

# Experiences from and Attitudes towards Applying User Participation in Public e-Service Development

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**Keywords:** e-government, Public e-Service Development, User Participation, Techniques for User Participation.

**Abstract:** It is evident that user participation is a vital component for successful public e-service development. However, it is also apparent that there is little guidance in e-government research about how user participation should be implemented in practice. Some high level guidelines can be found regarding user participation design schools but there is very little guidance in existing research regarding how these design schools can be implemented in practice. In this paper we have explored public administrations' experience of user participation, both in general systems development and in development of public e-services, in order to identify basic requirements that have to be fulfilled when implementing user participation in public e-service development. Thereafter we have applied these requirements on commonly used techniques to implement user participation in the light of three design schools: Participatory Design, User Centered Design, and User Innovation. Our results show that techniques to implement user participation in public e-service development must be adjusted to limited resources in terms of time and money as well as short development projects.

## 1 INTRODUCTION

Public electronic services (public e-services), an instantiation of e-government, have become an increasingly adopted channel for the delivery of services used for interaction between public administrations and members of the society, such as citizens (Rowley, 2006). So far, the main arguments for implementing public e-services have been internal cost reductions achieved via decreased time and effort needed for handling previously manual tasks (Anthopoulos et al., 2007). This has led to a situation where public e-services have been designed from an internal perspective wherein external user considerations have been given only little attention (Axelsson et al., 2010). In order to find public e-services useful and beneficial, external users, such as citizens, must experience that they are served and satisfied when using the e-services. Otherwise they will go back to other more traditional channels when interacting with public administrations (Anthopoulos et al., 2007). Increased knowledge of citizen needs is essential for successful development of public e-services (Verdegem and Verleye, 2009) and by applying user participation in public e-service development the likelihood of positive effects on

service usage is expected to increase, not only from the providing public administrations' point of view but also from a citizen perspective (Andersen and Henriksen, 2006).

However, user participation in public e-service development is challenging to put into practice (Axelsson et al., 2010) and many weaknesses in public e-service programs come from a failure to address needs from citizens. This is partly due to the voluntary nature of citizen participation in using public e-services (Saha, 2008) if compared to employed personnel, which can be obliged to participate (Albinsson and Forsgren, 2005).

There exist numerous methods and techniques within for how to implement user participation in systems development. In this work, we acknowledge a method as a recommended series of steps to follow, wherein each step may encompass one or several techniques used (Avison and Fitzgerald, 1995). Despite a vast number of available techniques, however, there is little or no knowledge about which techniques are the most efficient and effective in a certain public e-service development scenario (Maiden and Rugg, 1996) as well as how these techniques may be combined in order to obtain a comprehensive overview of citizen needs.

Furthermore, web applications such as public e-services often require a more rigorous requirements elicitation process due to the large number of potential end users (Escalone and Koch, 2004).

Government administrations need to implement user participation efficiently and accurately, but too little is currently known of how user participation is treated and adopted or not adopted by government administrations and what techniques are used when in the development process. The aim of this paper is to provide an analysis of current practice in the application of user participation techniques using three user participation design schools (User Centered Design, Participatory Design and User innovation) and an empirical study including public administrations in the form of government authorities, county councils and municipalities as a basis. Common techniques within the three schools will be analyzed and placed in an e-government context in terms of foundational requirements of user participation.

## 2 USER PARTICIPATION IN PUBLIC E-SERVICE DEVELOPMENT

User participation is a valuable and needed component in public e-service development. Jones et al. (Jones et al., 2007, p. 150) state that the “*key to the success of any e-government deployment is the citizen*” when they propose an agenda in order to better understand the approaches to citizen engagement. In fact, excluding users for example in the requirements engineering stage of public e-service development can be a problem (Folkerd & Spinelli, (2009). Early research on user participation focused largely on the user as an internal actor (Oostveen and van den Besselaar, 2004). More recently, the user concept has been widened to include external users, such as citizens and organizations that need to communicate with public administrations (Jansen, 2006).

