INTERACT 05-Workshop

User Involvement in e-Government development projects

Program Committee

Asbjørn Følstad
SINTEF

John Krogstie
SINTEF

Reinhard Oppermann
Fraunhofer-Institute for Applied Information Technology FIT

Dag Svanæs
NTNU – Norwegian University of Science and Technology

Workshop Program

0900-0915 Introduction and presentation

0915-1030 **Session 1: Strategies for user participation in e-Government development**

User involvement in large-scale e-Government projects: Finding an effective combination of strategies and methods
Anne-Marie Oostveen & Peter van den Besselaar:

User participation supported by usability engineering experts in e-Government projects
Reinhard Oppermann

Why do we involve users? The role of the HCI practitioner in e-Government projects
Asbjørn Følstad

1030-1050 Coffee brake

1050-1205 **Session 2: Stakeholders in e-Government projects**

Successful redevelopment of e-Government systems: Outcomes determined by system engineering approaches
Heba Mansour, Filiz Karabey & Paola Amaldi

User involvement in identity management e-Government architecture development
Kamelia Stefanova, Dobrina Kabakchieva & Lia Borthwick

Stepping carefully between powerful users: An incremental approach to system development in political mine fields
Lars Risan

1205-1300 Lunch

1300-1440 **Session 3: Methodological approaches to user-centred e-Government development**

Situating the transient user: overcoming challenges in the design of e-Government systems
Philip Inglesant & M. Angela Sasse

Service Design methods and UCD practice: Service Design methods as an approach to e-Gov development
Stefan Holmlid

A procurement approach to user involvement in e-Government
Henrik Artman & Erik Markensten

Prototypes and tender documentation: Overcoming the gap from specification to design
Jan Håvard Skjetne

1440-1500 Coffee brake

1500-1630 **Session 4: Thematic group discussions**

1630-1700 Presentation of group discussions and wrap up

Introduction

These are the proceedings from the full day workshop on practices and methods for user involvement in e-Government projects, arranged as part of the international conference on Human-Computer Interaction, Interact 2005.

e-Government may be defined as "the use of information and communication technology in public administrations combined with organizational change and new skills in order to improve public services and democratic processes and strengthen support to public policies" (eEurope 2005: An information society for all). e-Government IT development projects include IT-based service and system development in the public sector where the end-users either may be employed by the government or may be external users including citizens or private enterprises.

The objective of the workshop is to establish an overview of user involvement practices in ongoing or recent e-Government projects. The participants of the workshop were invited to provide presentations based on their experience and research on user involvement in e-Government projects. Hopefully, the experience from different projects will enable the persons present at the workshop as well as others with a basis on which to discuss factors contributing to successful user-involvement in e-Government projects, and recommendations for best practices.

Three main questions were expressed in the call for the workshop

- How should user involvement be conducted in e-Government projects?
- Are current methods for user requirements engineering and evaluation sufficiently suited to the characteristics of e-Government development?
- What is the state-of-the-practice for user involvement in e-Government projects today?

The papers submitted to the workshop have been reviewed by at least two of the members of the program committee. 10 has been accepted, four after modifications of the initial submission.

The workshop is structured in four sessions. Sessions 1-3 are constituted of paper presentations. Session 4 will be group discussions.

Session 1, "Strategies for user participation in e-Government development", includes three papers oriented towards how end-user participation may be integrated in e-Government projects on a strategic level. Oostveen and Besselaar describe the challenge of conducting user involvement in large-scale e-Government projects with existing methods and offer an analysis of factors specific for e-Government projects to include users as employees and as citizens on all hierarchical levels. Experiences with combining participatory design and technology assessment in two large-scale projects are presented. Oppermann provides background on methods of user participation and discusses user participation and supporting expertise in ergonomics as a combined strategy for e-Government development. He concludes that adaptivity and end user development complements the possibility for the user to identify and articulate own requirements before or during design and implementation, as well as provide a means for user participation throughout the system life cycle. Følstad argues that e-Government project leaders of today are well aware of the importance of user involvement. However, in order for the methodological toolbox of Human-Computer Interaction to be used in e-Government projects HCI experts need to explicate the importance of utilizing user-involvement methods particularly suited to the software development process. With their

combined coverage of participatory design and HCI approaches to e-Government development as well as discussions of methodological consequences of the strategic approaches to user participation, the three papers of the first session should provide an interesting backdrop for the remainder of the workshop.

The papers of Session 2, "Stakeholders in e-Government projects", are oriented towards the stakeholder level of user involvement, rather than the level of end-users. The concept of stakeholders may include government bodies and decision makers as well as organizational units and professional groups. Mansour, Karabey and Amaldi argue for the importance of taking a stakeholder perspective on systems development. Their argument is well grounded in the case of redevelopment of the National Health Services where important socio-technical issues has been overlooked due to a "hard" approach to engineering requirements, rather than a "soft" stakeholder-oriented approach. Stefanova, Kabakchieva and Borthwick present a case of participation of different national and EU-levels of government in a concrete e-Government project on identity management architecture. A critical element in this project is the engagement of EU governments in order to stimulate political consensus and support. The authors present the project's government engagement strategy which constitutes a way to conduct stakeholder-involvement at an international government level. The final paper in the second session is written by Risan who presents a case of e-Government development where an incremental approach to system development has enabled the development project to navigate between powerful stakeholders. The case is the development of a trial version of an electronic mail journal where the involvement of only a few stakeholders and a limitation of scope of the service have made it possible for the journal to evolve to become an institution. All three papers of the second session present interesting cases of e-Government development. In addition they serve to broaden the scope of user involvement to include also the level of stakeholders.

Session 3, "Methodological approaches to user-centred e-Government development", includes four papers directly oriented towards particular methodological approaches to user-centred development of e-Government development. Inglesant and Sasse present the challenge of developing increasingly ubiquitous e-Government services for large numbers of heterogeneous users. A case study of information systems in transport is presented, and a situated design approach is presented as a possible methodological approach to go beyond the mere support of static usability knowledge. Holmlid presents service design methods as a supplement to user-centred design practice in e-Government development projects. The service design approach and methods are illustrated through a case of government public relations. The two last papers to be presented at the workshop are both addressing the methodological challenge of bridging the gap between e-Government project owners and (external) software developers. Artman and Markensten points out that it is often assumed that user involvement is the responsibility of the developer organisation. However, for many e-Government projects the requirements and specification is developed before the developer organisation is included in the loop. The consequence is a gap in knowledge between the (often internal) project team involved in the specification phase and the (often external) project team involved in the development phase. Artman and Markensten explore personas and prototyping as a methodological vehicle for what they term "a procurement approach to user-centred design". Skjetne also addresses the gap in knowledge between the procurer or customer and the developer. Grounded in theory of boundary objects Skjetne explicates a number of characteristics of objects that may serve to bridge this gap. Prototypes are then discussed with regard to their adequacy as boundary objects. The methodological considerations of the papers in the final paper presentation session serve as a focusing and detailing of the issues dealt with in the two previous sessions.

We hope that the three paper sessions, as well as the group discussions of Session 4, with their combined coverage of strategies and methods for end-user and stakeholder involvement, provide a good foundation for fruitful discussion and relevant future research on user involvement in e-Government projects.

Program committee

Asbjørn Følstad, SINTEF

John Krogstie, SINTEF

Reinhard Oppermann, Fraunhofer-Institute for Applied Information Technology FIT

Dag Svanæs, NTNU – Norwegian University of Science and Technology

Acknowledgements

Content

User involvement in large-scale e-Government projects: Finding an effective combination of strategies and methods

Anne-Marie Oostveen & Peter van den Besselaar
Social Sciences Department, NIWI-KNAW
Royal Netherlands Academy of Arts and Sciences
anne-marie.oostveen@niwi.knaw.nl

Abstract

Many methods have been developed for engaging users in systems design. Our research found that traditional methods for user involvement do not apply to the development of large-scale e-Government systems. Nonetheless, involving the users in the design process of technological innovations is paramount for the success of these systems in terms of acceptance, trust and use. The aim of this paper is to shed some light on user involvement methods in e-Government projects. To begin with, we argue that - especially for e-Government - it is crucial for citizens to be involved in the design and implementation of new systems. Further, we will explain why involving users in large-scale innovations is different from traditional user engagement. Finally, we will briefly show how we tried to combine participatory design (PD) and technology assessment (TA) methods to effectively involve end-users in two e-Government projects and discuss whether this was a fruitful exercise.

Introduction

The intended effect of e-government technology is to make government more efficient. Citizens are expected to access information and services faster, in a more personalized manner and cheaper than before. The new technologies may enable politicians and public administration to serve the citizens better and would allow citizens to keep closer tabs on the performance and actions of their government. In addition to a better service provision, it is predicted that e-Government technology will empower democracy as it will gradually close the distance between the citizen and the legislator. With a wide range of technology-based approaches and new techniques government is hoping to attract those people who are not yet involved with the more conventional methods of citizen participation in governance.

In the past five years we have worked on two large-scale EU funded e-Government projects. The European Commission wants to reap the benefits of the Information Society. Many initiatives were launched to accelerate the European economy's modernization and to contribute to employment, growth, productivity and social cohesion (Liikanen, 2003). The FASME (Facilitating Administrative Services for Mobile Europeans) project aimed at developing a prototype of a system that supports Europeans in solving administrative problems when they move to another European country. The goal of the TRUE-VOTE project was to design and implement an e-voting system based on digital signatures and Public Key Infrastructure (PKI). The system allowed citizens to cast a ballot from home, work, or abroad on any computer hooked up to the internet. One of the questions we asked in both projects was: *How are these large-scale systems developed and how can users participate in their*

design? Our role in the projects was, on the one hand, to investigate how users can be involved in the development and implementation of large-scale systems and, on the other hand, to look at the effects of these complex systems, and the conditions under which they are implemented. As our study aimed to seek insightful opinions from the users, a combination of methods – testing the system, questionnaires, focus groups, interviews – were applied.

Why user-involvement in e-Government projects matters

We analyse new e-Government applications from a social informatics perspective. Social informatics is "the interdisciplinary study of the design, uses and consequences of information and communication technologies that takes into account their interaction with institutional and cultural contexts" (Kling, 2000). Social informatics has taught us that it is important to not only look at technology from the designer's point of view. Technology development is a process in which multiple relevant groups negotiate over its design. Each of these different social groups has a specific interpretation of an artifact and will see and construct quite different objects (Klein and Kleinman, 2002). Pinch and Bijker (1987) define social relevant groups as "all members of a certain group who share the same set of meanings attached to a specific artifact". Different groups will not only define the problem differently but things like success or failure are also rated differently. This means that there is not just one possible way, one best way, of designing an artifact. A relevant social group can be an organization, institution, or (un)organized group of individuals, and can be very heterogeneous. Kling et al. note that: "ICT design reflects an ongoing discourse among developers, and between developers, people who will use the ICTs, and other stakeholders" (Kling et al., 2000: 120).

Technology design is an open process that can produce different outcomes depending on the social circumstances of development. Artifacts and systems are the products of intergroup negotiations (Klein and Kleinman, 2002). It is known from the literature that not all social groups will have equal access and power to influence technological innovations (Winner, 1980; Douglas, 1990; Russell, 2002). Class, race, gender, education and ethnicity may be important factors in the evolution of technology (Winner, 1980). Pinch and Bijker point out the importance of relevant social groups in the development of technology in their Social Construction of Technology (SCOT) theory; yet implicitly, Pinch and Bijker's SCOT theory assumes that groups are equal and that all relevant social groups are present in the design process. This assumption fails to adequately attend to power asymmetry between groups. Some groups may be effectively prevented from participating in the design process at all (Williams and Edge, 1996; Klein and Kleinman, 2002).

Hamlett (2003) observes that: "it is only a small step from asserting that technologies are socially constructed (or that technology and society are mutually and reciprocally constructed) to asking more normative questions: How should technologies be constructed? Which 'relevant social groups' ought to be included in the process?" It is important in the development of large-scale innovations that designers actively attempt to include socially, culturally and politically excluded groups into the development of new technological systems. This entails enhancing the opportunities of ordinary, non-expert citizens to participate effectively and meaningfully in developing policy responses to identified problems (decision making about technology). Non-expert citizen participation in the design phase of new technologies provides an opportunity for deliberative involvement (Trigg, Anderson, and Dykstra-Erickson, 1994).

Social Informatics researchers have identified, as one major cause of system failures, the exclusion, from the design process, of the people who will be using the system. Many designers develop tacit scenarios of the ways that people will use systems that often differ from actual conditions and uses. If user feedback is not sought throughout the design process, then a new system is unlikely to effectively handle overlooked exceptions, complexities and nuances. Therefore, non-expert citizens need to be brought into participatory contact with specialists, experts, and policy makers.

Participation is often encouraged in order to ensure that user requirements are met, to gain user commitment and to avoid user resistance (Cavaye, 1995). Lin and Shao (2000) note that user participation, user attitudes and user involvement: "form a circular relationship". Their research implies that getting users involved in the development process may indeed improve their attitudes toward the system and enhance the importance and relevance users perceive about the system. Yet, according to Cavaye, empirical studies are not able to show consistently that there is a causal relationship between user participation and system success: research provides mixed results. However, these mixed results in existing quantitative studies may be the result of inconsistent operationalization of constructs. Hwang and Thorn (1999) acknowledge that empirical studies keep producing controversial results. They try to make sense of these inconsistent findings by using a meta-analysis in which they calculate 41 effects from 25 studies. They found that *user participation*[1] is beneficial to system development. By engaging in the actual development process, users have a better chance to provide input and feedback to systems design. Even though fewer studies have measured the effect of *user involvement*, the researchers also found that the psychological state of users had an undeniable positive impact on system success. According to Hwang and Thorn: "users are likely to be happy if they identify with a system under development, even if they do not make tangible contributions". This sense of belonging can also result in a high rating of the system upon completion and more aggressive use of information technology to improve performance.

In the design of the FASME, as well as the True-Vote system, great emphasis was placed on the participation of the end-users. We are of the opinion that user engagement in e-Government applications is of utmost importance because of the non-commercial nature of these systems. The fact of the matter is that there is a big difference between new technologies like DVD players, HDTV, or personal computers and innovations that are implemented by government. With the former, consumers have a certain power to influence the adoption, if not in the design process, then at least in their ability to refuse to buy and use the new products. "The final consumer may have little opportunity to engage upon the design and development of such artifacts (e.g. domestic goods) other than the 'veto power' to adopt or not" (Williams and Edge, 1996: 878). However, with many e-Government applications we speak about 'citizens' instead of 'consumers'. This is an important distinction. Citizens will have no other option than to use the systems that government implements (e-voting, ID card, etc.). Other options often do not exist. Social Informatics studies have shown us that consumers frequently use technology completely differently from the initial intention. People

---

[1] Note that in Hwang and Thorns' work there is a difference between the terms user participation and user involvement. User involvement is a need-based mental or psychological state of users toward a system and its development process. "The importance and personal relevance that users attach to a particular system, or to information systems in general, depending on the users' focus" (H. Barki & J. Hartwick, Rethinking the concept of user involvement, MIS Quarterly 13(1), 1989, p 53-69). User participation is the observable behaviour of users during the development process of a system. When both user participation and user involvement are meant it is called user engagement.

refuse it, or use it for other purposes then intended by the designers. With e-Government people are more or less forced to use it as intended, they can't abandon the technology or reshape it to be used in new ways. Therefore, the role of the citizen is crucial and he should be involved in the design and implementation of these large-scale systems. This will enable the citizen to have the last veto to reject something like, for instance, e-voting, before it becomes a fait accompli. When users are not involved in the development of e-Government systems, democracy will be in jeopardy.

Methods for user involvement

In the previous section we came to the conclusion that end-users should have a say in the design and implementation of new procedures and technology when innovative systems are being developed. In our research we investigated which tools and techniques can be used to involve end-users in the development of large-scale systems for (international) e-Government. We initially focused on the Participatory Design (PD) approach. Participatory design is a concept originating out of the Scandinavian nations in the late 1970 (Schuler and Namioka, 1994). Users were viewed as active collaborators in the design process rather than just 'passengers', and 'sources of information'. PD is a body of practice and theory that emphasizes direct, empowered, collaborative action by users, in concert with professionals. Participatory design is a useful approach, among others, to achieve high quality systems. However, PD is also one of the efforts to democratize technical change (Van den Besselaar, 1998). But is it possible to use PD methods in more complex environments? Can we use lessons and methods from participatory design to include the variety of political views and social interests in the socio-technical shaping of future trajectories of large-scale ICT based infrastructures? Having gone through the literature on user involvement and user participation we came to the conclusion that many of the theories and methods did not apply to us for several reasons. We identified three reasons why there was not one existing method that we could embrace (Oostveen and Van den Besselaar, 2004b).

The first reason is that all of the models and methods are based on rather small scale projects. Clement and Van den Besselaar evaluated some fifteen 'best practice' PD projects since the 1970s. The general conclusion from all these projects is that under appropriate conditions, users are capable of participating actively and effectively in information systems development (Clement & Van den Besselaar, 1993). The projects differed in many respects, but also had some common characteristics. One of the similarities was that most projects focused on small stand-alone applications of IT, indicating a low organizational complexity of the projects. In their article they state: "Since most projects have been relatively small, we do not yet have much experience on which to draw for participative approaches to develop large applications, integrating existing systems or creating technical and organizational infrastructures to support PC based "end user computing" (ibid, 1993). In another article, Van den Besselaar notes that: "participation in small-scale and micro-level technical development projects is relatively successful, whereas intervening in large-scale projects at company level or sectoral level generally is unsuccessful" (Van den Besselaar, 1998). FASME and True-Vote are large-scale cross-border projects with an incredible complexity in many respects and could therefore not be approached in the same way as the smaller projects which advocate an active involvement of users.

The second reason, why the existing methods did not apply to us, is that in the smaller projects the groups of users involved are more specific than the users in the FASME and True-Vote projects. Especially in the FASME case, we did not only have to deal with many

different user categories, we also had to bear in mind that these users came from 15 different EU member states. Because of their different nationalities, the users have different cultural backgrounds, opinions, moral standards and values. These will all be reflected in their level of acceptance of the new technology and will also add to the complexity of their involvement.

Thirdly, the problem with existing methods is that some involve *users* (citizens, civil servants) and (operational) *managers*. Other methods – focusing on more political and strategic issues – involve *citizens* and *politicians*, but not the citizens and workers in their role as users. In the case of FASME and True-Vote, both dimensions were highly relevant and interacting: the political and normative, as well as the operational dimension.

Finally, in the FASME case it was difficult for us to use existing methods, because there was no final completely functioning prototype to be tested. As the prototype was not a complete system to be experimentally implemented in a real life organizational environment, the outcomes of the evaluation with users did *not* say anything about the quality of the system in terms of functional requirements and usability. The prototype was still under development. If there had been a complete prototype available at the time of evaluation, we could have used methods like 'usability laboratories' or 'user trials'. The principle behind usability laboratories is that they provide a place where new equipment can be tested in laboratory settings (usually by specialized staff).

