



TOWARDS A LIVING LAB FOR THE DEVELOPMENT OF ONLINE COMMUNITY SERVICES

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ABSTRACT

Living Labs have been introduced in the field of ICT as an environment for involving users in research and development processes, in order to utilize the co-creative potential of users. Even though Living Labs are suitable for involving users as co-creators, no Living Labs have been described in the literature as environments for the development of new services for online communities, in spite of the tremendous growth we have witnessed in the area of online communities during the past few years. The present paper argues for adopting the Living Lab approach as a way to meet current service development challenges in the field of online communities. The argument is based on a presentation of the state-of-the-art of Living Labs, a reflection on existing needs for research and development environments in the area of online community service development, and a set of requirements for a Living Lab for online community service development. The main contribution of the paper is to introduce the idea that the Living Lab approach may be used for purposes of online community service development and innovation. The author also hopes that the paper may be seen as a contribution to the ongoing discussion on what Living Labs should be.

Keywords: Living Lab, online communities, ICT service development

1 INTRODUCTION

Involving users in the innovation processes leading to new ICT services is challenging. This is particularly so when user involvement is to be situated in users' everyday contexts rather than through artificial situations such as workshops, focus groups or user tests. As research and development (R&D) environments in which new ICT services may be implemented in contexts familiar to the users, Living Labs represent a fresh response to this challenge. The Living Lab approach is particularly promising due to the opportunity it gives to try out, and obtain user feedback on, services at different levels of development, where relatively large numbers of users may be involved in the innovation process. Furthermore, the Living Lab perspective on the user as co-creator, rather than a mere receiver of services, is important in order to achieve successful user involvement in the innovation process.

Until now, Living Labs have mostly been used as R&D environments for ubiquitous computing, mobile ICT, cognitive systems engineering, and collaborative work-support systems. However, we also see that the Living Lab approach seem to be suitable to meet evolving needs in other fields of ICT service development. At present, one of the most important new trends in the field of ICT service development is the incredible growth of online communities, which would appear to be a trend that indeed may benefit from the Living Lab approach.

Four or five years ago, only few of us paid much attention to the collaborative Internet services made available through web 2.0 technology: online communities. Today, online communities are among the hottest service areas in ICT. Web sites like YouTube, Myspace and Facebook are achieving tremendous growth, and new online community services are established every other day. Moreover, media houses are looking to online communities as a way of regaining their market share following the loss of users from traditional media like newspapers, radio, and television.

A striking aspect of online community service development is the importance of users as co-creators. Users are content providers, sharing text, pictures, audio and video with each other. Users are also designers, who employ their creative resources to adapt online community user interfaces to their liking. And users are developers, sharing applications and reusable code to be integrated into ever larger online community services.

However, at present the development of online communities typically seems to follow the pattern of "launch and learn", where an abundance of services and service concepts are put to the market and only a few survive. This current state of natural selection seems to work well enough from the customer perspective; you just start using the few success community services your peers are using. From the perspective of the service provider, it is necessary to find ways to reduce the risk associated with online community service development. In any case, as the field of online communities matures, it may no longer be possible for smaller companies with limited resources to be the key actors in improving existing services.

Consequently, suitable development processes and innovation environments are needed in order to develop successful online communities in the future.

The Living Lab approach, involving users as co-creators in contexts familiar to them, would seem to be an interesting candidate for a structured R&D environment for online community services, although optimal use for community service development may require some adaptations relative to earlier Living Lab approaches.

This paper presents how the Living Lab approach can be tailored to successful user involvement in the innovation processes related to online community service development. This is done by a brief presentation of the state-of-the-art of Living Labs, followed by a motivation for why Living Labs should be pursued as an innovation environment for online community services. The requirements for a Living Lab for online community services are presented and deviations from earlier perspectives on Living Labs are discussed. On this basis the outline of a Living Lab for online community services is presented. The Living Lab as outlined will be implemented as part of an ongoing research project. Finally, future perspectives and challenges are discussed.

