Participatory Design in Emerging Civic Engagement Initiatives in the New Public Sector: Applying PD Concepts in Resource-Scarce Organizations

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Participatory Design in emerging civic engagement initiatives in the new public sector: applying PD concepts in resource-scarce organizations

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Abstract

In this study, we address the role of Participatory Design (PD) in emerging public sector governance forms and, more specifically, civic engagement and we-government initiatives. We achieve this by first providing a research overview of the development of PD approaches since they originated in the 1970s, identifying different PD generations and associated concepts, contexts, and challenges, and then relating them to current public sector trends. Next, we link the overview to a practical example by presenting a case of applying PD to a civic engagement project that takes place in the Swedish emergency response system. Our example findings sustain previously identified needs to return to broad change processes and balance this with ICT re-configuration and structuration of the collaborative processes, the related stakeholders, and their needs, this time in a context where work tasks and responsibilties are not yet defined, known or experienced among stakeholders. We then suggest methodological ways to handle this by 1) applying an interdisciplinary PD approach, 2) replacing the traditional design group with a combination of various qualitative methods and PD techniques, e.g. focus groups, modified scenario-based Future workshops, exercises and after-action-reviews, and 3) support PD activities with context-specific frameworks. We argue that applying PD concepts to the governance forms that are emerging in resource-constrained public sector organizations poses a number of challenges, many of them relating direcly to the unknown character of the work setting and the practical difficulties of involving civil citizens as end-users. However, if they are addressed and handled adequately, making civic engagement initiatives work processes and ICT support to work smoothly, this can contribute to a re-politicisation of PD in terms of space, action and the empowerment of citizens both by enhancing their skills and by having them represented in design activities.

CCS Concepts:

Human-centered computing→Interaction design; Interaction design process and methods; Participatory design

Keywords

Participatory design, public sector, civic engagement

1. Introduction

Participatory Design (PD) has a history dating back to the early 1970s and had a clear ideology of democracy and active involvement of end-users. These were originally citizens involved in urban planning, and later shop-floor workers involved in workplace technology design e.g. [1]. Since then, PD has evolved in line with prevalent societal trends and technological development and has to some extent moved away from its ideological and political roots to focus on practical ICT applications and usability in order to benefit collaborative work environments e.g. [2], [3]. Especially in recent years, some traits of PD seem to have become synonymous with a more neutral form of "user-centered" design, concentrating on more local issues of usability and user satisfaction and sometimes bringing in commercial agile methods [4], [5], [6]. Other PD traits have moved away from an exclusive design/technology/ICT artifact focus and include, for example, a change in the mindset of participants and improvements in collaborative work [7]. Further, in the 1990s and 2000s some PD studies tried to adapt the approach to emerging trends of inter-organizational collaboration and large-scale systems involving heterogeneous user groups in increasingly complex work environments e.g. [8], [9], [10], [11]. Reflecting this overall development, throughout the decades and up to the present, there has always been debate about where PD should be heading. Should it turn back to its original ideological roots or move forward, adapting to demands of efficiency and industrial applicability in environments with increasing complexity and stakeholders? In this study, we engage in the debate with a focus on current governance trends in the public sector and, more specifically, to emerging civic engagement/we-government initiatives.

1.1 Participatory Design in public sector governance, civic engagement, and emerging we-government initiatives

The term "new public sector" was coined in the 1990s when the public sectors in developed countries were under pressure to become more efficient and effective, for example, by involving the private sectors [12] or by adopting new public management strategies [13]. More recently we have seen e-government trends emerging as a means to address

current public sector governance challenges, e.g. financial cuts, lack of professional resources, and rising public expectations [14]. Information and communication technology (ICT) has been an enabler, especially as regards authorities' ability to involve civil citizens by developing e-services [15]. In the past few years, we have also seen emerging e-government initiatives specifically targeted towards certain defined and demarcated groups of civil citizens who are supposed to collaborate with the authorities in carrying out certain tasks for themselves and their co-citizens. Linders [16]. refers to this engagement as we-government or do-it-yourself government. The initiatives have taken place in such diverse areas as neighborhood watch programs, park clean-ups, health care counseling, and emergency response [17], [16], [18], [19], [20], [21] and against a historical background in which citizen participation has experienced many policy dilemmas and failures [22].

