the questionnaire of the baseline study, it was regarded as important that the owners of and stakeholders in the social network sites regarded the information that was gathered as important. Therefore, a pilot study was undertaken to ensure the relevance of the items. The items in the questionnaires were determined on the basis of a discussion with developers of the Nettby community and other researchers, and by conducting a pilot investigation with 10 target users between the ages of 14-38 years who had some previous experience using online community sites.

The baseline study was based on a sample from a Norwegian online panel and users from four Norwegian online communities. They were asked about their usage of ICT in general and more specifically about their usage of and preferences when participating in online communities. The study had 5723 participants in total and served as the norm base for the toolset.

The questions from the baseline study were divided into four sets, each of which focused on a particular aspect of the development process: user analysis, user requirements, actual usage, and evaluation. In the baseline study, the questions had the following form:

- User Analysis Questionnaire - an ordinal scale measuring frequency of use of ICT technology
- Community Requirements Questionnaire - five-point Likert scales measuring importance of services offered by the community
- Community Usage tool- Yes/No questions regarding what the user does in a community
- Community Evaluation Questionnaire - five-point Likert scales for satisfaction with a community

In the final version of the questionnaire, all questions were changed to Yes/No questions in order to meet the simplicity requirement. This was done so that about 50% of the reference sample would answer “Yes” and 50% “No”. The four sets of questions were then factor analyzed using the statistical package SPSS (version, 15.0) in order to obtain homogeneous scales that reflected aggregated results in a meaningful way (This is illustrated in Figure 1). The items that loaded on the same factor and also had an acceptable value on a statistical measure of homogeneity (Kuder-Richardson 20), were then grouped together in the same scale and included in the questionnaire toolset. In addition, the data of the Community Usage Questionnaire were cluster analyzed in order to classify users into homogeneous categories.

Finally, the questionnaires were implemented as online applications that were easy for users and administrators to access. The questionnaires were implemented by means of the Sun Java Studio Creator IDE, utilizing Java and JavaScript. Question labels, computational constants, and respondents’ results were managed using a MySQL database.

The questionnaires can be accessed in English, German, Norwegian, and Dutch. Other languages can be added easily. As the questionnaires are used, the norm base will be extended, and comparisons across user groups, countries, and languages can easily be made.



## 5 Conclusions and future work

Web 2.0 applications differ from the traditional task-oriented applications that have been studied within the general Human Computer Interaction framework. Rather than focusing on task completion, speed, and accuracy, the new applications address user experience, social exchange, co-creation, creativity, and entertainment and their development is based on active end-to-end user involvement. Flexible and cost-effective methods for collecting data on users, their requirements, and level of satisfaction are needed.

We developed a set of norm-based questionnaire tools that collect data on (i) the computer literacy of individual users or groups of users, (ii) community requirements, (iii) community usage, and (iv) community satisfaction. The toolset might be useful for designers of Web 2.0 applications when profiling users with respect to their computer literacy and reasons for joining online communities. It might also be useful for developers and community hosts for adjusting functionality towards users' needs and for evaluating users' satisfaction. As the questionnaire toolset is used, the norm base will extend and make possible to for researchers to make comparisons across different user groups, countries, and languages. Further work includes evaluating the usefulness of the toolset.

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## Appendix

### Questions for the Citizen Media User Analysis Questionnaire

Is the Internet important to you for keeping in touch with other people?

The Internet is important for me to keep in touch with others

Every day, or almost every day I use

... PC at school or work

... Internet at school or work

At least once a week I

... use a word-processing application

- ... receive e-mail at school or work
- At least once a month I
  - ... use a spreadsheet application
  - ... listen to music on the PC
  - ... use a text-chat (MSN or other) application
  - ... receive information from official authorities via the Internet
- During the last year I have
  - ... downloaded forms from the public administration from the Internet
  - ... submitted completed forms to public administration by means of the Internet
  - ... got health-related information from the internet
  - ... downloaded software from the Internet
  - ... used file-sharing programs for music and video
  - ... watched video/DVD on the PC
  - ... watched video/DVD on TV
  - ... played PC games
  - ... played console games (Play station, X-box, etc.)
  - ... published pictures on the Internet
  - ... used the PC for talking to others (so that you can hear each other)
  - ... published video on the Internet
- A last question ...
  - Are you a member of an online community?

### **Questions for CITIZEN MEDIA Community Usage Tool**

What do you usually do in this online community?

- Write an entry
- Upload pictures
- See whether anyone has contacted me
- Look for a new friend
- Read new entries/posts
- See what videos or photos other users have published
- Make appointments for meeting contacts/friends
- Look for information - without any specific purpose
- Write letters and/or messages
- Discuss topics
- Browse profiles
- Get in touch with others
- Kill time

### **Questions for CITIZEN MEDIA Community Evaluation Tool**

I completely agree with the following claims:

- I will recommend this online community to my friends
- This online community is quick and easy to use
- I meet a lot of interesting people in this online community

I more or less agree with the following claims:

- I feel obliged to make this online community a nice place
- I feel as if I am a part of this online community
- This online community keeps me updated on news and other important information
- It is more rewarding to participate in this online community than to watch television

**Figure 2 presents the questions for the CITIZEN MEDIA Community Evaluation Questionnaire**

# Towards a Collaboration Framework for Selection of ICT Tools

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**Abstract.** Appropriate selection of ICT (Information Communication Technology) tools is valuable in project development activities where an organization can setup consistent means of collaboration to ensure that all the stakeholders use specific technology. This paper presents the conceptual framework for collaboration. The collaboration framework facilitates selection of the correct ICT tools for different project development activities. It is designed using a layer based approach and divided into three layers. We believe that the use of the framework will improve the collaboration between the teams.

**Keywords:** Collaboration, Framework, ICT tools, Collaboration Variables

## 1 Introduction

A software development process is composed of the following primary activities: requirements engineering, design and implementation, testing, and maintenance [3]. However, the requirements engineering process is a very decisive activity and, it is considered as a base of software development. Problems in requirements engineering practices lead to problems in design which further result in wrong implementation of requirements and continues to testing phase [2][3]. By improving requirements elicitation, the requirements engineering process can be improved, potentially resulting in a much better project development process [1]. Requirements engineering is a generic process and can be used in different domains i.e. software engineering, computer networks, human-computer interaction, selection of ICT (Information Communication Technology) tools etc. Here, we will discuss a requirements elicitation process regarding the selection of ICT tools for collaboration<sup>3</sup>.

According to Engsbo *et al.* [4] the usage of collaboration technologies has increased in project based organizations. The transfer of documents, inter/intra-organizational communication and project scheduling are prominent activities, which require high eminence collaboration. It is challenging to decide how to collaborate between stakeholders during the

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<sup>3</sup> The term “ICT tools” is limited to ICT tools for collaboration in the remainder of the paper. By collaboration, we mean the process of working together in pursuit of common objectives within a multi-disciplinary project.

complete project life cycle; therefore organizations should determine when and which tools are to be implemented. Building a collaboration framework is more than deciding on tools it should cover and enable the all organizational structures including stakeholders, and integration with downstream systems.

Grudin [8] mentions in his paper how collaboration tools can be categorized on time vs. space. Malone [9] discusses the interdependencies between the coordination process and possible ways for managing them. Sarma et al. [10] propose the framework that is based on the collaboration needs of the developers. The above mentioned studies focus on a particular aspect of the collaboration and are inadequate in providing conceptual guidance to help stakeholders in selection of right kind of ICT tool.

Different collaboration technologies are available but it is challenging to select the right tool from a number of technologies. In order to successfully apply ICT tools in project development activities, an organization needs a framework identifying the tools that fill the communication gap in between project activities. The framework functions as a requirements elicitation technique that can be used to select the appropriate ICT tools.

The framework is conceived as part of an IBBT (Interdisciplinary institute for Broadband Technology) project. IBBT is a virtual interdisciplinary research institute combining research groups and research institutes from all Flemish universities. Research groups with different backgrounds and from different universities collaborate within each IBBT project. This framework addresses the problem of selecting the appropriate ICT tools so multidisciplinary dispersed teams can collaborate within IBBT projects. A literature review, a workshop and survey results as well as our own experience in project activities, are the basis for this discussion. The workshop was organized within IBBT with the purpose to generate the list of project development activities. The survey was also conducted within IBBT to create an inventory of ICT tools that are currently used in IBBT projects.

This paper is organized in following manner: first the overview and background of the framework is discussed. Next, the collaboration framework and the collaboration variables are described followed by the proposed implementation of the framework. Finally, we mention the conclusion and future work.

## **2 Creation of Collaboration Framework**

As can be understood from the previous discussion, some fixed structure within the research area of collaboration and ICT tools is needed. A smooth integration and interoperability between tools are still the concern for a successful collaboration.

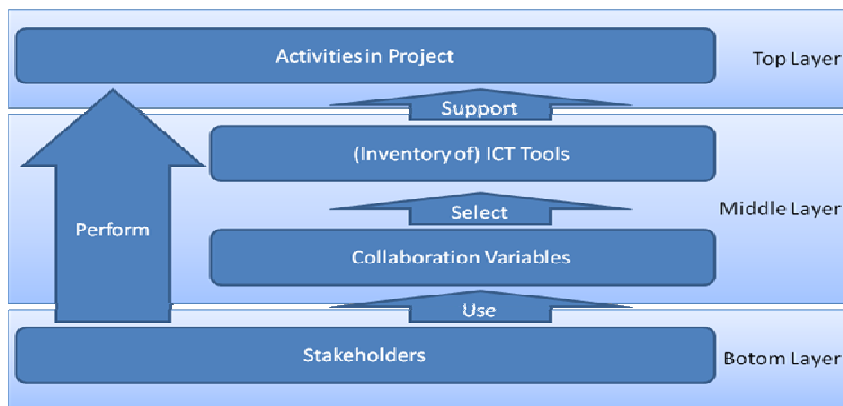
In currently available studies, ICT tools are mostly selected using ad hoc methods. There are no fixed criteria or frameworks that can be used for the selection of appropriate ICT tools. One reason could be that frameworks are not considered as essential and focus is put on selecting ICT tools rather than on how to select the correct one [5]. With the best of authors' knowledge a framework to select correct ICT tools depending on particular project development activities has not been discussed before.

Berander et al. [5] suggest a framework for evaluating requirements prioritization techniques. In their framework, independent (e.g. technique), dependent (e.g. accuracy), and context variables (e.g. environment) are proposed, and recommended to be considered in studies related to requirements prioritization. A similar kind of framework is discussed by Gallies et al. [6] for evaluating pair programming techniques. Our preliminary collaboration

framework is based on the variables that are discussed in the work of Berander et al [5]. Details regarding our selection of variables are mentioned in section 2.2.

## 2.1 Collaboration Framework

This section presents the conceptual collaboration framework. As shown in Figure 1, the framework is divided into three layers: top, middle and lower layer. Stakeholders use these collaboration variables to select appropriate ICT tools from an inventory of tools to support different project development activities. The three layers are discussed below.



**Fig. 1.** The Collaboration Framework

**Top Layer** – The top layer contains the project development activities. These are the activities which we consider in this paper to be selected from the workshop results. Some examples of high-level project development activities are project initiation, planning, project execution and completion. An overview of the project activities is shown in Figure 2.

**Middle Layer** – This layer mediates between the project activities and stakeholders and is responsible for defining the collaboration variables for the framework. The middle layer is mostly generated by defining variables (see section 2.2) and partially implemented by the developer which facilitates stakeholders to dynamically select tools for project activities (see section 3). It contains two sub layers namely (1) inventory of collaboration tools and (2) collaboration variables. An inventory of ICT tools currently used within IBBT was generated using a survey. The list contains different ICT tools that are currently used in IBBT such as e-mail, instant messengers, wikis, document management tools, project management tools and social networking websites etc. The collaboration variables will be discussed in detail in section 2.2.

**Lower Layer** – The lower layer of the collaboration framework contains the stakeholders, mainly users and partners that are involved in a project.

## 2.2 Collaboration Variables

The collaboration variables of the layer collaboration framework contain the variables. These variables will act as a set of guidelines that can be used for the selection of ICT tools. The variables can be used as a checklist which facilitates the stakeholders to take correct decisions and to make sure that no crucial information is missing [5]. We were inspired by the categorization and definition of the variables from Berander *et al* [5], and extended their set of variables with the variables used in the collaboration variables (see Table 1).

**Table 1.** Variables used in Collaboration Variables

Independent variables	Dependent variables	Context variables
ICT tools	Interoperability	Organization
	Security	Project
	User Interface	Stakeholders
	Platform	
	Ease of use	
	Notification support	

**Independent variables** – An Independent variable affects an outcome of a study [7]. The choice of independent variables includes the right selection of measurement scales, range of variables etc. [3] [5]. In a collaboration framework, the independent variables are basically the ICT tools that are used in the project. Further, it is also important to mention the purpose of the tool. Most of the time ICT tools can be used for multiple purposes. For example, email can be used for delivering asynchronous messages, or sending documents etc. This related information helps stakeholders to understand the background of ICT tools.

**Dependent variables** – Dependent variables depend on the treatment of independent variables, they are observed and measured to determine the effect of an independent variable [7] [5]. Dependent variables are basically a result or an outcome of a study [3]. In the collaboration framework, when a number of tools are compared, the dependent variables indicate, why and how one tool is better than another. Here, we will discuss a few important dependent variables briefly.

*Interoperability* – It is not convenient for stakeholders to use different tools for different or similar purposes. Interoperability allows two or more collaboration tools to exchange information.

*Security* – Collaborative systems are vulnerable and exposed to security issues. The ICT tool must provide security measures to prevent malicious attempts. Therefore, security is a vital criterion and should be considered in selection of ICT tools.

*User Interface* – It is important that ICT tools should provide intuitive user friendly user interfaces especially for collaborative work spaces.

Due to the limited scope of this paper it is not possible to discuss all dependent variables. Other variables, platform, ease of use and notification support should also be considered in selection of ICT tools.

**Context variables** – Context includes the circumstances and conditions that can affect the results of an occurrence [3]. In a collaboration framework, the selection of an ICT tool depends on the particular environment in which project activities have been performed. Here, we will discuss a few important context variables briefly.

*Organization* – The organization variable focuses on an application domain, process model, size and location.

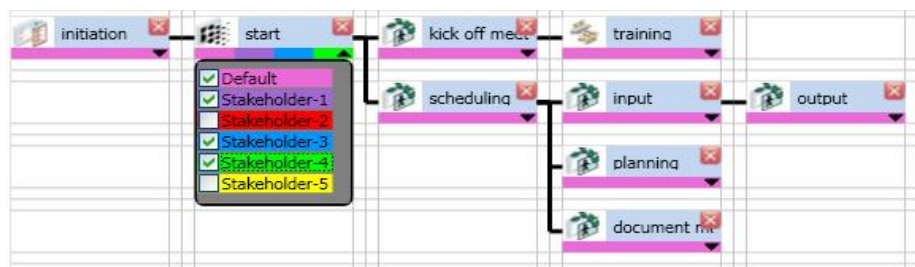
*Project* – The project variable includes the following attributes: size, duration, nature and goal of the project. These attributes should be considered during selection of tools. For example, small size projects do not require the use of wikis or project management tools. They can be managed by using email, instant messaging and light web based utilities.

*Stakeholders* – It is important to report the detail information about stakeholders including their roles, language barrier (if any), culture, location and experiences. For example, ICT tools that support multiple languages are recommended when stakeholders are from different countries and culture to overcome language barricade.