Having established that traditional PD methods on their own would not suffice, we combined them with approaches developed in the technology assessment tradition. Technology assessment (TA) is the systematic analysis of the anticipated impact of a particular technology in regard to its safety and efficacy as well as its social, political, economic, and ethical consequences. TA comprises two parts. The first is an analytical, factual part of scientific analysis of the functioning and of the effects of the technology considered. This takes into consideration, in particular, potential long-term and unexpected side effects. The second part is the normative evaluation of the results of the analysis with regard to criteria, goals, and objectives. This includes the comparison to other alternatives (other technologies or non-implementation). As it is stated in the Wikipedia encyclopaedia: "TA considers its task as interdisciplinary approach to solving already existing problems and preventing potential damage caused by the uncritical application and the commercialization of new technologies". We found the combination of technology assessment methods with participatory design strategies and methods very effective for user involvement in large-scale innovations. We used focus groups to mediate general social discussion of technological development. We conducted several case studies on similar projects (Hooijen et al., forthcoming). In the FASME project we used "use scenarios". Furthermore, we tested the prototypes throughout the project duration; the True-Vote system was tested at five different locations, with 14 experiments and about 2300 registered voters, while the FASME prototype was tested in the five involved cities by a variety of citizens, clerks, operational administrative management, executive management and service providers (both public and private sector). Finally, evaluation of the systems took place through hands-on experience by the users, interviews, observation, group discussions, and extensive surveys. The results of our efforts can be found in our publications (Oostveen and Van de Besselaar, 2001, 2004a, 2004b).

Conclusions

From participation in the design and development of small scale isolated systems, we now move into the direction of participation in systems innovation (Sahal, 1985) in the

development of large technical systems. Is it possible to use PD methods in more complex environments? In infrastructural developments the number and variety of involved users is often very large. In our two international e-Government cases we had to deal with many different user categories, coming from different countries with different cultural backgrounds, opinions, norms and values, all influencing the requirements, expectations, evaluation and acceptance of the new technology.

Another issue is the nature of participation. In small scale projects, users can be engaged in directly shaping their own working or living conditions, in other words the relation between interests and design is rather direct. This has important implications for organizing PD, as many PD techniques are based on the direct interaction of the user with the technology, in a more or less real life context. In large-scale ICT design, this generally cannot be done. For parts of the system (like the more operational aspects of the infrastructure) it may be an option to build prototypes for experimentation, or to do ethnographic observations of technology use in context. However, the more general political and normative dimensions, as well as indirect and long term effects, cannot be accounted for in this way; nevertheless they should be reflected in the design. To do this, we need other approaches to complement traditional PD methods. In this way PD becomes a part of a larger techno-political agenda, as PD alone is not the answer to every design or assessment problem (Miller, 1993).

In our research, we combined a variety of traditional PD tools (interviews, surveys, workshops and scenario based evaluation) with social informatics research and technology assessment. More specifically, we combined local involvement of users in design and development activities, using a variety of PD methods, with researching the potential long term effects of the systems proposed. This combination resulted in crucial input for the design of the system, as well as in discussions and a shared awareness about fundamental social dimensions of e-Government systems, which were directly related to design options, and to the context of use (Oostveen and Van den Besselaar, 2004b). However, many of these bigger issues cannot be solved on the level of a single project, because they relate to the politics of public administration and public services.

Our research demonstrates that the combination of technology assessment with PD practice can be successful, but is not yet practiced enough. What should be done, in order to stimulate social responsive technology development? First of all, we think our cases were relatively unique in that PD and TA were substantial and influential parts of the project. This is generally not the case in technology development projects, even not in those funded with public money. Take for example the large *framework programs* of the European Commission, in which one finds a lot of talk about involving the users, but we have the impression that despite this, user participation and technology assessment hardly play a role in most of the projects. Therefore, there is a need for an explicit technology policy, stimulating the integration of PD and TA in all technology development projects. If large technology programs would more strictly require PD and TA, interdisciplinary collaboration in technology development could become the normal pattern, and technology development could become more socially responsive. This is especially important, because, at present, the ICT infrastructures and models are developed that will influence peoples lives in the decades to come. We have learned in our projects that such an approach is possible, and that user participation does not hinder or slow down technology development at all, but that it actually enriches it.

References

Cavaye, A. L. M. (1995) User participation in system development revisited. *Information & Management 28* (1995) 311-323

Clement, A., and P. van den Besselaar (1993) "A retrospective look at participatory design projects", *Communications of the ACM, 36, No.4*, pp. 29-37.

Douglas, S. (1990) The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology. *Isis 81* (306) pp 80-84.

Hamlet, P.W. (2003) Technology Theory and Deliberative Democracy. In: *Science, Technology, & Human Values, Vol. 28 No. 1*, Winter 2003 112-140. Sage Publications.

Hooijen, I., A. Oostveen, P. van den Besselaar (in preparation) *Innovation as Learning. A Comparative Study of Three Smart Card Projects.*

Hwang, M.I. and Thorn, R.G. (1999) The effect of user engagement on system success: a meta-analytical integration of research findings. *Information and Management 35* (1999) 229-236.

Klein, H. and D.L. Kleinman (2002) The Social Construction of Technology: Structural Considerations. *Science, Technology & Human Values, Vol. 27 No. 1*, pp 28-52. Sage Publications.

Kling, R. (1999) *What is Social Informatics and Why Does it Matter?*

Kling, R., Crawford, H., Rosenbaum, H., Sawyer, S., & Weisband, S. (2000). *Learning from Social Informatics: Information and Communication Technologies in Human Contexts.* Bloomington, IN: Indiana University.

Kling, R. (2000) Learning About Information Technologies and Social Change: The Contribution of Social Informatics. The Information Society, Vol. 16, pp 217-232.

Liikanen, E. (2003) e-Government: An EU Perspective. In: *The World of e-Government.* Curtin, G, Sommer, M. and Vis-Sommer, V. (eds).New York: The Haworth Press.

Lin, W. and B. Shao (2000) The relationship between user participation and system success: a simultaneous contingency approach. *Information and Management, Volume 37, Issue 6*. Pp. 283-295.

Miller, S. (1993) "From System Design to Democracy", *Communications of the ACM, 36, No.4*, pp. 38.

Oostveen, A. and P. Van den Besselaar (2001), Linking Databases and Linking Cultures. The Complexity of Concepts in International e-Government. In: *Towards the E-Society: e-Business, e-Commerce, and e-Government*, pp. 765-774. Edited by B. Schmid, K. Stanoevska-Slabeva and V. Tschammer. Boston: Kluwer Academic Publishers, 2001.

Oostveen, A. and P. Van den Besselaar (2004a), Internet voting technologies and civic participation, the users' perspective. Javnost / *The Public Vol. XI* [2004], No.1, p61-78.

Oostveen, A. and P. Van den Besselaar (2004b) From Small Scale to Large Scale User Participation: A Case Study of Participatory Design in e-Government Systems. In: Artful Integration: Interweaving Media, Materials and Practices. Edited by A. Clement, F. de Cindio, A. Oostveen, D. Schuler and P. van den Besselaar. *Participatory Design Conference Proceeding 2004*. p173-182. Toronto, Canada. ACM

Pinch, T. and W. Bijker (1987) The social construction of facts and artifacts: Or how the sociology of science and the sociology of technology might benefit each other. In: *The social construction of technological systems: New directions in the sociology and history of technology*, edited by Wiebe Bijker, Thomas Hughes and Trevor Pinch, 17-50. Cambridge, MA: MIT Press.

Russell, S. (1986) The Social Construction of Artefacts: a response to Pinch and Bijker. *Social Studies of Science, 16* (2), pp. 331-346.

Sahal, D. (1985) "Technological guidepost and innovation avenues". *Research Policy, vol. 14*, 61-82.

Schuler, D. and A. Namioka (1994) *Participatory Design. Principles and Practices.* Lawrence Erlbaum Associates, Publishers. Hillsdale, New Jersey.

Trigg, R., Anderson, S. I., & Dykstra-Erickson, E. (Eds.). (1994). *PDC'94: Proceedings of the Participatory Design Conference. Palo Alto, CA*: Computer Professionals for Social Responsibility, P.O. Box 717, Palo Alto, CA 94302-0717.

Van den Besselaar, P. (1998) "Technology and Democracy, the limits to steering". In: R. Henderson Chatfield, S. Kuhn, M. Muller (eds.), *Broadening Participation -5th PDC*. Seattle:CPSR, pp.1-10.

Williams, R. and D. Edge (1996) The social shaping of technology. *Research Policy Vol. 25*, (1996) pp. 856-899.

Winner, L. (1980) `Do Artefacts have Politics?', *Daedalus, No. 109*, pp. 121-36.

User participation supported by usability engineering experts in e-Government projects[2]

Reinhard Oppermann
Fraunhofer-Institute for Applied Information Technology FIT, Germany
reinhard.oppermann@fit.fraunhofer.de

Abstract

The paper describes several means to increase the usability and utility of public services for citizens. User participation and supporting expertise in ergonomics are described as a combined strategy for e-Government developments. Direct user group participation and legal representatives have to be involved. Adaptation and end user development means can be incorporated to extend the user participation beyond the development process towards the whole life cycle of the system.

Introduction

To get optimal conditions for public service production and delivery with respect to the employees as producers of content and the citizens as receivers of content more than one approach is needed. Compared to private services public services in e-Government are not only concerned with the usability of the system supporting the service but public services are also concerned with the utility in a more complex sense. Public services have to reflect the political and legal rights of the parties involved beyond the pragmatic utility of the functionality and the content of the service. Citizens have to be involved from the very beginning to determine the subject of the service reflecting the interest of the citizens in the political and administrative context.

Thus, citizen participation is the first approach to be included to fit the interests of the citizens. Citizens are in part direct users of the system whenever they have access to the electronic services from home or from public access points (kiosk systems). At least citizens are addressees of the system in terms of procedures defined by the system or in terms of the (paper-) output of the system. Employees on the other side are another group of users and their participation is the next approach to be involved. Employees also have interests and they have qualifications and experiences which could and should be involved in the development process. For the employees the use of the system defines central parts of the quality of work.

For user participation the international standards 13407 can be supplied.

Beyond participation of citizens and employees usability experts are needed for the ergonomic aspects of system development. Users are competent and motivated in describing and analysing their working procedures and tools. But users are not trained and need support in the design of work systems. Usability experts could and should be included in the development team to support the analysis, the design, the implementation and the evaluation of work systems.

For usability issues the international standards 9241 can be supplied.

In this paper the author's experiences in system development in several projects are the basis to scan the complementary roles and contributions of user participation and ergonomic design of systems.

Methods of user participation

Political participation has been developed for technology development based on the experiences with public protest against nuclear power plant development. Information technology should not meet the same problems in public acceptance. In particular in Scandinavia and Germany many projects of citizen and employee participation have been started in the early 80th. One of the earliest citizen offices in local communities in Unna (Germany) was the first project of the author in this field and it included a wide spectrum of methods of participation. The methodology included three types of involvement (Mambrey, Oppermann et al. 1986):

Throughout the development process in several polls (written and verbal) employees were asked for their interests and their proposals for the technology design. Interviews and feedback groups were supported by more and more concrete drafts and prototypes of the system. Citizens were informed in the local newspapers and in several public presentations about the goal of the project and they were invited to contribute by comments and proposals.

A representative of the employees was nominated by the work council and a representative of the citizens was nominated by the local parliament to join the development team to continuously participate in the development process. These representatives had access to all documents, analysis results and design proposals of the project.

For the citizen participation direct methods of involvement seemed not to be sufficient. The citizen office aimed to integrate services of social and financial support for living. People concerned were not expected to be competent and resolute enough to articulate and to penetrate their interests. As an additional compensatory instrument an Advocacy Planner was involved in the project team who developed close contact to specific social groups and analyzed and represented their interests in the development process. Other experts that can be included are change agents if there is considerable resistance against change (Fogg 2002) or planning cells if there are more people concerned than could be involved by direct participation (Dienel 1999).

The results of the methodology of participation were successful even in several situations conflicts occurred between groups of participants and in particular between participating individuals and official representatives of the work council and the local parliament. Problems occurred between different interests of employees and citizens and between different roles of normal representatives (work council and parliament) and ad-hoc representatives in the development team. The conflicts could be resolved by subsequent discussions and acceptance of development team decisions so that the members of the parliament and the members of the work council did not loose their power of control.

The resulting outcome of the development project works successfully since 22 years. In my opinion the result goes back to two factors:

- the competent technical contributions of the parties concerned

- the constructive negotiations of different "interests" of citizens and employees with respect to service content and service location for the citizens and the qualification and chances for personnel development for the employees

The project followed the industrial science approach called "software design as work design" (Hacker 1987).

User participation has been developed in several other projects in public services (Mambrey and Oppermann 1983; Mambrey, Mark et al. 1997).

Usability Engineering

Users of e-Government applications (employees as well as citizens) are the authentic source to determine the quality of usability design. This does not include that they are also the best actors as analysts, as designers, as developers and as the final evaluators. Such roles need specific competency, experience and training. For the usability assurance of e-Government applications a cooperation of usability experts and users (employees as well as citizens) is needed. This holds for every system, this holds in particular for an application that is designed for specific tasks (compared to standard applications like, e.g., text editing) and this holds in particular for systems with a wide spectrum of users with a wide spectrum of computer related experiences, administrative, communicative and technical competency needed, and a wide spectrum of interaction methods in various contexts. Currently we are conducting a project focusing on the usability requirement analysis and usability design for mobile services for citizens in 5 European countries: Portugal, Spain, France, Germany and Poland. Scenario writing, focus groups with users and questionnaires were used to elicit utility and usability requirements for service content and service handling, respectively (Terrenghi, Kronen et al. 2005), and field experiments with users were used to evaluate design results under realistic conditions with citizens.

Beyond user participation and usability assurance during the development process also means should be considered to incorporate evolving user requirements during the usage period of a system. Adaptability and adaptiveness of a system are traditional approaches to ensure the flexibility of a system for various demands of specific users, specific tasks, and specific technology included during the live time of a system (Oppermann 1994). Today *End User Development* is the keyword to focus on the potential of users and user groups to incorporate services, functions and interaction methods into applications that occur during the life time of the system (Lieberman, Paternó et al. 2005). For e-Government applications end user development capabilities can be a crucial feature because for political participation of citizens specific configurations of social communities, role attributions, functions, access rights etc. are needed that can't be configured in advance but need flexible and powerful adaptation features of the support system.

Conclusion

Classical user participation where small or at least dedicated user groups are concerned by the system development process and where members of the user groups participate in the development process can not be applied in e-Government applications. In e-Government projects applications are to be designed that need inclusion of interests of employees and

interests of citizens. In both cases direct user group members and legal representative delegates from the work council and the (local) parliament have to be included into the participation process. A two step participation process seems to be appropriate for e-Government projects with direct user group members in contact with the development team working as specific task and interest representatives and legal representative delegates from the work council and the (local) parliament forming the global feedback and acceptance measure for the decision and development results with respect to the general interests of the user and citizen population.

Most of the people concerned in e-Government projects are not known before or during the development process—in particular from the side of the citizens. Many of the requirements are not known before or during the development process—this is also true for more and more other applications with dynamic goals in the context of use. Thus, adaptivity and end user development can be means to empower the user during the usage period. They reduce the necessity for the user to identify and articulate the own requirements before or during the design and implementation period. They allow the user to participate during the whole life cycle of the system. But means for system adaptation and end user development will hardly be applicable by occasional users like citizens in ad hoc contact with (local) authorities. In particular for citizen participation in political planning processes support will be needed if information, communication, negotiation or simulation tools are applied during the planning project. User-oriented software-engineering experts or advocacy planners can be useful to empower the user with respect to the development process and the product features to be designed.

References

Dienel, P. (1999). *Planning Cells and Citizens' Juries - Foundations of political Engineering of the Future.*

Fogg, B. J. (2002). *Persuasive Technology: Using Computers to Change What We Think and Do*. San Fransisco, Morgan Kaufmann Publishers.

Hacker, W. (1987). Software-Gestaltung als Arbeitsgestaltung. In: Klaus-Peter Fähnrich (Hrsg.): *Software-Ergonomie*. München: Oldenbourg Verlag, S. 29-42.

Lieberman, H., F. Paternó, et al., Eds. (2005). *End User Development*. Dordrecht, Kluwer.

Mambrey, P., G. Mark, et al. (1997). *Integrating User Advocacy into Participatory Design: the Designers' Perspective*. PDC'96: The Fourth Biennial Con-ference on Participatory Design November 13-15, 1996, MIT, Cambridge, Massachusetts.

Mambrey, P. and R. Oppermann, Eds. (1983). *Beteiligung von Betroffenen bei der Entwicklung von Informationssystemen*. Frankfurt/Main, Campus Verlag.

Mambrey, P., R. Oppermann, et al. (1986). *Computer und Partizipation. Ergebnisse zu Gestaltungs- und Handlungspotentialen.* Opladen, Westdeutscher Verlag.

Oppermann, R., Ed. (1994). *Adaptive User support.* Hillsdale: Lawrence Erlbaum Associates.

Terrenghi, L., M. Kronen, et al. (2005). Usability Requirements for Mobile Service Scenarios. *Human Computer Interaction 2005*, Las Vegas.

Why do we involve users? The role of the HCI practitioner in e-Government projects

Asbjørn Følstad
SINTEF IKT, Oslo, Norway
asbjorn.folstad@sintef.no

Abstract

There seems to be broad agreement on the importance of user involvement in e-Government projects. However, definitions of the term user involvement vary. Two perspectives on user involvement are presented - the traditional participatory practices of government projects and the user involvement methods of Human-Computer Interaction (HCI) - and mapped with regard to the user involvement goals of (1) participation/ownership and (2) usability. It is argued that the role of the HCI practitioners requires an understanding of the relationship between the two perspectives on user involvement, and a flexible approach for integrating and, if necessary, separation of user involvement activities towards the two goals.

Agreement on the importance of user involvement

Citizen orientation and inclusion is strongly accentuated and highly prioritized in the development of e-Government services for governments of today (see e.g. the European Commission's i2010 (EU Commission 2005) and eNorge2009 (Ministry of Modernisation 2005)). Electronic service provision is supposed to enable the governments to reach a number of ambitious goals, typically including:

- Citizen-centric service provision
- Increased service quality
- Increased efficiency of government service provision
- Lowered cost of government service provision
- Improved democratic processes through improved dialogue between the government and its citizens

Explicit ambitions exist with regard to develop e-Government in a way that the resulting services are user-friendly and accessible for all user groups.

It may be taken as fairly non-controversial that increased user involvement is widely perceived as an important way to achieve the ambitious goals of e-Government service provision and development. E.g. an investigation among Norwegian e-Government project leaders indicates widespread acceptance of the importance of user involvement activities within the development project (Følstad, Jørgensen and Krogstie 2004). Also, the need for increased user involvement has been accentuated in several public reports recent years (see e.g. Moløkken et al 2004, OECD 2001 and Pearce 2003). There is good reason to believe in the existence of sufficient agreement on the importance of user involvement in e-Government development projects, for user involvement actually to be prioritized.

What may not be assumed to exist, however, is a common understanding of the elements that constitute adequate user involvement.

The misconception of "User involvement = HCI"

From a Human-Computer Interaction (HCI) perspective, the obvious response to the demand for user involvement is to utilize HCI methods for user and context identification, user-requirements elicitation, design, and evaluation. Preferably within an iterative software engineering process – e.g. the process for human-centered design described in ISO 13407 (ISO 1999).

HCI methods for analyses include analyses of users and stakeholders, user tasks and context of use; methods for requirements elicitation and description include workshops, interviews, field studies, personas, and use cases; methods for design input include rapid prototyping, design patterns, card sorting, and story boarding; and methods for evaluation include analytical methods like cognitive walkthrough and heuristic evaluation as well as empirical methods like user tests and field evaluations (see e.g. Maguire 2001 and Usability Net).

