

IMPROVING THE USER-CENTREDNESS OF E-GOVERNMENT PROJECTS

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Abstract: An important challenge for e-Government service providers is to increase service uptake among citizens. Improved user-centredness of e-Government development projects may be an important key to increased service uptake. In the present study, 51 representatives of the domain of Norwegian e-Government service development provided their views on how the user-centredness of future development projects may be improved. The findings indicate that significant improvements in user-centredness of e-Government projects may be achieved through adherence to basic principles of user-centred design (UCD). The most frequently suggested recommendations made by the e-Government development representatives were to (1) clearly define and analyse users and stakeholders, (2) anchor the user-centred approach in the management and project team, and (3) involve user in the development process. The findings are discussed in regard to the organisational UCD maturity levels they may reflect.

1 INTRODUCTION

E-Government service provision through the Internet is growing ever more sophisticated. In European countries, for example, most basic public-sector services (such as taxes and VAT, job search, vehicle registration etc.) include one-way or two-way interaction¹ (Wauters and Colclough, 2006). As service sophistication has reached acceptable levels, a major challenge for public sector services providers is to increase e-Government service uptake in the general population; i.e., to move a larger proportion of citizens from traditional channels of service provision to e-Government service channels.

E-Government service uptake varies widely between countries, even between countries with similar levels of service sophistication. In 2006, United Kingdom had an e-Government service uptake by individual citizens of about 25 percent, in spite of being one of the European countries with highest levels of e-Government service sophistication. In comparison, the Norwegian and Swedish e-Government service uptake by individual citizens was greater than 50 percent in the same year for similar services (Wauters and Colclough, 2006). In spite of this range of variation between countries, most government service providers seem to be faced

with the challenge of increasing the service uptake of their e-Government services.

In order to increase uptake of e-Government services, these need to be developed and implemented according to the needs and requirements of their intended users. E-Government services that are difficult to use, or that do not reflect user needs, are likely to be used less than the service provider wants. The OECD public management policy brief “The hidden threat to e-Government: Avoiding large government failures” concludes that greater end-user involvement is one of a small number of factors leading to successful e-Government service development (OECD, 2001).

A user-centred approach is a suitable way to increase the user involvement in the development process. This approach is also helpful in facilitating system development in accordance with user needs and requirements. One prominent user-centred development process is User-centred design (UCD); a process particularly oriented towards user needs and requirements, as well as user-feedback on design solutions at different levels of maturity (ISO, 1999).

But how should we go about improving the user-centredness of current and future e-Government development projects? In this paper, I try to provide important insight into this question by presenting the

results of a recent investigation. The aim of the investigation was to identify factors that experts of e-Government service provision regard as crucial in order to improve user-centredness.

The investigation utilized data obtained from 51 representatives from the domain of e-Government service development who participated in one of six group sessions during a seminar on user-centred development of e-Government services. The data concerned Norwegian e-Government service development. However, since Norwegian e-Government services hold a fair level of service sophistication and relatively high level of citizen uptake, the results may also be of interest for the international community of e-Government researchers and practitioners. The results of the investigation provide 1) insight and inspiration regarding how the user-centredness of e-Government projects could be improved, and 2) a background for reflection on the maturity of UCD in e-Government development.

2 RELATED WORK

The sections of Chapter 2 discuss related work in four areas of knowledge:

- User-centred design (UCD)
- Current arguments in favour of improving user-centredness of e-Government projects
- Current status of user-centredness in e-Government projects
- Maturity models for user-centred development.

2.1 User-centred Design (UCD)

Strictly speaking, UCD refers to a development process according to the ISO standard 13407 "Human-centred design processes for interactive systems", which describes an iterative process covering the phases of 1) context specification, 2) user and organizational requirements, 3) design solutions, and 4) evaluation (ISO, 1999).

However, since it has been difficult to encourage software developers to adopt a user-centred process model in exchange for other software process models, UCD is currently also used to refer to any iterative development process that incorporates sufficient user-centred activities (Følstad and Skjetne, 2007).