User participation is a well-known concept in systems development (Mumford, 1981). However, only a limited number of studies discuss user participation in public e-service development, and even fewer focus on techniques for how user participation can be implemented. Karlsson et al. (2012) and Axelsson et al. (2010) both present challenges to applying user participation in public e-service development. Karlsson et al. (2012) analyze three user participation schools (User Centered

Design – UCD, Participatory Design – PD, and User Innovation – UI) from a goal fulfillment perspective in order to assess to what extent they fit into a public e-service development perspective. Holgersson and Karlsson (Holgersson and Karlsson, 2011, Holgersson and Karlsson, 2012) build on these findings by empirically investigating to what extent the challenges exist in practice. Chutimaskul (2003) stresses the importance of user participation in requirements elicitation for public e-service development, but does not discuss how techniques for requirements elicitation may be applied. Van Velsen et al (2009) include such aspects in their citizen-centric approach towards end user RE for public e-services, including data collection techniques such as interviews and low-fidelity prototypes. Tsumaki and Tamai (2006) emphasize the importance of choosing the appropriate technique and the importance of carefully considering context and surrounding factors. However, neither of these studies gives advice for how to apply techniques for implementing user participation in the public e-service development context. This context differs from classical systems development where there is often a well-known and easily accessible user that can be obliged to participate in the development process. Some guidance exists for evaluating what school of user participation is the most preferable when applying user participation in public e-service development (Holgersson and Karlsson, 2011, Holgersson and Karlsson, 2012). There is only little guidance on how the user participation approaches should be implemented in practice in terms of more specific techniques, which hampers public administrations in mitigating these findings to public e-service development projects.

## 3 RESEARCH DESIGN

This study is based on two main data sources, a literature review on techniques to implement user participation and an interview study on user participation in public administrations. The literature review has been based on commonly used techniques in the three user participation design schools UCD, PD, and UI. For each of the design schools, searches regarding techniques to implement user participation have been made broadly, including journals in IS and HCI as well as relevant conference proceedings and books.

The empirical data collection of current practice in the application of user participation techniques

was based on semi structured interviews with public e-service providers representing municipalities, county councils and government authorities. In total, 22 interviews were performed, distributed over 6 municipalities (ranging in size from 5.000 to 134.000 citizens), 6 county councils and 10 government authorities. The respondents were selected based on their current involvement in public e-service development projects and had work titles such as project managers, CIOs, and business developers. The interviews were carried out either face to face or by telephone and took about 30 minutes. The primary goal of the interviews was to obtain qualitative data regarding public e-service providers' experiences of applying user participation in public e-service development. All interviews were recorded and transcribed. The material was then analyzed from the perspectives of what factors that affect or govern how user participation is implemented. The goal of the analysis was to identify relevant techniques to implement user participation, when they were applied or not and the motivations behind these choices. It should be noted that our focus is user participation in the development process of public e-services, not the end product in terms of the e-services themselves.

#### **4 THREE DESIGN SCHOOLS FOR USER PARTICIPATION**

There are numerous methods that support user participation. As an example, Muller et al. (1997) list 61 participatory methods, such as Joint Application Development (Wood and Silver, 1995) and ETHICS (Mumford, 1993). Aggregated on a higher level, three user participation design schools can be derived; User Centered Design (UCD), Participatory Design (PD), and User Innovation (UI) (Karlsson et al., 2012).

UCD is a design school introduced by Norman (Norman, 1982) in the late 1970's as a branch of the human computer interaction research field. Users and designers are here not seen as equal partners. The developers are the designers and the users are predominantly seen as passive advisors (Kling, 1977) who participates to a varied extent in the design process. Responsibilities and final decisions are still made by the developers (Gulliksen et al., 2003).

PD aims at improving how technology can assist users in performing their work (Kensing and Blomberg, 1998). The perhaps most radical

approach to PD is the Scandinavian Design School. In this approach system developers and users are treated as equal partners (Karlsson et al., 2012) and both users as well as developers share responsibility to cooperate in a mutual dialogue (Carmel et al., 1993). This means that users must participate in decision making, either as advisors, as representatives or on a consensus basis (Mumford, 1981). It is the systems developers' responsibility to present a design that the users can respond to.

UI aims at capturing innovations from so called lead users (von Hippel, 1986). Lead users hold the key to innovative design proposals within the domain they are experts in (Kujala and Kauppinen, 2004). Put into practice, this means that the users identify problems as well as possible design solutions to the problems (von Hippel, 1986). The systems developers' main task is hence to capture lead users' ideas and designs and transform these into full-scale solutions in collaboration with the users.