Given the multitude of methods for user involvement available in the HCI toolbox, the HCI practitioner may feel fairly confident that she is able to provide adequate user involvement in most e-Government projects, and may take for granted that increased focus on user involvement equals increased utilization of HCI methods in e-Government development projects.

However, outside the field of HCI the obvious response to the demand for increased user involvement may not be an increased utilization of HCI methods. This, it may be argued, is an insight that the HCI practitioner may easily forget; in particular when facing government development projects.

User involvement in a government project perspective

Our experiences from Norwegian development projects clearly indicate that user involvement in government development projects is rife. This seems to hold both for projects developing new electronic services, as well as in government development projects in general.

There may be several reasons for the amount of user involvement in government projects. Often there exists an obligation to openness to the public, where development projects with sufficient impact on the public will be accompanied with public audits. Further, the government has an obligation to provide an equal public service level to all citizens, thus project that are critical with regard to accessibility and design-for-all should involve interactions with user and citizen interest organizations. Also, the tradition of democratic participation (see e.g. Emery and Thorsrud 1976 and Emery and Emery 1976), where the empowerment of employees through participation is often regarded a goal in itself (Wilpert 1994 and Elden 1986), may be said to be more solidly established within the government sector than private sector

The obligation to openness and design for all, combined with the widespread establishment of democratic participation, seems to have fostered a set of user involvement practices in government development projects in general. These user involvement practices are also being utilized in e-Government development projects. The practices typically include:

Establishment of user reference groups following the development project for a substantial period of time; inclusion of user representatives in the project team; inclusion of user and stakeholder representatives in project steering comities; formal and semi-formal audits of project plans and system specifications; workshops with user and stakeholder representatives; involvement of user interest organizations; public meetings and information activities.

It should be noticed that the user involvement practices rooted in government participatory practices are not synonymous to the methods and practices used and advocated by the HCI community. Consequently, there most likely exist a broad range of user involvement activities within any given e-Government development project that may be partly obscured to the HCI practitioner, due to the practitioner's narrow understanding of user involvement as something conducted by way of HCI methods.

## Two goals of user involvement

Given that HCI practitioners do not have monopoly on user involvement in e-Government development, it is important for the practitioner to be able to articulate the particular contribution of HCI in such development projects. Why is it important to do user involvement according to the field of HCI, when the government sector already has strong traditions of democratic participation and openness to the public? In order to answer this question it is important to raise another: Why do we involve the users in the first place?

Broadly speaking, user involvement may be conducted to achieve two goals:

1. To enable user participation thereby building a foundation for user ownership, increasing the users accept for new solutions and minimizing resistance in change processes.
2. To provide input in the system development process to facilitate the development of usable or user-friendly systems or solutions, in line with the needs and requirements of all relevant user groups.

Some user involvement activities are particularly suited for the fulfillment of Goal 1 (enable user participation), others are designed to support system development according to Goal 2 (develop usable systems). The author of the present paper strongly believes that practices of democratic participation are highly suitable to achieve Goal 1, and that HCI methods are particularly good for achieving Goal 2. This is not to say that practices of democratic participation may not contribute to the development of usable systems, nor to say that HCI-methods have may not be used for purposes of user participation; the important thing is that if one wants to use the most adequate practices or methods to achieve the two goals above, it will be necessary to combine the methods and practices of two different perspectives on user involvement.

The relationship between the two traditions of user involvement and the two goals of user involvement are visualized in Figure 1.
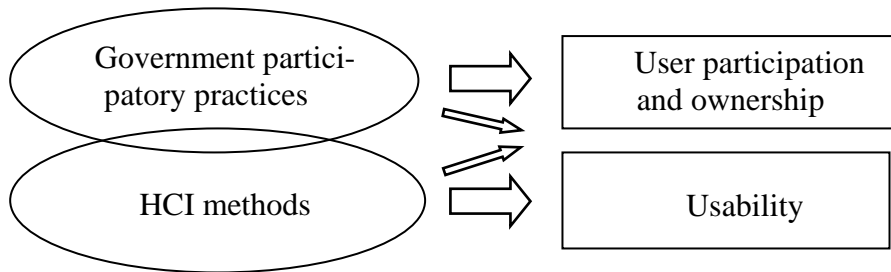
Figure 1: The relationship between government participatory practices and HCI methods with regard to the goals of user participation and usability

The figure indicates that there may be a certain overlap between the practices and methods of the two traditions of user involvement. Good examples of this overlap include user and stakeholder workshops for requirements identification and prototypes as vehicles for user feedback. It should be noted, however, that the methods and practices of the two perspectives may have the same name even though the goals of the practices are different, increasing the chance for confusion in new cooperative relationships.

Whereas there is some overlap with regard to the methods and practices of the two traditions, the figure indicates the importance of keeping the goals of the user involvement activities separate.

The analysis of the two goals of user involvement activities is reminiscent of the analysis conducted by Kujala (Kujala 2003), where the user involvement approach of user-centred design is described to emphasis usability, whereas the approach of participatory design is said to emphasis democratic participation. It should, however, be noted that the concept of democratic participation in the current paper does not refer to the participatory design tradition of HCI, but to the democratic participation practices of government development projects.

Integrating or separating different practices for user involvement?

Distinguishing between the two goals of user involvement is crucial in order to understand and communicate the strengths and limitations of individual user involvement methods and practices. This may be valuable in the early planning of project activities, which holds the key to effective and efficient user involvement. Methods and practices for user involvement from the participatory tradition of government development and the field of HCI may for some purposes be integrated, reducing effort required to recruit users and required calendar time. For other purposes user involvement activities for the two purposes need to be separated.

Integrating user involvement activities

An example of integration of user involvement activities for the two purposes may be taken from an ongoing Norwegian project developing an online citizen service, substituting a service now provided on-site by government personnel. The project is studied by the author as a case-project. One important stakeholder in the development of the new service is the group of personnel that are currently providing the service. Their work situation will be thoroughly

changed through the implementation of the online service. Also, they are important change agents – since they are meant to promote the online service to hesitant users who prefer to show up on-site rather than going online. It is clearly important to involve the on-site personnel to enable participation and ownership.

At the same time the on-site personnel are experts on the characteristics and needs of the future users of the online service. Through daily service provision, this group represents important knowledge that should be utilized in the development of the online service. Thus, it will also be important to involve the on-site personnel to enhance the usability of the online service.

This particular situation allows for integrating user involvement activities. In order to enable participation and ownership to the new service, it is planned to conduct full-day stakeholder meetings with a high number of on-site personnel. The agenda of the stakeholder meetings will focus on e.g. information activities, demonstrations, and feedback. To integrate HCI evaluation for increased usability, it is tentatively planned to involve a small number of the on-site personnel at the meetings in group-based structured walkthroughs. The participants of the walkthroughs will be chosen for their on-site expertise in providing the particular service, and it is assumed that the walkthroughs will not provide a significant increase in participation and ownership.

Separating user involvement activities

An example of the need for separating user involvement activities for the two goals above may be given from evaluation activities in the development of two different services for public sector employees. The evaluation activities were led by the author as part of a research project, and were conducted as group-based analytical evaluations with both usability-experts and domain-experts as evaluators The goal of the evaluations was to identify user-problems associated with the running prototypes of the services, necessarily giving this user involvement activity a problem oriented perspective.

The services under evaluation in this example were not developed on commission from a public sector enterprise. Rather the system developers were in a phase where they were still marketing the services to prospect customers. As part of the marketing strategy it is important to conduct user involvement activities for participation and ownership in order to create a positive attitude towards the developed services. However, this goal could not be sustained through the group-based analytical evaluation, and had to be reached through other means like user meetings or stakeholder meetings.

Conclusion

User involvement in e-Government projects has been presented from two perspectives: The participatory practices well established in government development projects and the user-centred methods of the HCI-tradition. To fulfill the role of as a HCI-practitioner in an e-Government project it is necessary to be aware of the amount of user involvement already going on in the project, differentiate between the two goals of participation and usability, and utilize a flexible approach for optimal integrating and necessary separation of user involvement activities towards the two goals.

Acknowledgements

References

i2010: A European Information Society for growth and employment. Commission of the European Communities: Brussels (2005)

eNorge 2009: Det digitale spranget. Communication from the Norwegian Ministry of Modernization (2005)

Følstad, A., Jørgensen, H.D, Krogstie, J: User involvement in e-Government development projects. *Proceedings of NordiCHI'04*. Tampere, Finland. 217-224 (2004)

Moløkken, K., et al., *Project Estimation in the Norwegian Software Industry - A Summary*. Simula reserach laboratory: Oslo, Norway (2004)

The Hidden Threat to E-Government. Organization for Economic Cooperation and Development (OECD) (2001)

Pearce, S., *Government IT projects.* Parliamentary Office of Science and Technology, United Kingdom (2003)

ISO 13407. *Human-centred design processes for interactive systems* (1999)

Maguire, M., *Methods to support human-centred design*. International Journal of Human-Computer Studies 55, 4, 587-634 (2001)

UsabilityNet. Available online at http://www.usabilitynet.org

Emery, F. and E. Thorsrud, *Democracy at work: The report of the Norwegian industrial democracy program.* Leiden: Martinus Nijhoff Social Sciences Division (1976)

Emery, M. and F. Emery, A choice of futures. *International series on the quality of working life*, Leiden: Martinus Nijhoff Social Sciences Division (1976)

Wilpert, B.E., Participatory research in organizational psychology. In G. d'Ydewalle, P. Eelen, and P. N. Bertelson (Eds.): *International perspectives on psychological science: Vol 2. The state of the art.* Lawrence Erlbaum Associates: Hillsdale, NJ., 293-310 (1994)

Elden, M., *Sociotechnocal systems ideas as public policy in Norway: Empowering participation through worker-managed change.* The Journal of Applied Behavioral Science, 22, 3, 239-255 (1986)

Kujala, S., *User involvement: a review of the benefits and challenges*, Behaviour & Information Technology, 22, 1, 1-16 (2003)

Successful redevelopment of e-Government systems: Outcomes determined by system engineering approaches

Heba Mansour, Filiz Karabey, Paola Amaldi
Interaction Design Centre, School of Computing Science,
Middlesex University, London, UK
hm264@mdx.ac.uk; FK099@mdx.ac.uk; p.amaldi-trillo@mdx.ac.uk

Abstract

In recent years there has been much concern and debate with regards to the approaches taken by the UK government for the redevelopment of the National Health Service (NHS). Taking the viewpoint that Information Technology will provide all of the solutions for modernising a predominantly paper based domain, has resulted in the socio-technical issues being overlooked during the process of 'change'. In light of these concerns we aim to analyse 'Hard' and 'Soft' approaches for engineering requirements in complex and safety critical environments such as the NHS. To successfully implement change it is imperative that designers have an understanding of all stakeholders' perspectives of the system, their existing work practises, activities and roles as well as the technical issues. In the light of recent studies done in the Computer Supported Cooperative Work (CSCW) literature, we intend to highlight some issues of concern as they emerged from a scrutiny of recent "Technical" Reports prepared by the NHS and its contractors. Our contention is that neglecting to deal with these issues might seriously jeopardize the success of the current redevelopment process.

Introduction

System developers have at their disposal numerous theoretical tools, techniques, approaches and methodologies to equip with them during the development or redevelopment of an organisational system. 'Systems' in this context are concerned with the intricate relationship between humans and their interactions with the technological system. An organisation which undergoes fundamental changes to its infrastructure, especially one which is complex, dynamic and safety critical in nature needs to be viewed as a 'whole' system (Checkland, 1999) if its complexities are to be understood and disclosed. The NHS is currently undergoing complete transformation as it is documented in 'Building the Information Core (**IC**) - Implementing the NHS Plan' (2001). The Plan alike other European Countries, intends to replace, among other things, existing paper-based working practices with digitally based processes by introducing Electronic Medical Records (EMR). The proposals entail "technical" solutions to what are at base socio-technical issues. When redeveloping an existing, mature system, considerations of the working context need to be elicited in order to fulfill the needs, goals, desires and objectives of its stakeholders. Requirements Engineering (RE) is a complex process of discovery, analysis and negotiation of the application domain. In order to develop a

system, which fulfils these needs, utilizing the appropriate tools is vital in order to engineer a system that meets its expectations.

Hard and Soft approaches are some of widely used techniques available in practice, which aim to disclose the necessary knowledge needed for system redevelopment. It is our view that a fundamental distinction between the two approaches lies in the underlying assumption concerning the nature of the change process: According to the Hard system viewpoint, the main focus is on "engineering" the conditions that will make a solution workable. In turn, solutions are identified, typically, because of "problems" in the current working practices and Hard System approaches aim at eradicating "bad" practices by engineering solutions that typically support a fairly restricted, and therefore highly predictable, range of user-system responses. The downside of this approach is that it tends to focus on the "prescriptive" nature of the control process rather than on the intrinsic variability of the user-system interaction which is often a necessary condition for safety and efficiency of the overall control process (Hollnagel, 1999)

Technical solutions Vs User centred objectives

The IC (2001) takes the view that problems in a system can be well defined, justified and can be quantified. A deterministic view of the organisation is taken whereby conditions can be anticipated, behaviours predicted and the solution can be technically definable.

The proposed changes in IC (2001) do not reveal how stakeholders conduct their activities by seemingly neglecting to highlight the distinction between prescriptive and actual behaviour. Mass integration across many NHS sectors is being proposed such as:

> The NHS Plan stresses the need to support well co-coordinated 'seamless' services across 'whole systems'. The information and IT systems needed to deliver these objectives must be capable of being personalised to meet the needs of these individuals who provide these services as well as those who receive them. (Building the Information Core, 2001: 7, 1.2).

However it may be useful to focus on the specific places in an organisation in which coordination and integration actually happen (Winthereik and Vikkelso, 2005).Understanding actual practices is vital as the design of new (human-machine) team requires new coordination between machine agents and human practitioners (Woods, 1996).The major problem with engineering systems with just a Hard System Methodology is that it does not consider the social aspects, which will affect the technical solution. Hartswood, Procter, Rouncefield, Slack (2003) highlights the concerns of relying on purely technical solutions to what are, at base socio-technical problems. This can be applied to the concept of:

> Providing care professionals with access to common and consistent decision support systems will ensure that they are able to offer people the best diagnosis, referral and care across the country' (IC, 2001:3.9).

Patient referral relies upon the various features of health care workers' mundane, interactional competences: Knowing how to preface, repair, produce formulas, tell stories, develop scenarios, involves formulations about whether a patient fits referral criteria and what

help can be offered (Hartswood et al, 2003). Ignoring such communication patterns can lead to latent conditions being embedded in the system. When a retrospective view (Dekker, 2002) is taken, errors in the system are perceived as an incompetence of the individual, in this case the practitioners. In such cases the design of the system will not reflect the entire context of where the system will be used. The design views the practitioner's interactions with the system as isolated from other tasks. This effectively results in a system that fails to act as a team player (Woods, 1996).

Overall, these reforms appear to be both ambitious and conflicting and do not appear to have been analysed beyond face value. Co-ordination across 'whole systems' entails the conforming and support of staff within a highly hierarchal organisation, which may result in conflict and resistance

> Reforming the system to create new and more effective clinical practices, care processes and ways of working relies on good quality information and modern information and communication technology. Building this information core is vital. (Building the Information Core, 2001:5)

The NHS Plan further highlights the need for change due to the fact that 'Information is not shared and investigations are often repeated, performance has been inhibited by a lack of reliable information for clinicians, managers and patients' (IC, 2001:2.4). The need for change to the working practices of the NHS staff can be viewed as a hard approach as it presumes that technology will simply eradicate the problems highlighted. The current information obtained by the various departments is viewed as 'isolated' information, which can be better, utilised through the use of IT technology *(See Figure 1 next page for a view of existing interactions)*. Similar concerns are raised concerning a recent proposal to introduce Electronic Medical Records (EMR) in the ambulance service. (IT Perspective, 2003). Again, the limitations of the HSM approach emerge in several places. The design of data base repositories on the one hand, and the process of inputting data, on the other, is always kept distinct, whereas the latter is considered just a matter of designing an "appropriate" interface. There is, however, in the technical proposal an expression of concern that such a distinction might jeopardise the whole project:

> "The collection system must not hinder their work and they [*ambulance crews*] must be able to see real benefits from its collection. If they are tempted to circumvent the system in order to concentrate on the "real" work of the service, the data will not be trustworthy and undermine the whole system" (Output Based Specification—OBS, 2003, page 10)

Again as pointed out while discussing the overall proposal, the OBS document seems to assume that providing more information will inevitably result in a better decision making process. But as Berg and Toussaint (2003) have recently pointed out this is quite naïve:

[…] professional "knowledge" and "information" cannot be conceptualised as atomic bits and pieces that can be "stored" and "retrieved" at will, and that can be unequivocally mapped on simple, universal schemata." (Berg & Toussaint, 2003).
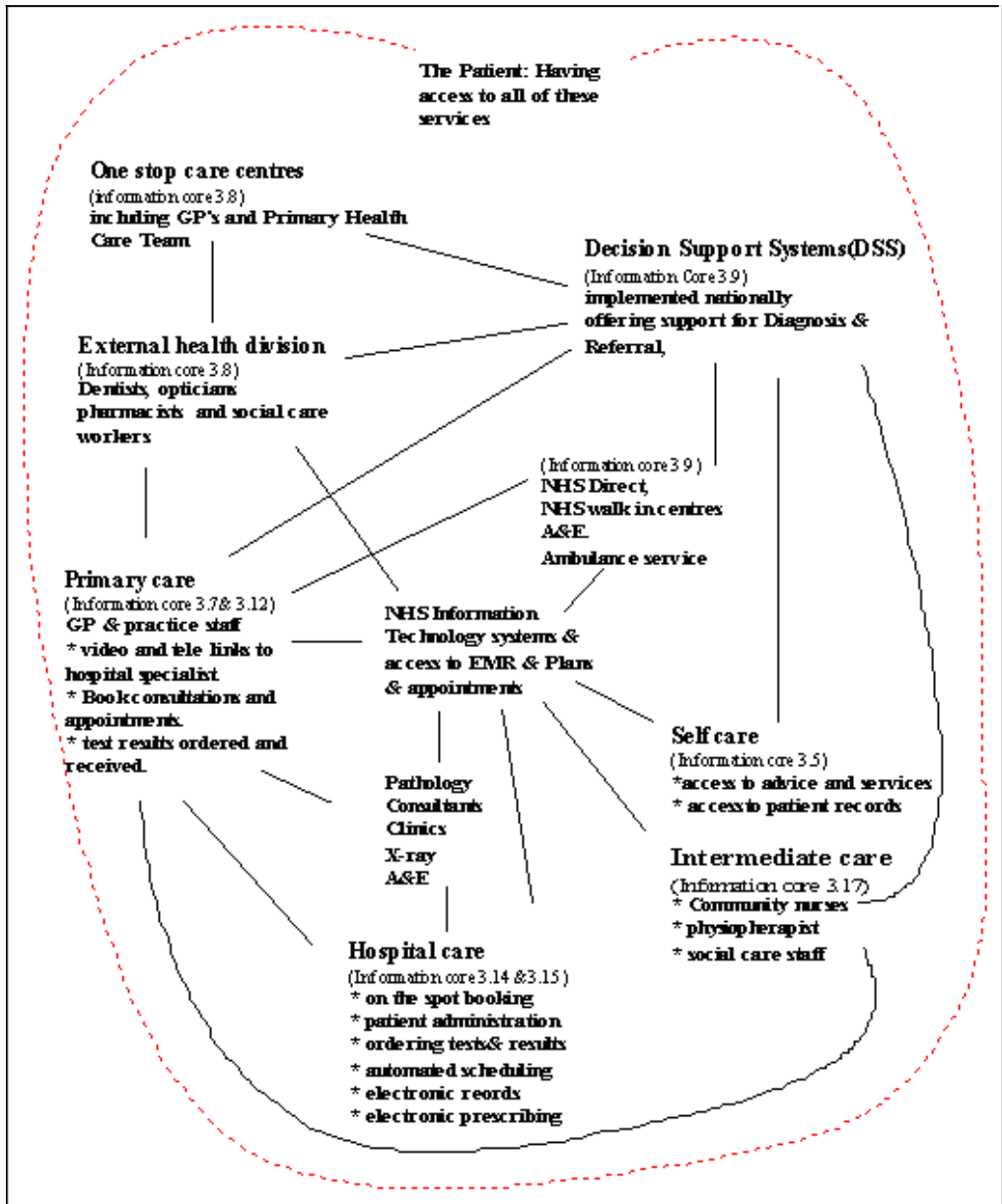
Figure 1. A Rich Picture illustrating the complex interaction and communication between the NHS sub divisions and associated external health care services. The access to the various IT services by all the divisions are also displayed. (Information Core Document Chp 3)

Both in the IC and in the OBS description, the underlying unquestioned assumption is that enabling information to be easily distributed and accessed will in turn enhance performance and automatically provide clinicians, managers and patients with quality information.