It is hoped that this paper will serve to introduce the idea that the Living Lab approach may be used for purposes of online community service development and innovation, and that it may be seen as a contribution to the ongoing discussion on what Living Labs should be.

2 STATE-OF-THE-ART: LIVING LABS AS ENVIRONMENTS FOR USER-CENTRED INNOVATION

In order to understand how a Living Lab approach may be used to improve online community service innovation, it is necessary to have an overview of the Living Lab state-of-the art.

There seem to be broad agreement that the term Living Lab can refer to a range of environments or approaches to ICT innovation and development. For example, on the home page of the European Network of Living Labs it is stated: “So what is Living Labs? The answer depends on who you ask because of the big differences between running Living Labs.” (The European Network of Living Labs, 2007)

Motivated by the current uncertainty regarding the defining characteristics of the term Living Lab, the author of the present paper conducted a review of the Living Lab literature (Følstad, this issue). This state-of-the-art presentation is written on the basis of the literature review.

2.1 Living Lab trends

The term Living Lab has been used within the field of ICT research and development since the nineties. Abowd and his colleagues at Georgia Institute of Technology seem to have been the first to use the term Living Laboratory to refer to real-world contexts in which users were given the opportunity to use state-of-the art technology (see for example Abowd, 1999; Kidd et al.,

1999). Similar Living Lab approaches have subsequently been described by other workers (e.g. Beigl et al., 2002; Intille et al., 2005). Like Abowd, these authors present Living Labs for ubiquitous computing (ubiquitous computing) research.

In recent years, two different Living Lab approaches seem to have emerged in the literature:

1. Living Labs supporting context research and co-creation
2. Living Labs as extensions to testbeds.

Living Labs supporting user-centred design or user-driven innovation

The use of Living Labs as environments for (1) co-creation of new ICT services and (2) collection of information on the service's context of use has emerged as a significant trend in recent Living Lab literature. Exponents of this trend include Pierson and Lievens (2005), Hoving (2003), and Mirijamdotter et al. (2006) who present Living Lab innovation processes focusing on the early development phases of needs analysis and early design. Some of these Living Labs (e.g. Pierson and Lievens, 2005; Hoving, 2003) have introduced ethnographic approaches to enable co-creation and data collection on context of use.

Living Labs for user-centred design and user-driven innovation have been used for example in the fields of virtual enterprise services (Katzy, 2005) and mobile broadband services (Pierson et al., 2005). Living Labs understood as regional open innovation platforms (Ballon et al, 2005; Eriksson et al., 2006) also seem to follow this trend.

This tendency to view Living Labs as environments for user-driven innovation is extremely interesting. It seems both to meet a need of the industry with regard to user involvement in the early phases of ICT service innovation, and to establish a Living Lab identify that clearly separates it from related test and experimentation platforms.

Living Labs as extensions to testbeds

Abu-Hakima (1998) used the term to describe testbeds (controlled network environments for test and validation) for ICT services. This view of Living Labs as facilities associated with testbeds has been continued by other researchers such as Zhong et al. (2006a; 2006b). The opportunity to conduct real-world validation studies of testbed applications seems to be an important motivation also for many of the Living Labs belonging to Living Labs Europe (2007).

Within the European Network of Living Labs (2007) there seem to be a tendency to merge Living Lab and testbed facilities, in order to establish environments within which users and stakeholders can collaborate in the creation and validation of ICT services (e.g. de Leon et al.; 2006).

From small-scale to large-scale Living Labs

Another current trend seems to be the move from the rather small-scale Living Labs seen for example in ubiquitous computing research (Abowd et al., 1999; Beigl et al., 2002; Intille et al., 2005), where services access was given to a relatively small number of users, to defining geographical

regions with large numbers of users and state-of-the-art network facilities as Living Labs. Examples of this trend are the Helsinki Living Lab – Arabianranta (Helsinki Virtual Village, 2007) and the Digital Madeira Test Bed and Living Lab (Oliveira, 2006).