A wide range of methods that support UCD exists for all phases of the development process; some of the best known are presented in Table 1.

2.2 Why Improve the User-centredness of e-Government Projects?

When investigating how to improve the user-centredness of e-Government projects, it is necessary to know on which basis we make a decision to improve user-centredness.

There are several reasons why the user-centredness of e-Government projects should be improved. Følstad and Krogstie (2007) have presented the following four:

a) The Range of Relevant Stakeholders, Users and Goals

E-Government service development is typically associated with a wide range of stakeholders and user groups. Examples of this was given by Følstad et al. (2007) who presented three cases of e-Government development; all associated with important challenges related to the services' multitude of user-groups and stakeholders, leading to unclear service goal-hierarchies.

b) Socio-technical Challenges

E-Government services typically imply changes in organisational structures and work processes (Mansour et al., 2005). Successful implementation of e-Government services often require that socio-technical challenges related to the service to be treated well. Furthermore, organisational rather than technological issues may be the reason why e-Government service development is slow in some areas (Krokan and Midtbust, 2006).

Table 1: Example methods supporting UCD, distributed across the development process phases (based on Maguire, 2001).

Context specification	User and organizational requirements	Design solutions	Evaluation
Stakeholder identification Context-of-user analysis Field study Task analysis	Stakeholder analysis User cost-benefit analysis User requirements interviews Focus groups	Parallel design Storyboarding Paper prototyping Software prototyping	Expert evaluation User testing Satisfaction questionnaires Post-experience interviews

User involvement in the development process should facilitate the socio-technical aspects of service implementation.

c) Experience Reports

Reports from OECD (2001) and the UK government (Pearce, 2003) concluded that end-user involvement is a critical success factor for e-Government development projects. In the reports, “end-users” refers to users both within and external to the government organisation.

d) Political Priorities

Achieving user-centred e-Government services is a political priority in many countries. The priority given to this issue may be seen in political documents such as the “i2010 - A European Information Society for Growth and Employment” (European Commission, 2005), in particular with respect to the aim of e-Government service accessibility.

2.3 Current Status of User-centredness in e-Government Projects

Følstad et al. (2004) investigated the status of user involvement in Norwegian e-Government projects. The investigation indicated that e-Government project leaders seem to be aware of the importance of user involvement in the development process, and that they also include a fair amount of user involvement activities. However, current user involvement tends to follow the practices of democratic participation rather than methods developed and used within the field of UCD. Examples of such practices of democratic participation include:

- User representatives in project group
- Reference groups with user representative
- Audits
- User meetings and other information activities.

Følstad et al. also found that e-Government service users within the government were involved more often and earlier than users external to the government (the general population of citizens).

2.4 Maturity Models for User-centred Design

Using UCD maturity models can be a useful approach to conceptualize and improve the user-centredness of an enterprise’s development projectsⁱⁱ. An early UCD maturity model was developed by Earthy (1998), who provided the

following classifications to describe an organisation’s UCD maturity:

- X: Unrecognized
- A: Recognised
- B: Considered
- C: Implemented
- D: Integrated
- E: Institutionalised.

At Level A the need to improve the user-centredness of existing services is recognized. At Level B an awareness of the importance of following end-user requirements is established. Level C requires that user-centred development processes are implemented, but not integrated in the organisation’s quality lifecycle. User-centred development processes integrated into the organisation’s quality life cycle are not required until Level D. At the highest level, Level E, a user-centred approach is adopted for a whole range of systems, and the user-centred approach should be of benefit to the culture of the organization.

3 RESEARCH QUESTION

The main research question investigated in the present study was:

“What do representatives of the domain of e-Government service development perceive to be crucial factors for improving the user-centredness of e-Government projects?”

The data collected in the study of the main research question also permitted discussions on current e-Government developers’ user-centred maturity. This sub-question was formulated as:

“Which user-centred maturity levels are reflected in the factors perceived by domain representatives to be crucial for improving the user-centredness of e-Government development projects?”

