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Co-Design and Web 2.0: Theoretical Foundations and Application

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Abstract: Web 2.0 is not just a new buzzword. It represents a new direction of development in the ICT-field strongly related to co-design. The theoretical foundations of co-design as a mean for explaining contemporary practical and theoretical development trends in the ICT-field will be discussed using the e-Me project as an example of a contemporary effort. In this a focus will be put upon both the design process and the resulting artefact as such. By doing this we would manage both to theoretically validate the ongoing trends and also provide inspirational thoughts for how to manage the continual development of the ICT-field in the future. When putting the co-design oriented thinking into application a number of other complimentary trends could be identified. These integrate old classical domains such as private and public, education and work, science and politics, enabling new types of e-services.

Keywords: e-Me, e-empowerment, collaboration, communities, mentality, co-design, web 2.0

1. Introduction

The underlying assumption in this paper is that web 2.0 is not just a new buzzword but represent a direction of development in the ICT-field with both impact and potential. The main idea in this paper is that theoretical explanations may help us to see the potentials of web 2.0 at the same time as they open new views indicating future possibilities. One of the strongest trends in the ICT-field of today is e-empowerment of different kinds of clients, such as citizens and consumers. This means that more emphasis is put upon the possibility for clients to manage and contribute to the information galaxy [2] – both in terms of the use and supply of content as well as services. An often mentioned concept in relation to this trend is Web 2.0. O'Reilley [22], as one of the people who coined term, claim that

> "Web 2.0 is the network as platform, spanning all connected devices; Web 2.0 applications are those that make the most of the intrinsic advantages of that platform: delivering software as a continually-updated service that gets better the more people use it, consuming and remixing data from multiple sources, including individual users, while providing their own data and services in a form that allows remixing by others, creating network effects through an "architecture of participation," and going beyond the page metaphor of Web 1.0 to deliver rich user experiences."

Web 2.0 is a concept that put emphasis on participation and co-production of data and services. Some key characteristics of Web 2.0 [22, 23] are especially Rich Internet Applications, User-generated content, Semantic Web, Recommendations, Social Networking, Syndication/mash ups, Open Standards, Software as a service, Personalization, User-generated Services, and Device Independence..

From a theoretical stance these characteristics can to a high degree find explanations within the systems ideas launched by e.g. Churchman [6]. Based on these ideas the notion of co-design was coined by Forsgren [8] (In Swedish: "Samskapande"). His principal idea was that we can design an unlimited number of views on reality. Every view implemented in IT gives new options and benefits for different groups of people. Therefore to optimize the value of these new options the interests of as many as possible of the influenced groups of people should be involved in a co-design of the implemented view. From this angle web 2.0 can be described as a set of models, methods and techniques to bring interest and energy from influenced people into a co-design process. Since the designed perspectives in such process also can be described as knowledge and the implemented views can be regarded as technology the long term development can be described as making influenced people co-producers or co-designers of knowledge and technology.

From a historical perspective we can see a number of different approaches aiming at involvement of users in information systems development in what is called socio/technological approaches [21]. In Scandinavia Langefors [14] with his infological approach was a pioneer for this work. Later Goldkuhl [11] and others have further developed this tradition. All these approaches get theoretical inspiration from philosophical work on how to relate to the fundamental questions of data, information, communication, and knowledge. With our co-design approach we want to take this approach one step further both by considering the philosophical foundation and give examples of such approach have impact on information systems development.

There are today contemporary efforts building on to the idea of web 2.0. One such effort is the e-Me project [2, 3] highly influenced by the necessity of a high degree of stakeholder involvement. The e-Me project is about exploring the concept of an electronic assistant as the next generation of platforms for people-centric e-services. In its start the e-Me project focused students as one category of people. This exploration has been done in conceptual development (refinement of the vision), realization of the e-Me as an artifact, and in a phase of proof of concept involving several future users in the spirit of co-design. The line of action adopted in the e-Me project has been inspired of design science [13]. The users, in their "business" environment, were co-designing a future situation with an electronic assistant supporting them in the management of the lives as students.

2. Objectives

The objective of this paper is two-folded. First of all some theoretical foundations of co-design as a mean for explaining contemporary practical and theoretical development trends in the ICT-field will be discussed using the e-Me project as an example. In this a focus will be put upon both the design process and as the resulting artefact as such. By doing this we would manage both to theoretically validate the ongoing trends and also provide inspirational thoughts for how to manage the continual development of the ICT-field in the future. Secondly, some claims, founded in the theory of co-design supported by examples from the e-Me project, of future trends going beyond web 2.0 will be discussed.