However, the impact that the transformation from paper based medical records to electronic forms would have on redefining the roles of individuals as well as the relationships between healthcare workers was not envisaged. The working practices of General

Practitioners were not successfully identified nor were the intricacies of the construction of traditional patient records. The simple process of reading and writing medical records has revealed that these activities 'rest upon complex and systematic social practices which are not explicitly concerned with the group, or interaction, or with the organisational, and yet do have relevance to co-operative work' (Heath & Luff, 1996: 355).

Furthermore, the assumption that medical data could be communicated in a 'seamless' fashion, raises concerns due to the dynamic nature of information. (see Figure 1). Information can be interpreted in many forms by the various stakeholders, which can lead to distortion. Different people have different interpretations of data, and these must be disclosed if miscommunications are to be avoided (Woods, 1996).

In effect systemic vulnerabilities can thus be embedded as each individual within this hierarchal domain will have varying objectives that are context dependant.

It appears that the needs of the patient have not been analysed in respect to: what patients want access to? How they want to access the services and what objectives they hope to achieve. Modelling this kind of activity could have extracted the obscure requirements necessary to inform the development of a successful system.

The issue of access, whereby all 'health care professionals and patients are to have the right access at the right time', further conflicts with the issue of safety and security, (IC, 2001:3.4).

Discussion

Given the domain where this system is being introduced, the government has failed to anticipate the possibilities of conflicting requirements due to the number of stakeholders involved and the approach adapted to reengineering. Individuals perceive situations in unique forms; doctors will have different needs and requirements of a system than that of patients or nurses. Relevance and meaning are not the same in every situation and cannot be codified, as shown in the case study around the discharge letter (Winthereik and Vikkelso, 2005).

New technology often forces practitioners to tailor a system in locally pragmatic ways, to make it work in real practice (Dekker, 2002, Winthereik and Vikkelso, 2005). Healthcare professionals will adapt systems to fit in with their routine activities. It can therefore be argued that when designing for the sharp end, overlap in organisational boundaries need to be identified so that the inadequacies of systems can be elicited *(see figure 2 next page for an example of crossing over the boundary)*.

Socio-technical systems are mutually constitutive; implementing new systems not only changes practices but also impacts back on the system itself (Hartswood et al, 2003). A design approach which only considers one stakeholder 'patient-centred' will come at the expense of the other stake holders such as the staff.
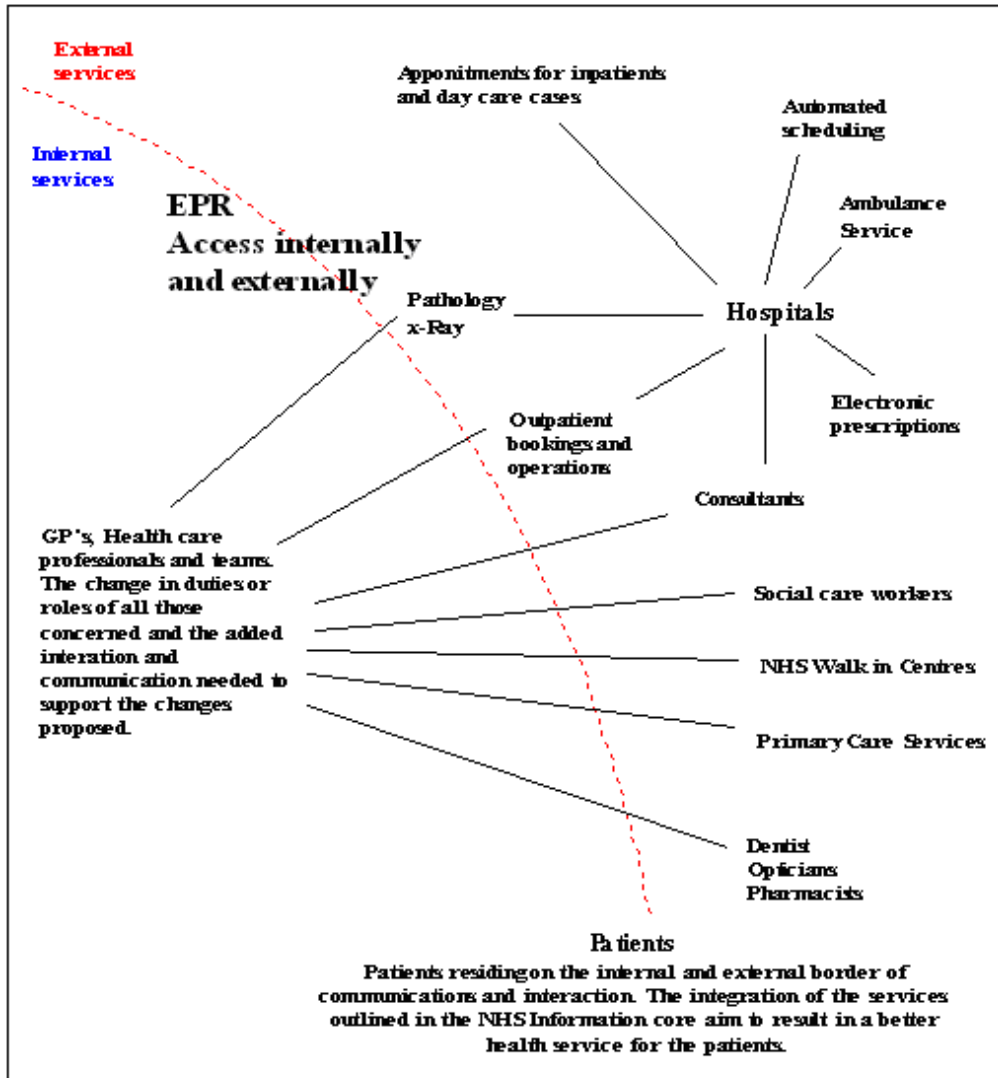
Figure 2: A Rich Picture indicating the activities of the hospital and other health care professionals. The boundary indicates the intended cross over between sub sections of the NHS. The patients being the primary concern reside on the border, indicating their role concerning the proposals.

System developers must ask certain questions in order to extract an understanding into complex and safety critical environments such as:

- What are the current working conditions?
- What are the conflicting objectives that would allow practitioners to violate procedures?
  (E.g. Efficiency Thoroughness Trade-off (ETTO) Principle; Hollnagel, 2002)
- What are the latent conditions for errors in the system, procedures and working conditions?

- How do practitioners make judgments?
- What or who is involved in decision making processes?
- How can Information Technology be deployed to make communication more efficient?
- How can we ensure that these findings are implemented into a usable system where stakeholders needs' can be met?

When dealing with the sharp end, system developers need to search for underlying patterns of current user-system interactions, (Woods, 2002). Modelling could have given developers insight into how people, teams and organisations coordinate information and activities. Furthermore, it could have established how practitioners handle evolving situations and cope with underlying complexities of the work domain (Fields, Amaldi &Tassi, 2005).

Soft Systems methodology (SSM) and Computer Supported Cooperative Work (CSCW) studies have criticised the approach taken by the government when trying to impose structural change without considering social aspects of the domain. We suggest that had SSM been deployed in unison with alternative methods, developers, whose high level objectives are to implement a system that meets and supports user's needs, may be well equipped to deliver a flexible system.

We need to understand the 'messiness' and the concrete forms of the work practices for which ICT application has to be designed, and capture the features that makes the current system "workable". This serves at least two interrelated purposes: it facilitates the interaction with the users in the process of requirements elicitation, and it is a necessary step in the generation of system requirements (Berg & Toussaint, 2003). The NHS is a prime example of such a domain because it is a social and cultural organisations whereby problem situations cannot be well defined, explicitly explained or be resolved simply. In healthcare, tasks are often fuzzy, complicated and involve a great number of people and technologies, whose activities are intricately linked (Winthereik and Vikkelso, 2005).

Technology can be used to enhance human expertise as long as technology is viewed as an effective "team member" rather than as a "prosthesis" (Hollnagel & Woods, 1983; Woods, 1996). This discussion does not intend to restrict the development of electronic medical records, but rather to raise awareness that designing for complex socio-technical systems requires to identify as early as possible the existing and potential tensions among different stakeholders. Realising that there is no easy solution to resolving these conflicts; in each case some compromise must be reached which addresses only a subset of the recognised stances. To paraphrase Hollnagel (2002) we claim that human performance must always satisfy multiple, changing and often conflicting requirements. Not recognising this from the start of the design process increases chances of introducing latent conditions for errors.

References

Checkland, P. (1999): Soft Systems Methodology: a 30-year retrospective. England: John Wiley & Sons Ltd.Collins, T.(2004): *Strategy for NHS IT must be 'all about the patients*. Computing.

Collins, T. (2004) *The public and private faces of the programme*. Computing.

Dekker. S. (2002): *The Field Guide to Human Error Investigations*: Ash Gate.

Department of Health. (2001): *Building the Information Core- Implementing the NHS Plan.* NHS Executive.

Dix, A. Finaly, J. Abowd, G. Beale, R.(1997): *Human-Computer Interaction.* 2nd Edition. England: Prentice Hall.

Hartswood, M. Procter, R. Rouncefield, M & Slack, R. (2003): *Making a case in Medical work: Implications for the Electronic Medical Record.* Computer supported cooperative work 12: 241-266.

Heath, C. & Luff, P. (1996): *Documents and Professional Practice: 'bad' organisational reasons for 'good' clinical records.* Computer supported cooperative work. ACM press. 354-363.

Kotonya, G. Sommerville, I. (1998) *Requirements Engineering. Process and Techniques.* (Chp 1-3 & 8) England: John Wiley and Sons Ltd.

Hollnagel, E. (1999) From function allocation to function congruence. In S. Dekker and E. Hollnagel (Eds), *Coping with computers in the cockpit.* Ashgate, page 29-53

Hollnagel, E. (2002) Understanding accident From Root Causes to Performance Variability. 2002. *Proceedings of the 2002 IEEE 7th Conference on Human Factors and Power Plants.*

Hollnagel, E., & Woods, D. D. (1983) Cognitive systems engineering: New wine in new bottles" In *International Journal of Man-Machine Studies*, **18**, 583-600

Norman. D.A. (1990): The 'problem' with automation: inappropriate feedback and interaction, not automation. *Human Factors in Hazardous situations, Proceedings of a Royal Society Discussion Meeting.* 28-29 June 1989: Clarendon Press, OXFORD .

Preece, J. Rogers, Y. Sharp, H. (2002): *Interaction Design: Beyond human computer interaction.* USA: John Wiley & Sons, Inc.

NHS Information Authority. (2003): *ERDIP N2 Core National Evaluation- North & mid. Hampshire:* Volume 1 Sections 1-3. Jan 2003. http://www.nhsia.nhs.uk/erdip/pages/picker/?TopicID=15&subTopicID=31

NHS Information Authority. (2003): *ERDIP Lessons learnt.* Functionality Topic. http://www.nhsia.nhs.uk/erdip/pages/picker/?TopicID=15&subTopicID=31

Woods. D. & Cook. R.I. (2002): *Nine Steps to Move Forward From Error.* Cognition, Technology and Work 4:137-144, Springer-Verlag London.

Woods. D.D. (1996). : Decomposing Automation: Apparent Simplicity, Real Complexity In R Parasuraman & M. Mouloua (Eds.), *Automation and Human Performance. Theory and Applications.* Associates, Mahwah NJ.

User involvement in identity management e-Government architecture development

Kamelia Stefanova, Dorina Kabakchieva,
Centre for Information Society Technologies, Sofia University, Bulgaria
kamelia@fmi.uni-sofia.bg; dorina@fmi.uni-sofia.bg

Lia Borthwick
British Telecom Ltd., London, UK
lia.borthwick@bt.com

Abstract

This paper briefly presents an innovative approach in collaboration of interested parties conducting research, technological development and implementation with the aim of creating an architecture that will enable open and interoperable e-Government electronic identity services and transactions in the EU (within GUIDE - an European Commission funded Integrated Project). A critical element of GUIDE is engagement of EU governments in order to stimulate political consensus and support among member states that will ensure the realization and political sustainability of the project in the long term. GUIDE's "Government Engagement Strategy" is designed to provide a unique venue through which to understand the tactical and strategic concerns of governments while at the same time to enable the project partners to better target their research and development objectives.

Introduction

Governments have always been concerned with identity and are now confronted by the challenge of provisioning identity in the networked world.

Identity can be considered as a uniquely defined and maintained set of data, referring to a person or an organization and used for uniquely identifying the entity for particular e-Government processes.

Identity Management involves maintaining an entity's complete information set, spanning multiple contexts and transactions, and establishing the relationship among various identities with the goal of improving data consistency, accuracy and systems security in an efficient manner. Identity Management is becoming a key factor for the further advancement of e-Government throughout Europe as it should support e-Government processes in cross-application and cross border environments.

It is well understood that deploying an Identity Management solution has many dimensions and uncertainties. Nevertheless, governments are now faced with a complex set of challenges as they are asked to balance the need for security, privacy, citizen and business demands for online services, and the issuance of digital identities to make these services a reality. This is not a simple undertaking and must be supported by a complex framework of laws, policies, institutional decisions, business practices and ultimately technology.

This paper briefly presents the objective of GUIDE, a project financed by the 6FP of the EC, with the main goal to develop an Open Identity Management Architecture for e-

Government in Europe. The architecture constitutes a first step toward the piloting, testing and enablement of pan-European e-Government services in the EU. In this context, a critical element of GUIDE is engagement of the EU governments in order to stimulate political consensus and support among member states that will ensure the realization and political sustainability of the project in the long term.

European Aspects of Identity Management

The European aspects of Identity Management are briefly discussed in this section. The problem that GUIDE addresses, the main goal and vision of the project are also presented.

The Current Situation in Europe

Currently there are many "Identity Silos" in existence within Member States and across Europe, as it is shown on Fig.1.
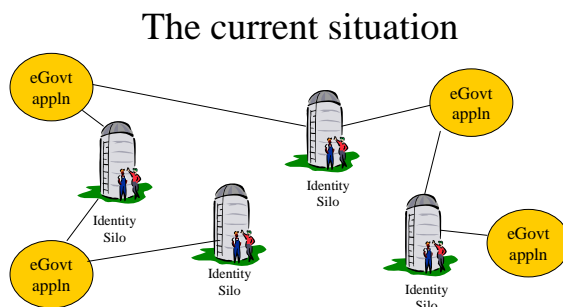
Figure.1: Current Situation in Europe

These silos are defined as disparate data stores containing identity data – often different versions of the same data, not joined-up or managed in any way. They exist within Government and also corporate systems. This is impacting the effectiveness of e-Government and security services across Europe. Identity is a key foundation of security solutions. Disparate, conflicting and unavailable identity data are currently limiting the effectiveness of authentication, authorization and general security applications across Europe. Governments find e-Government solutions costly to implement and maintain, due to a need to 're-invent the wheel' every time, and through expensive administration. Citizens find current e-Government solutions difficult to use, particularly due to disparate authentication mechanisms. Businesses are unable to securely and efficiently interact with Governments, impacting business agility and profit.

Innovative Approach to Identity Management Research for e-Government at EU Level

The *problem* that GUIDE addresses is the definition of a logical, technical, institutional and legal framework supporting the development of Identity Management services, which integrates existing Identity Management systems while being consistent with the juridical and regulatory conditions prevailing in Member States.

The *aim* of GUIDE is neither to address national Identity Management issues as such, nor to enable nationally constructed applications. Its objective instead concerns interoperability across national systems and structures (processes, cooperation, interfaces) within broader transnational, policy, legislative, and socio-economic boundaries.

GUIDE's *vision* is to develop an architecture that integrates local, regional, national and pan-European Identity Management services in an interoperable manner that allows accommodating the requirements of Member States.
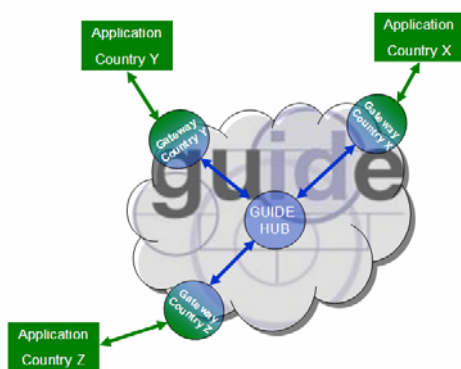

Figure 2: GUIDE Conceptual Model

The conceptual model of GUIDE is presented on Fig.2. The design and development of the GUIDE Open IdM Architecture is driven by *eight key political and functional axioms*, to which further research is designed to add more knowledge and insight (The GUIDE Consortium 2004).

1. European Open Identity Architecture: "A European Open Identity Architecture will be defined";
2. EU governance: "The architecture will conform to the overall EU regulatory and legal framework and system of governance";
3. State Governance: "Each Member State will have governance over Attribute Services operating within their boundaries, and the identity data underpinning these identity services".
4. Data Ownership: "Each functional element of identity data within the Identity Grid will have clear data ownership and data obligations";
5. External Applications: "All identity data is produced and consumed through applications outside the Identity Grid";
6. External Data: "A significant amount of identity data will always stay outside the Identity Grid";
7. External transactions: "A significant amount of identity transactions will always be done outside the Identity Grid";
8. Identity Services: "Applications outside the grid will interact with a set of "Attribute Service Providers" within the Identity Grid";

Much of the research work within GUIDE focuses on institutional, policy, legal and sociological frameworks underpinning Identity Management in order to identify conditions for, and obstacles to, EU-wide take-up of e-Government services. Central to the research is an understanding of critical organizational and political aspects of Identity Management. An analysis of the legislative landscape at both, national and EU level, is also undertaken, as it will give the "enabling legislative framework", that will shape the paths of development of the Open IdM Architecture of GUIDE. The socio-economic, ethical and cultural differences that drive identity formation are considered and studied as well.