### 3. Dynamic Implementation of the Framework

To support framework users, we are currently designing a semi automated system for stakeholders to select appropriate ICT tools for different project activities, called the dynamic framework. This dynamic framework mainly focuses on implementation of tool support for the use of the collaboration variables. A software tool facilitates stakeholders to perform more actions than can be provided by paper based framework.

Figure 2 presents a fictive usage scenario that could be created using the dynamic framework. The list Stakeholder-1, Stakeholder-2 etc represents the multiple stakeholders working on a particular activity of the project. It provides transparency to stakeholders, as they always want to know who is working on which activity of the project and their progress on the project. The blocks represent the project activities; these activities also include the project details (size, complexity, nature). The creation of an overview of the activities in a project, the values of the variables associated to the stakeholders and the activities will be automatically compared with the variables of the available ICT tools, leading to a configuration of appropriate collaboration tools. This configuration would then be adapted and realized.



**Fig. 2.** The Dynamic Implementation of Framework

## 4 Conclusions and Future Work

The main point of this paper was to define a framework for the appropriate selection of ICT tools depending on different project activities and the stakeholders performing them. The collaboration framework proposed in this paper provides a framework using which one can select appropriate ICT collaboration tools. The framework is divided into three layers: top, middle and lower layer. The collaboration variables are an important part of the middle layer and include three types of variables: independent, dependent and context variables. We believe that the preliminary collaboration framework will be a good way to select ICT tools for collaboration. Yet, it is important that the framework is validated and further refined. To validate and refine the collaboration framework and the collaboration variables, the authors will use this conceptual framework in one of the IBBT projects. The authors will also implement the dynamic collaboration framework in the near future.

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# Putting Personas to Work: Combining Card Sorting and Personas in Requirements Analysis

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**Abstract.** This paper introduces a method to gather system requirements based on a combination of card sorting and personas. The method described is suitable for determining very detailed system requirements for complex collaborative systems. Regardless of the system complexity, the method makes sure that the system remains manageable for individual users by incorporating user profiling in the early stages of determining an information architecture.

**Keywords:** personas, card sorting, requirements analysis, user-centred design, methodology

## 1 Introduction

Technological advances in software development, as well as customer demand lead to constant creation of extra functionalities in software packages. The UI and navigation structure often suffer as more and more features get stuffed in a limited and set space, designed to work well with only a fraction of current developments. Overbloating a software package is often referred to as featuritis [3]. In cases of featuritis, a redesign of the UI is a good solution to keep customer satisfaction high.

The research described in this paper focused on the Xeikon software suite. Xeikon is one of the pioneers, and leading companies in digital printing. Their digital front end is a very complex application responsible for the entire print workflow, including calibrating the presses, creating complex layout and folding schemes, printing, managing a customer database, etc. [8]

Due to the large scope of functions covered by the software suite, hardly anybody uses, or even knows of the existence of, a lot of the functionality. A solid information architecture therefore was key in this project. The methodology used to create this information architecture will be elaborated on in this paper.

## 2 Method

The method used to determine an adequate information architecture for the new software roughly consisted of two parts. First, a set of personas based on existing user types was

created. Afterwards, these personas were re-used for profiling the software in a card sorting exercise to determine which persona should have access to which functionality.

## 2.1 Personas

During an initial user and task analysis, several people have been observed in a contextual inquiry, while they were using the software. During this analysis, it became apparent that the observed companies divided the entire print workflow among their employees in different ways. Among all variable factors, the nature and the granularity of work division was the most important. The granularity of the division was quite variable: larger companies typically had more specialised employees working in very specific aspects of the print workflow, while smaller companies mostly had employees with a somewhat broader responsibility.

The software package, managing the entire workflow, had to provide one general solution for all companies, regardless of the division of responsibilities. This search for a common denominator resulted in a high-level distinction between three general user profiles with separate responsibilities. The user profiles were sufficiently general to accommodate company-specific differences in responsibilities. These user profiles were reworked into three personas<sup>4</sup>.

Literature about personas suggests that one should create a primary persona and a limited number of secondary personas [2]. Instead, the choice was made to create one persona per target group addressed to really be able to organize the software for each user's individual needs in a series of card sorting<sup>5</sup> exercises. In this way, profile-specific information (e.g. information about information flow and workflow) was integrated into the personas [2].

Additionally, the personas were completed with a user scenario describing a typical day's work. For instance, Rik Cops (Figure 1), one of the personas, was based on the profile of a print operator. When considering the overall printing work flow, Rik represents the last chain: he receives a fully laid out file, and ensures that it is printed in the best possible quality. The persona of Rik constitutes an overview of the observed operator tasks ranging from the responsibility for the entire end product to only refilling print toner and paper rolls.

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<sup>4</sup> Personas are descriptions of fictitious, specific, concrete representations of target users. These descriptions serve as a guide in the design process [7].

<sup>5</sup> Card sorting is a user-centred design method that involves sorting a series of cards containing UI labels into groups to increase a system's findability [4].

**Rik Cops**

"As long as the machines never stop or run out of paper, my goals are met"

Age: 25  
Location: Sint-Jans-Molenbeek  
Marital status: Unmarried

Press Operator

**MEET RIK**  
Rik is a 25 year old who lives for travelling. He takes his day job as merely a way to earn enough money to afford his trips. He does what he is paid to do, but has no ambition to grow in the company. His responsibility is to keep three presses running.

**WORK EXPERIENCE**  
- Has been working in the print industry for 2 years  
- Did all types of jobs before:  
- hot driver  
- post man  
- bar tender  
- His job is rather relaxed, which he appreciates

**FAMILY LIFE**  
- His chaotic lifestyle doesn't even afford him to have a solid film alone, let alone family  
- He wants to be free for now  
- he would like to have kids and get married but he'd rather wait until he is 30

**LIKES**  
- Discovering new cultures  
- Learning new languages  
- Sleeping late  
- Meeting his friends

**DISLIKES**  
- People who frown upon his lifestyle  
- Strict hierarchies  
- Being pushed by weekly planned meetings of the software he uses at work

**STUDIES AND INTERESTS**  
- He enjoyed school as it gave him lots of spare time  
- He never had any difficulties in school  
- After high school he backpacked for a year which got him hooked

**A REGULAR DAY AT WORK**  
Every morning starts by battling the alarm clock. He tries to get to work on time but usually gets there a few minutes late. His first half our is spent calibrating the machines, giving him ample time to have a coffee and talk to his colleagues. He likes his job, he likes the anticipatory character of it. Checking the toner, water levels and paper. If he times it all right the machines never stop and he can leave well ahead of time, as he can go home as soon as he completes his batch of jobs.

Work experience, study background, etc.

Colour-coded header

General persona description

Scenario: 'A regular day at work'

**Fig. 1.** Example of one of the personas: Rik Cops. The persona description includes a picture, a short biography including studies and work experience, and a scenario describing his typical working day.

## 2.2 Card Sorting Sessions

The personas that were created were used during card sorting sessions. The first session was performed by a group of expert users of the Xeikon software. As this group was familiar with the terminology used in the software, an open card sorting exercise was done<sup>6</sup>. In this exercise, the expert users were given predefined cards with system-specific terminology to ensure that the card sorting exercise would be thorough and in-depth, without forgetting key aspects of the software. After the predefined cards were sorted and grouped by functionality, they were reconsidered from the personas' points of view. In this phase, the cards were annotated to reflect user profile access: participants were asked to assign colour codes to the cards according to which persona they felt should have access to the functionality on the cards (see also Figure 1: each of the personas had a coloured header for easy reference).

To ensure that the overall results were not biased by the expert group with their elaborate knowledge<sup>6</sup> of the existing system, a similar card sorting exercise was performed with graphical arts students who were well-acquainted with the domain of printing, but not with digital printing. To get acquainted with the field, the printing process was presented in the form of a short scenario which described the entire workflow, from receiving a new print job by email until it is printed. As the students were not familiar with the specific terminology,

<sup>6</sup> Open card sorting is the most common method and the focus of this article. It allows users to create and name their own piles, providing further insight into their thinking processes that can be used as an input in defining information structures [4].

they were asked to create cards themselves during a brainstorm. Afterwards, they followed the same method as the expert group. In a first phase they were asked to sort and group the self-made cards according to functionality; in a second phase, the cards were assigned to the personas that should have access to that particular part of the software. The goal of these sessions was to determine which user profiles (represented by the personas) should have access to specific parts of the software.

Both profiling card sortings have, however, been conducted with graphical arts experts that didn't fit the operator profile. Therefore, the information gathered on the print operator persona needed to be specified. An additional card sorting, with print operators, allowed to specify the operator software functionality into greater detail, determining which functionality is used most often, which functionality is used less often, and which is not used at all.

### 3 Results

In general, three card sorting sessions were done, of which the results were integrated to create one overall information architecture. The final card sorting session specifically focused on the print operator user profile and was therefore a further specification of the general card sorting sessions. The first two card sortings with experts and non-experts were integrated into a coherent whole.

As the expert group started from predefined cards and the non-expert one did not, differences between the results of the two card sortings were anticipated. Since the group of experts started with predefined cards, this session showed more elaborate results. However, on a more general level, the results of both card sorting sessions were found to be highly compatible. The student card sorting complemented the expert card sorting, as it provided a clear high-level structure that clustered the detailed structure of the expert group (Figure 2). One of the categories the students suggested did not completely fit in one of the other groups, as it represented functionality that was out of scope for the Xeikon software. Therefore, this group was omitted from the information architecture.

After creating the general functionality-based structure (Figure 2), a comparison with the persona-based structure was made. This analysis resulted in a more intricate picture. In some categories, assignment of functionality to personas was quite obvious, such as 'print engine control' which was only assigned to, the print engine operator. However, most categories yielded a more complicated picture, having different personas assigned to different cards in the same category. This indicated that the proposed user profiles did not correspond with the existing information architecture, and that a separate user profiling mechanism would have to be used in the new information architecture.

The third and last exercise helped to further develop the print operator part which was only surfaced by the previous card sorts. The results of this session provide more detail in the structure already defined in the previous sessions.



available for the participants to get acquainted with the personas (compared to a longer usage period when developers use personas). This observation leaves us somewhat unsure whether the personas were really seen as a user they are designing for, or as a mnemonic device to remember an inanimate set of characteristics.

Using personas in combination with card sorting techniques proves to be a valuable, low-cost method to obtain a user-driven and personalised information architecture. It does, however, require an extensive pre-study to determine user profiles and create matching personas. Even though the results are based on one case study, it is deemed necessary to distribute them among other HCI professionals. The eventual validity of the results can only be tested by using this method over a larger scope of cases and in a greater number of trials.

In sum, adding personas to a traditional card sort can help in reducing featuritis. In the case of the Xeikon software only conducting a traditional card sorting would have resulted in an incomprehensible navigation tree with too many subcomponents. The use of personas brought the exercise to a higher level and produced a stable and good structure adapted to the needs of its users. Not only does the use of personas result in a clear view on system requirements, it also offers a manageable, usable information architecture based on user profiling.

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# Motivation for creating new user experiences while watching online video

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**Abstract:** Sharing and watching video content are more or less two different activities performed separately. However there is potential to bring these two activities together. In this paper, we present ongoing research with the goal of creating a more intuitive media player. The results of a survey are presented, with questions related to media sharing and the sharing of videos in particular. By asking questions about sharing, producing and watching content we try to link the answers together to an overall user experience. Based on these findings, the design of a new metadata-based media player is presented, which would allow users to share and watch videos in new ways.

**Keywords:** Sharing content, video, metadata, annotation.

## 1 Introduction

The use of streaming video on the Web is experiencing a rapid increase, with YouTube being the 3rd most visited website on the internet [2]. Most of the user involvement on video-sharing sites is limited to watching, ranking and sometimes entering comments for videos. Compared to TV guides which provide summaries and descriptions of each program, the user must usually trust the popularity or user-supplied rating of each video to find something relevant [3].

A more usable tool released recently is the “Elections Video Search” plugin by Google [1]. This gadget searches through the speeches of American politicians with the help of transcripts created through speech recognition. This sort of extra metadata may provide more precise results to user queries.

In this paper we present our survey of sharing content which concludes to our findings regarding the use of more intelligent metadata that allows users to watch content that is much more relevant, and to share content with others in a more usable way. These ideas are grounded on questions which depend not only on communities on the internet but also on the general interest of people.

The rest of the paper is organized as follows: Section 2 presents our survey and the discussion of the answers. Taking motivation from these results, Section 3 presents some basic concepts of our media player. Finally, Section 4 concludes the paper.



## 2 Survey on media-sharing

Our online questionnaire was open to participants for exactly one week. All questions were related to sharing in some way, with a majority of questions focusing on the sharing of video content. The survey contained 29 multiple-choice questions. It used choice modelling for presenting the answers to the questions rather than a rating scale such as the Likert scale. This forced the participants to make a conscious choice between the given options. Thus they had to make a trade-off between the costs and benefits of each answer which is an advantage that a linear rating does not provide. The survey contains questions with subjects that dealt with why, how, when and with whom people usually share media. With respect to video content the survey asked questions about the participant's prior experience with creating and sharing self-created videos. Some questions also dealt with the acceptability of commenting or annotating video content with others in different situations.

Of course we could handle just a selection of the survey questions in this paper. Some questions relevant to our idea are presented in detail while others are just presented in general in the discussion.

### 2.1 Participant profiles

The online link to the survey was distributed virally by the authors using social networking websites, instant messenger and email. This ensured that the majority of the participants were familiar with online social networking and to some degree, media sharing. The survey received responses from a total of 151 participants, of which 58% were male and 42% were female. The most number of responses came from Germany (50%), followed by India (31%) and Austria (7%). The remaining 12% came from 14 other countries. Most of the participants were in the 20-30 age group, with the youngest participant being 18 years old and the oldest being 55. Most of them were consumers of content; just a few uploaded content to websites, but we see also a lot of potential among the rest to share content on the internet.

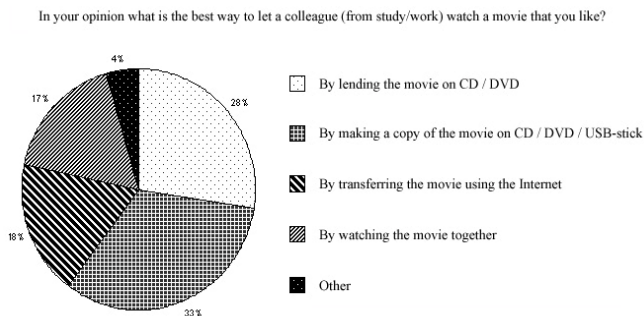
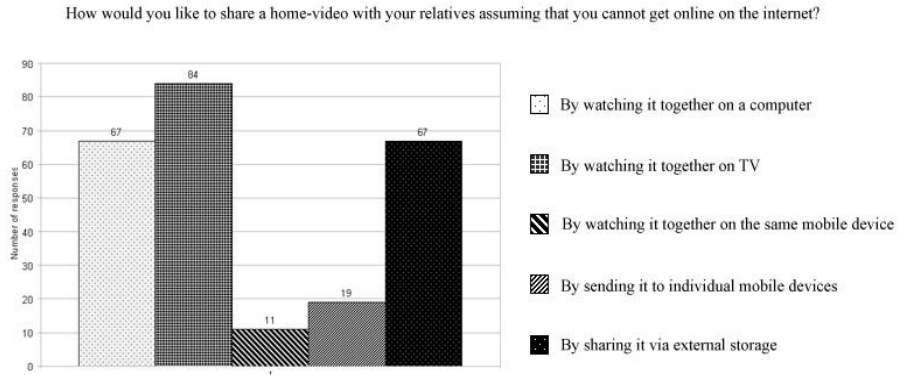


Fig. 4. Survey question on sharing a favourite movie with a colleague



**Fig. 2.** Survey question on sharing of media in the absence of the internet (multi-choice)

## 2.2 Means and motivation for sharing

The questions in the survey presented scenarios involving the sharing of video or other types of media, and tried to find out how the participants would share content with others under some given situations. For example, participants were asked how they would share a home video with relatives, friends or colleagues. In addition, some factors were introduced in the questions to see how they shaped the responses. One question, for example, asked how participants would share media with others in the absence of the internet.