Seen from a top down perspective, these three design schools represent different points on a floating scale wherein form and degree of participation varies, from passive forms of participation building on user representatives to more direct forms building on participation as advisors, consultants, and lead users (Bjerknes and Bratteteig, 1995, Cavaye, 1995). In this sense, UCD represents the least demanding form of participation whereas UI represents the most demanding form (Karlsson et al., 2012).

### **5 ANALYSIS**

The analysis includes two parts: First, a literature review is made concerning commonly used techniques when implementing user participation in each of the three design schools (section 5.1); secondly, empirical findings are expressed with which the literature results will be compared (section 5.2). Our advices to public administrations are highlighted in italics.

#### **5.1 Commonly Used Techniques in Literature**

For UCD as well as for PD there are a number of techniques eligible for user participation. In many cases, UCD and PD are regarded as nearly equivalent concepts that often overlap with each other (Scandurra, 2007). This implies that it is generally difficult to identify techniques that are

unique for a particular design school. In many cases, the same technique is associated with both design schools, but at the same time, the same technique is applied differently. Thus, there is no 1:1 mapping between techniques and participation schools. As an example, focus groups are a technique that can be used for various purposes and in various forms. In UCD, focus groups are mainly used for aspects related to HCI (Gulliksen and Göransson, 2002), whereas they in PD are used for a larger spectrum of design activities (Bødker and Grønbæk, 1991).

The most commonly used techniques in UCD and PD are workshops in various formats (Bødker et al., 1991, Greenbaum and Kyng, 1991), observations (Folkerd and Spinelli, 2009), interviews (Gulliksen and Göransson, 2002, Oostveen and van den Besselaar, 2004, Bødker and Grønbæk, 1991), scenarios (Gulliksen and Göransson, 2002, Carroll et al., 2000), and various forms of prototyping (Bardram, 2000, Ehn and Kyng, 1991). UI is not associated with the same eligible techniques as for UCD and PD in literature. The main reason is that UI exists in several variants, such as end user development, where end users construct their own information systems (Taylor et al., 1998). Therefore, UI does not have structured techniques for its implementation as UCD and PD have. *Public administrations should be aware of UI not always being a first-hand choice due to its demands in terms of resources and time.* The main emphasis in UI lies on the user working together with the designers in an iterative fashion as an integrated part of the users ordinary work duties (Kujala and Kauppinen, 2004).

## 5.2 Empirical Findings: Public Administrations' View on Public e-Services and User Participation

The analysis of the interviews reveals differences in how public administrations view e-services and user participation in the development thereof. Despite these differences, there is a consensus on what features that affect user participation in public e-service development. During the analysis of the interviews, it became evident that most public authorities and county councils have established ways of working with user participation. As one respondent puts it: *"We use those user groups that are affected by the service that we will present and look at what they think and what they would like to change. We cannot sit here and think that we know best, because we do not. Those who will use it know best"*. This is an interesting comment. The

respondents seem aware of their own limitations. However, it is important to remember that *users sometimes need guidance in what they want as well as in what is possible to achieve and what is not.* When it comes to municipalities, user participation varies. Smaller municipalities (less than 10.000 residents) seem not to apply user participation at all, mostly because they do not see any basis for implementing public e-services and no economic gains to be made. The following quotes exemplify the situation: *"We see no gains to start using e-services since 1) there is no demands from the citizens, and 2) there is no saving but only cost increases with e-services"*, *"If we take for example the application for alcohol licensing it is perhaps four such cases per year to handle. Developing an e-service for this will never pay off"*. Two immediate questions arise from the first quote: How do they know there are no demands from the citizens, and how did they calculate the cost increases versus lack of savings? At best, the organization has made a thorough investigation of both issues, but it is also possible that they base their decision to develop or not develop an e-service on assumptions. If the latter is the case, *there is a clear need for practical guidelines to aid in and guide through the development decisions.* Larger municipalities (more than 50.000 residents) apply user participation most sparsely despite the fact they have many public e-services. These larger municipalities all wish to devote more attention to their external end users: *"User participation is something that we do not work enough with. It feels a bit awkward to ask the citizens what they think. We have been a bit cowardly there and instead went to our administrations that get a lot of impressions and feedback from citizens"*, *"We have not had the opportunity to have the users in development but I think it would be great to test this. As it is today, it is the administrative officers' needs and what they believe the citizens need that determines"*. Both quotes illustrate how the users are part of development indirectly and that there is a will to try to include them, but also that there is a fear for doing so. This fear may stem from a lack of knowledge of how to address and include citizens. This suggests a *need for practical guidelines for how to apply the techniques.*