User Involvement in GUIDE

The objectives of GUIDE are planned as sequential phases of research and development, leading to adoption and implementation of the architecture. The most important element of GUIDE is to collaborate with EU governments in order to create political consensus and support among Member States that will establish fruitful cooperation for innovative ideas and solutions for EU e-Government services Open Identity Management Architecture design and development.

Government Engagement Strategy

The Government Engagement Strategy" (The GUIDE Consortium 2004) is designed to provide a unique venue through which to understand the tactical and strategic concerns of governments while at the same time to enable the project to better target its research and development objectives.

The Government Engagement Strategy has two main goals:

- To ensure political support and obtain expert advice from government officials involved in Identity Management at local, national and EU levels;
- To maximize the impact of GUIDE by involving local and national governments in pilot solutions.

The Government Engagement Strategy is composed of four interrelated and concurrent phases. The first phase consists of face-to-face consultations with senior government officials, involved with policy and technological aspects of Identity Management at local, national and EU levels. Apart from its introductory nature, the purpose of this phase is to allow GUIDE and governments develop complimentary and mutually supportive perspectives, and explore the key technological and policy priorities and challenges of different Member States. The second phase includes the formation of an Advisory Board to be composed of senior government officials and other experts involved in Identity Management. The structure and precise function of the Board is designed to reflect and represent the diversity of the political constellations that make up the EU and the different approaches to Identity Management that result thereof. The third phase involves a series of high visibility workshops around the EU in order to enable government officials concerned with Identity Management to participate and explain the strategic orientation and challenges of their respective organizations. They will also have the opportunity to exchange experiences with their counterparts from other governments and the wider scientific and research community involved in Identity Management. The fourth phase includes the formation of a GUIDE extranet and an observatory on Identity Management issues in the EU and internationally. The objective here is to provide space for the exchange of experience and insights while keeping the Identity

Management 'community of practice' at the cutting edge of international developments in Identity Management issues.

The project participants are aware of the diversity that marks national approaches to Identity Management. The strategy therefore is one of "relative autonomy", designed to reflect and represent this diversity in a way that allows GUIDE to operate as a platform of engagement with different national orientations or constellations thereof without being entirely absorbed by any one in particular.

Official Consultations with Member State Governments

The Government Engagement Strategy has now concluded the first round of official consultations with Member State governments (Guide Phase 1). The consultations have been conducted according to a consistent methodology in order to produce comparable results across Member States. Taking into account the legislative and technological diversity that marks Member States, efforts have been made to remain flexible with respect to the parameters of inquiry, while adhering to the principal research questions of the project.

The consultation phase of the Government Engagement Strategy has been organized with the objective to yield information and primary research material in support of the main pillars of GUIDE, namely its position within the IST program and other related initiatives; its strategic goals and outcomes; its policy aspects and engagement with Member State governments; and its technological approach and objectives.

The scope of the consultation meetings and engagement includes the following issues:

- Architectural principles, nationally-specific Identity Management services "views', and interoperability challenges for architectural design;
- Institutional, policy, and legal conditions that structure and delimit Identity Management in specific national contexts and their implications for technology design and solutions;
- Nationally-specific Identity Management process and service analysis, interoperability standards and elicitation of user requirements;
- Government stakeholder cooperation and organizational modeling in Identity Management and e-Government service provisioning;
- Identity data analysis and definition of technical and interoperability guidelines in Identity Management;
- Exploration of trials and pilots in terms of their relevance to the implementation of the GUIDE architecture, GUIDE's innovation and cross-border usefulness.

Each of the government consultation meetings has concluded with exploration of the prospects of government engagement in the GUIDE planned pilots and participation of government officials in the Advisory Board (Phase 2 of the Government Engagement Strategy) and in the planned workshops (Phase 3 of the Government Engagement Strategy).

Conclusions

GUIDE's overall goal is to create the main critical requirements and principles for Open Identity Management Architecture development that will support EU e-Government services interrelations and interoperability, based on durable trans-national co-operation and consensus on a pan-European basis. The two main objectives of the Government Engagement Strategy, presented in this paper, are to ensure political support and obtain expert advice from government officials involved in Identity Management at local, national and EU levels, and to

maximize the impact of GUIDE by involving local and national governments in pilot solutions. Through achieving the scientific, technological and socio-economic goals GUIDE will contribute towards initiatives that will ultimately deliver multiple benefits to governments, citizens and business.

Acknowledgements

References

The GUIDE Consortium (2004) GUIDE Open Identity Management Architecture Overview, GUIDE Architectural Snapshot.
The GUIDE Consortium (2004) GUIDE Government Engagement Strategy.
GUIDE Government Engagement Strategy – Phase 1: EU Member State Government Consultation Report.

Stepping carefully between powerful users: An incremental approach to system development in political mine fields

Lars Risan

Center for technology, innovation & culture, University of Oslo, Norway

lars.risan@tik.uio.no

Abstract

The development of e-Government projects often takes place in contested spaces, with a large numbers of stakeholders and in the tensions between conflicting, yet important values of the community. ICT-systems sometimes intervene in these conflicts because to distribute information in new ways may potentially mean to distribute power in new ways. In such cases we may not expect that a formally explicated method of user participation will ease the tensions. The steps taken to be able to introduce a new system may then have to be incremental and ad hoc-strategic rather than following a rational procedure. These claims will basically be underpinned empirically, by reference to an investigation of a Norwegian trial project known as the Electronic Mail Journal.

Introduction

Nation states are big, powerful institutions. They allocate great powers, such as the right to kill, and crucial values, such as the liberal rights of its citizens and their rights to be different from each others and to disagree. The development of e-Government projects often takes place in contested spaces, with a large numbers of stakeholders and in the tensions between conflicting, yet important values of the community. Some e-Government projects will intervene in these conflicts and tensions. The general points of this paper is, first, that ICT-systems sometimes will intervene in these conflicts precisely because ICT is a technology to *move information*. Information is knowledge, when it is understood by humans, and knowledge is power (more on this further down). Distributing information in new ways means, potentially, to distribute what Foucault termed power/knowledge (Foucault 1980) in new ways, and that often meets resistance.

The second general point concerns user participation, in cases where the "users" include many user groups (internal as well as external users), and where many of these user groups are also stakeholders. In such cases, and especially where ICT distribute power/knowledge, we can not expect that a formally explicated method of user participation will ease the tensions. Conflicts are sometimes objective, and social engineering will not solve them. The steps taken to be able to introduce a new system may then have to be incremental and *ad hoc*-strategic rather than following a rational procedure.

This paper will present the development of an e-Government service that exists in a contested space of various stakeholders and interests. The case in question is a trial project to let the general public have web-access to the mail journals of the central Norwegian state

administration. The system is called the *Electronic Mail Journal* (subsequently the "EMJ").[3] The contested stakes of the EMJ-project, in short, are these: The EMJ is explicitly made to promote an open and accessible state administration. This is broadly accepted as an important side of all democracies. Against this value of openness stands the need of any administration not to be unduly disturbed in their work. A critical press – or a scandal oriented one – with too much access to works in progress may hamper necessary preparation of cases and due processes. The need for indisturbance may be of both legitimate and illegitimate kinds, and there is a large gray zone between legitimate peace of work and illegitimate concealments, where the press and various kinds of governmental bodies will draw the boundaries between them quite differently.

Against the value of openness also stands the obligation of the state to safeguard the legal rights and privacy of the individual. The state is obliged to keep some of the information it collects about individuals away from the public eyes.

Trapped between these values, the establishment of an EMJ-service has succeeded (so far) due to the following reasons:

- The system has been developed "bottom up", by small and politically insignificant actors.
- The system was initially developed with very few users (end users as well as internal users). This limited the numbers of stakeholders, and made the system less dangerous.
- Numbers of users (internal as well as external) have gradually increased, through a series of small and seemingly "insignificant" steps.

EMJ has been developed incrementally, but only partly by an explicit strategy to do it incrementally. To a large degree the proponents of the system have done what they can to develop the system, leading them by necessity rather than by strategy to take one step at the time.

Information and communication technology works by moving and changing information. Introducing it where it was not before is seldom a mere rationalization of the previous flow of information. It is a *change* in the flow of information. It is the making of new knowledge by the reorganization of (possibly the "same") bits of information. Thus when ICT moves or reorganize information it possibly change power relations. This may make the introduction of it dangerous to those liable to loose power, and it may make *non-communication* – *not* to speak or make public a given item – preferable to some, because non-communication can mean the preservation of differences that are also differences of power.

The following story about the Electronic Mail Journal exemplify this.[4]

---

[3] A mail journal is a list of the officially recorded incoming an outgoing letters to a given governmental body (Note: The word "electronic" does not refer to the nature of the mail, as in "E-mail". The Electronic Mail Journal is an "electronic" list (a database) of all kinds of letters, including old fashioned letters, faxes and formal E-mails). The journal contains the title of the letter, its date and the receiver and sender of the letter, and some technical data (notably the subject number, linking relevant documents together).

[4] This paper is based upon an empirical investigation of the EMJ-case, published in a lengthy report in Norwegian (Risan 2004). I have read all relevant and available documents in the case and interviewed central actors. I have learned to use the EMJ by having "trial access" to the service. Due to this trial access I also have been able to use the EMJ-service to search for documents concerning the EMJ, and thus to have a very good insight in where the relevant documents are, and to whom they have been sent. In the following I will not refer to the documents that supports my claims, as this would fill this short English paper with Norwegian footnotes (except when I refer to a quote that is not mentioned in the report). The interested reader is referred to the report.

The Actors of the EMJ-process and their Stakes

Here is a list of the major institutions and stakeholders in the EMJ-process.

1. **The Ministry of Modernization.** Owns the EMJ-project. As owners they are formally responsible for the fate of the EMJ-project. They support the system both principally and in practice, but have also acted in ways that strongly indicate a resistance to the project. The Ministry have to be an mediator between external actors of different opinions. In addition, there are probably both supporters and critics of the EMJ within the Ministry, but it has not been possible to get anyone to speak about these internal differences. Their effects can only be observed in ambivalent actions, an ambivalence that has resulted in the very long trial period.

2. **The Central Information Service ("SI", now part of "Statskonsult")**. The daily maintainer of EMJ. They have been a directorate placed under The Ministry of Modernization during most of the process (recently privatized as a state owned company), and have little formal power. They have always been enthusiastic promoters of EMJ, and have seen it as their cause to "effectuate the nice words about openness and democracy that the Ministry talked so much about", as one SI-person working with EMJ expressed it.

3. **The Press and its organizations**. Enthusiastic supporters of a system that they see as a most effective instrument to promote an open state and to ensure good conditions for a critical and informed journalism.

4. **The Data Inspectorate**. A governmental body with quite broad authorities concerning personal privacy. Fears the possibility that EMJ mat be used in order to systematically collect personal information, notably personal contact with the state administration. They fear that if people starts to believe (rightly or not) that their correspondence with governmental bodies may be used in commercial or political ways, they may not want to make otherwise necessary contact with governmental bodies.

5. **The Ministry of Finance and The Office of the Prime Minister**. The purpose of the EMJ is to make the inner workings of the state administration more available to the public. However, several institutions and people have been worried about the possibility that EMJ can also be used to produce information about documents that are (legitimately) exempted from public disclosure. This is a possibility because the search engine of the EMJ makes cross-departmental/ministerial searches possible, thus enabling the coupling together of information that isolated is meaningless and/or harmless. Many actors fear this possibility. The Ministry of Finance and The Office of the Prime Minister is only the most explicit advocates of a careful line in relation to possibilities of leakages.

6. **The Minister of Justice currently in office**. In June 2005 the Minister of Justice proposed a new *Freedom of Information Act*. During the last 6 years, defenders of EMJ have worked in the committee that has written the proposal. In the proposal, EPJ is at last legally authorized, and the law is likely to be approved by the Parliament.

The institutions in point 4 and 5 are both critical to the EMJ-project, but none of them explicitly rejects the entire project. They just want some limitations and some assurances against what they see as possible misuse. Moreover, their skepticisms share one factor: Both The Data Inspectorate and The Ministry of Finance/The Office of the Prime Minister want to secure "privacies", respectively the privacy of individuals, and the privacy of certain inner workings of the State administration. They want to achieve this "privacy" by putting limits on the flow of information. That is, they want to preserve and establish certain kinds of non-communications, certain kinds of "taboos". Some things are better not said, not

communicated. I'll return to the politics of non-communication further down. First I need to present, in a very brief outline, the story of the Electronic mail Journal.

The story of EMJ

Just to give an idea of how EMJ has been developed, here is a list of the major events in its history.

1990: A temporary Norwegian governmental body – The "information committee" of the Government in office – takes the initiative to develop an Electronic Mail Journal.

1993: The first version of EMJ is launched, with five ministries/ departments delivering their mail journals to the system, and with five newspaper offices as end users. The usability is awkward and in need for serious rethinking.

1995: A Web based version is launched. EMJ has hit the "desktop" of Windows 95 and Mac. The number of end users and content providers are increased. The end users express their great satisfaction with it.

1995 and onwards: New users (eagerly waiting to get access, lined up in a queue) and content providers are gradually included.

1999: The owner (the Ministry of Modernization) takes an initiative to consider the possibility of unrestricted public access. The externally produced report recommends such public access. However no action is taken, except for the continued gradual increase in number of users and providers.

2002: The Ministry of Modernization (MOD) slowly (and tacitly) acts in a way that suggests that they try to demolish the project. The daily maintainer (SI, now Statskonsult) arranges a broad meeting where the owner get to meet the users (the press), and is forced to explicate their plans. The press writes about the coming "scandal". One week later the political leadership of the Ministry promises the permanent continuation of the EMJ-project.

2003, winter: The Ministry of Modernization publishes a report that outlines the permanent, public EMJ. Some restrictions are suggested implemented, to preserve personal and ministerial privacy.

2003, spring: Statskonsult produces a requirements specification for the permanent service. The plan is to have a permanent service ready by the end of the year. The owner of the project receives this document, but does nothing but prolonging the trial project through 2004.

2004, spring: A bureaucrat at the Ministry of Modernization let it shine through to me, in a phone call, that the requirements specification is not likely to be used, but no explicit reason is given, and no letter (public or exempted from disclosure) exists that describes the reason for this.

2005, spring: The Minister of Justice proposed the new *Freedom of Information Act.* EPJ is about to get its legal authorization. All Ministries and central state departments will *have* to deliver their mail journals to the EMJ.

There are many delays in this story. There are steps leading in the direction of a new service and steps leading away from it, sometimes taken by the same institution (notably the Ministry of Modernization). I cannot explicitly discuss all of them, but I will make some general sense

of them by giving an outline of what I think is the three major arguments and positions in the EMJ-case.

The major positions in the EMJ-case

Openness. All the involved parts of the EMJ-process agree on the following: An open state administration, where the press as well as the public in general have access to as much as possible of the inner workings of the administration is seen as a democratic good. No one questions this explicitly. Furthermore, no one questions that EMJ is a truly helpful tool in achieving a more open state. This gives the EMJ-project an unquestionable strong position, used for what it is worth by its supporters and acknowledged by its critics. In line with this argument, it is also argued with authority that a future EMJ must be open to the general public, not only to the press. The "information privilege"[5] of the press in the current institutionalized trial version cannot be upheld.

Personal privacy. Since the 1999-report, this has been the most controversial theme, at least the argument most explicitly discussed. Personal privacy has a quite strong position in Norway, much due to the work and the strong position of *The Data Inspectorate*. Ideologically, all actors in the EMJ-process recognize the value of a strong protection of personal privacy. In practice most of the actors also support the Data Inspectorate in their cautious line of reasoning. Notably, the departmental 2003-committee followed this line, repeating the conclusions made in the 1999-report, made by the external lawyers and based on the arguments of the Data Inspectorate.

The press organizations, however, strongly rejected this cautiousness. They argued that the measures to protect personal privacy would become a great hindrance to critical journalism (because the suggested protection of personal privacy will take the form of tagging and making invisible of personal names, including the names of public persons). Moreover, they claimed that the feared misuse was not actually possible to do. Thus, the measures taken were not only harmful, but unnecessary. Their position where registered but not taken into account.

Ministerial non-communication. I use this term to cover both legitimate concealment of information and more or less legitimate secrecy. Most documents and actors in the EMJ-process recognize the importance of legitimate concealment, also the press. However, the ways in which different kinds of concealment is talked about in the EMJ-case documents is different from the ways in which openness and personal privacy is talked about. Both these two values stand on moral high ground. They are normatively celebrated. Not so with concealment, not the legitimate one, and certainly not the informal one. Non-communication is barely mentioned, even if always recognized, and very seldom *more* than barely mentioned.

When reading the documents of the EMJ-case, and when talking to people in the administration, I have often been struck by a "sense" or "feeling" of the importance of concealment rather than confronted by explicit knowledge of its importance.

There have been many turns and many delays in the history of EMJ. They are mostly undocumented. That is, there exist no explicit and publicly available document to explain events like the silent attempt by the Ministry of Modernization to close down the EMJ-service in 2002. Obviously, something that is not documented and written down has been going on. I have reasons to believe that some of this "invisible" activity involves strategic maneuvers by

---

5This phrase is used in several documents, see (Arbeids- og administrasjonsdepartementet 2003).

EMJ-skeptics, taken in order to preserve non-communication. The following case provides us with a glimpse of such strategic, non-explicit maneuvers.

The Ministry of Finance and the Office of the Prime Minister are still (as the only ministries) not taking part in the EMJ. The explicit reason for this is a known leakage through the EMJ of sensitive information. The case runs as follows.

"Governmental notices" are political documents made by the ruling party/parties, often circulated between The Ministry of Finance and the Office of the Prime Minister, in the making of the next year budget. They are widely acknowledged as exempted from public disclosure. The political opposition has no rights to know them, not even by their title. Some years ago such a title, or some of the title, was leaked through the EMJ. It was possible to trace the title of one such document, because it, apparently, had reappeared in another non-secret document. The electronic possibility to link series of documents across departments and ministries through their subject numbers made this leakage possible.

The Ministry of Finance and the Office of the Prime Minister will not take part in it before they are assured that cases like the one mentioned above will not – and *cannot* – recur.

Now, as part of my investigation into the EMJ case I conducted a quantitative survey of the possibility to systematically use the service to produce "personal profiles" about individuals (in ways that the Data Inspectorate fears). I tested the presence in the EPJ-base of 1768 accidental persons and got some strong indications. Only 41 persons had one entry or more in the base, and I interpreted our findings to include only 4 persons with entries that possibly could be used to build person profiles. I concluded that it does seem very unlikely that these few occurrences (0.23%) will legitimate any systematic attempts to build person profiles (Risan 2004).

In April 2005 I was invited by Statskonsult to present these results, at a one-day conference where many of the involved parties of the EMJ-project were present. One person persistently and fiercely questioned the validity of my quantitative investigation of the (im-)possibility of making "person profiles". This person was not – as one might perhaps have expected – the person from the The Data Inspectorate, but the archive leader of the Ministry of Finance, the Ministry most concerned about protecting its own non-communication. This person also sat in the 2003-committee that suggested the protective measures to ensure personal privacy.

Can it be the case that the "politically correct" argument to protect personal privacy is being used to promote the case of ministerial non-communication? This may at least be a *possible* strategy. The proposed measures to protect privacy can probably not be implemented at the already available (10 years old) database. This database may have to be closed down, in the name of personal privacy, something that will also protect Ministerial privacy, including an assurance that possible but not discovered links to reconstruct titles of Government-notices will also be removed.