In parallel, there have been various attempts to adapt PD to the emerging contexts (see e.g. [23], on citizen involvement in municipal planning). It has been claimed that it is well suited to development if e-government initiatives partly driven by a desire to strengthen democracy and increase transparency between authorities and civil citizens [24]. At the same time there are various connected challenges reported, including disagreement between users and authorities regarding the envisioned tasks, and unclear target user groups, where civil citizens may be difficult to identify, motivate, and involve over longer periods of time [24], [25]. A lack of methodologies and "know-how" in the e-government context has also been identifed [26]. Recently, emerging we-government initiatives have been included in discussions of PD applicability [17]. While e-government initiatives are driven by motives of increasing authority and internal efficiency and later also by democratic motives in what is usually referred to as e-participation, we-government initiatives are often developed to compensate for a lack of professional resources and to retain public services in financially and organizationally strained environments. Involving civil citizens in this way often requires them to be integrated with the authorities' own ICT solutions, which constitutes a new challenge – for information systems development in general and for user-centred design and PD [17]. There is thus a need, not only to identify PD potential and applicability in relation to this emerging field, but also to address how various challenges can be handled methodologically and in practical development.

1.2 Study aim and objectives

In this study, we take a conceptual perspective addressing the role of PD in new computing contexts, more specifically, public sector governance emerging civic engagement/we-government initiatives characterized by the need to involve stakeholders in resource-strained organizations. More specifically, we relate the on-going PD debate to this particular context, and identify which challenges seem to apply specifically. Therefrom, we suggest how they can be handled methodologically and practically, trying to balance active user participation with the need to reach and represent many stakeholders in a work setting where their tasks are in many respects, new, undefined or unexperienced. We sustain our argumentation by:

- providing a research overview of the emergence and development of PD approaches since they originated in the 1970s, identifying different PD generations and associated concepts, ideological standpoints and challenges, and relating them to current public sector trends;
- providing a practical example by presenting a case of applying PD to a civic engagement/we-government project taking place in Swedish emergency response and linking it to the research overview.

We then discuss the findings and implications for PD in a wider public sector governance and we-government context. The term "we-government," as we use it in the study, refers to the concept coined by Linders in which he embraces "the re-emergence of citizen coproduction – whereby citizens perform the role of partner rather than customer in the delivery of public services" [16] to "make citizen coproduction of government services more viable and effective" [27]. The study's major focus is thus on emerging we-government and civic engagement initiatives, but the results may also be relevant to more traditional forms of e-government and other collaborative forms emerging in the public sector, for example, cross-sector, multi-agency collaboration.

The practical example is the project Enhanced Neighbors, in which civil volunteers are alerted by certain alarms and sent to act as first responders at incident sites. Here, we initially set out to apply traditional PD concepts, principles, and work procedures in developing the volunteers' collaboration with the professional response organizations and in related ICT design and configuration. In the study, we address the PD process and how we were forced to adapt and change it over the course of time. In particular, we focus our contribution on methodological and practical suggestions as response to challenges and difficulties experienced in the specific context.

2. Participatory Design research overview

In this section, we provide a research overview and analytic narrative of PD in a historical perspective, in the light of past and contemporary societal and technological development, landing in the contemporary public sector. The overview is thus rooted in available PD research literature, in books, conference proceedings, and scientific journals. It also includes our own many years of research experience in PD, for example, in adapting it to large-scale systems, and to inter-organizational and cross-sector collaboration with markedly heterogeneous end-users and stakeholders. The intention is not to give full details of all PD traits having existed over the decades, but rather to focus on those that are of specific relevance for contemporary public sector governance trends. For a comprehensive overview and analysis of how PD has

evolved between 2002 and 2012, conceptually, theoretically, and with respect to application domains, see [7]. In our overview, we present the material as different generations of PD approaches, even though there are no clear breakpoints between different PD traits and they often exist in parallel. The notion of generations is rather used to capture and visualize significant trends and overall pictures. We also consider ideological standpoints and specific challenges in connection to each generation.