4 METHOD

In order to gain insight relevant to the research questions, it was necessary to collect data from a sufficiently large number of representatives from the domain of e-Government service development. This was done in conjunction with a whole-day seminar on the topic of “User-centred development of e-Government services”. The seminar dealt with Norwegian e-Government services.

In order to efficiently gather data on the representatives' perceptions, a group session was conducted. Each group was asked to agree on "top four ways" to improve user-centredness in future e-Government development projects. This procedure had the aim of including all the participants' relevant viewpoints, at least as objects for consideration among their peers in the groups. The procedure also allowed an analysis of the prevalence of the different viewpoints across the groups.

4.1 Participants

In the invitation to the seminar, the target group was described as persons displaying the following three characteristics:

- Working on the development of e-Government solutions
- Focusing on the end-users of e-Government services
- Wishing to be updated on how to include user perspectives in development projects.

Invitations to the seminar were distributed by e-mail to more than 400 representatives of the target group in the Norwegian public sector, private service providers and research organisations. The seminar was free of charge.

A total of 51 persons participated in the seminar. Participants' came from 1) government bodies, 2) private service providers and 3) research organisations. The distribution of the participants is shown in Table 2.

Table 2: Participants' work-places.

Work-place	Number of participants
Government bodies	27
Private service providers	16
Research organisations	8
Total	51

4.2 Group Processes

The participants were divided in six similar sized groups. The group session lasted 45 minutes, and the groups were self-administered. The following process was applied in each group:

- Introduction
 - Presentation
 - Choose group leader and minute-taker
- Brainstorming: Possible ways of strengthening user-centredness (20 minutes)
 - Two minutes individual note-taking (1-3 suggestions per group member)

- Individual presentations of suggestions
- Joint structuring of suggestions
- Discuss and decide: "Top four ways" of improving user-centredness (15 minutes)
 - Group agreement, through discussion, on the "top four ways" that best reflect participants' viewpoints.

The stated goal of the group sessions was that each group should develop a set of "top four ways". The groups were aware that they were to present their results in plenum immediately following the group sessions.

4.3 Data Collection

Data were collected via a plenary session following the group sessions. All groups were given two minutes to present their results. Each group's written notes were handed over to the seminar leader. Five of the groups presented four "top ways", while one presented five.

4.4 Analysis

After the seminar, the data were analysed in a three-stage process. First, each of the groups' "top ways" to improve the user-centredness of future e-Government projects were analysed with respect to whether or not they should be interpreted as representing one single issue, or a merger of two issues. A "top way" interpreted to reflect one issue only was regarded as one item; otherwise it was divided in two items. One example of a "top way" that was interpreted as representing two issues was "Clear definitions of target users and goals". This particular "top way" was split in the following two items: "Clear definitions of target users" and "Clear goal definitions".

Following the first stage of the analysis, all items were classified as belonging to a category. The categories were developed iteratively through the analytical process. The full set of items from the six groups was classified in a total of 14 categories. Each of the categories can be regarded as a recommendation aimed at improving the user-centredness of e-Government projects.

In the third stage of the process, all categories were classified according to how advanced they were judged to be relative to the state-of-the-art for UCD. Three categories were used:

- **Basic** (Basic UCD principles. Awareness of, and/or adherence to these principles may be expected at Earthy's UCD maturity levels A-B.)

- **Advanced** (UCD principles followed by fairly advanced practitioners. Adherence to these principles may be expected at Earthy's UCD maturity levels C-E.)
- **Research needed** (State-of-the-art UCD does not support this advice. Further research is needed.)

The third stage of classification in the analytical process was carried out independently by two researchers. In case of disagreement on classification, agreement was reached through discussion. The two researchers initially disagreed with regard to three of the 14 categories.

5 RESULTS

This section presents the 14 categories of recommendations for improved user-centredness of e-Government projects. The most popular category includes items from all six groups. Five of the categories include items suggested by one group only. The number of groups which presented an item relevant to a given category is indicated through a number shown in parentheses following the category label.

Each category is also classified according to how advanced it was judged to be relative to current state-of-the-art in the field of UCD. Seven of the categories were judged as reflecting Basic UCD principles. Six were judged as reflecting Advanced UCD practice, and one was classified as Research needed. The classifications are also presented in parentheses.