One may question the scientific validity of the case here presented. After all, I am speculating about hidden intentions of a single person. I may be wrong about it. This is true, but I want to defend the necessity of speculating about silent strategies. There is little doubt that strategies of this kind do exist, and that they are at work in cases like the EMJ-trial project. The promoters of personal privacy and the promoters of ministerial privacy have good reasons to join their forces. But such strategic alliances are hard to study explicitly, because people tend to avoid talking to inquiring social scientists about such strategies. (The person from the Ministry of Finance has denied to be interviewed by me). Yet, alliances and strategies of such kind do undoubtedly exist, and their very existence is important to the argument presented in this paper. This leads me to the concluding remarks.

Conclusion

The EMJ service is a tool to give the press and the public in general *real* and *substantial* insight into the workings of the state administration. The service is not a top-down, politically driven and politically correct celebration of openness and democracy, like the Email address "president@whitehouse.gov", just to take a small but well known example. It is not a project that any politician has ever used in order to win votes or promote him- or herself as a promoter of democracy, not to say "E-democracy".

This links up to the generalization I initially made about the relation between power, knowledge and information- and communication technology. The EMJ database and its search engine is a machine to distribute knowledge and power in new ways. That makes it dangerous to some people and some places.

The party to lose control of knowledge (and thereby to lose power) by the introduction of the EMJ is the central state administration, notably the Ministries. In the last case I presented, it is a representative for the Ministry of Finance, a powerful institution in Norway, who, seemingly, acts strategically to preserve control of knowledge. This ministry is under pressure to denounce this power for the sake of openness. The pressure comes from three sides: "bottom up" from Statskonsult (formerly SI), who has worked enthusiastically and slowly to build up the EMJ-service during the last 12 years, "externally" from the press, who has lobbied and used its media power to support Statskonsult, and more recently, "top down" from the current political leadership, notably the current minister of Justice.

I am quite certain that it has become possible to put pressure on old, powerful institutions like the Ministry of Finance and the Office of the Prime Minister because the EMJ-project has been driven "bottom up", by less powerful institutions, slowly and through a series of small steps and alliances.

As Følstad is discussing elsewhere in this collection, user involvement may be a device in order to increase user acceptance of new solutions (Følstad 2005). In the EMJ-process the main challenge has been to achieve the acceptance of the internal users, the content providers of the service. These users have been involved, and their involvement has been of vital importance to the project. Mostly this user involvement has taken the form of bilateral negotiations between Statskonsult and the potential content providers. Statskonsult has been in contact with the archive leader of a given governmental body. When, as often has been the case, the archive leader has been sympathetic to EMJ, this person has pushed the service internally in her organization, and EMJ has won another content provider.

However, user involvement does not necessarily minimize resistance to a new system, and we should not think of this involvement as a technocratic means to speed up user acceptance. The Ministry of Finance (and other hesitating actors) have been highly involved future users of EMJ, albeit not through formalized procedures of user involvement. Some of the major obstacles of the EMJ-service are *due to this involvement*. This, however, is not a problem that could have been avoided. The Ministry of Finance has good reasons – as they see it – for not wanting certain kinds of openness. The press disagree. They accuse the Ministry for protecting information that should be public. Who is right? Could a formalized procedure of user involvement – applied by an external change consultant – settled this question rationally, or earlier in the process? I doubt it. It may even have resulted in someone in the right position to call the whole project off in an early phase of it. Conflicts are often not solved rationally. When the Ministry of Finance (and other hesitating actors) will accept the EMJ – as they may have to do when it becomes legally compulsory – it may not be because they have rationally bought the *content* of an argument. There may be no rationally achievable synthesis between two values (such as democratic openness versus more and less legitimate concealment of due

processes). It may be that the Ministry of Finance keeps on having good reasons for not wanting certain kinds of openness. Thus it may be that the Ministry becomes forced to acceptance of the EMJ by a constellation of actors that slowly and tactically have built up a *position* from where to enforce this change, despite the resistance. Power/knowledge is context dependent, and sometimes the *con*-text is more important than the text.

Acknowledgements

References

Arbeids- og administrasjonsdepartementet (2003) *Elektronisk Postjournal – Prinsipper for etablering av en ny elektronisk postjournaltjeneste i en åpen og brukerrettet forvaltning*. Saksnr hos AAD: 1999/02858, doknr: 082

Foucault, Michel and Gordon, Colin (1980) *Power/knowledge : selected interviews and other writings* 1972-1977. Brighton : Harvester Press.

Følstad, Asbjørn (2005) "Why do we involve users? The role of the HCI practitioner in e-Government projects", this volume.

Lars Risan (2004) *Prøveprosjektet Elektronisk postjournal – Statlige manøvrer mellom åpenhet og personvern*, Arbeidsnotat nr. 33/2004, Centre for technology, innovation and Culture, University of Oslo. Available at

http://www.effin.org/Dokumenter/EPJ_statlige_manovrer.pdf

Situating the transient user: overcoming challenges in the design of e-Government systems

Philip Inglesant and M. Angela Sasse
Department of Computer Science, University College London
p.inglesant@cs.ucl.ac.uk; a.sasse@cs.ucl.ac.uk

Abstract

e-Government systems present new challenges for user involvement in the design process. Existing user-centred and participatory design methodologies were mainly developed for situations where a user is in the workplace. In e-Government applications the user population is heterogeneous and numerous; the increasing ubiquity of e-Government systems also questions the concept of "the interface". This paper presents the results of a study of discourses of e-Government users in two cases studies of interaction with new information systems in transport, which illuminate usability problems arising from a failure to prioritise users' needs at all stages. An approach is proposed which accounts for the values as well as the goals of users, appropriating stakeholder analysis and ideas from Soft Systems Methodology while recognising that the routine actions of users in the real world are situated and contingent.

Introduction

Electronic Government was originally understood as the online provision of existing services, as, for example, in the UK Government's 2005 target for all services to be online. However, e-Government plays a crucial role not only in the delivery of existing services, but also in making available new public policy options, in a mutual shaping of technology and society. A more inclusive definition of e-Government is as the adoption of electronics to mediate interactions between government and citizens, business, or other governmental organisations. Transactions may be complex and distributed; ownership and responsibilities may be distributed between government, citizens, and third parties such as commercial software developers or service providers. The resulting complexity makes it harder for users to understand the systems they are interacting with, and for developers to address usability throughout the design process.

Conceptions of the user in e-Government

There is a lack of research into the user in e-Government. In a short article, Flak, Moe, and Sæbø raise the need for more research into the user side to balance the primacy of increased efficiency as a driver of e-Government. An HCI approach goes beyond this, though, aiming for a deep understanding of the users' *needs and practices* and of their *values*; such a view, as Friedman, Kahn, and Borning argue, requires influence in the design of technology from the earliest stages and continuing through the process.

Who is the user?

Much of the existing research into involvement of the user in the design process assumes that the user is typically an employee in the workplace, but in e-Government, *the user* is not within an organisation but is both a customer of a service and a citizen. At the same time, public sector employees, who traditionally have performed some of the tasks which electronic systems enable citizens to do for themselves, are also users of the system. What is needed is a perspective on the overall *system*, which does not make assumptions about the users but rather attempts to identify the "clients", as well as various other kinds of stakeholders.

What is the computer?

The category of computer is no longer a single machine, either a classic mainframe or a personal computer on a desktop; not only the machine itself, but the bounded set of functions it performs is "*multiplying and dissolving*". The systems, too, within which the computers are situated, are not bounded by the particulars of the technology, and in the case of e-Government are part of a much wider system, driven by policy needs.

What is the interface?

Whether using techniques of cognitive psychology, ethnography, or sociology, the traditions focus of HCI has been the *interface*. Sometimes, as in Suchman's ground-breaking study, a study of the interface illuminates usability problems whose origin lies elsewhere; as computers become increasingly ubiquitous, though, it is increasingly the case that users' interactions are not at a single interface or, indeed, that they may "interact" without being consciously aware of the interaction.

Embodying Values, Ensuring Usability: an Analysis of Users' Discourses

For this paper, discourse analysis was applied to qualitative data from two studies on user interaction with technology in the transport sector. The discourses of users are used to throw light on their situated interactions with e-Government as encountered in daily life. These interactions are encountered in different situations and across multiple interfaces, including but certainly not limited to web pages: ticket machines, card readers, and mobile phones for both voice and SMS, amongst other interfaces, are implicated in these interactions.

Some illustrations from e-Government in transport

Two case studies of e-Government in support of transport policy in London illustrate these usability issues in a multi-interface environment: Web sites are just one example of interfaces which also include ticket barriers, automated cameras, ticket machines of several kinds, and mobile phones for both voice and SMS messages.

As a locus for investigation, an urban transport system has characteristics which make it especially appropriate to throw into relief some of these questions, as a *system* which is encountered frequently and routinely by large numbers of people who are not particularly interested in "interacting" with it or the computer systems which support it, but simply in moving from one place to another as easily as possible.

The Oyster card is a contactless transport smartcard which can store period tickets as well as *Pre-Pay* value which can be used to pay for individual fares; it has the potential to encourage public transport use through reducing barriers to access, improve bus journey times, and free staff from the ticket office, as well as providing an integrated ticket across all modes[6]. **The Central London Congestion Charge** is a road charging scheme aimed primarily at reducing congestion by encouraging people to choose other forms of transport than private vehicles; revenues for the scheme are used to fund public transport. This study focused on usability in *payment* for the Congestion Charge, the area with which users interact most often and most directly.

For both case studies, a rich dataset included interviews[7] and focus groups with a total of eighty users of the e-Government services, interviews with twenty-five senior managers, policy researchers, trade union officers, transport campaigners, and other staff, observations, and analysis of published policy documentation in the form of strategy documents and minutes of meetings. The interviews were voice-recorded and transcribed for discourse analysis.

Beyond heuristics: usability in situated action

It is not within the scope of this paper to develop a theoretical understanding of the concept of usability; to ground the analysis of usability issues some well-known usability heuristics are appropriate, using a broad interpretation adapted to these situated interactions.

Nielsen's heuristic: *Match between system and the real world* is interpreted here to include extra-linguistic communication with the user where the interface is not necessarily a Web site or other screen-based interface. The following examples illustrate usability problems arising from policy and from the technical design of the system.

Policy constraint

A good example of a failure of a system to match the users' world is the non-availability of *Pre-Pay* on Overground services run by the Train Operating Companies. For the user, this means a complex and confusing situation in which some Oyster tickets, for example period travelcards, are available for use on TOC services, and some National Rail stations have Oyster readers, but other fare options, such as prepay, are only available at a limited subset of stations:

> I get off at .. somewhere where I can only get out with a valid ticket ... , so sometimes I've just waved a prepay .. card, and sometimes ... they let me out, and sometimes they let me go and buy a ticket once I get out – Oyster user

Essentially this *usability* problem arises from policy issues related to the separate organisation of TOC services, and their different fare structure.

Technical constraint

Another example of the mismatch between expectations and delivery is the online purchase of Oyster tickets. Oyster users can buy a period ticket or add prepay value via the Internet, which is then loaded to their card at a nominated Tube (London Underground) station. However, this

---

[6] Pre-Pay is not currently accepted on some rail services run by Train Operating Companies

[7] A large amount of this data from charge payers was collected by undergraduate students at UCL as part of a final-year project, and the authors of this paper gratefully acknowledge their contribution.

is constrained by the technical architecture of the system. Downloading of a ticket or stored value, ordered earlier on the Internet, onto the chip held on the Oyster card can only be done by passing through a gate or using a "validator" machine at a Tube station; there are no facilities for downloading stored value elsewhere:

> *Oh, yeah, and if you live in Hackney, which doesn't have a close Tube station, what are you going to do? – Focus group participant*

The restriction which requires physical presence in order to download data to the card is inherent in the architecture based on RFID technology; the point here, though, is that the requirement to pass through a ticket gate at an Underground station is not a match with the real world of the users travelling by bus, train, or some other mode of transport.

Normal, natural troubles

The capability of the system to handle "*normal, natural troubles*", to use the phrase that Randall and Hughes have borrowed from Garfinkel, is related to a broad interpretation of Nielsen's heuristic: *user control and freedom.*

The Congestion Charging payment system provides some good examples of failure to allow for contingencies. Although the system provides both traditional and electronic payment channels, interviewees cited events such as being unable to find a shop to pay in, not being sure in advance whether they will need to pay, arriving home late, or being forced to drive into the charging zone by some incident such as a diversion:

> *sometimes it's hard to find a shop. They don't have the shops all around the, you know, ...*

Sometimes users simply forget, but this, too, is a "*normal, natural trouble*":

> *... sometimes, you just, it slips your mind, it's so easy, and then you think at midnight you think, oh, damn, I haven't paid the congestion charge, and you know you're going to get a ... fine or something – Congestion Charge payer*

Reaching the Transient e-Government User

In moving towards a proposed *approach*, rather than a methodology, for involving users with the aim of improving usability in situated, ubiquitous e-Government systems, it is useful to appropriate ideas from existing practices such as Soft Systems Methodology in terms of modelling and understanding a situation from the viewpoint of many stakeholders. The "*purposeful action*" which SSM takes as its basis needs, however, to be qualified with the understanding that the moment-by-moment interactions with technological systems in real-life situations are contingent and are "*not adequately explained by ... preconceived cognitive schema*". Such an analysis must also take into account the *values* of its heterogeneous *users* as well as their goals in using the systems, and these must be reflected not only in the system implementation, but in the public policies with it embodies.

If not articulated as cognitive plans, how, then, can the values and goals of users, and in particular the tensions between their values and goals and their interactions with the system, be understood? It should be clear from this discussion that a variety of approaches is needed, but in identifying usability issues an analysis of the discourses of the users has illuminated some "breakdowns", or mismatches between the users' world and the computer world.

Heuristics, as understood in the HCI tradition, have their place, as pointers to usability issues; but heuristics developed for usability evaluation of web pages (for example Nielsen

2005) can only provide some general guidelines; as these few examples illustrate, existing heuristics widely used in usability studies need to be substantially broadened and adapted if they are to be suitable for the situated interactions of e-Government.

Conclusions

This analysis of the discourses of e-Government users has shown that usability problems for these two application areas were not in the interfaces themselves, but in the wider context of the transactions as a whole, and in the policies which they implement. In e-Government, though, there are further constraints not only on the users, but on the designers and the implementers, of public policy imperatives. Usability is one of a number of competing considerations and trade-offs; usability problems arise from a complex interplay of policies, which have a significant impact on the interactions experienced by the service user.

Overcoming the "*great divide*" between the social and technical sciences means not only that implementers of electronic systems have to be aware of the social aspects, but also that policy-makers have to be aware of the implementation, and the usability impacts, of policies as they are embodied electronically. This awareness, too, must be an iterative process, or rather continuous, as new understandings of the users are gained, and as the systems constantly develop and mature.

References

Agre, P.E.: *Conceptions of the user in computer systems design.* In: Thomas, P.J., (ed.): The Social and Interactional Dimensions of Human-Computer Interfaces, Cambridge University Press, Cambridge, UK (1995) 67-106

Bannon,L.J.: *Dwelling in the "Great Divide": The Case of HCI & CSCW.* In: Bowker, G.C., Star, S.L., Turner, W. & Gasser, L., (eds.): Social Science,technical systems,and co-operative work: beyond the great divide Erlbaum, Mahwah, NJ, USA (1997)

Cabinet Office: *Government to speed up introduction of online services*: 30/03/2000. Available at: http://www.number-10.gov.uk/output/Page2795.asp. Visited: 25/05/05

Checkland, P. & Scholes, J.: *Soft Systems Methodology in Action (with 30-year retrospective).* John Wiley & Sons, Ltd., Chichester, UK (1999)

Flak, L.S., Moe, C.E., and Sæbø, Ø.: *On the Evolution of e-Government: The User Imperative.* In: Traunmüller, R. (ed.). Electronic Government: Second International Conference, EGOV 2003; Prague, Czech Republic (Proceedings). Springer-Verlag, Berlin, Germany (2003) 139-142

Friedman, B., Kahn, P.H. & Borning, A.: *Value Sensitive Design and Information Systems* In: Zhang, P. & Galletta, D. (eds.): Human-Computer Interaction in Management Information Systems: Foundations. M E Sharpe, Inc., NY, USA (forthcoming)

Margetts, H. and Yared, H.: *Incentivization of e-government.* Available at: http://www.governmentontheweb.co.uk/downloads/papers/02031267_academic_report.pdf (2003). Visited: 25/05/05

Nielsen, J.: *Ten Usability Heuristics.* Available at: http://www.useit.com/papers/heuristic/heuristic_list.html (2005). Visited: 25/05/05

Randall, D. & Hughes, J.A.: *Sociology, CSCW, and working with customers* In: Thomas, P.J. (ed.): The Social and Interactional Dimensions of Human-Computer Interfaces. Cambridge University Press, Cambridge, UK. (1995) 142-160

Suchman, L.A.: Plans and situated actions: The problem of human-machine communication. Cambridge University Press, Cambridge, UK (1987)

A procurement approach to user involvement in e-Government

Henrik Artman and Erik Markensten
Computer Science and Communication, Royal Institute of Technology, Sweden
artman@nada.kth.se; erik.markensten@antrop.se

Introduction

In Sweden user involvement is legislated. If an organization is to change the employees work task and organization, which often is a consequence of acquiring computer systems, they have to involve them in the process. Despite this structured user involvement is still very rare. Furthermore, legislation is only applicable for system that affects the employed personnel. Much of the government computer systems today concerns applications for the public i.e. e-Government. What happens to user involvement when it comes to e-Government applications, and what motivation is there for user involvement if there is no legislation? For public interactive computer systems the answer is simple: the benefit that a system yields is directly connected to the extent to which it is used. If the system cannot be used there will be no benefits (Ottersten & Balic, 2004; Markensten, 2005).

Some recent approaches to integrate User-Centred Design (UCD) in systems development in Sweden have addressed that UCD should be of interest to the acquiring organization. For example, Lif, Göransson, Sandberg (2005) suggest that it would be sufficient for the procurer organization to follow a manual of systems procurement which include requirements of different user-centred activities and, in this way, force developmental organizations to work with user-centred design. The problem is that the manual is based on a project-model, rather than organizational motives. Another slightly different approach, put forward by Users Award - a Swedish union-owned company, is to certify products and in the long run force product markets to work for high quality products. Certification is here meant to help procurer organizations to make the "right choice" when choosing among alternatives. The problem is that it only covers product development and not tailored systems development. Furthermore it is the supplier company that applies for certification as well as pay for it.

Unfortunately, both of these approaches still presume that UCD is the suppliers' or developer organizations' responsibility. As argued in Markensten (2005) this approach, which has been prevalent the last 20 years or so, has seldom worked in practice. Very few suppliers take UCD seriously and employ usability professionals. And those that do still struggle to integrate the competence into their work processes. We argue instead that a successful approach requires an active procurer who addresses UCD issues already in the systems acquisition. If there is a direct relation between the use of an interactive service and the benefits it yields the procurer of that service needs to go through a user-centred design process in order to define what to acquire. This requires that the procurer organization must be much more active in deciding the relation between benefits and interface design, design object, user gestalts, usability evaluations and, as we propose, even in designing prototypes.