2.1 First generation of PD: ideology, democracy, and shop-floor workplace technology

The late 1960s and 70s schools of PD, for example, cooperative design and early Participatory Design, had clear political/ideological orientations and started by actively involving civil citizens in urban areas in the planning of their own living environments. The approach quickly expanded to shop-floor production workers, and the development of workplace technology. The focus was thus on industry, production, and realizing the good work, reflecting a time where information technology were still highly centralized relying on mainframes with little or no focus on user interfaces or communication. Projects were often joint efforts by academia and the Scandinavian trade unions in what we usually refer to as "the collective resources approach" [1]. The end-user group was thus relatively small and homogeneous, mostly consisting of shop-floor workers in part of an organization. At a practical level, design groups consisting mainly of workers and system developers (and sometimes trade union represenatives and journalists) were formed. The groups worked together over time and through recurrent design meetings to develop creative technical solutions. They used easy-to-learn practical design techniques such as future workshops, games, role-plays, and scenarios, (e.g. [28], [29], [30]). Much emphasis was put on following democratic principles, for example, by creating joint principles for talking or taking turns chairing meetings [31].

Ideological standpoints and practical challenges

PD as it was originally practiced was mainly a philosophy based on politicism, ideology, and far-reaching democratic principles, not a coherent design methodology or systems development process. Its advocates claimed that, beyond the obvious aspects of worklife empowerment e.g., [32], it resulted in better systems than other approaches, since the systems were designed together with the users instead of merely using them as information sources, e.g. [31]. Nevertheless, it can be noted that by the 1980s the practical challenges of carrying out the philosophy of PD began to be notified, e.g. it was pointed out how its lack of formalization resulted in increase of overall complexity of implementation [33].

2.2 Second generation of PD: collaborative office work and increased focus on usability

In the 1980s and early 1990s the term "computer supported cooperative work" (CSCW) was coined, referring to the increased use of decentralized ICT solutions, and computer software supporting collaboration and coordination of teams working together, e.g. [34]. In PD, it is possible to see a similar shift where collaborative office work partly replaced the previous focus on Taylorism and production technology, e.g. [35], [30]. Similarly, the marked democratic principles and clear ideology associated with the Scandinavian school partially gave way to more pragmatic approaches focusing on usability and the notion that direct user involvement actually produced better systems [36]. The term "PD" gradually replaced "cooperative design" and spread in North America and globally [7]. Also, related approaches were developed such as Joint Application Development (JAD) in North America, in which both managers and workers participated in design groups, somewhat widening the stakeholder perspective. At the same time, the ideological, democratic, and empowerment aspects lingered on in many projects, e.g. [37], [31] and new perspectives such as feministic perspectives were also incorporated, (e.g. [38], [39]).

Ideological standpoints and practical challenges

In line with decentralized ICT available to more workers/users and an increased pragmatic usability perspective, the dichotomy of the PD ideological standpoints and associated practical challenges became more pronounced. Some studies delivered criticism towards the academic focus and prolonged emphasis on democratic principles and argued that the PD conceptual framework was in need of renewal if it were to be applied outside the academic context [40], [41]. Others claimed that while the approach extensively deals with the early design phases, the later, more technical, stages were less well covered, and that few reports of the concrete use of PD were actually available, e.g. [3]. It was argued that as a result of this, actual implementations in use were infrequent, and those products delivered were almost exclusively small stand-alone applications [42]. In relation, some studies questioned the axiom of active involvement of end-users in all phases of the design process, claiming that user participation must be focused on user tasks and needs to proceed the design process smoothly e.g., [10], [43]. Other studies were on the other hand critical of the political aspect of PD being lost arguing for the reintroduction of political dimensions [44], [32] and claiming that democracy should once more be brought forward as a core political – and PD – ideal [45].

2.3 Third generation of PD: inter-organizational collaboration, heterogeneous stakeholders and large-scale systems

Another parallel although somewhat later trait of PD sought to adapt to trends of inter-organizational collaborations and large-scale decentralized information systems with ever-increasing complexity, reaching extensively to people working in organizations. This in turn resulted in growing and increasingly heterogeneous user groups. The notion of stakeholder versus end-user was highlighted. Active and full user participation could still be argued for from a democracy and empowering perspective. Extensive stakeholder representation in its turn implied that organizational conflicts could be resolved at an early stage, rendering the system a higher chance to be accepted and used. Several studies pointed out that all stakeholders that are to be affected by a system (e.g. system financers, system administrators) must somehow be represented in the design process in order to arrive at practically implementable and working systems, e.g. [10], [11]. This was, for instance, achieved by an increased focus on defining and categorizing users and secondary stakeholders, e.g., [8] and by the involvement of such heterogeneous stakeholder groups in practical design work, e.g. [10], [9].