3. Methodology

The theoretical sources are both principles of co-design together with what is claimed to be constituents of web 2.0 [5, 22]. Empirical sources are both reports upon contemporary efforts [10, 20] and with experiences from the e-Me project [2, 3, 15]. The e-Me project is to regard as design-oriented action research [16] in which researchers have been collaborating with businesses and organisations as well as end-users in creating new knowledge. Such dynamic interplay between these actors and processes constitutes the core

of the co-design knowledge creation process [12]. The result of the work is a new type of infrastructure supporting an ongoing co-design of new citizen centric services.

4. The Foundations of Co-Design

Co-design is to a high degree inspired by Churchman and his late postmodern writings [7]. The basic fundament can be described as a social constructive pragmatism where it is possible to design an infinite numbers of views of reality. They may differ in their granularity (level of detail), their level of abstraction, and so on. Every such view opens for actions and possibilities in specific directions. People affected by such actions are regarded as stakeholders. A view of a university focusing healthy living opens for possibilities for healthy living students and so on. In that way all views are corresponding to values and interests of different groups of people. As an example a university view showing night life will attract a different group of stakeholders/students compared to the healthy living view. Important is that these groups of people and their values are in a state of continuous change. It is also stated in this theory that quality of information and services is related to stakeholder satisfaction. A university with information about healthy living is of good quality from the point of view of healthiness interested students. This also implies the need for, in this case the university, to decide what type of "ideal" student life they want to support. An effective technique to strengthen the co-design process in this sense is to use short co-design scenarios. In such scenarios we can follow the student in a future ideal episode of importance in the students' life.

To be able to design a good e-Me the students have to reflect and decide what life they want to live as students. When they have an idea about that then they can implement that view into their e-Me mentality. That mentality is part of a general framework where e-me mentalities can be embedded. In Churchman's terms the co-design of this general framework is the same as to "calibrate" the viewing instrument. This necessity to agree upon some common design for a system has also been put attention on by other scholars [18]. This collective, or individual, process of challenging existing views, designing new views and choosing the best one for re-implementation is called co-design. It has shaped the way we look at knowledge in general and information systems in particular [1, 4, 19].

5. The Concept of e-Me – Towards an Artefact Enabling Peoples Co-Design of New Services

The e-Me is a (personal) electronic assistant that helps people in organizing their life [2, 3, 15]. So far the e-Me has been explored as a filter and an agent for students. In the student situation this means both in their professional development and in their existence in collaborative environments. This involves, for students, activities such as organizing the course schedule, buying or lending course books, planning public transport, managing study progress, and so on. Today students have to go to a number of places, both physically and virtually, to accomplish that. e-Me will turn that process around. The vision is that the students should not need to go to the information; the information rather comes to the students based on the active profile or e-me mentality set by the student.

Today students, as many other groups of citizens, are offered, indeed required to use, a rapidly increasing number of e-Services. They range from school and course sites to interactions with authorities as well as companies offering student discounts. This forces students to remember a multitude of user IDs, passwords and login procedures. On top of this students are often provided with special email accounts for courses and educations. Many students have four or more different email addresses. Consequently a lot of time is spent on logging on to different mail systems, trying to find passwords and links to various sites. On top of this they also need to organize their life in establishing their identity in

collaborative settings. These types of problems are not only restricted to students, but as they are an experienced group of citizens they are the first group of citizens involved.

The e-Me will act both as an agent for individuals and as a filter in the information galaxy. It takes as its starting point the individual and his/her life situation, instead of the organization which is providing services to the individual. An important part of the vision is that the e-Me should evolve over time with input from different stakeholders.

The core of the e-Me consists at the moment of the following components:

- Calendar management, in which the user's calendar can be shared with other e-Me users' calendars.
- Mood management, in which it possible to set and manage in which mood the e-Me user is. Three possible moods have been implemented so far; private, meeting and open. The mood is the individual's desire in its relation to the environment.
- Mail aggregation, in which mail can be popped from different sources and distributed to the user dependent on the mood that is set.
- Contact Management, in which contacts can be grouped into different categories and a status of the contact, can be set in relation to the possible moods.
- Archives, in which files (of different types) can be stored and shared with others.
- Assignment, in which the user manages all tasks assigned to the e-Me. In the pilot version four assignments has been implemented. These are the possibility for e-Me to receive study results, get the schedule into the calendar, receive this weeks lunch menu, as well as matching desires and needs of offers from organizations with students discounts.
- Community, where the stakeholders; users, developers, e-Me project management and service providers can discuss the e-Me, suggest improvements/additional services and share experiences.