Our recent research on how procurer organizations understand and work with usability shows that procurer organizations often have a quite naïve view of user-centred design methodology but, on the other hand, a quite mature and complex conceptual understanding of

usability. In spite of this many are prone to initiate user-centred activities (such as workshops, design activities etc.) before actual procurement (Artman & Zäll, in press; Markensten & Artman, 2004; Markensten, 2003). When starting the development project the organizations we have studied think they have done appropriate user-centred activities, and therefore is not willing to pay a developmental organization to "redo" this work. The problem is that the initial activities by the procuring organization often are made by project members who lack competence in UCD and focus more on the democratic issues of user involvement (Følstad, Jørgensen, Kogstie, 2004). The problem is thus more of a lack of design competence than interest and intention. The procurer organization may also face the risk of downplaying their competence in work practices because design of the system takes over.

A procurement approach to user-centred design

The approach we suggest focus on satisfying the procurer organization's motives for acquiring a new system. By performing user research, interaction design and usability evaluation as part of systems acquisition the users' motives are included as well. Since business benefits are generated in use this process makes it possible to relate the choice of requirements and features to overall business benefits via the goals of different user groups. If the users can realize their goals in using the system the business, in turn, will realize their goals of investing in the new system. For large governmental organizations this requires involving usability competence in the procurement department (or business department). The solution for smaller organizations is likely to consult specialists in user-centred design, who performs this process together with the procurer organization project group. Despite how the procurer organization is organizing itself it does have to consider some vital aspects in order to procure usable systems. Here we summarize some aspects that we find important and which are supported by our and other's research.

Design object / scope

First of all a procurer organization must get aware of the different design objects that are present in any design/development project. The operative procurer starts off with one image of what the system will be like – we call this image "brief image" as it is included in the first design brief when the procurer organization articulate its general systems idea. The designers in the project team each have some kind of designer's image, an "operative image" which is directing the design creation. The user on the other hand has an "activity image" which connects practices, systems design and context. Each such image is followed by several non-articulated assumptions of actual use and subsequently the design object. The design object can be everything from designing interaction between people to designing interfaces for fluent task completion (Artman, Ramberg, Sundholm, Cerratto-Pargman, 2005). The importance is to articulate ones image and unfold the design object into some common ground.

Relating benefit and user requirements

Organizational goals for acquiring an e-service can be to decrease costs, receive better knowledge of costumer patterns or increased customer satisfaction, effectiveness etc. These are benefits that motivate the acquisition of a new computer system. Organizations sometimes satisfy with these high-level motives for designing and then go directly to what technical means would accomplish these motives (Markensten, 2003). However, as mentioned above, technical means in itself will not make public systems directly usable or guarantee business

benefits. In order to do this it is vital to also analyze the levels in between technology and business – user requirements (utility) and interaction design (usability). When designing already before considering development one has the possibility to transcend the gap between technical means and business goals through user requirements. While public systems must realize user goals in order for any form of organizational benefits to appear user goals may as well inform business goals. If users think it is a good idea to inform the tax government through Internet, the tax government may as well design a system that makes it possible and subsequently change their work organization as to handle such communicational channels.

User gestalts

In traditional user-centred systems design for intra-organizational use the users are often known from the offset. In such cases it means that one can work directly with the users that will be affected. However, in large organizations even such practice is cumbersome because there might be too many affected employees. Using user representatives who is representative for the actual cluster of users in specific ways often solves this situation. There are several problems with this approach, such as representing a larger population as well as that user representatives quickly adapt to a role as a project member rather than a user representative. Lastly, the approach often presumes that using a system and knowing how to redesign it is the same thing. In reality the latter part requires competence in interaction design and even elicitating/anticipating requirements about current/future needs may be difficult for someone who is not trained in methods and design.

In e-commerce and e-Government, i.e. public systems this is even more problematic as the presumptive users may not share any work practices, task organization or even motives for using the system. Public systems are often assumed to be designed for the most averaged user, or sometimes for the most problematic users (as for example when designing for extreme use cases). Many procurer organization starts with an idea that everyone will use the system – which is as false as blurred a user gestalt can be. The consequence is that you design for no-one, or for very rare cases and assume you have some minimal resemblance to other cases. Furthermore, such indistinct user gestalts are seldom correlated to business cases.

We have found Personas as being a useful method, both for public and internal systems design (Markensten & Artman, 2004). Personas are descriptive user gestalts with specific scenarios. They should be based on thorough analysis of users goals and motives for using the system as well as important user characteristics and business scenarios. If one cannot find information of about the users, as for example when working with systems of high secrecy level, personas must be thoroughly validated by the procurer organization. The personas are then used by designers to prioritize design decisions. Just as when involving real users in design Personas is meant to downplay the designers and developers motives and biased operative images. Detailed Personas has the advantage of distancing the designer as well as the operative procurer from his/her own image of the ideal user and use situation and may empower discussions of the different images at play in the project.

The effectiveness of Personas in systems acquisition is demonstrated in Markensten & Artman 2004. But even when it is impossible to get access to users personas can be effective. To work as a tool for design persons must be based on real data, but even when this is impossible they can still play an important role as a mirror of different actors images of who the user are. We recently participated in a high secrecy project with no possibility of actual user involvement. The procurer had a naïve design brief that described the users as "anyone".

Our students first formed Personas from their own prejudices. Not surprisingly, the Personas became lesser versions of young persons who, who had university diplomas and had vast experience of computers – that is mirrored versions of the students themselves. The intention from our point of view was of course that they should become aware of their prejudices. When they then reworked their Personas and subsequently presented them to the operative procurer as a form of validation – the procurer first just accepted them. We then forced the students to do a more thorough validation in order to form a primary persona, which no design decision is allowed to violate. The procurer refused to give a concise answer to the validation. Instead he presented a new image of the primary user that did not at all conform to the six personas created, but to a young very creative man in advertisement business. This gestalt was more a less a mirror of *himself*. Persona gestalts and brief image of the future system in use were oriented towards an idealized self-image. It is exactly such images user-centred design must work against before a system is put into development.

Prototyping and evaluation

Analyzing and creating user gestalts is not enough in order to extrapolate user requirements. This only covers the "what" part of the equation – what services should be included in the system to match user needs? To solve the second part, the "how" part, it is necessary to also design and evaluate prototypes of the future system. This will explore how the interaction with the services should be designed in order to match the goals and needs of the future users. By making prototypes and confronting users and business management with them it is possible to evaluate not only how the system will work in use when ready, but also if it seems to support the desired business goals. By using prototypes before actual RFT (Request for Tender) one also gets the benefit of getting a very tangible image of the system to be developed, and it is possible to discuss the requirements in a way that is far more accessible than a list of requirements. We have found procurer organizations who have organized several activities to engage users. For example, prototyping workshops (Artman & Zäll, in press) or quality validation workshops (Artman, 2002). These workshops were put together quite loosely but with strong incentive for making a user-centred design. Prototyping as such is tangible and can of course be done by most people, but informed design is a far more serious matter and should be performed with professional designers who can judge a specific systems appropriateness against an analysis of current and future needs.

It is important that the procurer organization must not get marginalized. They should actively and continuously assess the progress of the project. In some of our studies procurers have become marginalized as soon as the developmental project started, and they lost the power of the project (Artman, 2002). This is exactly what a procurer approach can hinder.

Benefits of a procurer approach

Above we have hinted about benefits with a procurement approach. Here we will summaries the benefits but also give some critical questions for the systems development branch at large.

Validated systems as RFT: The procurement is based on an evaluated system design, which is thoroughly anchored in several layers of the organization. The developmental organization will have to deal with fewer changes in the user requirements. With a procurement approach users are involved at the earliest possible stage.

Integration and precise requirements: A procurement approach as suggested above integrates all levels of systems development with the e-solution and the user as the central point between business goals and systems requirements, since it is the user, not the system, that will realize the organizational goals by using the future system.

Communication: Organizations are most willing to negotiate and discuss systems benefits and designs at an early stage. An approach that integrates users and business benefits is more likely to stimulate and encourage communication between different stakeholders. Moreover, visual tools such as personas and prototypes make communication much easier, both within the project group or the organization, as well with the development organization.

Active procurer: The procurement approach to UCD put the operative procurer in an important position. He or she must actively analyze and negotiate the relation as well as trade offs between business- and user requirements.

Critical for assessment of the market of system development

The systems development market has become used to having the power of development but as the industry and the users matures it is reasonable to expect drastic changes in the power distribution between procurers, users and developers. The market today is naturally suspicious towards a procurer approach, in part because experience of recent procurements, but also because the developmental organizations would loose their power.

The lack of opportunity to negotiate between a request for tender and an actual contract in governmental procurement points to the problem that the procurer organization has to actually require usability and user involvement from the development organization or conduct independent user analyses before actual contracting, which in any case requires knowledge about usability and usability methods. Usability therefore depends on the procurer organization's ability to see the benefit of doing or requiring usability at an early stage of the development. In such acquisition procedure, the question of usability is moved back and higher up in the decision-making management structure, and thus financial accountants are made responsible for making resources for usability available.

One argument often given as a caveat against a strong procurement approach is that during development many requirements changes and then the design cannot be frozen. However, such criticism is still strongly situated in a traditional approach that says that design is strongly connected with programming and technical considerations. Further more, there is nothing in this approach that encourages frozen requirements. Simply, what we propose is that acquiring organizations should become more sensitive to what they purchase, by using UCD as a natural bridge between business and user requirements. Yet, as any RFT, this is but a vision of what a desired future system should be like, and changes are bound to come later on when the development starts. The advantage is, however, that decisions about changes can be made much more consciously by the procurer since he or she understands the relation between the design, the services and the business goals by now. We believe the market will converge towards the relationships between procurer and developmental organizations as the corresponding stakeholders for architectural design and marketing.

References

Artman, H. (2002). Procurer Usability Requirements: Negotiations in Contract Development. *Proceedings of NORDICHI 02*. pp 61-70.

Artman, H., Ramberg, R., Sundholm, S., Cerratto-P., T. (2005) . Action Context and Target Context Representations. Proceedings of CSCL'05. Taipei, Taiwan.

Artman, H., Zällh, S. (In Press). *Finding a way to Usability*. Cognition, Technology and Work.

Følstad, A., Jørgensen, H., Kogstie, J. (2004). User involvement in e-Government development projects. *Proceedings of NordiCHI'04*, Tampere, Finland, October, 217-224.

Lif, M., Göransson, B., Sandbäck, T. (2005). Buying Usable – The user-centered Procurement Process. Position paper at UITQ – User-driven IT Design and Quality Assurance: "Who can judge IT quality better than professional end-users?", Stockholm, Sweden, 25 May, 2005

Markensten, E. (2003). Procuring Usable Systems – An Analysis of a Commercial Procurement Project. In J. Jacko and C. Stephanidis (eds.). *Proceedings of Human-Computer Interaction International*., pp.544-548. London: Lawrence Erlbaum Associated.

Markensten, E. (2005). Mind the Gap: A Procurement Approach to Integrating User-Centred Design in Contract Development. Licentiate Thesis, Royal Institute of Technology, Stockholm, Sweden. TRITA-NA-0447.

Markensten, E., Artman, H. (2004). Procuring Usable Systems Using Unemployed Personas. *Proceedings of NordiCHI'04*, Tampere, Finland, October, 13-23.

Ottersten, I., Balic, M. (2004). Effektstyrning av IT. Liber.

UsersAward. UsersAward.se Last Visited 2005-05-19.

Service Design methods and UCD practice

Stefan Holmlid

Human Centered Systems, IDA, Linköpings universitet, Sverige

steho@ida.liu.se

Abstract.

When developing technology supported government services or administration, it is of utmost importance that the methods employed are based on user-centredness. In this paper, methods from Service Design are used to provide a user-centred approach to design and development of e-government solutions. As a design discipline Service Design seem to be well fitted to sustainable and integrated design work for the benefit of government and citizens.

Introduction

When developing technology supported government services or administration, it is of utmost importance that the methods employed are based on user-centredness. During the last two decades design has become an important perspective within the methods- and experience-movements of user-centred systems development. Interaction design and experience design both were established during the 90's, and have gained ground within user-centred design, UCD, practices. As of today they have reached a level of integration where it is hard to tell whether they can or should be regarded as separate design disciplines. Simplified, it can be said that in the outset Interaction Design worked with tools and tasks, while Experience Design worked with media and entertainment.

One recent development within UCD is the introduction of an acquisition perspective. During the 70's, 80's and 90's UCD developed into a practice for system developers. As a consequence of this the needs and perspectives of user organizations and acquisition practitioners was not in focus nor were they the driving force. During the last few years the interest in these perspectives has increased, in Sweden largely due to the "Procurement competence" project (Vinnova, 2001; Holmlid & Artman 2002). Some of the issues pertaining to the acquisition perspective identified by this project are; the importance of tying together business goals, strategic and organizational change, and use quality of technology, the proactive stance a user organization gain in relationship to the system developer when using design methods from e.g. UCD (see e.g. Artman 2002; Holmlid 2004; Holmlid & Artman, 2004; Markensten, 2005; Artman & Zällh, in press). Service Design provides and contributes to the former of these issues, with a set of design methods. From a user organization and acquisition perspective, it is contra-productive to single out the software providing a service as the most important entity to design. For most organizations this holistic view can best be taken care of by the organization itself, and not by a system development company. It is within this context that Service Design operates. The work described in this paper was performed as part of the *Procurement Competence* project.

Without going into any depths on e-government, I wish to stress that user-centredness is important, but might differ, depending on what aspect of e-government that is under scrutiny. The aspects that most frequently are discussed are e-administration, e-services, and e-democracy. In one sense it is hard to deal with only one of these aspects, if one does not use very limited senses of the aspects. As this paper will not deal with issues of political science, I will leave the topic by stating that the case referred to here mainly concerns e-service and e-administration, but they are influenced by issues of democracy, and equally influences the e-democracy of a society.

What is evident with technology supported government services and administration is that it bears strong resemblance with services, in contrast to products. A service most of the time is described as being intangible, heterogeneous, and perishable. Moreover, it is considered that there is inseparability between production and consumption when it comes to services. Edvardsson et al (2005) argues that this is an outdated definition, and that services rather are characterized by performance, processes and deeds. Lovelock & Gummesson (2004), e.g., agree partly with this and argue that for a specific service in a specific context, individual characteristics are more important than others, but they should not be viewed as a compulsory whole. When talking about service organizations, the term product-service system, PSS, is often used, to point towards a systemic point of view (Edvardsson et al 2000). With that perspective the term servuction is often used, to differentiate from production.

Designing such services calls for user-centred methods that apply to services (see e.g. Mager 2004). While being rooted in software development, Interaction Design seems to lack the wider perspective of differentiating between services and products. The main interest for Interaction Design is to design a well-functioning interaction of a software based application. E-government goes beyond the specific software application, and provides a portfolio of technology supported as well as people based services, with more or less complex mixes thereof.

Service Design as a field has a history almost as old as Interaction Design. It had its lift-off during the 90's and was defined as a cousin to industrial design. This means Service Design assumes the position of the customer/user of a specific service and by creative, user-centred and user-involved methods depict how the service should be performed. At the same time Service Design considers the possibilities and means to perform a service with such qualities, within the economy and strategic development of an organization. Thus, a Service Designer can visualise, express and choreograph what other people can't see, envisage solutions that do not yet exist, observe and interpret needs and behaviours and transform them into possible service futures, and express and evaluate, in the language of experiences, the quality of design (Service Design Network, 2005). Service Design aims to create services that are useful, usable, desirable, efficient and effective. Service Design has earned recent interest by Design Councils in Sweden as well as in Britain.

Several of the Service Development frameworks incorporate something that is called Service Design (see e.g. Edvardsson 2000). In reality it comes closer to service engineering in the sense that it is not supposed to drive idea generation or creative processes with the actors of a PSS.

Based on the descriptions of Service Design as a *design* discipline it seem to be well fitted to sustainable and integrated design work for the benefit of government and citizens. In this paper, methods from Service Design are used to provide a user-centred approach to design and development of e-government solutions.

Selected methods

In this section I will briefly describe two methods employed within Service Design. The sources of the methods come from a wide knowledge area including non-design disciplines such as Service Marketing, Service Operations and Service Management. The descriptions are written as if they were design methods, in contrast to marketing, operations or management methods. A human-computer interaction specialist with knowledge on user centered methods will find similarities with established methods within their own field.

Blueprint

In non-design literature there is no exact definition of what a blueprint is, nor is there any consensus on what it should include. The different perspectives of the areas define and scope a blueprint very differently (see e.g. Shostak 1984, 1987; Verboom et al 2004; Kalakota & Robinson 2003). Zeithaml & Bitner (1996, p 277) suggest the following description "a picture or map that accurately portrays the service system so that the different people involved in providing it can understand and deal with it objectively regardless of their roles or their individual points of view"

When taking the perspective of *designing* a PSS, a blueprint is a depiction that ties together, in a procedural manner, details and wholes of servuction. That is, it defines what is on-stage, how back-stage issues are performed, co-operation, touch points, technology support, the line of visibility, the line of interaction etc. It can be used both as a mapping of an existing PSS; and as a design tool for an envisioned PSS, or as a tool for understanding an emerging idea for a PSS.

Service interface/interaction

In non-design literature the more common terms are *touch points* and *evidence* (see e.g. Zeithaml & Parasuraman, 1990). In Service Design, however, it is more enabling to use Service Interface or Service Interaction. These terms comprise touch-points, evidence, meetings and technology. Thus it deals with issues related to graphic communication, human-computer interaction, social interaction, etc.

Again, it is a holistic method, but it focuses on interaction, communication, experience and relations. It is not feasible only to define and design one kind of interaction or singular touch-points if we design a service. We need to consider the whole servuction process and the PSS, and find and design detail and wholes. A service interface can be depicted in several different ways, narrative, functional, aesthetic, etc. In most cases several of these are needed, with iterations and user evaluations, to be well-designed.

Government public relations case

One case will be presented, to highlight and describe the application of the methods. The design was performed as a part of an inventive or idea-generation phase of the design life cycle. The need/s were already identified and discovered.

All Swedish government agencies were supposed to change their ways of working to support the vision of a 24-hour government. Moreover, this agency had the specific task of making some of their databases with journals of cases public. The agency interpreted this as putting the databases online through a web interface. From the business perspective this move

seemed to be able to create an efficiency improvement of the press department's work. This work today mainly consists of getting phone calls, e-mails and faxes from journalists, searching the databases and providing journalists with answers. Most of the time, many journalists are interested in the same cases, so the questions to be answered are very similar. The agency saw an opportunity to demand more self-service by the journalists, and require of them to search in the databases by themselves.

Our approach was to view the work that the press department had been doing as a service to the journalists. From that point we performed a service design. This included developing a service blueprint, a pluralistic customer journey and suggestions for service interaction. These were developed by studying the work of both journalists and the press department, interviewing them, as well as pin-pointing the business change that the agency wanted to accomplish.