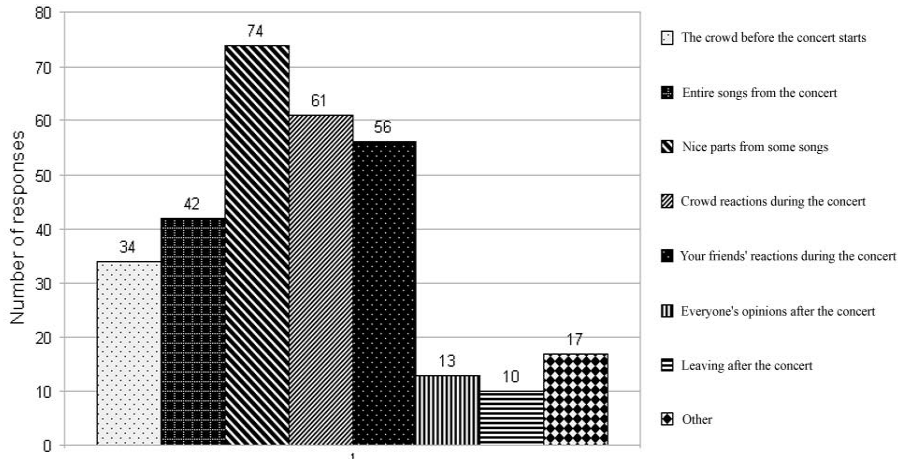
When comparing the question asking about the best way to share a movie with a colleague (see Figure 1) with the question which deals with watching the video together with their relatives in absence of the internet (see Figure 2) a big shift is seen from copying the movie to the experience of watching it together. In the survey we found out that personal relations and convenience play a large role in sharing. On the one hand there is a more personal and social experience and on the other hand there is the comfort of using the internet or storage devices for an easy and time-independent way of sharing.

Based on the answers to other questions, most of the motivation for sharing came from the users' need to inform or entertain relatives and friends with important events in their lives, or to simply preserve some memories or show off some creative skills. Most of the participants were reluctant to share such videos with anyone outside their inner circle of relatives and friends.

With regards to those outside this close circle, respondents were reluctant to share videos that were very personal to them (such as something involving friends/family) or videos that might have legal, ethical or moral issues with respect to sharing (such as copyrighted content). However, media from activities or events (such as vacations or parties) were the most preferred types of videos for sharing with the general public.

## 2.3 Sharing video segments

If you're at a live concert with some friends, which parts of it would you like to record as a video on your cellphone and share with other friends later?



**Fig. 3.** Survey question on what part of a concert participants would like to share (multi-choice)

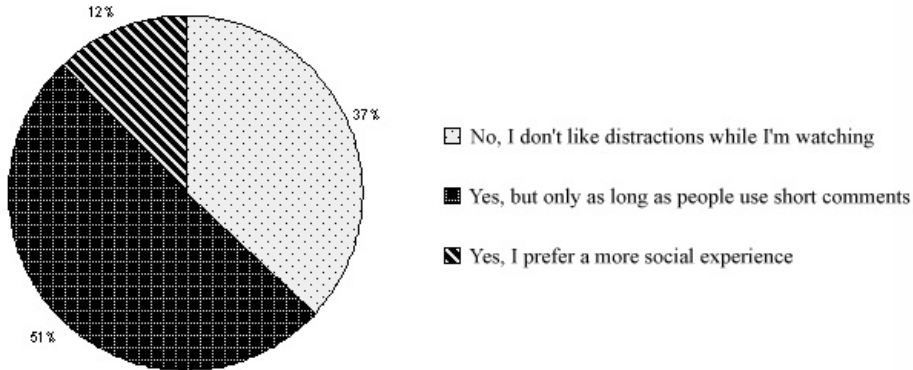
One of the questions in the survey asked participants which parts of a concert performance they would like to record, with an aim of sharing with their friends later (see Figure 3). Most participants favoured recording some nice parts from the concert rather than the full songs themselves. Thus in general, sharing small interesting segments of content are an important aspect of sharing when considering videos from social events or excursions. Also of importance were comments and reactions from their friends and from the rest of the crowd. This supports the theory that content annotation is considered to be almost as equally important by users as the content itself. In the words of one of the participants, the primary goal of sharing videos from a concert are not to document the entire concert, but to share the feeling, "Hey look I was there, and it was cool".

## 2.4 Content annotation

Some of the questions deal with communication between users about the shared content. While watching a movie with a group of friends, most users (51%) preferred to have a social experience of discussing it with others as long as everyone used short comments (see Figure 4). This shows that users do not mind being disturbed while watching a video, as long as it is relevant, short, and does not interfere with their viewing experience to a large extent.

Besides that users were asked if they would not mind talking with someone else while watching a movie. The largest percentage of users answered that they would prefer to have a discussion, but only during a quiet or uninteresting part. However the second

If you are watching an interesting movie with a large group of friends in a room,  
do you like discussing it while it is still running?



**Fig. 4.** Survey question on discussing about a movie with friends while it plays

largest answer was that users would like to discuss something about the movie only after it has ended. This contrasts with the previous survey question where users were more open to discussing a movie while it plays. The difference in both questions was that in the first case the user was watching the movie with a large group, while in the second case the user watched the movie only with a single friend. Thus, a social situation with many people can sometimes generate more discussion while a movie is playing than a situation with just a pair of friends.

## 2.5 Survey conclusions

The results of the survey show the main factors that affect sharing. It depends on the content with whom someone shares and how much time someone wants to spend doing it. Besides that privacy was a topic in the survey, even mentioned by multiple participants while giving feedback. In this paper we couldn't discuss it adequately. While most of the participants didn't upload content on public sides, many of them were willing or have experience to share content over the internet. A quarter didn't want to use the internet, but sharing media offline in privacy mostly all do.

Summing up most users prefer not to share personal media with anyone on the internet, but rather choose to do so within their private circle of friends and family. Then convenience plays a major role in sharing of media socially, even when the sharing occurs on a very personal level. Sharing in the sense of an experience together decreases outside someone's private circle.

While sharing content from an event or excursion, most users prefer to make a snapshot of the content by highlighting certain parts of it instead of making a detailed report of it. Such a selection is easier to discuss or annotate. Furthermore in groups discussion is rather short but preferred that way, whereas the acceptability depends mostly on the type of content that is being annotated.

### 3 Metadata-based media player

For the design of our player we highlight two conclusions which resulted from the survey: It is preferred to share snapshots of content which may be personalized further to enrich them and make them interesting for friends. So the user should be able to select and share segments of content easily, which could then be annotated or commented.

Because people prefer watching content together so that they can share their experiences about it communication while watching should be possible. This communication may either be online and offline. Dealing again with shorter segments users are more willing to take their time to watch together. Offline discussion, where communication is not real-time anymore, is even more flexible and easier to achieve.

Based on the context of most of the questions in the survey, we focus on video or audio content for our player that users like sharing with people they know.

#### 3.1 Sharing segments

Creating metadata for content by hand is time consuming, so most content is hardly ever annotated by casual users. YouTube already offers some tools for timeline dependent annotation [10] and shows these text comments while playing the video. The selection of the range is done by setting a start and end timer by hand.

Besides that user-created content can also be automatically structured using audio and video analysis processes. For audio, BIC-segmentation [7], speech/non-speech- and audio event detection, speaker clustering [6] or speech recognition may be performed. For video content, shots and objects such as faces may be detected [4]. The resulting metadata can then be saved in an MPEG7 format [5], which is loaded by the player when requesting the media.

Showing the structural analysis data while playing the user could capture a general view of the content. Automatically generated segments boundaries could be used for selection or navigation through the video, but also to easily contribute user-generated metadata such as comments. With the help of metadata, selecting parts of the content personalizes the media and just these segments could be shared or new combined.

#### 3.2 Online and offline communication

Online communication methods such as live chat and two-way video communication encourage a feeling of jointly viewing content. Users can express their thoughts and feelings in real-time with others while viewing content together. Both the speaker and listener roles for such communication in the video player are designed so as to not distract the users from the actual content [8].

But live communication is not always possible, so we also design offline methods for users to communicate while watching a video. Here, the communication is not realtime, and hence users can access existing comments or add their own asynchronously. Users can choose how complex or involved their communication can be. Thus the form of communication may range from something simple such as a non-verbal 'emoticon' [9], to text or audio and video clips, or on to more advanced forms of annotation.

## 4 Conclusion

This paper presented a discussion of a survey which analyzes the characteristics of sharing media content. The results show that sharing is still a personal experience. The content must somehow relate to the user and a collective experience is favoured over an individual one. Because snapshots are easier to personalized and annotate we concentrate the design of our player to give the user more information and functionality to use segments. To get a collective 'cinema-like' experience, we also design possibilities for communicating with others using online or offline methods. Then the automatic generated and user generated information are saved in one metadata file whereas the player could adjust to show just the desired one.

As the next step we will evaluate the player to see if the user accepts these additional features and how the presentation of the metadata could be designed well.

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# Requirements Elicitation: Investigating Users' Values and Emotions

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**Abstract.** Although soft issues such as politics and people's feelings are often cited as problems in the design and development of software, few studies have directly considered values or emotions during the analysis phase. This paper reports an investigation of requirements analysts' current practice for gathering and using such tacit information. This investigation indicated that most analysts serendipitously discover user values and emotions but do not take a structured approach to identification. This investigation led to the development of a method to support analysts in the identification of 'soft' information such as emotions and values. The method is presented here, followed by a brief outline of ongoing evaluation work.

**Keywords:** Requirements Elicitation, Values, Emotion, Motivation

## 1 Introduction

Soft issues, such as politics and people's feelings are often cited as problems in the Requirements Engineering (RE) process [1], although there is little advice about how to deal with these issues. Few studies have directly considered stakeholders' emotions during the analysis phase, though there are numerous examples of post-hoc studies of computing projects in which the difficulties were mostly related to political or cultural factors, rather than to technical problems, for example the role personal and professional values played in the poor uptake of a wiki developed to allow healthcare workers to share best practice data [2]. Alongside some of the more predictable reasons for their unwillingness to use the system, such as concern about writing the wrong thing or nervousness at using a public forum, the healthcare workers explained that they were uncomfortable with the idea of reducing their close relationships with their patients to abstract 'cases' (with the term case being particularly problematic, in that it focused attention on the problem not the person). Potential users were also concerned at lack of control over their online 'self' and that other readers, lacking knowledge of the work context might misinterpret postings.

It is apparent from the RE literature that many people acknowledge the importance of understanding user beliefs and values [3, 4], but whilst some 'soft' issues and social relationships, such as responsibility and authority, are modelled in the requirements modelling language *i\** and extensions thereof [5], user values, motivations and emotions have not been explicitly included in requirements processes to date.

Requirements analysts liaise between the business and software developers, eliciting and analysing requirements for new software and associated business changes. User centred elicitation and design is an established movement which is intended to help the analyst address the social, cultural and political aspects of IT projects. There are instances of user focussed techniques such as scenario based design [6] and ethnography[7] providing good insight into user values and beliefs, for example, Jirotko et al.'s investigations into trust and team working in breast examination units [7]. However, whilst these methods encourage the analyst to reflect on sociotechnical aspects of their projects, they do not include methods for eliciting or analysing data with the specific intent of identifying user values.

This paper reports an investigation of requirements analysts' practice for gathering and using such tacit information. An analysis method for identifying and using this information is presented, followed by a brief outline of ongoing evaluation work.

## 2 Interviews with Analysts

Evaluations of computer science education and analyst skills have suggested that there is a gap in novice analysts' training with regard to 'soft' skills. A review of the undergraduate curriculum for software students found little emphasis on communication [8]. Given this lack of emphasis it is unsurprising that Shenk et al.[9] observed that novice analysts show a lack of political and social awareness. The starting point for developing our method was therefore to interview requirements engineering experts about their interest in and awareness of, users' personal values, motivations and emotions.

We interviewed ten business analysts, with 3-32 years' experience, and varying degrees of formal training ranging from short courses to higher degree-level training. They worked in a wide variety of industries, including pharmaceutical research, finance, education and local government. All the analysts acknowledged the usefulness of understanding users' emotions and values. They were particularly conscious of the need to be aware of anxiety or negativity – they were concerned about changes that might be considered negative, and were keen to find benefits or improvements as a way to 'sell' the software development process:

*"I was working on a book-keeping system, the first time this office had ever had computers, so way back before you were born! All the women that work there had been employed because they had beautiful copper-plate handwriting – and now they were going to change to keyboards, so you can imagine how worried these women were! I had to work really hard to understand how they were feeling and how we could help them find value in the new system"*

Analysts were generally less conscious of users' personal values, but many of the projects they discussed included examples of systems conflicting or agreeing with users' values. Fiona discussed developing a system she was involved in implementing for social workers. She comments that the social workers felt that secretarial work 'is not part of their day job'; they implied that they value and prioritise other aspects of their jobs, and don't view administration work as part of their role. Consequently they were concerned at the prospect of a new computer based system for case management they would be expected to use: Similarly Lucy describes the experience of working with someone who was considered to be a 'problem' user, who placed particular value on control and personal esteem:

*"I worked with a lady a number of years ago that had the reputation of being a dragon. No one seemed to be able to deal with her. She always found fault with the requirements, often for the most unreasonable of reasons. When I was assigned to work with her, one of the*



*first things that I noticed was that she wanted to feel in control, that she was the person who had the final say in whatever happened to the application. She wanted to be catered to, to feel important and to be treated as such."*

Lucy went on to change the ways the project team interacted with this user, for example modifying the specification format to one this user preferred, and found that by making some minor changes she was able to improve the relationship.

None of the analysts mentioned exploring positive emotions around the users' work or software development, but did remark on users reacting positively and emotionally to a piece of software development. It also appears that on some occasions the analysts were aware of the dynamics of relationships within a project, and the impact of emotional ties but were not sure how to handle the consequences.

*"The developer has a much closer relationship with her than with the other business leads and on occasion, has placed more priority on her requests than requests submitted by other members of the team. This is an almost exact repeat of the previous project. My opinion on this is that while the specifications are likely to meet her needs, this is not necessarily the best use of the developer's time if the resulting product does not meet all the other users' needs."*

Several analysts reported occasions when they had made use of their learning about user values or emotions, either in management of the requirements process, or in system design. One of the analysts described her surprise that the scientists she works with preferred an interface that demanded more interaction from them, but discovered they made parallels between clicking around the system researching information and lab-based research. The design 'spoke' to the users' self image as scientists. It became apparent that the majority of analysts interviewed see this understanding as something that just 'happens' when they're being particularly perceptive. Some analysts commented that they felt this area of expertise had been neglected in their training:

*"I have one colleague who is particularly good at this kind of thing, picking up on what's going on. I don't know exactly what she does; she just knows the right thing to do"*

*"The training courses I've been on have always been about tools and management, change control and so on, which is important, but there isn't enough emphasis on understanding your users."*

Two of the most experienced analysts interviewed, (each with 20+ years experience) had developed their own methodical approaches to try to increase their ability to pick up on users' emotions and values.