## 5.3 Features that Affect User Participation

When discussing important features regarding techniques to implement user participation public

administrations in general experience the same problems, regardless of how experienced they are in putting user participation into practice. Techniques for user participation in public e-service development must take into consideration that the time for development in many cases is sparse, or as two respondents put it: *“We always are in a hurry. It takes time to make the applications since there are so many other related systems. This requires extensive testing in order to make sure that everything works correctly. We start to work on the following year’s version of the application in May and then we have a year until the next version must be ready to use”*, *“Since our project is a EU-project financed for three years we have to stay within these time frames. That means that we have to run pretty fast”*. Slimmed resources in terms of time and economy clearly are delimiting factors for user participation in public e-service development, as the following quotes illustrate: *“For obvious reasons, time and money limits how we can work with the citizens”*, *“It is actually a question of resources to cope with doing it too besides everything else”*, *“We probably would have worked in a different way if we had had more time”*. Time and money are influencing factors. However, there may be an underlying assumption that user participation requires time without an actual testing of or investigation into whether or not this is true. Again, we see the *need for practical guidance to developers in order to make more informed decisions*.

#### 5.4 Summarizing Discussion

In summary, in order to apply user participation in public e-service development one must take into account that development cycles often are short and time to spend with external end users is limited. Based on our results, we give the following advice to public administrations:

- *UI is not always a first-hand choice due to its demands in terms of resources and time.*
- *Users sometimes need guidance in what they want, what is possible to achieve, and what is not.*
- *There is a clear need for practical guidance for making informed development decisions, and how to apply the techniques.*

Public administrations often experience limited resources in terms of time and money available for external user engagements. However, these experiences may be based on assumptions without thorough investigations of their truth value. More

practical guidance is needed to help investigating these situations.

## 6 CONCLUSIONS

User participation in public e-service development is a matter that most public administrations wish to devote more resources to. However, scarce resources, little time available and short development projects are limiting factors that must be taken into consideration when discussing the issue. The limitations mean that not all techniques available for putting user participation into practice are possible to implement. None of the techniques discussed in chapter 5.1 are disqualified from usage in public e-service development, however. What matters is *how* a certain technique is implemented. For example, workshops are an umbrella term for a number of techniques that may be used for user participation (Nuseibeh and Easterbrook, 2000). A workshop can be executed in variety of ways, such as focus groups (Kuniavsky, 2003), Joint Application Development (JAD) (Carmel et al., 1993), Interactive prototyping (Bødker and Grønbaek, 1991) etc. Furthermore, each of these ways can be executed in different manners, such as in close face to face iterative group sessions or as individual sessions held via Skype and similar (Sanders et al., 2010) depending on what design school that is considered. Another example is the usage of prototypes, which will look a lot different depending on the design school chosen. In UCD, prototypes will be used mostly as a technique to evaluate usability and functionality from a user perspective. In PD, prototypes will be used as a means for designers and users to actively elaborate during development. Design decisions are joint decisions by users and designers. In UI, prototypes will be used as a means for lead users to demonstrate potential solutions to identified problems for system developers. This large variety in technique execution makes it difficult to recommend a specific technique for a specific matter. All techniques discussed in chapter 5.1 fail to fulfill the basic requirements posed by public administrations. At the same time, if executed in another fashion, every technique is eligible. In conclusion, the *how* is more important than the *what*. Our findings are in line with previous research regarding citizens and business employees willingness and ability to participate in public e-service development (Holgersson and Karlsson, 2011, Holgersson and Karlsson, 2012) where it is concluded that it is important for public

administrations to use techniques that are efficient and less time consuming in order to get business employees and citizens interested in participating.

Even so, there is a knowledge gap concerning how existing techniques for implementing user participation work and how they may be implemented when developing public e-services. This paper has originated from three user participation design schools and the analysis indicates that all participation techniques are eligible but must be adjusted with respect to time efficiency and to the context that most public administrations belong to. They must also follow the design principles for each of the design schools and this means that each technique will be applied differently. Future work is hence needed to develop concrete and practical guidelines that will help public administrations to develop useful and usable e-services in collaboration with the intended users.

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