Define and Analyse User-groups and Stakeholders (6; Basic)

All groups pointed out that one should be careful to establish a clear definition of the user-groups of a service in order to improve user-centredness. Two groups also made a distinction between user-groups and stakeholdersⁱⁱⁱ. Two groups also pointed out the importance of including sufficient analysis of the user groups rather than merely identifying them.

Anchoring (4; Basic)

Four of the six groups emphasised the importance of appropriate anchoring of a user-centred approach within management and the organisation. Anchoring in management was mentioned by most groups, but anchoring of user-centredness in the development team was also suggested as being important. In order to achieve

anchoring, measures such as cost-benefit analyses of user-centred activities were suggested in addition to the importance of changing attitudes and disseminating knowledge.

Involve Users in the Development Process (3; Basic)

Three of the six groups pointed out the importance of involving users in the development process. One of the groups focused on initiating user involvement as early as possible in the process. Another group presented the importance of involving users throughout the project life-cycle.

Define Goals (2; Basic)

Two of the groups emphasised the importance of establishing clear goals for the e-Government service; what the service should provide for the user groups and stakeholders, and at which quality level.

Prioritising Among User Groups (2; Basic)

Two groups recommended prioritising among user groups. One stated that prioritizing is important in order to improve the efficiency and effectiveness of a project's user-centred activities. Another group pointed out that it is necessary to prioritise a service's first-time users under development, to ensure that the resulting service is intuitive and supports walk-up-and-use.

Document Usefulness (2; Advanced)

Documentation of the usefulness of user-centred activities was mentioned as being important in order to sell and maintain a user-centred approach in the project group. It should be possible to evaluate the user-centred activities according to pre-defined goals and measures.

Competence in the Project Group (2; Advanced)

Two groups emphasized activities aimed at ensuring transfer of competence in user-centred development within the project group. It was also pointed out that the structures for cooperation in the project group should facilitate transfers of competence.

Exploit Feedback on Running Services (2; Advanced)

Two groups suggested the exploitation of user feedback on running services as an important way to improve the user-centredness of e-Government services. One of the groups focused particularly on the use of beta versions; the other took a more general approach to systematic exploitation of user feedback in maintenance and redesign.

Structures for Cooperation in the Project Group (2; Advanced)

Structures for cooperation in the project group, improving dialogue and exchange between the project members, were mentioned as important by two groups. No specific structures were suggested, but one of the groups pointed out the need to formalise new models for cooperation within the project group.

Prepare Participants in User-centred Activities (1; Basic)

Some user-centred activities, such as certain kinds of workshops, would be greatly improved if participating users and stakeholders are given the opportunity to prepare before participation.

Budget (1; Basic)

One of the groups pointed out the importance of establishing defined budgets for user-centred activities in a project during project planning.

Exploit Richness in User-centred Methods (1; Advanced)

One of the groups pointed out that there seem to be tendency for only a few user-centred methods to be widely used, whereas other methods that may be more suitable in certain development contexts are not used as much as they could. Project planning should encourage higher levels of reflection regarding choice of user-centred activities.

Lifecycle User-centredness (1; Advanced)

User-centredness was described by one of the groups as something that should be included throughout a service's life cycle. It was pointed out that it is not sufficient to keep up a user-centred approach in, for example, the early phases of a project if this for some reason - such as budget limitations - cannot be continued throughout the project.

Usability as Quality Criterion (1; Research needed)

Usability should be included in the most important service quality criteria, together with, for example, service stability.

6 DISCUSSION

The first two parts of this section deal with the two research questions investigated through the study. The third concerns the validity and generality of the findings.

What do representatives of the domain of e-Government service development perceive to be crucial factors for improving the user-centredness of e-Government projects?

The results indicate that representatives of e-Government service development are in fairly high agreement on three factors as highly important in order to improve user-centredness: Define and analyse users and stakeholders, anchor the user-centred approach in management and the project team, and involve users in the development process. It should be noted that these three "top ways" all reflect an absolute minimum regarding user-centredness. It is noteworthy that as many as seven of the 14 recommendation categories were judged to reflect Basic UCD principles.