In the first pilot study (the phase of proof-of-concept) 120 students became a part of the e-Me project as co-designers [15]. The students co-designed e-Me by writing ideal scenarios. They also tried out the prototype – both in order to identify shortcomings in the application and identify new usage situations, both within and beyond the school setting, when an e-Me would be of assistance. To make this possible a particular (virtual) community space was created as part of e-Me. In this space interaction between different stakeholders, such as the project management, researchers, designers, service providers, programming team, and students as users took place. The goal was to create an on-going and lasting co-design between the various stakeholders in order to create new possible views to be implemented in the concept of an electronic assistant.

During the test period of 3.5 months, the project implemented several refinements. To stimulate continuous interest among the students for being part of the project we used several different mechanisms, such as meetings, workshops, media exposure, continuous updates of the e-Me, and role-plays. The results of the pilot also did show that it was a big range of interests among the students. Some students had very limited ideas of what the e-Me could do to help them while other students had developed ideas on how the e-me could be their bodyguard on the internet. During this process it was clear that the electronic assistant metaphor stimulated ideas about future design options. In the conceptual development it was identified that students, in Sweden and Spain, of today have two important qualities; they are professional and collaborative [2]. This lies well in line with MeWe-generation [17]. This generation is constituted by individualists but no "hardcore" egoists since they put value in friends and collective solutions.

Using the assistant metaphor it would be possible to say that different students could imagine different mentalities of their e-Me assistant. That is also to say that in Forsgren's terms they wanted to implement different views of the reality. In Forsgren [9] this process is described in more detail as co-design where a specific view is co-designed and

implemented as solutions in products and services. In the virtual co-design platform they could get inspiration from each other, both in the sense of finding new usage situations and in the sense of helping each other in finding different usage situations when the e-Me would be of value, as well as they could stimulate the development of the general framework.

In that way, a high degree of participation in the co-production of the content, has been an important driver in the design, development, and evaluation of the e-Me artifact as well as in the requirements on the e-Me as an artifact. e-Me, as a personal electronic assistant, should enable users, by its connectivity, to co-produce content and services.

From a Web 2.0 point of view the e-Me pilot as it is now still miss a number of collaborative dimensions to be explored. A deeper investigation, covered in the next section, into the web 2.0 will make that clear.

6. Contemporary Developments in the ICT-Field

Web 2.0 is to be seen as a reaction against Web 1.0 with static homepages consisting of information meant to be spread to others. Before entering the Web 2.0 world the development towards higher degree of possibilities to interact with organisation-centric web sites became a reality. The 1.0 world has resulted in billions of web sites as part of an increasing information overflow. This has been identified as the electronic service paradox in the sense that there are simply too many sites, services, and communication, but still there are things people cannot do electronically [3]. Key characteristics of Web 2.0 as a collection of trends in Internet development that go beyond the traditional site-html-browser structure are [5, 22]:

- Rich Internet Applications ("Web as Platform"), which is driven from mobility problems created due to locally stored data. These problems have created a need for store data remotely and access the data through applications in different devices.
- User-generated content ("Open Content"), which is driven from the idea that authors generating contents, are of less quality than the co-design of the content from all "readers". The solution is to let users "co-design" the content.
- Semantic Web driven from the problem of that content is categorised using algorithms instead of its semantic meaning. The solution is to let the user categorise or co-design the categorising framework.
- Recommendations driven from the problem of others (than the users) are judging the value of the services. The recommendation is to let users tip each other.
- Social Networking driven from users wanting to find others with similar attributes. The recommendation is to let users to come into contact with each others networks.
- Syndication/mash ups driven from the problem that information is owned by organisations and not distributed to others. The recommendation is let the content become "official" and in that way make it possible for services building on "integration" of information from several sources.
- Open Standards as a consequence of the point before where different systems have problems in interact due to problems of interpretation of different formats. Open standards should be used instead.
- Software as a service ("Light-weight Business Models") driven from the inflexibility resolved in letting users buying licenses for a static product. Other forms, such as subscription, are recommended as an alternative.
- Personalization as a reaction against that systems are not adapted to the desires of the individual. Personal profiles should be stored and continuously adapted based on the behaviour of the user.

- User-generated Services which is a reaction against that most services are built by information providers. The recommendation is to give users a platform for building services for themselves and for others.
- Device Independence, which is driven from the fact that data is only possible to access for certain devices. The recommendation is to develop and use standardised techniques for overcome this problem.

In the table below we put these characteristics in relation to the evolving e-Me artifact as it stands for now.