*"Body language is very informative. You can't directly ask someone how they feel, the secretaries were very anxious about their jobs, but it was apparent from their body language and our conversations. I think they would have been very defensive if I'd asked them directly. I also pay a lot of attention to what people are wearing, and what I'm wearing."*

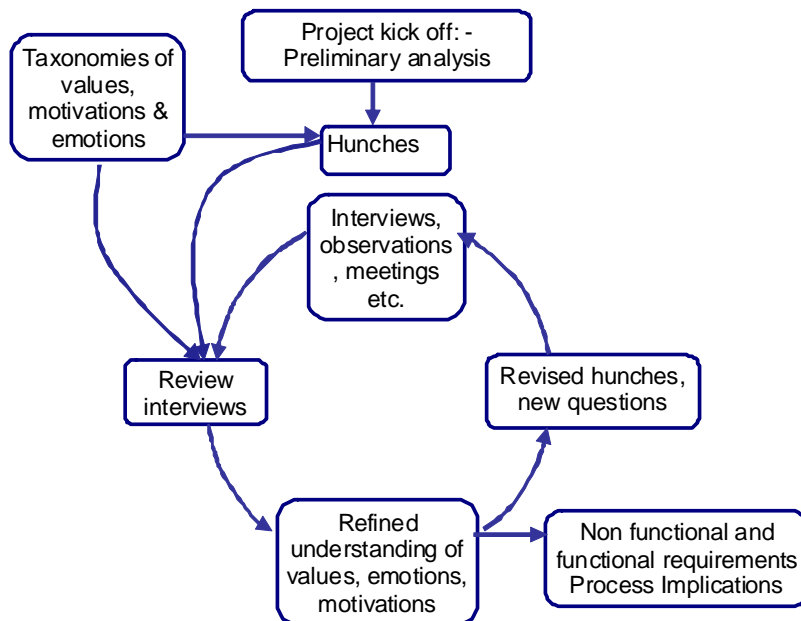
*"I gather the information by observation of both the person's behaviour vs. their words and by their interactions with others. I try not to discuss my suspicions until I have had a chance to test them. I test them by changing my behaviour to reflect the way that I sense the other wishes to be treated. If it works, i.e., I see the results I expect, I continue with more of the same. If it doesn't, I go back to observing until I detect a pattern."*

It would appear that analysts do recognise the impact of users' values and emotions within the design process, but that the majority of analysts see this understanding as something that just 'happens' when they're being particularly perceptive, whilst a minority have techniques they've developed through experience.

### 3 Method Development

Based on the literature and expert analyst interviews, an approach has been developed which encourages reflection by the analyst on users' values and emotions. Previous RE studies of values have used questionnaire based approaches [10], effective in gathering shallow information from many users but less suitable when the goal is rich information from a smaller number of users, when a comprehensive, qualitative approach is more appropriate. The method design was also influenced by concerns raised during the analyst interviews. Analysts expressed reluctance to ask direct questions about emotions and values, so the method should ideally not require analysts to directly quiz users, but make use of data gathered during interviews and observations. Making use of routinely gathered interview data also reduces the burden on analysts who are already busy.

Figure 1 provides a summary of the reflective practice method. The analyst begins by recording their own hunches about values, motivations and emotions which they believe may be relevant to the project. This may be informed by past projects, previous interactions with the users or features of the project that are likely to be important or controversial. A set of taxonomies listing values, emotions and motivations along with ideas about sources of values and guidance as to their potential impact support this process (see [11] for more detail on the taxonomies). The level of guidance offered when dealing with 'soft' issues is inevitably limited, so whilst the taxonomies provide indicators, the focus is on understanding the complexities of their own situation.



**Fig. 1.** Process stages in the value investigation method.

The analyst begins their standard requirements work – running meetings, interviews etc. At regular intervals the analyst will review the outputs of such activities for evidence of the expression of values, emotions or motivations. The most thorough, but time consuming approach to this review is to transcribe audio recordings, these transcriptions are then marked up by the analyst, relevant pieces of text are highlighted and named with short ‘tags’ which

summarise the analysts' opinion about the value or emotion being expressed. The taxonomies can be used again during the analysis as a prompt to help the analyst in identifying evidence. Alternatively, analysts may only transcribe short quotations they find informative, or simply either listen back to their recordings or reflect on meeting notes. The approach taken will vary based on analyst expertise, time pressures and whether circumstances will allow audio recordings.

Once the initial coding is complete, the analyst then begins to group their tags, looking for codes which express similar values, motivations and emotions. The initial set of 'hunches' are then updated based on the analyst's findings – modifying the original ideas, adding in new understanding and new questions the analyst would like to explore. This developing list of hunches serves two functions, firstly providing a source of potential interview topics for the analysts' next meeting with the user, and secondly, over time, growing to create a rich picture of the user's values, motivations and emotions. The analyst then repeats this process with a new set of interview or observation data, using the revised version of the framework.

#### **4 Method validation & conclusions**

The reflective practice analysis method is currently being evaluated via three case studies. All of the case studies investigate software that will have a substantial socio-technical impact. The first study uses the reflective practice method to support a project which is engaged in making substantial changes to the working practices of research epidemiologists. The second study looks at a system for clinical data collection which has been rolled out, the development team are concerned. The third study is based within the IT department of a pharmaceutical company, to support the outsourcing of experimental laboratory work to an external partner company in China. A requirements analyst is making use of our method to understand stakeholders' values and emotional positions with regard to the outsourcing of this work. Two of these studies are being run by the first author, the third by an external requirements analyst. Feedback from these case studies will be used to improve the methodology and taxonomies.

Initial feedback from these studies suggest the method has improved the process of understanding and engaging with users, albeit with increased time demands on the analysts to carry out the analysis. In particular, learning derived from the use of our method has informed the development of a data sharing strategy in the first study and resulted in a change of requirements focus and strategy in the third case study. Future work will concentrate on gathering more evidence about the efficacy and usability of the method, via further case studies and experimental evaluation.

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## **NordiCHI'08 Workshop**

# **How Can HCI Improve Social Media Development?**

### **Organizers**

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## Introduction

### 1 Workshop theme

The theme of this workshop section was Social media and its relationship with Human-Computer Interaction (HCI).

Social media are systems and applications supporting content sharing and co-creation in sociable online environments. This includes solutions for media sharing (e.g. YouTube, Flickr), self presentation and debate (e.g. MySpace, blogs), social networks (e.g. Facebook, LinkedIn), referencing and recommendation services (e.g. Digg, Del.icio.us) and co-created knowledge resources (e.g. Wikipedia). Social media may also include technology platforms such as interactive television and mobile phones.

The growth of social media will most likely have important consequences for the field of HCI. Social media is said to “[reframe] the debate in terms of user experience, usability, and most importantly what matters to users” [6]. Vice versa, HCI and usability will be increasingly relevant for social media development. In a recent study by Brandtzæg and Heim [3] end-users reported low usability as their third most important reason for reduced use of particular social network sites. A similar perspective is held by danah boyd [2] criticizing what she terms “autistic social media”.

Social media development implies important challenges for the field of HCI. Social media’s context of use, and end-users competencies and preferences are changing rapidly and unpredictably. Social media design needs to support not only individual users, but communities and co-creation of content [1, 4]. Knowledge resources such as guidelines and design patterns, need continuous updating due to fast changes in what is considered successful social media design. Evaluation of social media requires sensitivity to utility and user experience issues rather than just usability [5, 7], while at the same time user feedback methods should not overburden participants [8].

### 2 Submission and review process

The authors contributing to this workshop section were encouraged to focus on one or more of the following core issues:

1. Evolving patterns of social media use, and consequences for user requirements
2. Social media design
3. User-centred evaluation of social media applications.

Given the relevance of the workshop theme in this time of web 2.0, online communities and social media, we aimed to receive in the area of 15 submissions. This did for some reason not happen; we received far fewer than this. The planned workshop was therefore merged with a parallel NordiCHI workshop on user requirements; in both workshops the majority of the papers were of high relevance for social media development.

All papers were reviewed independently by three reviewers. The reviewers were:

- Amela Karahasanovic, SINTEF ICT, Norway
- Asbjørn Følstad, SINTEF ICT, Norway
- Crysta J. Metcalf, Motorola Labs, USA
- Elaine Huang, RWTH Aachen, Germany
- Erik.G.Nilsson, SINTEF ICT, Norway
- Erika Reponen, Nokia Research Center, Tampere, Finland
- Jan Håvard Skjetne, SINTEF ICT, Norway
- Kris Mihalic, Mobile Yahoo!, USA
- Licia Calvi, CUO, K.U.Leuven, Belgium
- Marianna Obrist, ICT&S Center, University of Salzburg , Austria
- Petter Bae Brandtzæg, SINTEF ICT, Norway
- Rich Ling, Telenor, Norway
- Sheila Mc Carthy, University of Ulster, Magee, UK
- Suzette Keith, Middlesex University, UK

All authors were encouraged to update their submitted papers, on basis of the reviewers' feedback and the feedback from the participants of the workshop, prior to publication in the final workshop proceedings.

### **3 The papers of this workshop section**

The five papers presented in this workshop section on HCI and social media cover topics that nicely complement those of the associated workshop sections on user requirements.

In the first paper, Saila Ovaska and colleagues from University of Tampere discusses user evaluation of social media applications, arguing that the nature of these applications makes it important to focus on continuous evaluation of running services, in particular to gain knowledge regarding the users' motivation.

The second and third papers target how to design social media services. Jari Multisilta from Tampere University of Technology, presents a framework for social media design on mobile platforms, whereas Marianna Obrist and colleagues from the University of Salzburg presents user experience patterns developed on basis of evaluations conducted on web and IPTV applications.

The fourth and fifth papers address two different social media applications. Petri Mannonen and Mikael Runonen from Helsinki University of Technology, discusses social media services in the context of a limited application area: that of work support in small and medium sized enterprises. Pirjo Näkki and Mari Antikainen from VTT Technical Research Centre of Finland, present the use of social media tools to support innovation and development.



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## Studying User Interest in Social Media Sites

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**Abstract.** Social media websites often provide their users with recommendations, ratings, and reviews as part of their social texture. Some of these recommendations are based on the content explicitly provided by users while others are automatically generated with the click-stream data collected implicitly from users' interactions with the site. Evaluating such systems is not trivial since the recommendations typically evolve with user activity and the systems get better with time; one-shot evaluations do not necessarily capture the essence of the user experience with the site. We compare the results from our field observation study of Amazon use with other research approaches. Although we collected our data in just one 2-3 hour session per participant, we claim that the results we gained describe authentic user experiences. Such real world observations are needed to give an understanding of how the user interacts with the rich information environment where recommendations and other social navigation cues compete for the user's attention.

**Keywords:** recommendations, user generated content, evaluation, motivation, loyalty, user centered design

### 1 Introduction

The so-called social media applications are systems and applications that support content sharing and co-creation in online environments. The content shared spans from the actual media files, such as texts, photos, audio, and video, provided by the users to recommendations, including ratings and reviews. Even business-to-consumer websites such as Amazon have social presence in that they provide consumer-generated reviews and recommendations of products based on what the user is currently viewing [7], even if users might not uniformly perceive such sites as having social presence [10]. The environment reflects the usage and displays various social cues about the choices people have made and the recommendations they have given to others. The recommendations are typically generated based on automatically collected data on click streams and other user interaction with the site, but sometimes users also provide explicit feedback by rating and reviewing the items.

In this kind of a dynamic, ever-evolving system it is difficult to evaluate the user experience or study the gains people get from participating. However, not only researchers but also the practitioners building and maintaining such websites are interested in what makes a certain kind of website useful and valuable, and thus attracting to customers and enhancing customer loyalty [7].

Most features in social media sites depend on user input, be it collected explicitly or implicitly [3]. Furthermore, the features typically work the better the more they are used [12; 18]. However, the relentless collecting of user information has also led to justified privacy concerns [6]. The developers often need to resort to automatically collected click-stream data when they want to understand how the users interact with the site. Such data lack information about the user's intentions and goals, success in fulfilling the intentions, and reflections on the overall use experience. Consequently, when one wants to collect information in order to learn about the users' motivations for participation, more than just click-stream data needs to be collected.

Information-rich environments typically contain features that indicate synchronous or asynchronous presence of others in the environment. The concept of social presence has not been well defined in the literature. In a study of Kalas [18], a social navigation system for food recipes, social presence was defined as a perception of "not being alone in the space." Social texture or social cues in the interface provide the basis for experiencing social presence. Kumar and Benbasat [7] show that recommender systems, including customer reviews, increase the perception of social presence in addition to increasing the perception of usefulness of the website.

However, different ways of finding items of interest compete for user attention. All the websites discussed in this paper offer various ways to browse the items, and recommenders are only one of many. Recommenders and other social cues must be seen as part of the larger user interface. Thus, instead of only studying the recommenders or any other individual features in isolation of the whole, the information-rich environments should also be studied as integral wholes since all the individual parts of the interface together form the user experience and thus make it better or worse as parts of the whole, not individually [10].

Based on recent work by Lindfors [11], Leino [8], and Leino & Riih a [9, 10], we will briefly discuss some relevant studies and point out the challenges involved in the evaluation of social media sites. We discuss especially approaches related to learning about the interests and motivation for participation of the users.

## 2 Studies of Social Media Sites

Evaluation of social media websites has taken many forms but not all studies look at the site from the end user point of view. For instance, a recent review of collaborative filtering recommender systems [14] notes that accuracy concerns are still the main focus area in evaluation of these systems. Also the other evaluation metrics mentioned, such as novelty and coverage, learning rate, and confidence in their quality, look at the system from the system point of view. User satisfaction metrics are also listed for consideration "if researchers have the ability to present the system to users, and measure how users perceive the system" [14]. Unfortunately, often the developers do not have contact with the end users.

### 2.1 User-Centered Design of Social Media Sites

User-centered design (UCD) emphasizes involving users early in the process. Furthermore, as an iterative design approach, it takes the feedback from the users into account in the development loop. However, it seems that in the field of social media applications, the sites need to be launched first and then developed based on the feedback received, thus resulting in the services being in the state of "perpetual beta" [12].

From the point of view of an ongoing social media website development project, there is nothing much that can be done currently beyond standard usability testing and other basic UCD approaches. It is possible to run tests with a social media prototype that only seemingly functions. As with single user software, the tests will help in removing the biggest usability defects. However, even the most focused usability tests fall short of capturing true motivational aspects and fail to give any proof-of-concept. Such information will be available only after the site is up and running. Building a vibrant virtual community and obtaining effective recommendations requires much more than just the effort of building the site from scratch [7].

Recruiting people from real user groups is time consuming. In many cases the only feedback available to developers is collected from the usage logs, and the logs do not reveal the intentions and needs of the users, only what they ended up doing in the site.

No web site can assume that the users will log in every time they visit the site. For instance, in Amazon the click-stream data collected without a need of logging in has also been used for personalization of the site and producing recommendations [7]. However, the click-stream data logs are not pointing at any recognizable users but only at general user behaviour. While that information can be used in further developing the social texture of the site, as done in Amazon, adding social cues that are irrelevant for the current user task might make the user experience worse than without them.