One Living Lab of particular note in this regard is the Botnia Living Lab (Ståhlbröst, 2006) which includes a pool of several thousand users available for participation in innovation processes. Unlike other Living Labs with high numbers of users available, the users of the Botnia Living Lab seem to have a broader geographic distribution and have explicitly agreed to be part of the Living Lab as participant resources.

2.2 Characteristics of Living Labs

Characteristic aims across the great majority of the Living Labs, as identified in the literature review, were to:

- Evaluate or validate new ICT solutions with users
- Gain insight in unexpected ICT uses and new service opportunities
- Experience and experiment with ICT solutions in contexts familiar to the users
- Medium- or long-term studies with users

With regard to the purpose of the present paper, it is interesting to note that all four common characteristic aims appear to be relevant also for Living Labs for online community service development.

The review also identified characteristic aims of relevance for about half the papers reviewed. Three of these seem to be of great relevance to Living Labs for online community service development: “Gain insight in context of use”, “Try out ICT solutions with large number of users”, and “Involve users as co-creators”.

3 THE POTENTIAL OF LIVING LABS AS ENVIRONMENTS FOR INNOVATION IN ONLINE COMMUNITY SERVICES

Internet services have been changing rapidly with the appearance of Web 2.0, in particular by facilitating the participation of users as co-developers, online content producers and online community members. According to Alexa (2007), the online community websites YouTube, Myspace, and Orkut were as of June 2007 among the ten most trafficked websites in the world. This sudden change towards online community services represents an opportunity for both service and content providers to establish themselves in a new market, as well as new challenges with regard to design and development.

User behaviour is evolving from passive content consumption to active co-creation of services and content. Users are empowered not only with regard to the content that is produced and how it is presented, but also how the service for content provision is designed. The huge number of blogs in existence is a good example of end-users' willingness to

generate content. User-generated tags may be seen as an example of end-users as co-creators of information architecture. And user-driven interest groups or communities developing new solutions for commercial ICT services indicate that end-users may indeed be useful for co-creating applications. Examples of the latter include interest groups at Myspace.com developing applications that enable users to configure their own Myspace profile pages.

In the case of online communities the service provider is no longer simply designing new services, but is also designing new communities. In many respects, service providers are limited to providing an empty technological shell that may or may not become a thriving online community. The success of an online community depends on a sufficient number of users starting to use the technological shell provided, fill it with content, and shape it according to their emerging needs. The service provider's job is thus not so much to create a finite online community for potential members to move into, as to develop a starting point for the building of a community, and then to engage in continuous development of the online society for the whole community lifecycle. The development will be both technological (utilizing new technological opportunities) and social (making sure that new community members are recruited and that existing community members are content with their membership).

In order to meet the design and development challenges implied in the opportunities of Web 2.0, it is necessary to establish R&D environments that to a greater degree open up for active user participation in the development process, where a greater number of users can be involved and the feedback loop between users and designers is made as short as possible. Given the proven willingness of users to engage in both content and service development, it would seem to be a good idea to aim for systematic Web 2.0 service tools to be used in the design process, rather than merely having these services as design goals.

Would it not be good to be able to discuss new designs with a large number of users? Or ask users for their design suggestions? Or to participate in online discussions in which users comment on and improve your design? In the remainder of this paper, we discuss requirements for a R&D environment utilizing Web 2.0 opportunities for development and design, and present an outline of the Living Lab that will be established in the Norwegian research project RECORD (see www.recordproject.org).

4 REQUIREMENTS FOR A LIVING LAB FOR FUTURE INTERNET SERVICES

A Living Lab utilizing Web 2.0 for the development of future Internet services requires an online environment for user co-creation and feedback on new service and design concepts.

Based on discussions in the RECORD project group, an online environment for user co-creation and feedback should permit the following:

- Developers posting new service and design concepts

- User comments and ratings of suggested services and designs
- Users posting design revisions or alternate design suggestions
- User-user and user-developer discussions
- User feedback on user experience and uptake of running services.

In order to serve as a Living Lab, the R&D environment also requires online access to a relatively large sample group of potential service users. It is preferable to have a high degree of control over the representativeness of the sample. Representativeness is required in order to ensure that the user feedback generated through the R&D environment actually reflects the needs and attitudes of the target user population.