It is somewhat comforting that also advanced issues, as seen from the perspective of the field of UCD, were among the 14 categories. The recommendation "Usability as quality criterion" was even found to imply interesting and relevant research challenges within the field of UCD. Even so, the findings clearly suggest that important improvements regarding the user-centredness of e-Government service development may be achieved through general adherence to basic UCD principles.

Why then are basic UCD principles not already fully integrated into current e-Government service development? Literature describing the principles has been in existence for a long time, and knowledge of the principles does seem to exist among e-Government service development representatives.

One possible explanation suggested by Følstad et al. (2004) is that current uses of democratic participation practices have yet to be adequately combined with UCD methods specifically intended to provide systematic input to the system development process.

Another, in many ways complementary explanation is the current lack of UCD process support tailored to e-Government projects. This means that even though, as summarized by Følstad and Krogstie (2007), there are several good reasons for improving user-centredness, we still may be in need of process support that can help the individual project leader of e-Government development projects to take the step from knowledge of general UCD principles to implementation of actions actually improving the user-centredness of planned or ongoing projects.

Which user-centred maturity levels are reflected in the factors perceived by domain representatives to be crucial for improving the user-centredness of e-Government development projects?

The factors presented by most groups to be crucial in order to improve user-centredness were judged to reflect basic UCD issues. The three top recommendations, along with four less common recommendations, seem to reflect organisational UCD maturity at no more than Level B of Earthy's maturity model. Level B is characterized by user-centred activities and processes being considered, without the implementation of a full fledged user-centred process.

At the same time, the seven categories of recommendations classified as either Advanced or Research required reflect recommendations requiring UCD maturity at Level C or higher. The recommendation "*Lifecycle user-centredness*" seems to require UCD maturity at Level D. And "*Usability as quality criterion*" may even require UCD maturity at Level E.

It should be pointed out that the interpretation of the current findings as reflecting e-Government UCD maturity is only a tentative conclusion. Data that directly reflect the development processes in representative e-Government projects are needed to allow strong conclusions to be drawn in this regard. The author hopes that this study will motivate future research on the UCD maturity of e-Government development projects.

Validity and generality

The most important limitation on the validity of the present study is the fact that participants were selected on the basis of a convenience sample. This means that we do not have full control of whether the participants were a representative sample of the population of e-Government service developer representatives. The results should therefore preferably be perceived as a source of testable hypotheses and motivation for future studies.

The generality of the results is also limited by the data having been collected with regard to Norwegian e-Government development projects. However, the results should still be of interest outside the Norwegian context; both in other Scandinavian countries (due to similarities in e-Government services provision and uptake) and in other European countries (due to the relatively high levels of e-Government service uptake in Norway). However, given the limitations on the generality of the study's findings outside the Norwegian context, these should preferably be used as background material for related studies in an international context

7 FUTURE WORK

The author hopes that this study will draw more attention to the user-centredness of practical e-Government service development. In particular, the finding that adherence to basic UCD principles could lead to significant improvements in user-centredness hopefully provides motivation in this regard.

Future research should aim to study the findings of the present study as testable hypotheses in international contexts. Such studies could include surveys of randomly drawn samples of e-Government system developer representatives, possibly conducted in a similar manner in countries with varying degrees of e-Government service sophistication and uptake in the general population. Survey studies of this kind could be followed up by small-scale qualitative studies that would provide in-depth knowledge related to key findings. This would establish a solid base for improving user-centredness of e-Government development projects.

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ⁱ Wauters and Colclough's (2006) levels of one-way and two-way interaction seem to correspond to the stages of interaction and transaction in Siau and Long's (2005) synthesized model of e-government evolution.

ⁱⁱ An overview of UCD maturity models is provided by Jokela (2004).

ⁱⁱⁱ User groups were understood as users both within and external to public sector bodies. Stakeholders were understood as actors affected by the service, or with an interest in the service, without being direct users of the service.