In many social media sites, the content provided by users is very rich and could be used as descriptive information of the users and the things they find important. However, the content is sometimes being used for purposes not related to the site development but to the business models of Web 2.0. Some social networking sites (for instance, Facebook<sup>7</sup>) offer special “social advertising” to companies willing to target their marketing efforts based on the contents of the users’ home pages. Thus, the content supplied by the user might even raise conflicts of privacy preservation since it is available to marketing campaigns of third parties—such concerns might not be realized by the user who is giving out the information as part of building a user identity in the social community.

Sometimes material external to the social media web site, such as fan sites [5], can be used in learning about the users. For instance, Habbo Hotel<sup>8</sup> is meant for teenagers, and the site policy prevents talking with real names or addresses [13]. Thus, recruiting users for interviews in the site itself is ethically questionable. On the other hand, a fan site with its discussion forum threads [5] provides material for those interested in forming a picture of user categories and information about the likes and dislikes of the users. Similar findings can be captured in user interviews, but getting into contact with the actual users can be challenging.

All in all, it seems that user-centered development of social media sites requires not only an understanding of the needs of the users, but also an on-going analysis of how the site evolves. Developers need to understand what means of social navigation should be promoted to further increase the chances of fulfilling the needs of the users, be they informational needs, task oriented needs, or pursuit for social encounters. The next section discusses studies that focus on understanding user behavior within social media sites.

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<sup>7</sup> <http://www.facebook.com/ads/>

<sup>8</sup> several language versions, e.g. <http://www.habbohotel.fi>

## 2.2 Other Approaches to Evaluation Studies

We have done a literature review of some of the recent studies on information-rich environments to discuss the evaluation approaches used in them as well as the challenges encountered. We discuss the studies mentioned in Table 1 considering especially their approaches to learning about the motivational aspects of participation in social media sites.

In some studies [4, 14], the evaluation was conducted as *comparative field tests*: a group of users is recruited to use the site for an extended period, and they provide the raw data required for generating recommendations for the second group. The performance of the user groups is then compared especially in relation to items found with the social cues left by others in the environment. Such comparisons have generally indicated that users benefit from the social navigation cues and the recommendations given within the system.

**Table 1.** Studies evaluating social navigation and recommenders in information-rich contexts.

System	Study method	Source
I-SPY	Field test	[17, 11]
Antworld	Comparative field test	[15]
Knowledge Sea	Field test	[1]
Livemaps	Field test and user test	[2]
Social ACM DL	Comparative field test	[4]
Kalas	Field test and interviews	[18]
Amazon	Applied ethnography; Controlled experimental study	[8, 9, 10]; [7]
Various	Subjective evaluation	[11]

In their *controlled experimental study* of Amazon with 60 student participants, Kumar and Benbasat [7] used dynamically filtered content to study the impact of recommendations and reviews separately. They collected data on perceived usefulness and social presence with previously validated rating scales. In order to learn about how people actually use recommenders in Amazon, Leino [8] conducted an *observational study* at the participants' homes. He gave the participants some money to buy a book for themselves from Amazon, and then observed how they interacted with the system. The participants were asked to think aloud, and they were interviewed before and after each task. The motivation for conducting an observational study together with interviewing comes from the say-do problem: the users' tendency to describe what they do differently from what they actually do [10]. The observational data give a rich picture of the interaction with the website, and the navigational steps involved can be analyzed in detail. However, the only means of capturing intentional content is by the *think-aloud protocol*—the observed behaviour needs to be explained so that the observer understands the intentions behind the actions.

In the data collected by Leino, it becomes clear that the way tasks are presented to the users can have an effect on the outcome. One of the participants exercised meticulous care when selecting a book to buy. A follow-up task concerned a pre-defined area (photography) that the participant was not interested in. Furthermore, that task did not result in him getting the book he chose. After viewing the first book in the result list he said: "Apparently this [the second book in the list] is similar, but I don't think I care to browse further, this is enough." This indicates that it is important to pay attention to how well the task matches the real world

situation. It has been noted that people use “affect or other simple heuristics to guide their decisions” in non-involving or unmotivating tasks while in highly involving and deeply engaging situations people use “cognitive analytical processing” [16]. Thus, if the user is not in it for real, the behaviour will not be the same.

In the study by Leino, the data collection was done in one session with several tasks. However, in some environments such one-shot strategy will not produce valid results, since both the site changes based on the users’ interaction with it and the usage patterns of each individual evolve. There is a need for *field tests* that typically last much longer than two or three hours.

The challenges of running field tests are many. The study participants need to be motivated to use the website and to contribute. For instance, in Kalas [18] and Livemaps [2] users were able to chat in real time when viewing the same content. Both studies wanted to evaluate the effect of having several users browsing the site at the same time to see if chatting took place and how it evolved in the context [2] defined by the informational content being viewed. However, such situations were not common, as the users did not log in at the same moment. Thus, some goals of the field tests were not achieved. Motivating actual users to continue using a system can be a further problem in *longitudinal research* [18].

One approach for longitudinal studies is *subjective evaluation* by the researchers by using the system under evaluation in their own work. While such trials are common among the developers of a particular system, collecting experience from several alternative systems is not done so often. In her thesis work [11], Lindfors installed and used several tools for social navigation in the World Wide Web. A comparison of their features and several findings of their usability are based on one researcher only, but are valuable as such. The reason for not recruiting other trial users was that the research questions required longitudinal usage periods and no participants could be asked to use several systems at the same time. They would hardly be motivated to use them.

Motivational issues are well known especially in systems that require user reviews and ratings. If there is no motivation to contribute, free loaders can still benefit from the system but the system will not evolve. However, in studies it is possible to motivate by giving extrinsic prizes—for instance, a promise of a pizza party [15] motivated the students to contribute in the Antworld system. Unfortunately in most real world cases such extrinsic prizes are out of the question. A user should be motivated to take part on one’s own so that the system will get a persistent user population.

A further problem with prizes is that they might stimulate trials but not result in motivated, and thus genuine, use. What the participants in Leino’s study received depended on how well they did Task 1, because they received the book they bought and not something independent of the study setting. That kind of intrinsic motivation (though provoked within the study setting) resulted in genuine behaviour and thus increased our understanding of the role of the recommendations in the users’ work towards the purchase decision.

According to Leino [8], Amazon’s recommendations promote products often viewed or bought together with the currently viewed item. The user still often starts with a keyword search that seeds the recommender system with information about the user’s current interest. For instance, some users seeded recommendations by making keyword searches to see what is recommended to them on the item page of a book on the topic area that they were interested in. Though all the six users that took part in Leino’s study used recommendations in the item-finding process, their behaviour differed: some deliberately seeded and viewed recommendations given while the others ended up using the recommendations more in an opportunistic fashion.

Recent development ideas in digital libraries [1, 4] promote various social cues in the interface so that users can find information and items by looking at what other users have searched for, viewed, or commented. The interaction history of users with similar search keywords is recorded and displayed together with the search results using icons with prominent visual coding [4]. The feedback collected points out that users unanimously consider social cues useful in finding relevant items from the library.

When the interface has social cues about user comments attached to a node in the digital library, it affects the navigation [1]. The nodes that are visited by others get more traffic than the nodes lacking previous visits, but even more visits are attracted by the nodes that have comments. However, the comment does not need to be positive to attract people; even negative evaluation of the node attracts visitors. Thus, just counting visited nodes does not tell if the content found is really useful or not. This problem tends to be inherent to studies using solely click-stream data.

Social presence of other people acting in the site is generated by seeing signs that they have left in the environment, and consequently feeling that others exist in the same space and are present by the marks that they have left in it. Some of these marks are useful for the task at hand, perhaps as recommendations of items of predicted interest. Other marks provide knowledge of what is “hot” in the community, as in Technorati’s<sup>9</sup> “Where’s the Fire? What’s Hot, and Why,” when looking for interesting blogs. Tagging and other newer approaches widen the potentially useful signs, and simultaneously add to the complexity of the environments. In Leino’s sample of six participants, the perception of the inherent sociality of complex information spaces divided the participants in two. Half of them felt that Amazon had social presence while the other half felt that the social texture was not enough for that.

### **2.3 The Wider Context of Social Media Sites: the World Wide Web**

Social media sites do not work in isolation; they are visited by users that commonly also visit other similar sites. For instance, Leino [8] reports that one of the participants often uses Google to find reviews on an interesting item, in addition to (or instead of) the reviews provided by bookstore sites such as Amazon. Perhaps social navigation tools might be even more useful on the level of the whole World Wide Web.

However, giving meaningful recommendations automatically is especially hard when one does not know the context. For instance, with the I-SPY search engine that was built to support communities of shared interests on the WWW [17], the feedback collected from a trial use within a work organization showed that the search results were relevant only in 50% of the searches, even though the community consisted of workers of the same organization. Based on her own trials, Lindfors [11] noted that if the user does not select the right community before making the keyword searches, the recommendations made based on the searches are off. Thus, designing a general purpose recommender is even more challenging than using one in a closed digital library system.

Clearly we are still far away of commonly available support for social navigation on the World Wide Web. Consequently, the tools available for social navigation are fragmented into the various social media sites that flourish on the WWW, each developing tools for its own users. No consensus exists on what kind of social navigation tools are useful or how they should be presented in the interface.

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<sup>9</sup> <http://technorati.com>

### 3 Conclusions

Since social media sites are ever-evolving with the users themselves providing much of the content and recommendations, capturing the interest and motivation of the users requires special care in study design. Clearly we need more studies of user interaction with the already existing websites, since such studies may reveal important aspects of how to raise and foster user interest in contributing to the site, and how to enhance loyalty to one site among the many sites available. The study of wholes has been neglected, although the complex whole is what users face and have to cope with [4]. We have evidence that the actions of others made visible in the social texture affect the behaviour of at least some users in complex information environments even if they do not always give a feeling of social presence. How this affects motivation to participate is still an open question, although there is some evidence that perceiving social presence leads to increased propensity to contribute [8]. Without the motivated users that are willing to contribute, no social media site can flourish, and thus motivation is a key ingredient for success. In this paper we have discussed pros and cons of the research approaches currently used for the study of participation interests.

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# Designing for Mobile Social Media

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**Abstract.** In this paper, we try to create a mobile social media design framework that could be used in designing user experiences and user activities for next generation mobile social media services. The model is based on existing models such as Activity Theory (AT), Mobile Web 2.0 Ecosystem (MW2E) and the idea of considering the user experience or the shared felt experience as a central design rule.

**Keywords:** Social media, activity theory, mobile web, design, ecosystem, felt, experience

## 1 Introduction

Social media applications have gained popularity because of services like Blogger, Facebook, Flickr, Jaiku and YouTube. The idea behind social media is that users are actively contributing to the services i.e. sending their blog notes, images or videos to the service, creating tags and doing other types of social activities i.e. commenting on and rating blogs, images and videos others have posted. Many social media applications are designed for entertainment purposes, by creating experiences for users.

Social media applications have been designed for laptop usage. Nowadays, many applications also have a mobile client. Using a mobile client, the users can post to their blogs or Flickr accounts using their mobile phones. Sometimes this application is just a simplified version of its full browser version used with a mobile browser or it may be a native application for a specific mobile platform. In the future, social media services will be more and more designed for mobile users as people are updating their social media sites while they are on the go. Latest mobile devices can even include geotags to images and videos in order to mash-up the images with a mapping service.

Although social media services can be designed using Web 2.0 principles (client server model, ajax), user centered design models (human-centered design processes for interactive systems, ISO 13407 [8]), participatory design, and guidelines for creating usable web pages, the design process can be improved by designing social interactions from the point of view of felt experience. Girgensohn and Lee presented three sociological challenges for designing a social web site: 1) encouraging user participation, 2) fostering social interactions and 3) promoting visibility of people and their activities [5].

In this paper, we try to create a mobile social media design framework that could be used in designing user activities in next generation mobile social media services and applications.

The framework created in this paper is based on existing models such as Activity Theory (AT), Mobile Web 2.0 Ecosystem (MW2E) and the idea of considering user experiences (UX) and especially felt experiences as central design rules. Activity Theory has been widely accepted for designing user interfaces [1, 4, 10, 12]. However, it is not yet used to explain collaborative activities in social media. The Mobile Web 2.0 Ecosystem describes the processes of the users as content producers, but is lacking more detailed analysis of activities related to this process. This is why we are trying to create a combined SEAF framework. It should be noted that SEAF is not a complete design model for social media services but complements other existing design methods.

## 2 Theoretical background

In this chapter we discuss Activity Theory and Mobile Web 2.0 Ecosystem as a theoretical background for the study. We will also discuss the role of user experience and felt experience in the service design process. First, we try to define the concept of mobile social media.

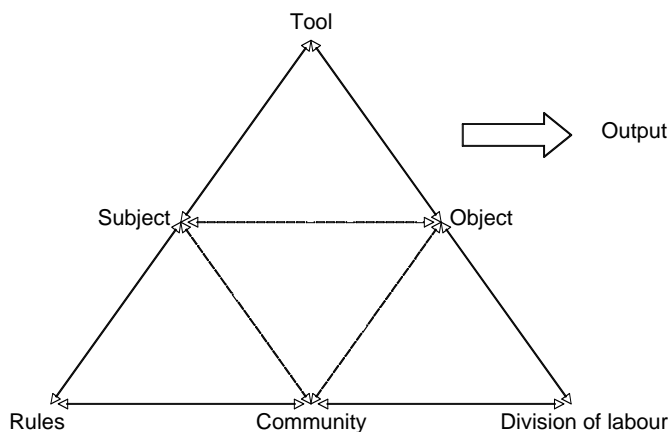
It can be said that social media is a combination of people, technologies and practices that enable users to share their experiences with other users, and build shared meaning among communities. In fact, the experiences are mediated by technologies as a form of content i.e. my real experience is reflected as a set of images. Mobility adds the freedom of time and place – I can share my experiences from where there is reasonable network access. In addition, mobile social media may support the automatic gathering of context information, for example by adding geotags to images.

### 2.1 Activity Theory (AT)

Activity Theory is based on the Vygotsky's cultural-historical psychology [10, 2, 3, 12]. There is a lot of research related to Activity Theory in learning, see for example Engeström [2]. Barthelmeß and Andersson [1] have discussed the role of Activity Theory in software development and Fjeld et al. [4] applied Activity Theory to groupware design. Activity Theory has also been applied both to learning from digital games [12] and to interaction design [10].

The central idea in Activity Theory (AT) is that all human actions are called activities. An activity involves an object that is to be transferred to the output of the activity. In AT, subject performs the activity using a tool. Engeström extended the original AT by adding community as the third component to the model. The interactions between subject, object and community can all be mediated. The activity may be collaborative i.e. several subjects jointly do the activity using tools and dividing the work between each subject. The object can be for example a problem to be solved. Tools, rules and division of work mediate the relationship between subject, community and object. Tools, rules and division of work are artifacts that are used to achieve the outcome. Artifacts are not necessarily a specific set of tools or things but they can evolve over time. [3, 10]

Activity can furthermore be divided to actions and an action to operations. In general, activities are based on high-level goals (for example documenting a work process with images and video clips). Activities involve more practical goals (using a mobile phone to record a video) and operations are routine or automatic (launching a video application, pressing a record button). In this case, rules would be described as the procedure of how to do the documentation.