As a final requirement, the R&D environment should include facilities for investigating evolving patterns of use. This requirement implies that it is desirable to be able to follow the same users for a certain period of time. The sample group of potential service users should therefore be stable enough to allow studies to be performed over relatively large periods of time (possibly several years), and should be large enough to permit a certain amount of flexibility with regard to the nature of the services to be evaluated.

5 DEPARTURES FROM CURRENT TRENDS IN EXISTING LIVING LAB LITERATURE

The use of Living Labs for the development of online community services is a promising approach. However, based on the requirements developed within the RECORD project, a Living Lab for online community services requires a slight shift away from the some current ideas in the existing Living Lab literature.

The first departure from the majority of the literature is that an efficient Living Lab for R&D of online community services needs to go beyond geographically defined communities or regions. A Living Lab for R&D in the field of online community services ought to include a distributed selection of participants, since the services to be developed within the Living Lab would typically serve a distributed end-user population. Most Living Labs of today seem to be based on geographically defined populations, but exceptions do exist – such as the Botnia Living Lab (Ståhlbröst, 2006) mentioned above.

The second deviation from the current Living Lab literature is that the physical environments of the end-users should be of less importance. In the early days of Living Labs, the physical environments of users were either simulated, or the technology to be investigated was placed in real-world environments. However, since the online community services to be explored in a Living Lab more often than not will be independent of the physical environment of the user, the importance of the users' off-line environment diminishes; usually it is sufficient that the user has stable broadband access and a suitable computer. At the same time, the users' online context – typically that of other websites or online services - will become increasingly important.

6 A LIVING LAB FOR ONLINE COMMUNITY SERVICES

In the RECORD research project, a Living Lab for online community services is being developed as a joint initiative between industry and research partners as well as the Research Council of Norway. The first version of the Living Lab will be established in 2008. A similar current initiative has been described by Näkki and Virtanen (2007).

The RECORD Living Lab for online community services will be developed in order to facilitate:

- Knowledge of evolving user patterns
- Knowledge of online community success factors
- Design dialogue between developers and users
- Rapid evaluation of new design and service concepts.

The outline of a Living Lab for online community services is based on two core elements: a user panel and an online environment.

6.1 User panel

The Living Lab user panel will consist of 3-4000 users, selected from a national representative panel of 60,000 persons. The Living Lab user panel will be recruited in such a way as to be representative of Norwegian Internet users in the age range of 15 to 40 years. Detailed information on the participants' characteristics will be gathered according to the needs of the industrial partners using the Living Lab.

The user panel may also be extended to include participants who are users of relevant existing services at Living Lab industry partners, in cases where service knowledge is required in order to generate relevant results.

6.2 Online environment

The Living Lab participants will be invited to engage in design dialogues, evaluations and design feedback activities. All activities will be conducted in an online environment with facilities for developers to present design concepts, early prototypes and aspects of running applications. Early design concepts can be presented in the form of images, videos and storyboards. Prototypes and running applications can be presented as integrated elements in the Living Lab online environment.

Through the online environment, developers may present concepts and designs at practically any level of fidelity, for immediate end-user feedback from the panellists. Posted design suggestions may also trigger discussions between developers and the user community. Simpler forms of design feedback may also be provided, such as simple rating mechanisms for individual design suggestions, or voting for competing designs. Users may also be invited to complement or extend suggested designs, or to present their own concepts.

6.3 Methods and development processes

The Living Lab for online community services will allow a broad range of methods to be adopted, depending on the objective of the data collection or development activity. For investigations of evolving user patterns, methods such as online surveys, online group interviews and discussion boards may be used. Relatively new methods for user pattern investigation, such as online group interviews and discussion boards, may be validated through comparative analyses, with results generated from well-known methods such as surveys and traditional group interviews.