The journalists wanted better access to information from the databases, wanted to be able to subscribe to changes related to specific cases, and specific areas of interest, and did not want to get rid of the contact with the press department. The press department wanted to perform less work with repetitive questions, to free capacity for more complex work, and to easily provide information prepared to all. The service concept proposed was to define the journalist and the press department as a perfect match to produce good, correct and interesting information. The journalist asks, the press department retrieves and produce information. The database and the on-line technology provide a possibility not to have to reproduce information over and over again.
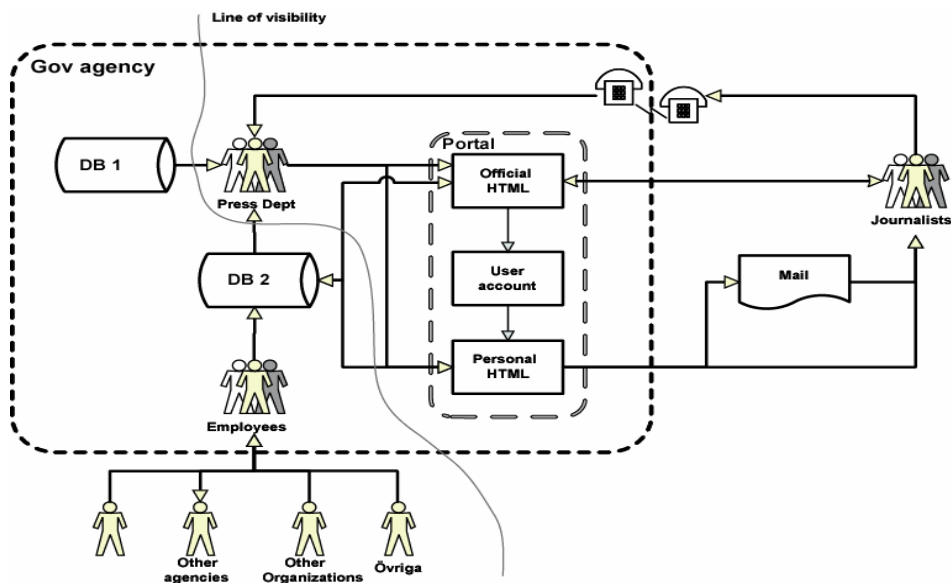

Figure 1: The blueprint for the public relations case

The blueprint (see figure 1) depicted a wide range of actors influencing the service for the journalists. As the service concept suggested the press department would still take phone calls and prepare on-line versions of database information. This information would be published in the information portal, once prepared it would be easy for the press department to point to these pieces of information. Journalists would be able to subscribe to database updates for this

specific case, or to other more general criteria. Moreover, they would be provided with an individual user account where they would get an individualized portal page, with their own subscriptions, and saved database searches. Full public access to the database would still be available, but not assumed to be the entry point for journalists.

The suggested service interactions, of which some can be identified in the blueprint, comprised such things as a search portal, evidence and interaction related to a subscription model, etc. The design work in this case did not go as far as to develop the detailed conversational protocols for the Press Departement, and internet interactions, but suggested that this would be needed to fulfill the visions of the service concept.

Conclusion and discussion

In many ways the methods presented here resemble design methods from Interaction Design and User-Centred Design. They are processual, capture interactivity, and the dynamics of the design material and object are important. And the means of depiction also are similar – with story-boards, scenarios, etc.

In Interaction Design though, it is fairly uncommon that the longer processes of use are designed. They might be taken into account, e.g. when one is designing a web interface of a insure agency for seldom users, but most of the time design problems are limited to a singular use situation or a singular application, which might be extended over time. The design area is closed within a task or an application. Moreover, Service Design methods also highlight relational matters and the balance between business and user centered design.

Service Design provides an overall design and contextualize Interaction Design for technology supported services. The focus on users and the method portfolio are shared, which provide user-centred design action space across not only a technology development process, but also an organizational change process.

Service Design and Interaction Design can mutually benefit each other for the sake of user-centred design. Such a beneficiary relationship can be achieved, e.g., by procurers doing Service Design and use it as a part of their procurement strategies. In such cases Interaction Design will be dealt with at a much earlier stage of a IT development process, i.e. before the contract is signed and during the early requirement specification phase. This will provide the UCD professional with a better ground-work, and require a developer to work more user-centred.

For e-government the challenge lie in connecting organizational development and technology development through design, and not letting the IT-developer drive organizational change through a technological business opportunity.

Failing to tie Service Design and Interaction Design together, regardless of who is actually performing that specific work task, will lead to unnecessary double-work or hindrance of continuous, mature and sustainable user centered design work.

References

Artman, H. (2002). Procurer Usability Requirements: Negotiations in Contract Development. *Proceedings of NORDICHI 02*. pp 61-70.

Edvardsson, B., Gustafsson A., Johnson, M., D., Sandén, B. (2000). *New Service Development and Innovation in the New Economy*. Lund, Studentlitteratur.

Edvardsson, B., Gustafsson, A., Roos, I. (2005). Service portraits in service research: a critical review. *International Journal of Service Industry Management 16(1)*:107-121.

Artman, H., Zällh, S. (In Press). Finding a way to Usability. *Cognition, Technology and Work*.

Flieb, S., and Keinaltenkamp, M. (2004) Blueprinting the services company: Managing service processes efficiently*, Journal of Business Research, 57*:392-404.

Holmlid, S. (2004). Issues for cooperative design: A procurement perspective. In *Proceedings from PDC 2004*, vol II:139-142.

Holmlid, S., Artman H. (2004). Shared Object – Asymmetrical and Conflicting Objectives. In proceedings from Bertelsen, O., W., Korpela, M., and Mursu A. (2004). *First International Workshop on Activity Theory Based Practical Methods for IT Design, ATIT 2004*. http://www.daimi.au.dk/publications/PB/574/PB-574.pdf

Holmlid, S., Artman, H. (2002). Procuring usable systems: Key issues for systems development. *Workshop at Nordichi 2002*.

Kalakota, R., Robinson, M. (2004). *Services Blueprint: Roadmap for Execution*. Boston, MA: Addison-Wesley

Lovelock, Gummesson (2004). Whither Services Marketing? In Search of a New Paradigm and Fresh Perspectives. *Journal of Service Research,* 7:20-41

Mager, B (2004). *Service design: A review*. Köln International School of Design, Köln.

Markensten, E. (2005). Mind the Gap: A Procurement Approach to Integrating User-Centred Design in Contract Development. *Licentiate Thesis, Royal Institute of Technology, Stockholm, Sweden. TRITA-NA-0447*.

Service Design Network (2005). Service design network manifesto. Unpublished.

Shostack, G.L. (1984) Designing services that deliver. *Harvard Business Review, 62(1)*:133-139.

Prototypes and tender documentation

Jan Håvard Skjetne
SINTEF IKT, Oslo, Norway
janhavard.skjetne@sintef.no

Abstract

Developments of IT systems and especially Governmental IT systems have for many years experienced problems reaching specified requirements. Successful development of IT systems is characterized by collaboration between disciplines and early verification by end-users. The tender process usually used today could hinder this collaboration and verification. This proposal suggests that a prototype with essential characteristics could be used as a boundary object to enhance collaboration and verification. There is a need however to identify exactly what these characteristics are.

Introduction

Development projects of IT systems and especially Governmental IT systems have for many years experienced problems reaching the specified requirements, deadlines and budgets. The reason for this is complex, and many guides are produced to lower the risks for failure. Examples of this is the OECD Policy brief which identify eight general guidelines from managing risks to involving end-users (OECD 2001), and The Office of Governmental Commerce which have set up a website to promote good practice:

(http://www.ogc.gov.uk/sdtoolkit/index.html).

The main characteristics of procurement of Governmental IT systems are that they are usually developed using a tender process. In a tender process the public organizations specify their demands in tender documents. These documents are then sent to a set of pre-qualified suppliers and they write a proposal based on them. The organization then selects one of the proposals based on a set of predefined criteria. This process is described in rules from the European Commission (EC) and World Trade Organization (WTO) regarding acquisition of products and services to public organizations, and one of its purposes is to ensure an open and free competition and should be supplier independent.

Could this tender process be part of the problem? It has been reported that the tender process generates a communication gap between the customer with focus on the business and the suppliers developing proposals based on the tender documents (Lauesen and Vium 2004). This paper suggests that use of prototypes with the right characteristics could increase the quality of the proposals and still be supplier independent. We do however not yet have enough knowledge about these characteristics.

Successes in product development

When reviewing the literature from a Human-Centred approach two important factors were identified which are important in successful development projects.

- Collaboration between disciplines
- Early verification of user requirements with prototypes

Collaboration between disciplines

Many successful development teams share the same characteristics: They are able to establish a collaboration between different disciplines and specializations (Leonard-Barton 1995), and new innovation happens on the border between these disciplines. This is however not easy to achieve. To be able to collaborate they need to communicate and share knowledge. Successful communication can be achieved when there is established a Common Ground which require coordination of content and process (Clark 1996). To establish this Common Ground is however not trivial. Knowledge has characteristics which make it difficult to share and alter. Knowledge is tacit in nature (Polyani 1966) which makes it difficult to represent explicitly. Common representations therefore need to be able to capture this tacit knowledge. Knowledge is also sticky (Hippel and Tyre, 1996) because it is hard earned and it is therefore also hard to alter, and it is necessary to alter and adapt existing knowledge for it to be used successfully in new development (Carlile, 2004). Prototypes have proven to work as a common ground for some development projects (Subrahmanian, 2003).

Early verification of user requirements with prototypes

Errors in user requirements have been identified as a major cause of costly software project failures (Jones, 1995). It is very important to remove these errors as early as possible in the development since the cost of detecting and fixing the problems increase as the project go on. Prototypes are tools to validate user requirements before the final product reach the customer. Early low-cost prototypes have also shown to be predictors of usage intentions and behavior up to six months after workplace implementation (Star and Griesemer, 1989). This means that the prototype should have a role in the tender documents, but it should be documented in a supplier-independent way.

A prototype used in a tender documentation should be supplier-independent and also useful as a technique for collaboration and verification. We therefore need to identify only the essential information which could be documented in an abstract supplier-independent form. The rest of this paper discuss some of the relevant theory and come up with a model which could be used to identify the necessary characteristics of a successful prototype in a tender documentation.

Translation of knowledge to a Common Ground

Usually the customer and the developers have established different languages they use when describing their knowledge. The customer focuses on the business and users goals and the supplier focus on developing a product which meets technical and economical requirements and constraints. To enable communication between these disciplines they therefore need to translate some of their knowledge from their own language to establish a Common Ground.

Pym has described some of the theories related to translation between different cultures with different languages (Pym, 2003). He describes some aspects which are important to consider when translating:

1. Who moves? Which actor shall do the translation?
2. Choice of what to translate
3. Translation versus language learning
4. Trust
5. Why and how is complexity reduced?

Boundary objects as bridging points

Star & Griesemer have develop a theory on boundary objects and translation (Star and Griesemer, 1989). Boundary objects are used to establish Common Ground, and Translations are part of the theory around boundary objects. Boundary objects and translations have proven to be useful as concepts to understand how to establish a successful communication between actors with different backgrounds in scientific work. This should be transferable to a development team with different disciplines.
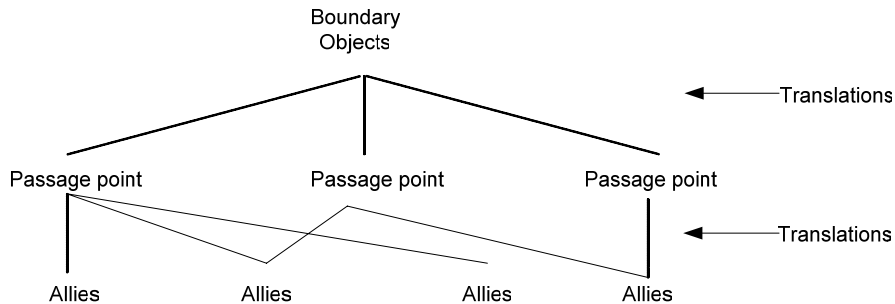

Figure 1. Boundary objects and translation[11]

Star & Griesmer describe how different actors (allies) can collaborate through a set of boundary objects. These boundary objects are established through translations and obligatory passage points.

Star & Griesmer have developed a set of requirements for successful implementation of boundary objects:

- Participants should have a shared goal
- …"objects should be PLASTIC enough to adapt to local needs and constraints of the several parties employing them, yet ROBUST enough to maintain a common identity across sites." (page 393)
- The set of boundary objects should maximize both the AUTONOMY and COMMUNICATION between worlds. Only the parts ESSENTIAL to maintaining coherent information should be pooled into the intersection of information.
- Establish a clear, stringent and simple set of METHODS. Standardized methods shift the focus to how, not why.

A model of boundary objects in human-centred software development

When combining requirements set to establish Common Ground, Translation between cultures and to Boundary objects, one ends up with a high level model of a boundary object serving as a bridging point with the following characteristics:
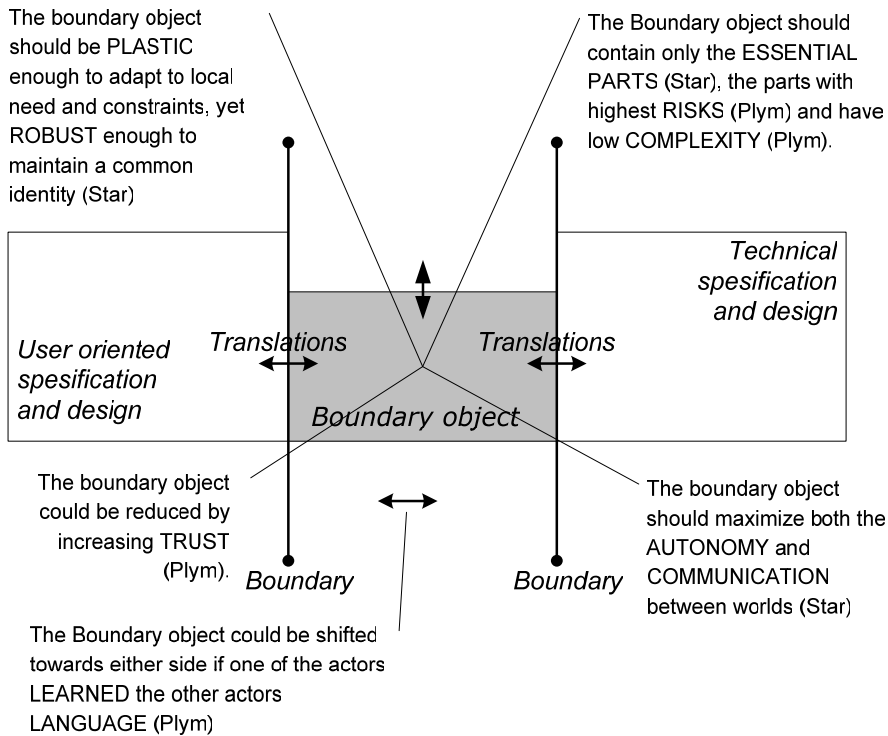
Fig. 2. The model of a boundary object between customer and supplier

Implications for the design

When one review this theory-based model against the current knowledge about work practice of customers and developers one ends up with the following:

AUTONOMY and COMMUNICATION – To enhance the autonomy of and the communication between each actor a proposed implementation of a boundary object with related technique should be familiar to both actors. The gap between their practice today and any proposed new technique should be small. This means that both actors should have knowledge about the core object and techniques proposed.

ESSENTIAL PARTS and with HIGH RISK – High level essential knowledge for both two actors is basic knowledge about users, tasks and the environment. This basic knowledge is then specified with more details based on each actors needs during the process. How each actor specifies this knowledge could however differ. This essential knowledge is then used to develop several prototypes which eventually end up as the product. Prototypes are essential for both actors, and even though each actor could use some different techniques when designing the prototype, the goal for both actors is to model parts of the end product. This is also of concern to all other actors in the development process.

With respect to risks in project development all projects usually have some activities concerned with minimizing risks. The focus for these activities is how to reach the goals of the project. There is little knowledge about what type of knowledge generated by the customer is most critical for the supplier to meet his goals and visa versa.

COMPLEXITY – The object which shall be translated need to have low complexity if the translation should be cost-efficient. There have been found no literature related to complexity and translations between specifications in the human-centred research area. There are some works on translation in software engineering but usually between types of specification which could not be used by actors with a user focus.

TRUST – It is not easy to establish trust between each actor. It is usually a long-term activity. You have to earn trust. A boundary object will build trust first when it has proven to be useful.

PLASTICITY and ROBUSTNESS – One interpretation of this is that the proposed object with related technique should be used by and adapted to each actor's needs. The challenge is that it also should be robust so the object could be updated and used by the other actor during the process even though each actor adapts it to their needs.

Prototypes as the boundary object

Prototypes of different kinds have been useful as a boundary object in many industries from the automobile industry to the software industry (Schrage, 1999) (Subrahmanian et al, 2003). Prototypes are some kind of visualization of the end-product and are therefore of concern to all actors in the project, both the supplier and the customer. Both actors can be influenced by and give input to a prototype. On the other hand prototypes have problems transferring knowledge to software specification late in the development, and inconsistency can be introduced in the specification (Ravid and Berry, 2000). Prototypes have up to now primary be used as tools for each individual actor. It has been reported how to use prototypes as tools to verify Look and Feel, Implementations or Roles (Houde and Hill, 1997), but not explicit how to develop prototypes to work as boundary objects.

Prototypes have been used as boundary objects and have many of the characteristics necessary to fill that role. Prototypes are robust, flexible and can be used autonomously by both actors – supplier and customer. Prototypes have low complexity since they are concrete representations. Prototypes can therefore potentially meet many of the requirements for a bridging point between supplier and customer and seem to be a good tool to investigate how to establish a boundary object as a bridging point between supplier and customer. There is however a need to identify which characteristics are essential and associated with high risks, and also how complex the prototype could be to enhance the translation to and from other specifications.

Acknowledgements

References

"The Hidden Threat to e-Government," vol. 2005: OECD, 2001.

Lauesen, S. and Vium J.P. "Experiences from a tender process," presented at REFSQ'04, Riga, Essener Informatik Beitrage, 2004.

Leonard-Barton, D. *Wellsprings of Knowledge: Building and Sustaining the Sources of Innovation*: Harvard Business School Press, 1995.

Clark, H. H. *Using language*. Cambridge: Cambridge University Press, 1996.

Polyani, M. *The Tacit Dimension*. London: Routledge & Paul, 1966.

von Hippel, E. and Tyre, M. "The mechanics of learning by doing: Problem discovery during process machine use," *Tech. and Culture*, vol. 37, pp. 312-329, 1996.

Carlile, P. R. "Transferring, translating, and transforming: An integrative framework for managing knowledge across boundaries," *Organization Science*, vol. 15, pp. 555-568, 2004.

Subrahmanian, E., Monarch, I., Konda, S., Granger, H., Milliken, R., Westerberg, A., and T. N.-D. Group, "Boundary Objects and Prototypes at the Interfaces of Engineering Design " *Comput. Supported Coop. Work* vol. 12 pp. 185-203 2003

Jones, C. "Patterns of large software systems: failure and success," *Computer*, vol. 28, pp. 86-87, 1995.

Davis, F. D. and Venkatesh, V. "Toward preprototype user acceptance testing of new information systems: implications for software project management," *Engineering Management, IEEE Transactions on*, vol. 51, pp. 31-46, 2004.

Star, S. L. and Griesemer, J. R. "Institutional Ecology, Translations and Boundary Objects - Amateurs and Professionals in Berkeleys-Museum-of-Vertebrate-Zoology, 1907-39," *Social Studies of Science*, vol. 19, pp. 387-420, 1989.

Schrage, M. *Serious play: how the world's best companies simulate to innovation*: Harvard Business School Press, 1999.

Ravid, A. and Berry, D. M. "A Method for Extracting and Stating Software Requirements that a User Interface Prototype Contains," *Requirements Engineering*, vol. 5, pp. 225-241, 2000.

Houde, S. and Hill, C. "What do prototypes prototype?," in *Handbook of Human-Computer Interaction (2nd Ed.)*, M. Helander, T. Landauer, and P. Prabhu, Eds. Amsterdam: Elsevier Science B. V., 1997, pp. 367 - 381.