**Fig. 1.** Engeström's view to Activity Theory describing activity as a collective phenomenon [2, 3].

## 2.2. Mobile Web 2.0 Ecosystem (MW2E)

Currently, the web and its applications are developing towards a socio-technical system. According to Hornung [7], "a socio-technical system is a system composed of technical and social subsystems". This development is often referenced as Web 2.0. Social software refers to communication and collaboration software that enables people to communicate and collaborate using communication and information technologies.

Web 2.0 was first defined by Tim O'Reilly [13] by giving examples of Web 1.0 services and related next generation Web 2.0 service. In this comparison, Britannica Online was replaced by Wikipedia and personal websites by blogging. Wikipedia defines Web 2.0 so that it is "a perceived ongoing transition of the World Wide Web from a collection of web-sites to a full-fledged computing platform serving web applications to end users. Ultimately Web 2.0 services are expected to replace desktop computing applications for many purposes." What can be considered as a main difference between first generation web and Web 2.0 is the social dimension of Web 2.0. Many applications of Web 2.0 include users as producers of the content. Typical examples of Web 2.0 are wikis and blogs.

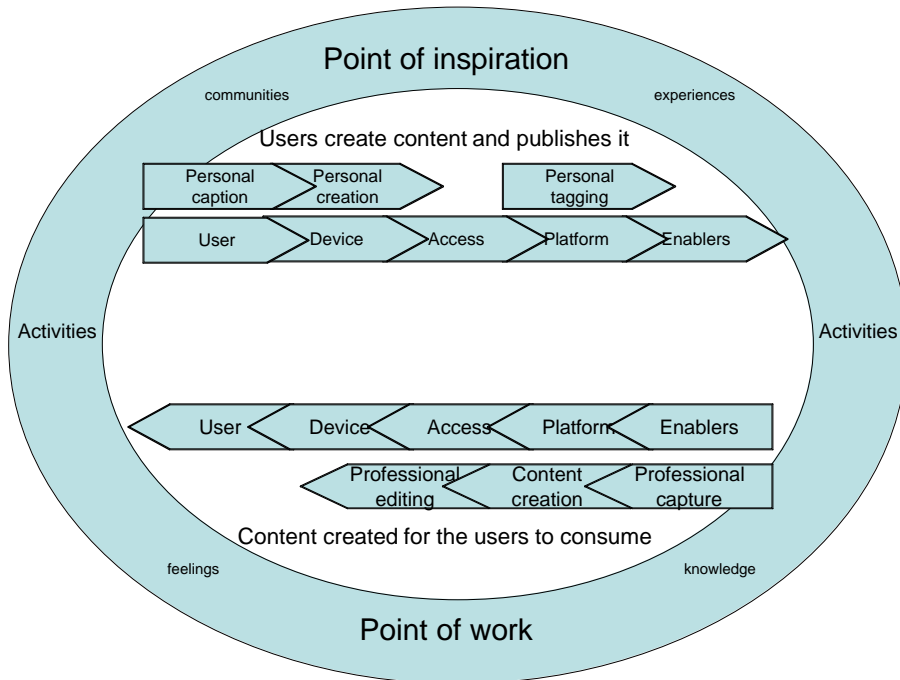
How does Web 2.0 relate to mobile world? Ajit Jaokar [9] says Mobile Web 2.0 "extends the principle of 'Harnessing Collective Intelligence' to restricted devices". Jaokar [9] gives also a more detailed definition to Mobile Web 2.0:

- Harnessing collective intelligence through restricted devices i.e. a two-way flow where people carrying devices become reporters rather than mere consumers.
- Driven by the web backbone – but not necessarily based on the web protocols end to end.
- Use of the PC as a local cache/configuration mechanism where the service will be selected and configured.

Mobile Web 2.0 provides the applications of Web 2.0 to the mobile users. The applications are not necessary the same as desktop users have. The aim is not to port desktop computer to mobile. Instead, mobile users can access web with certain limitations.

It can be assumed that mobile users have different needs (or objects in AT) from the web than stationary users (home, school or office). The advantage he/she is gaining is the access to the knowledge and data sources with mobile devices and networks despite the full access to the web.

In Figure 2 there is a modified Mobile Web 2.0 Ecosystem based on Jaokar [9]. The users are co-creating the content together with professional content providers. Users' interest to create content has a point of inspiration that can be for example an activity, a community, an event, or a feeling.



**Fig. 2.** Mobile Collaboration Ecosystem adapted from Jaokar (2006) Mobile Web 2.0 Ecosystem (MWE).

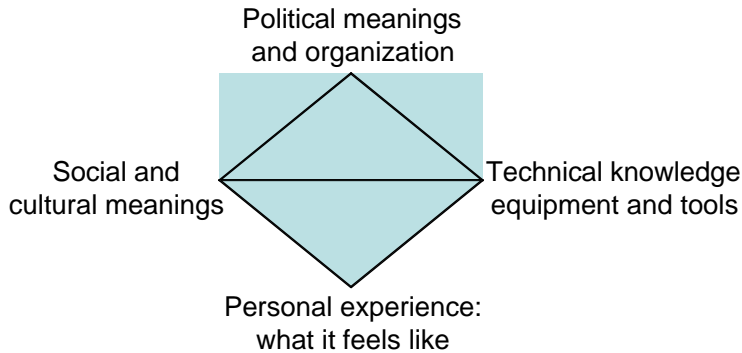
Interestingly, Jaokar also accepts unconnected mobile devices as a part of a Mobile Web 2.0. Downloading material to the mobile device when the broadband connection is available was actually the first attempt to try to use web content in mobile devices (on Palm PDA's).

### 2.3. Mobile web as an experience

According to McCarty and Wright [11], interacting with technology involves us emotionally, intellectually, and physically. In case of social media, the interaction with technology is related to sharing experiences with technology. The role of the technology is mediating. Technology is mediating our experiences to others while being itself an experience. Pacey [14] argues that all activities involved in practising or using technology have several dimensions. The dimensions are a) political meanings and organization, b) technical knowledge equipment and tools, c) personal experience and d) social and cultural meanings (Figure 3). Pacey [14] suggests that personal values and individual experience of technology

should be distinguished from shared, social meanings. These dimensions can support designing for mobile social media services.

According to McCarthy and Wright, we have to “interpret the relationship between people and technology in terms of felt life and the felt or emotional quality of action and interaction” [11]. We can understand this when we think of different brands – people like to belong to a certain group by owning certain products or using certain services.



**Fig. 3.** Dimensions of technology practice and experience (Pacey [14]).

Based on Wikipedia, experience means “to observe certain events; undergo a certain feeling or process; or perform certain actions that may alter one or contribute to one's knowledge, opinions, or skills”. Felt experience is one’s interpretation of the experience [11], for example I can express my experience by telling about it, drawing, taking a photo etc. The use of technology as a means to share our experiences to our family, friends or communities is called a *shared felt experience*.

### 3 Design process based on AT and MW2E

For designing activities for mobile social media applications, we propose combined *Shared Experience and Activity Framework*, SEAF (Figure 4).

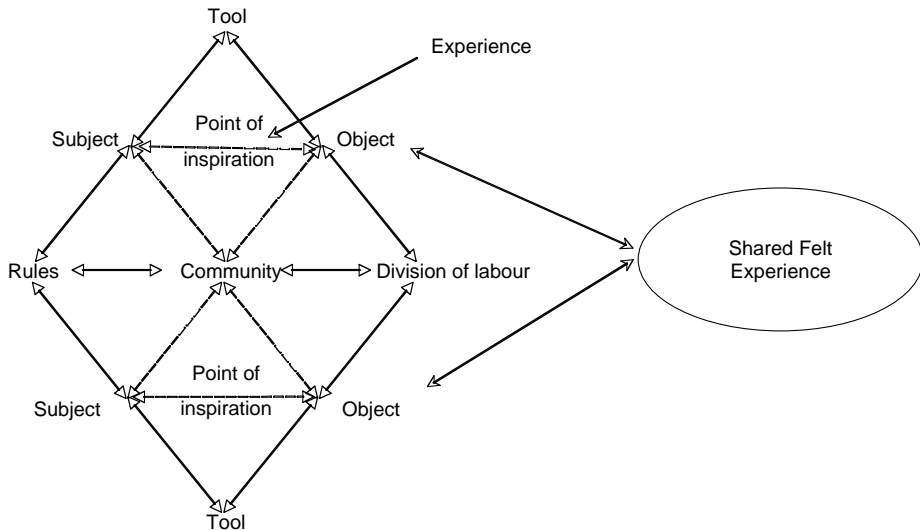
In activity theory, an important issue is that contradiction can occur between subject and object or between subject and rules. Subject can then try to solve the contradiction using a tool. Eventually, this can lead to learning by solving the contradiction.

By combining AT and MW2E, we can replace the contradiction with a more general expression, namely point of inspiration (or experience). Point of inspiration provides the subject the initiation of an activity. Clearly in learning applications, contradiction is a type of point of inspiration. As an outcome, design should focus on the shared felt experiences. However, we are not claiming that all outcomes of social media should be shared experiences. For example, in learning systems people may be sharing knowledge or information.

The user experience is considered to be a subset in SEAF. In general, user experience (UX) describes the overall experience a user has when using a technology [11]. Users’ point of inspiration may also not be an experience as such but it can be for example a remixing session of videos recorded by others. So, the SEAF framework characterises a certain types of activity systems but not all kinds of activity systems.

There are two modified AT model triangles representing two separate users in the SEAF framework. This is to emphasize that users are going to share experiences with other users by sharing some of the components of the system with other users. However, each user may have different tools and objects in her activity system.

Subjects are sharing the community, rules and division of labour. They are using the same system operating under same rules and they can divide their activities using available tools, for example by rating images and thus expressing the general opinion of the group.



**Fig. 4.** Shared Experience and Activity Framework (SEAF).

We present an example of simple design case in Table 1. The application we are designing is a simple mobile video sharing application that can be used with a mobile phone.

The activity design process starts by defining or recognising the points of inspiration for the users. This is the motivation for the users to use the service. Next step is to describe the components of activity system (subject, object, tools, community, rules, and division of labour) and activities needed for creation of an experience. The activities are divided to actions and operations. In conjunction to this, the designer should analyze and anticipate the experience the service is aiming to. The designer should consider the social, cultural and political meanings of the service as a potential source of an experience.

The co-creation and collaboration aspect is important when designing a mobile social media service. The designer should analyse the collaboration aspect in every design step.

**Table 2.** An example of the activity design in SEAF.

Activity	Action	Operation	Point of inspiration	Felt experience Social/cultural/political meanings	
Share fun moments from a music festival	Shoot a video	Launch recording application	Record fun moments	Joy from creating a recording	
		Press record button			
	Upload video to a social media service	Connect the phone to WLAN/3G	Open service from browser	Share your video clips with a community	Joy from sharing the moment
			Select clip from phone directory		
			Press upload		
	Tag the video	Select a tag	Write a description	Help users to find your clip easily	Creativity
	Remix a story from clips in the service	Select clips from service	Press create	Create added value for the community	Creativity
			Press create remix		

## 4 Conclusions

In this paper we have presented a framework for designing mobile social media services, Shared Experience and Activity Framework (SEAF). The framework is based on Activity Theory and Mobile Web 2.0 Ecosystem and it has a strong emphasis on shared felt experience. The framework is not a complete design model as such, but is intended to be used in conjunction with other design methods available.

The framework is going to be used to design and analyze a mobile video sharing service, which will be used both in entertainment and learning purposes. As an example, we presented one analyze of an activity from this service.

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# User Experience Patterns: A useful way to support social media development?

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**Abstract.** In this paper we present the user experience pattern approach in order to support the development of social media, in particular of audiovisual networked systems for user-generated content creation. As part of our research we theoretically and empirically explored user experience for different audiovisual systems. Based on first evaluation results gathered from an IPTV (Internet Protocol Television) based and web based application, we created User Experience (UX) Patterns. Why UX patterns were developed, how they were created and what first lessons learned are will be presented in this paper.

**Keywords:** user experience, pattern approach, audiovisual systems, method.

## 1 Introduction

An increasing number of social networking and audiovisual networked systems are currently designed to enable user generated content (UGC) creation. Examples like MySpace, Facebook (with over 60 million members) and YouTube (with more than 300 million members world wide) have changed the way people use new media, in creating personal profiles, sharing photos, videos, blogs and UGC in general. The increasing interest of people in such platforms based on the numbers of participants is evident, but it is still unclear what makes these applications so successful or which features or elements motivate people to become consumers or active producers of UGC. In our research, we investigate the relevant factors characterizing user experience for audiovisual networked media and how to translate them into best practices for motivating and engaging people.

The intention behind our research is to explore these user experience factors and make them available for designers for the development of future systems. To achieve this, we are building on the pattern approach. The role of patterns lies in the need of re-using experiences made in the design of social media applications. Several design and interaction principles, guidelines and patterns are already available. In particular, existing HCI design patterns provide proven solutions to recurring problems, but there is still a lack of proven solutions for designing “good user experience” summarized in the form of patterns. Therefore, we developed User Experience (UX) Patterns based on a profound literature study and supported by empirical results on audiovisual networked systems evaluated within the European project CITIZEN MEDIA (<http://www.ist-citizenmedia.org/>). The results presented in this paper are mainly based on the evaluation results of a web-based application and an IPTV (Internet

Protocol Television) platform. A combination of qualitative and quantitative methods, such as interviews, focus groups, questionnaires, usability testing and group based expert walkthroughs etc., were used to collect user feedback. Further data will be collected by means of cultural probing, experience sampling as well as based on logging data and qualitative content analysis until the end of the project, namely until end of February 2009.

The main purpose of UX patterns is to share successful solutions beyond our research project and to help to avoid recurring mistakes in the design of user experience for social media and for networked audiovisual media in particular. In this paper, the creation process of the UX patterns, an example and first conclusions are presented.

## 2 Related Work

The concept of patterns was developed by Christopher Alexander in urban architecture [1]. According to the definition of [1] “each pattern describes a problem which occurs over and over again in our environment, and then describes the core of the solution to that problem, in such a way that you can use this solution a million times over”. This definition points out the central characteristics of patterns: The possibility of reusing patterns, the importance of the context (physical and social characteristics) in which the patterns are embedded, and the aspect of sharing knowledge by using patterns. Besides architecture, patterns are used in the area of software and usability engineering, where patterns are used to describe design experience (see for example [10; 3; 11; 14; 8]). The first who mentioned the idea of patterns in the context of HCI were [15]. Currently, the role of patterns for interaction design is getting more and more important, as patterns represent a way of dealing with the increasing complexity and diversity in the field of HCI [2].

According to [5] and [6], human activity is an additional factor which has to be kept in mind when designing interfaces. A human perspective is taken by [7] introducing a pattern language which can be used to generate user centered software designs. User centered software design is thus defined as placing the user’s experience first and foremost when interacting with the application through the user interface. Although the authors call their pattern language “Experiences”, they only deal with usability aspects of interface design and therefore do not differ much from other pattern languages for interaction design (e.g. [17; 21; 9]). Experiences are described by [20] as the main user goals and tasks that need to be supported by designers. [12] indicate that there are no patterns describing solutions to motivational or other hedonic aspects. In order to overcome this, they suggest to develop patterns which integrate broad and general principles of human behaviour in the form of concrete solutions.

However, the work of [20] and [12] is only a first step towards the development of patterns dealing explicitly with user experience; they have only described a few patterns explicitly addressing user experience. Furthermore, their approaches lack a framework for describing and defining user experience, which is the basis for developing user experience patterns.

So, why are there no patterns for describing user experience, that means, why are there no patterns that tell us how to design user experience in a good way and help us to avoid mistakes other designers made before?