Activities for requirement elicitation and design information may be implemented through digital ethnographic methods and online adaptations of user-centred design methods. Similarly, evaluation activities may be performed through the online environment, which should permit more efficient evaluations to be made. This may be utilized as a means of performing a larger number of evaluations in order to allow reliable comparative evaluations of competing designs to be made. For purposes of investigating the validity of particular methods, comparative studies of traditional off-line counterparts of individual methods will be performed whenever feasible.

It will be a challenge to adapt the methods and Living Lab environment to the particular development processes of the involved industry partners. In order to facilitate this adaptation, the industry partners have been actively involved in establishing requirements for the first version of the Living Lab, as they will be in the redesign of the Living Lab when the second version is to be established.

The relationships between the Living Lab, the service under development and the activities meant to investigate the validity of the methods used in the Living Lab online environment are illustrated in Figure 1.

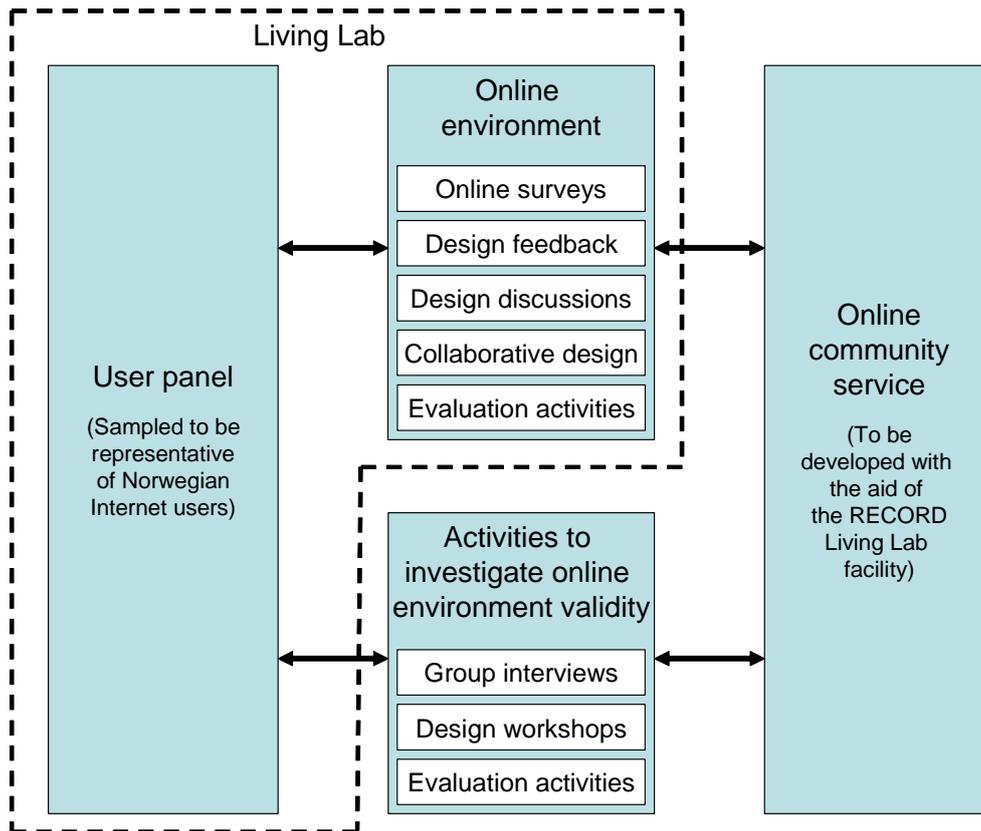


Figure 1: The relationships between Living Lab components, services under development, and validation activities

7 FINAL WORDS ON LIVING LAB DEVELOPMENT FOR ONLINE COMMUNITY SERVICES

In the immediate future, work on the RECORD Living Lab for new Internet services will include setting up the Living Lab panel and online environments. The next priority will be to study the methods used in the Living Lab. Work will also be done on adapting the Living Lab methods to the development processes of the Living Lab industrial partners.

The development of a Living Lab for online community services is in many ways a journey into the unknown. It is to be hoped that the knowledge and experience represented in existing Living Lab research may make the journey more pleasant.

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