User Involvement in Large-Scale eGovernment Projects: Finding an Effective Combination of Strategies and Methods

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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 designers 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 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

[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.

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.

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