### 3 User Experience Patterns

#### 3.1 What are UX Patterns?

It has become clear that several attempts have been made to include the user perspective into the creation of patterns. User experience has also been addressed, but often restricted on usability issues. In our research we wanted to make one step further by addressing mainly user experience issues. We are aware that user experience is not an easy concept and research area, as there are still discussions about the right definition [13]. We tried to address this challenge by defining user experience patterns on the basis of pre-defined user experience factors for audiovisual networked systems, namely: (1) fun/enjoyment, (2) emotion, (3) motivation, (4) user engagement, (5) user involvement, (6) co-experience, (7) sociability and (8) usability (see Obrist et al., 2007 for a detailed description of each factor). We define user experience patterns in the following way:

*A User Experience (UX) Pattern for A/V networked systems captures the essence of a successful solution to a recurring experience problem/demand in A/V networked systems.*

According to these factors, the following questions are covered by UX Patterns: Which elements/features/functionalities/design has to be integrated in the A/V networked system in order to ...

- ... make using the application more fun?
- ... motivate the user to (re-)use the system?
- ... evoke positive emotions when using the application?
- ... increase the user's engagement?
- ... let the user feel involved?
- ... provoke co-experience?
- ... improve sociability?
- ... improve usability?

Based on the defined user experience factors empirical data within a European project were collected over the last two years and the UX patterns were created. Depending on the goal of the application, the designer could have an early look on which features worked well in similar applications in order to increase motivation, for instance, and thus contributing to the improvement of the overall user experience of a networked audiovisual system. We also analyzed the empirical data to find good examples of positive experience when interacting with a given interface (i.e. audiovisual networked systems). These examples are described in a comprehensive and uniform manner as UX Patterns.

#### 3.2 Creation of UX Patterns

In order to provide uniformity of patterns and to support information seeking, a consistent structure is needed. There are different approaches of how to structure patterns (see [4; 19; 18]). The structure we have used for our UX patterns is based on the terminology proposed by [19] or [4]:

*Name:* The name of a pattern describes the main idea of the pattern in one or a few words; it should be both descriptive and unique so that it helps in identifying and referring to the pattern [10].

*Problem:* The problem states out the major issue addressed by the pattern. Problems in UX patterns are related to usage of the system and are relevant to the user or any other stakeholder that is interested in improving the system with regard to UX.

*Forces:* The forces further elaborate the problem statement.

*Context:* This part of a pattern describes the characteristics of the context of use, including the tasks, users and environment for which the pattern can be applied as well as the UX factor(s) addressed by the pattern.

*Solution:* The solution provides proven solutions to the addressed problems in a compact form.

*Examples:* This part of a pattern illustrates how the pattern has been successfully used in a system.

In the following section, one of the UX patterns developed by the authors is presented. The empirical data we used for developing patterns is based on the evaluation of two audiovisual systems: a web application and an IPTV application. In order to collect empirical data on user's experiences with the above described applications, qualitative and quantitative methods were used, for example focus groups, questionnaires, interviews, walkthroughs or analysis of logging data.

### **3.3 UX Pattern Example**

Based on desktop research and analysis of empirical data, about 25 UX Patterns have been developed so far. In Figure 1, one UX Pattern called "Keep the User Active", mainly addressing the UX factor "motivation", is shown in detail. This example illustrates the structure and the appearance of the patterns we already developed. It can already be stated, that the patterns revealed through our research seem to address a broad spectrum of factors influencing UX and provide a lot of solutions to common problems in the area of audiovisual systems, and could provide valuable input for the development of social media in the future. All UX patterns developed so far can be found on the UX Pattern website: <http://citizenmedia.icts.sbg.ac.at/uxpatterns/>

## **4 Initial Conclusions & Future Work**

Patterns have already proven to be useful for many different application areas as they provide solutions to recurring problems in a structured and fast manner. We are therefore convinced that UX Patterns represent an important tool for designers and developers to avoid recurring design mistakes and provide a clear and structured way to communicate best practices for designing a positive UX.

However, the collection of UX patterns is only the first step. The next step is to validate the usefulness of these patterns in practice. The UX Patterns are not yet used by designers and developers in the phase of designing an application. For proving in practice, patterns should not only help designers and developers to avoid recurring errors and therefore save time and money, but they must also be comprehensible so that the stakeholders are willing to use them. Therefore, a workshop with different stakeholders for evaluating the existing patterns will be conducted as a next step. Moreover, the patterns will also be evaluated by external research partners with different backgrounds in order to integrate their experience and knowledge in the field of A/V systems in the UX patterns.

Finally it has to be stated that a pattern collection is never complete but rather in a constant improvement process; therefore our patterns represent a preliminary collection of “best practices” and will be improved continuously. Dependent on new results and experiences, the existing UX patterns can be extended or assembled.

**UX PATTERN: “KEEP THE USER ACTIVE”**

**Problem:** How to motivate the user to continue using an audiovisual application?

**Forces:**

- Users need incentives for using the platform
- Users want variety when using the platform
- Users want to stay up to date by using the platform

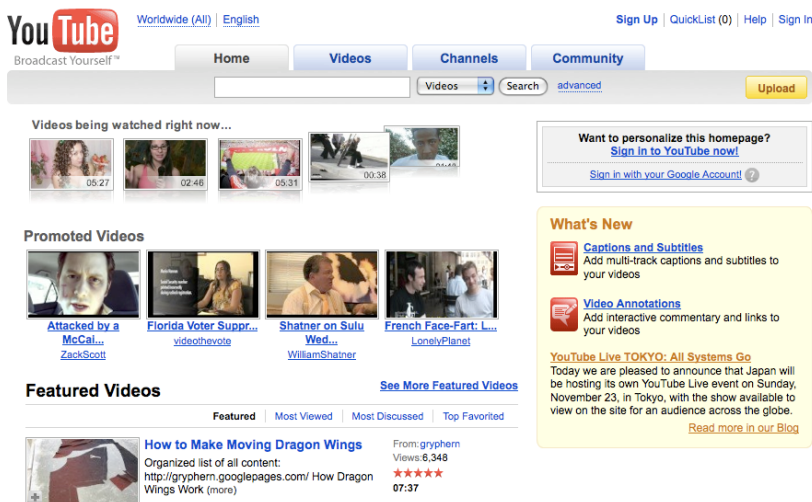
**Context:** Users who are bored by the platform will not use it anymore. Therefore, it is important to avoid boredom when using the application. This pattern addresses the UX factor “Motivation”.

**Solution:**

- Continuously add new content and features, stay up to date: This means that the application and its features are continuously improved, and that new and actual content is added on the platform. Constant improvements and updates make using the application interesting and exciting for the user.
- Let users actively participate: When users are given the possibility to actively participate on the platform, the motivation and interest for using the platform increases. Active participation results in a more interactive and variegated platform, which attracts many users.
- Provide a broad spectrum of features: An application offering many features is exciting as users can try the different features and then choose those in which they are really interested in.

**Examples:**

- Most actual videos on the start page of YouTube (see Figure 1)
- Possibility to vote for the videos on YouTube (see Figure 1)



**Fig. 1.** Screenshot of YouTube.com start page, showing the most popular videos.

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## SMEs in Social Media

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**Abstract.** Social media and Web 2.0 are currently hot topics when designing and developing new digital services. In addition to the leisure or business-to-customer services such as MySpace.com, Facebook.com, and Amazon.com, web 2.0 and social media functionalities are promising for other businesses as well. However quite little is known about the actual needs and characteristics of companies as users of these kinds of services. This article reports results of a study where small and medium-sized enterprises (SMEs) were studied and then web 2.0 and social media service concepts developed for them. The concept of social media proved to be challenging in SMEs' context. Although the users were familiar with web and online services and even used some of them during their free time, they could not see the benefits of using similar solutions in their work. Most of them could however see the risks and pitfalls.

**Keywords:** user research, social media, web 2.0, small and medium-sized enterprises

### 1 Introduction

During the last couple of years social media and Web 2.0 have become major phenomena and concerns in both business and leisure time contexts [4, 8, 10]. Social media is usually understood through such Web 2.0 applications or tools as blogs and social networking sites. Tim O'Reilly introduced the term Web 2.0 in 2005. He defined it to mean next generation web services that utilize new collaborative and dynamic information sharing and producing technologies and practices [7].

Web 2.0 and social media are both somewhat vague concepts. What makes them interesting for many stakeholders are the bold promises they make. According to the promises, Web 2.0 [e.g. 4, 7]:

- Facilitates flexible design, creative reuse, and user centered content
- Provides a rich user interface
- Facilitates collaborative content creation
- Establishes social networks of people with common interests
- Helps gather collective intelligence.



These promises are extremely attractive also from a business perspective. The quick growth, the high user or visitor amounts of the biggest social media services<sup>10</sup>, and the hype surrounding them increases the companies' interests even more.

However the Web 2.0 or social media services for business and especially for business-to-business context are few and success stories even fewer. The usual business examples of Web 2.0 are web stores that have been able to take advantage of the long tail effect with different user profiling and activating strategies. However, for example easier collaboration, collaborative content creation, flexibility, and utilizing collective intelligence are very interesting aspects also from business-to-business viewpoint.

From user-centered design's point of view too little is known about companies as users of different social media services. Important questions are the needs, context of use, current practices, and in general the relationship with technology (especially high technology such as Internet) of companies.

We were especially interested about the collaboration between companies and thus selected small and medium-sized enterprises (SMEs) as our focus. SMEs are used to build their business around networks and collaboration. In many cases collaboration is the only way to SMEs to compete and collaborate with large corporations. Additionally the identity and personification are not so big issues with SMEs as with large corporations. In SMEs there are only few persons working in the company and thus there are only few persons representing the company to outsiders, whereas in large companies there are strict rules and restrictions concerning who is acting on behalf of the company or informing outsiders about the company.

None of the SMEs selected for the research operated in ICT business area. We decided to focus on other than ICT companies in order to avoid the bias that ICT companies and their workers might have. In ICT industry people are sometimes prone to accept new technologies without questioning.

The research project aimed at understanding how social media could be utilized in business context and what kind of users companies would be, and at producing concept ideas about Web 2.0 and social media services that would fit to SMEs context. Since the aim was both to understand the users and develop new product ideas, user-centered concept development (UCCD) seemed to fit well as a research method. UCCD also has some interesting similarities with Web 2.0 phenomena. Where UCCD emphasizes the users' role in product and concept development and aims at developing products that answer to the needs of the users and fit into their context of use, Web 2.0 emphasizes the users as active members of both using and developing the services.

## **2 Developing Social Media Service Concepts for SMEs**

We used a quite general concept development process, which had similarities with e.g. Kankainen [1], Nieminen, Mannonen, and Turkki [6], and Salovaara and Mannonen [9]. The concept development process consisted of user research, small-scale technology research, concept idea generation and visualization, and concept evaluation. For example Nieminen et

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<sup>10</sup> In January 2008 Facebook had 100 million unique visitors and MySpace 109 million. Chang. M. Facebook vs. MySpace: The battle for global social network dominance. The Industry Standard. <http://www.thestandard.com/news/2008/04/16/facebook-vs-myspace-battle-global-social-network-dominance> (retrieved October 27, 2008).

al's [6] concept development process is promised to be quite lightweight and especially developed for emerging technologies. Thus the selected process was judged as suitable for developing social media and Web 2.0 concepts for SMEs.

The concept development produced quite abstract level concept ideas. The projects aim was not to develop exact products or services but to produce ideas on how the promises of Web 2.0 and social media could be realized in industrial settings. The concepts provided us a way to receive users' feedback on possible social media solutions for their purposes.

User research part of the concept development consisted of contextual interviews in five SMEs located in southern parts of Finland. The interviews lasted from one to two hours each. The main research questions were: what are the current needs and practices of SMEs when collaborating with other companies, and in what kind of context the developed services would be used by SMEs.

As mentioned earlier the technology research was quite lightweight. We examined the basic ideas and technologies behind social media and Web 2.0 concepts and mapped the most noticeable current trends. The technology research was conducted in parallel with user research.

Numerous concept ideas were generated based on the results of both user research and technology research. The best concept ideas were visualized with PowerPoint presentations. The presentations described the main functionalities of the service concept and user interface sketches.

The concept evaluation was done with three SMEs. During the evaluation interviews also the user research results were discussed and validated. The semi-structured interviews lasted 2 hours each. The concept evaluation produced improvement proposals for the concepts and also new information about the companies.

### **3 Results**

There seems to be a clear need for social media services or products for SMEs. All the interviewed people mentioned managing one's business connections as an important but cumbersome task. Keeping track of what is happening with customers, competitors, and business domain in general takes time and is extremely important for the business. Currently the biggest problem is information leakages if and when a key worker leaves the company. The companies did not have any organized ways of sharing status information about the customers, competitors etc. and thus the information as well as the actual contacts were attached to individual workers.

Since the SMEs have only few employees, there are also only a couple of users for the service in each company. However they need to be able to share both the information that is received and produced and the identity of the company in the service. Sharing the information solves a big part of the information leak problem. However the actual contacts to other companies and customers also personified and thus the contacts should also be shared. In practice this means some kind of shared identity.

The current practices of collecting information about other companies and contacting them seemed to be quite similar. For example the process of selecting new subcontractors followed a general process of 1) searching potential partners from own personal contacts, from Internet and from directory services, 2) selecting the most potential partners based on background checks (e.g. customer experiences, financial information, etc.), 3) contacting the companies

usually by phone and presenting an invitation to submit a tender, 4) selecting the best partner based on the tenders, 5) closing the deal, and 6) managing the after-deal feedback etc. This kind of general process sets special requirements for social media services. Of course one could develop a service for supporting subcontracting but the same could also be achieved with quite simple and general solutions where the users/companies can contact each other and exchange openly defined information.

As can be concluded from the previously described strategies of searching potential subcontractors, the SMEs are currently a part of multiple communities and networks. They belong to some business domain or category. The directory services and domain specific fairs and exhibitions are good concretizations of this kind of categorizations. In addition the companies can be subcontractors to some other bigger companies and thus belong to subcontractor networks, or the companies can belong to regional or interest based networks, e.g. network of start-up companies of some specific industry. Networks and communities are important marketing and advertising channels as well as information sources.

The technological context of the SMEs' was quite established. Even though the companies did not have much knowledge and know-how about Internet technologies or computers, they all had managed to build web sites and used email daily basis. Some of the companies even had mobile email and other more sophisticated services in use.

The technology relationship of the companies and employees was much more complex than the technological context. The companies had Internet connections, modern enough computers and sometimes even smart phones that enabled the use of even the high-end web services. In addition the employees were familiar with online services, Internet and some even with Web 2.0 services such as Facebook and MySpace. However the current tools and solutions they used in work were typically very conventional PC software. Also the current practices and habits of work relied on traditional and quite conservative values. Consequently the employees had difficulties in accepting that social media services could be utilized in business context.

The resistance and disbelief was even stronger with utilizing the social media and Web 2.0 ideologies in business. The employees and entrepreneurs were afraid that competitors would be able to piggyback if their company would share and distribute information openly in the Internet. All the interviewed people said that they would require some kind of explicit proof before starting to use such services.

Interestingly the interviewees had also difficulties in understanding how the services could function. The social media approaches were so radical compared to current solutions that everyone had difficulties in seeing what could be achieved and how.