Table 1: Web 2.0 Characteristics and its Resonance in the e-Me Galaxy

Web 2.0 characteristic	**Resonance in the e-Me galaxy**
Rich Internet Applications	Data is stored remote and possible to access remotely
User-generated content	The use of archive as a shared area for e-Me users. A more structured approach to this will further explored in coming pilots. The community site, built on share point server, let the users generate content jointly about experiences and desires of e-Me.
Semantic Web	Not implemented yet, but the archive could be developed in this directions. All users have the possibility to include new categories on the community. Some stakeholder groups have the possibility to define higher-level categories.
Recommendations	Some parts of it is implemented through the community by users interacting with each other in recommending services and sharing experiences.
Social Networking	e-Me:s could connect to each other. The scenarios do however not yet show the need for letting the networks of one person's be connected to others (c.f. e.g. LinkedIn).
Syndication/mash ups	A strong design parameter for the design of e-Me has been to stress the question of integration of information aimed for different purposes.
Open Standards	In the next pilot protocols for enabling different services to become part of the e-Me eco system.
Software as a service	In the next pilot the business model for the e-Me galaxy will be further explored.
Personalization	e-Me would let the user make their own settings in regards to e.g. mood, preferred assignments (such as desired offers), calendar, contacts etc.
User-generated Services	Due to that protocols become standardised this will let the user build his/her own services to be deployed in the e-Me galaxy.
Device Independence	e-Me could be accessed from different devices; computer connected to Internet and the mobile phone as the remote control to the e-Me galaxy.

As can be derived from the table there are a number of collaborative potentials in the e-Me for letting people through their use of e-Me's interacting with each other. So far, the community space has this role. This community space does however have a stronger resonance related to the development process. Some initial parts of the e-Me as an artefact have the potential in being developed towards a stronger support in future collaboration.

7. Implications: What is There to be Seen Next?

In the co-design theory it is stipulated that the overall quality of services will increase if as many as possible of the stakeholders are active involved in co-producing the service. Web 2.0 is mainly a set of techniques making it possible for stakeholders to be involved and to build on results produced by others. In that sense the e-Me pilot, with its community, as it stands now is an example of a web 2.0 artefact.

In the e-Me case both groups of students and individual students are designing their view to be implemented as a mentality in their virtual e-Me assistant. It can be identified that they learn from each other in their discussion about the ideal e-Me. Taking that into account it would be possible to create a library or an arena for exchange of possible e-Me mentalities to download and try out as a learning experience.

Another important discussion and development can be expected in correlation to the e-Me mentality framework. The key question is going to be responsibility and trust. In the university case, should a specific university allow an e-Me framework that makes it possible for students to connect to other competing universities? Who is responsible if a student are designing and using an e-me mentality designed to harm other peoples e-Me? Is that the student or the owner of the e-Me framework? Of course we already have these questions all the way from the birth of the technology itself. The difference is that these earlier “philosophical questions” now become practical concerns.

Related to the question of responsibility is the even bigger question of “world order”. A further developed web 2.0 applications as well as a co-design application is challenging the classical borders between public and private in one service as well as it is challenging the classical border between science and politics. One consideration in the same area is whether there should exist a court in the e-Me galaxy governed by the clients (= students)

The e-Me service accepts integration of both private financed and public financed services. Maybe new forms of combined financing will be best suited for survival? In a similar way an e-Me mentality designed for selecting the best area to live in will be both scientific in its models but also highly political in its impact. This example also gives a hint to a new future co-design oriented science where the creation of knowledge is regarded as a process of co-design.

Finally we have the co-design communities. They opens for companies to use students as important co-designers of their own services as well as they open for students to be active in real systems development. The border between education and practice is not so easy to see any longer.

8. Conclusions and Summary Recommendations

Given the foundations of co-design the development towards e-empowerment of clients is a central point. An interesting observation though is whether we have reached far enough. When putting the co-design oriented thinking into application a number of other complimentary trends could be identified. All of them are challenging old classical borders.

The recommendation is obvious: Be open-minded - a fundamental change of old classical beliefs and assumptions are under way. New classification borders are going to be developed in line with the co-design thinking where web 2.0 can be viewed as a first step.

Another important conclusion is the necessity for going beyond the web site as a design metaphor for e-empowering clients. Potentially e-Me as a device-independent platform for e-empowerment distributing user generated e-services in a public-private partnership business model would be an alternative design metaphor. This platform is also a starting enabler for people to exist in a collaborative world without any “real borders” for joint creation of the future. By letting several views of reality be “collided” with each other in co-design processes, by the support of virtual platforms, different desires and roles will

evolve. People and organizations acting as clients in this galaxy will individually and jointly form their desires, judgments, and recommendations of what is good and bad. People and organizations acting as service providers in this galaxy will have a chance to contribute with services that the clients actually desire. Due to an increased globalization and development of infrastructure in diverse corners of the world such platforms, as e-Me is an example of, will be an enabler for people to be included in the information galaxy in a preserved way.

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