## **4 Conclusions**

The research revealed interesting phenomena relating to possibilities of utilizing social media services in business-to-business services targeted to SMEs. Social media services seem to be plausible solutions to some acute needs and problems SMEs' have. However current Social Media and Web 2.0 technologies and user interfaces promote changes in companies' cultures of doing business and utilizing technologies. The potential of Web 2.0 is related to its new possibilities of open collaboration and free sharing of ideas [2]. The SMEs are not currently used to work in this kind of open ways. The difference between SMEs' current practices and practices promoted by Web 2.0 is clearly visible in three different levels: 1) user interfaces of

products and services, 2) information sharing practices, and 3) business philosophy of companies.

The current user interfaces of products and services in use in SMEs are somewhat traditional PC user interfaces that obey the traditional usability guidelines and heuristics such as Nielsen's Aesthetic and minimalist design heuristic, which says that dialogues (user interfaces) should not contain irrelevant or rarely needed information [5]. Thus the user interfaces of the tools in use in SMEs are about the most important tasks and information. On the other hand Web 2.0 user interfaces try to utilize the power of masses by for example providing prioritized but changing news and other information lists. Good examples of this are "people who bought this item were also interested in..." information available in many popular web-stores. In summary the Web 2.0 user interfaces are about the information that might be interesting or useful to users. The difference between the user interface approaches create a challenge to user interface designers designing social media or Web 2.0 services for business context.

On the information sharing practices level the gap is the difference on the motivation and aim of the information sharing. Currently the main motivation in SMEs is in delivering the product. On the other hand in leisure time (or ordinary life) there has been a trend of spectacularizing and performing meaning that our mundane activities have become smaller and bigger performances and spectacles that we perform to our friends and relatives, i.e. to our audience [3]. The Web 2.0 and social media services seem to promote this trend. The services help and guide the users to share real-time information about the events in their life to their friends and also make it easy to follow friends' activities as remote audience. The difference in information sharing practices seems to require changes in companies' practices for them to be able to utilize Web 2.0 type of services.

The philosophy promoted by Web 2.0 technologies is "you are what you share"[2]. However, the philosophy of SMEs can be summarized in "you are what you can do". The focusing on actual products and capabilities is quite natural. The products and services are the core part of any company. However, in order to truly exploit the Web 2.0 technologies, the companies need to broaden their perspectives.

As a requirement the change in habits and practices of doing business is extremely significant. It clearly sets difficult obstacles for any product that aims to succeed as a social media solution for SMEs. However the requirement for changes is not something that cannot be overcome. Many new systems and solutions change the ways people work either knowingly or by accident. Additionally, the social media services have become hugely successful in leisure time. Thus people probably become slowly but surely more prepared to try them in work context. There is nonetheless a push for any new service to show concrete evidence that the new technology and way of working is in fact more profitable than the current tools and practices. Without a clear proof of concept the resistance is hard to surmount.

The question of how to transform the user interface and interaction paradigms that have been stigmatized to some context to some other remains open. How to transform trendy emerging web services to non-IT-related businesses? We need to either solve the problem or wait until the workers are enough IT-conscious to accept the services as is.

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# Online Tools for Co-design: User Involvement through the Innovation Process

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**Abstract.** Social media tools provide new possibilities to involve end users as co-designers through the whole innovation process. Owela (Open Web Lab) is an online community that supports participatory design within users, designers and developers. Currently Owela serves as a platform that collects user feedback, experiences and ideas from different physical and online sources. In this paper we present the Owela co-design model and tools for different phases of the innovation process. The co-design process consists of open innovation space and scheduled projects for product and service development. We present a case example of the use of the Owela process in a design process of the social bookmarking service called Tilkut. We conclude that online tools can make the co-design easier and cheaper to apply in everyday work. However, the traditional tools and methods can not be directly applied on the web, but the whole design process should be reconsidered in aim to work well online. A combination of online and offline tools is needed for effective co-design.

**Keywords:** co-design, online laboratory, social media, innovation process, web tools, participatory design

## 1 Introduction

Along with the rise of Web 2.0 phenomenon, consumer roles have shifted from passive objects to active participants. Consumers are more and more involved in business processes as co-creators and they are actively participating in the value creation processes. Social media tools offer easy ways for users to share their ideas and feedback openly. Therefore, numerous open innovation platforms aiming to attract consumers to innovate or act as co-designers have emerged on the web.

By opening their innovation processes, companies may increase their effectiveness and enhance their relationships with customers and end users. Co-design describes a process that allows customers to express their product requirements and carry out product realisation processes by mapping the requirements into the physical domain of the product [1] [2]. Co-design process can involve different stakeholders, such as customers, end users, designers, developers and managers.

## 2 Online Tools for Co-design

In order to motivate users to participate in open innovation and participatory design processes, offering appropriate tools for users is important. Understanding the distributed innovation process and users' roles is in a central role. [3] For example, some manufacturers provide users with toolkits and configurations to customise and even design their own products.

Tools for participatory design should enhance and support the creativity of users. Farooq et al. [4] suggest three design implications to support creativity within information systems: 1) Integrate support for individual, dyadic, and group brainstorming; 2) Leverage cognitive conflict by preserving and reflecting on minority dissent, and 3) Support flexibility in granularity of planning. In general, Farooq et al. stress the importance of also including the sceptical voices in the discussion. Furthermore, social networks and their management is a crucial part of creativity. [4]

Technology changes constantly and rapidly, which sets some requirements for the participants, too. A decade ago, most Internet users were, of necessity, skilled computer programmers, or at least, they had a relatively deep understanding of network applications. Nowadays, many people have access to the Internet and the skills that are needed. However, in avoiding misunderstandings and making it easy to participate there is a need for a clear and simple design of service and tools. People are not willing to use too much of their valuable time to learn how a questionnaire should be filled in, for example.

Furthermore, an average Internet user is often overwhelmed by a variety and vast amount of information. For this reason, people have difficulties processing and selecting the relevant information, a factor which increases the demand for clear, attractive design as well. Clearly, utilising an online environment in participatory design requires specific and carefully designed instruments that not only accommodate but also exploit the features of the electronic environment to attract respondents [5].

Finally, one thing to consider is the openness of discussion on web forums. The positive point of view is that the method remains a group discussion enabling participants to gain others' viewpoints. On the other hand, the openness of the discussion can sometimes generate some challenges as well. Firstly, openness can increase a threshold to participate for some participants. Secondly, the openness of the discussion raises a question about the IPR management, and therefore, it is important to clarify guidelines and provide information about such issues for all participants.

In order to attract people to participate in an online community, it is important to know users' motivations to visit the service [6]. In addition to knowing the motivation factors, offering incentives can help in encouraging them to participate. Both monetary (like money, paychecks, fees, trophies and awards) and non-monetary rewards (like member's name in top ten lists, privileges and public recognition) should be used [7].

## 3 Owela as a Co-design Platform

To study the phenomenon of co-design and the suitability of online tools to support the process we have created an online laboratory Owela for designing especially digital media products and services. Owela (Open Web Lab) aims to be a conversational online community that connects users with developers and researchers promoting open innovation. Owela offers social media tools for gathering user needs and development ideas as well as collecting feedback for scenarios and prototypes. The participants create own profiles in the service,

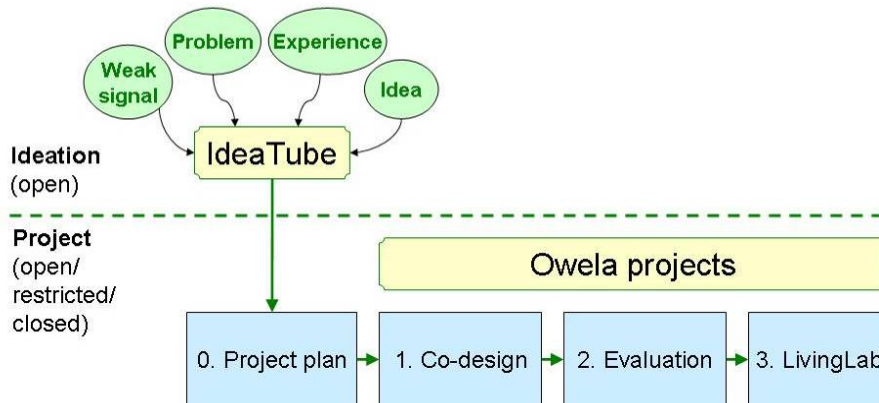
which makes the roles of different people transparent to everyone. Visual aids like profile pictures and different background colours in comments are used to make the roles visible.

We first started with an open innovation space where anyone was allowed to tell their needs and ideas as well as rate and comment on the ideas of others. In the first trials it was seen that people tend to be more motivated to participate if they can clearly see, how their feedback and ideas affect the final product or service [8]. Therefore more structured and transparent process for innovation management was developed.

### 3.1 Co-design Process in Owela

The Owela process consists of two parts shown in Figure 1: open ideation and scheduled projects. The open ideation takes place in a tool called IdeaTube, where participants may report their experiences and problems with current solutions as well as suggest development ideas and needs for new products and services. IdeaTube is a blog based tool where ideas can be rated and commented on by other users [9].

When new ideas emerge in the open space, some of them will be carried on as Owela projects. The project starts with scheduling and goal setting which are articulated also to the participants. The project phases are co-design of scenarios, evaluation of the concepts, and LivingLab, where users can take part as active testers and co-developers of the prototypes. The goal is to provide users not only a channel for feedback and ideas but also tools for modifying or creating their own services together with other users.



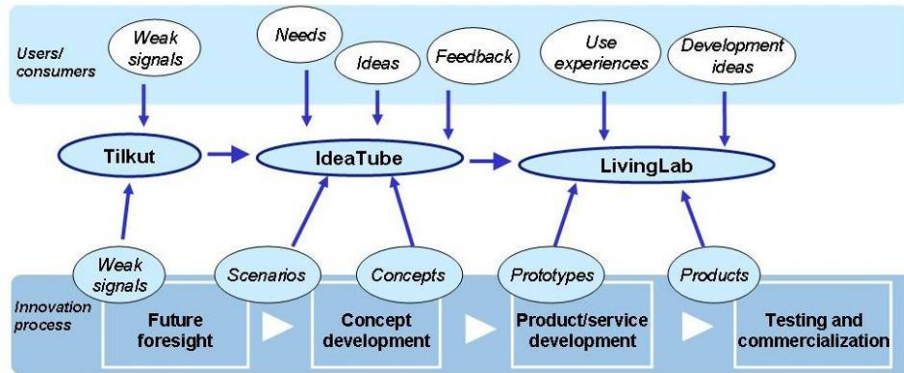
**Fig. 1.** Owela co-design process consists of open ideation phase and scheduled projects.

Common experience shows that consumers typically discuss on services in various online communities as well as in real life discussions. Owela will serve as a platform that collects user feedback, experiences and ideas for further development from different physical and online environments. Various mobile and web tools will be used to gather ideas and weak signals of future trends from different places.



### 3.2 Support for the Different Phases of the Innovation Process

We believe that users can be involved as co-designers in all phases of the innovation process starting from the acquisition of weak signals and future needs and continuing up to sharing use experiences and development ideas when using the real products and services.



**Fig. 2.** User participation and Owela tools for different stages of the innovation process.

Different tools can be used in the different phases of the innovation process as Figure 2 shows. The upper part of the figure shows the input from users, whereas the lower part illustrates the innovation process inside a company and the input from designers and developers. The innovation process starts with future foresight, in which both professionals and end users may participate in finding and collecting weak signals of possible future needs. Social bookmarking tool called Tilkut can be used in that phase to bookmark interesting findings both on the web and in the real world. Tilkut has been developed to make it easy to share the findings within a certain group, categorize them for further analysis and discuss them.

When end users' and designers' insights meet the aims of the company, a concept development process can be started. In this phase IdeaTube can be used for collecting needs and ideas for a certain concept either openly or within a certain group of people in an Owela project. The designers create scenarios based on the user needs and provide them openly for commenting and further development by both the users and the developers. In this phase designers propose new suggestions in rapid pace so that end users can easily see, how their feedback influences the design of the concept. IdeaTube makes it easy to get quick feedback on visualisations of the concept, because the users are ready to comment small changes right away and no special arrangements like focus group sessions or workshops are needed.

Based on the user feedback real prototypes can be developed and tested in the LivingLab that can be either a physical laboratory in the real world or an online test laboratory when it comes to digital media services. In both cases user experiences and further development ideas can be collected in the Owela LivingLab. When people share their feedback within the community, new ideas may evolve as a combination of various comments. Also problems can be solved faster, when the test users can give hints to each other and the developers can participate in the discussion immediately when problems occur. The LivingLab phase may also continue after the commercialization of the product or service. New development ideas can evolve during the real use and serve as a basis for further development.

## 4 Case Tilkut

The Owela co-design process was piloted and developed in the user studies of a social bookmarking service Tilkut that was developed at VTT in a project called Täky. The aim of the project was to study user experience of tagging in different web and mobile applications.

The study started with the ideation phase where problems and needs regarding to tagging were studied with the users of the Delicious social bookmarking service. An online questionnaire and interviews (either face-to-face or phone) were used to find out present tagging conventions and needs for more intelligent services. In the interviews we already demonstrated some features that the researchers had designed for improving the current services. We also gathered ideas for further development in an open IdeaTube discussion in Owela.

After that, the development of the Tilkut prototype started. At the same time, more requirements for the service were collected in a user test, in which a combination of existing online services was tested. Test users were recruited from Owela so that we could know that they were familiar with the online feedback tools. Especially the lead users of the new Internet services were selected to the testing. The inquiry methods included an online questionnaire for background information, initial and final interviews with all participants and an online test period with a certain set of current services, during which the participants discussed their experiences and ways of using the services in a blog.

After analysis of the feedback and further development of the prototype, the third phase of the user study was made with the real Tilkut prototype. In this LivingLab phase users were asked to test the new service and give feedback and ideas for further development. The research methods were interviews, individual testing periods, blog discussion and traditional usability tests. The developers participated in the blog discussion as well, which made it possible to fix some of the reported problems in the software already during the test period. Bigger changes were made afterwards based on the user experiences and results of the usability tests.

## 5 Discussion

The current state of the Web 2.0 makes it easy to take end users as co-designers by using online tools. This is convenient both for the users and the researchers, because everyone can participate in the design process from the place they want and at the time that is best for them. Online tools lower the threshold to invite users into the different phases of innovation process as a daily practice. Online community also serves as a permanent connection to the users throughout the design process and enable a lively forum for discussion and feedback. Since the online space is not limited like physical rooms, more people and different stakeholders can participate more easily and effectively.

Utilising open innovation in scheduled projects needs planning of methods, tools, guidelines and schedule. This is helpful in achieving the goals set as well as in committing the users since they know when the project ends, after which time they will get the outcomes and possible rewards. Besides designing online research environment, strategy for the user administration should be done. In other words, the administrator needs plans on how to attract users, how to activate them, and finally, how to commit them. In addition to offering appropriate service design and tools as well as motivating tasks, rewarding can influence on

users' motivation. Also, rewarding strategy should be well planned in order to lead them into the planned consequences.

The Owela process presented in this paper is not meant to rely only on online communication, but direct interaction with users is recommended. We believe that a combination of online and offline methods with users will lead to the most in-depth knowledge on the users' needs and behaviour. However, the online tools make it in some cases easier to involve the users through the whole process and use them as co-designers in small tasks, as well.

In the future, more research is needed to evaluate the methods and tools presented here. In a current study we compare IdeaTube discussions with traditional focus groups from different view points (e.g. quality and quantity of content, easiness of participation, and efficiency of the method). More empirical studies evaluating the benefits of the online tools will be done in the future.

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