Ideological standpoints and practical challenges

The challenges of applying PD in organizational contexts managing a complex set of multiple heterogeneous stakeholders, had been noted earlier by in studies of PD in large product development companies. Identified obstacles included difficulties in getting access to, benefiting from, and receiving feedback from users [46]. The practical difficulties associated with involving a larger and more varied set of end-users and stakeholders, so that they were all represented in a design group and to retain large design groups to work over a long period of time, was now found increasingly difficult. Alternative practical approaches were suggested, such as rotating between design groups and complementary data collection to reach external stakeholders, and to introduce iteration in the PD process to allow for the collection of a massive amount of data [10], [47] . Moreover, the conflict perspective tended to extend the traditional one of workers and managers as the stakeholder group grew, rendering design work more time demanding. Several studies argued for the need to balance extensive user participation with efficiency and formalization demands, to reach later design phases and an end-product [11], [42], or even tried to integrate PD with software engineering methods (e.g. the Rational Unified Process for designing large-scale systems [11].

2.4 PD in emerging public governance forms: e-services, civic engagement and ICT re-configuration

In recent years, the public sector in many Western countries has experienced cutbacks in financial resources or simply a lack of professional resources available. This, together with growing demands for public services in urban areas and simultaneous depopulation of rural areas where many services are dismantled, have led to various strategies, e.g. new public management and emerging governance forms. One example of the latter is cross-sector collaborations in different areas, e.g. [13], [48], [49], [50], [51], [14]. Another is the increased involvement of citizens in e-government e.g. [23], [52]. Initially, e-government initiatives focused mostly on increasing public organizations' internal effectiveness and on the delivery of online public services. However, the focus gradually widened to include more interactive processes and technologies where citizens can engage in dialogue with government authorities through e-consultation and e-participation [53], [54].

The target of e-government has primarily been large groups of civil citizens or the broad masses who perform tasks out of their own interest or because they are obliged to, e.g. [15], [54]. However, it has recently become possible to discern emerging initiatives transcending the previous forms in that they are directed explicitly towards certain groups of citizens that are to actively support public authorities by actually carrying out certain work tasks identified for themselves and for their co-citizens. This means that they not only use authority-provided e-services and technical support but they must also be directly integrated into the authorities' own IT solutions, further complicating the issue of information systems development [17]. Linders [16], [27] refers to this engagement as a partial transformation from e-government to we-government, where the new types of citizen engagement include citizen sourcing, government platforms, and do-it-yourself government. In we-government, the motives strongly relate to increased efficiency, but also to simply creating redundancy in societal systems as a means to maintaining public services.

Relating the above to PD, [7], in their overview of PD research from 2002-2012, identify different areas where the approach has made progress in the past decade: PD in new domains, PD methods, PD and new technology, and theoretical contributions to PD. It is possible to discern how many contemporary PD applications reflects current societal challenges, e.g., in public sector health care organizations and social welfare, in non-profit organizations, in projects involving underdeveloped countries and/or marginalized societal groups, in projects aimed at decreasing education gaps between different groups of students, and in projects directed towards civic engagement and communities of interests involving civil citizens [7], [23] [55], [56], [57], [58]. Researchers have also explored how technology can mediate citizens acting as first responders in emergency response, advocating user participation to bring together emergency management professionals and decision-makers to understand the constraints of technological solutions, citizen competencies, and operation protocols [18]. As to e-government, it has repeatedly been argued that end-users/ citizens must be involved in the development of e-services e.g. [25], [52]. It has also been claimed that user-participation-intensive approaches such as user-centered design and, especially, PD are well suited for this purpose. In relation, civil citizens' willingness to actively participate in e-government PD projects has been investigated and was found to be high [24].

As to changes to specific PD concepts, [7] claim that the notion of users has changed to the notion of people (e.g. civic engagement) and that the political aspect has become subtler with a poly-voiced, rather than the traditional worker-

manager conflict, perspective. They also argue that the end-product no longer has an exclusive design/technology/ICT artifact focus but can also include, e.g., a change in the mindset of participants and improvements in future collaborative work. On the other hand, there are still parallel traits where PD is considered synonymous with a more neutral form of user-centered design, concentrating on more local issues of usability and user satisfaction. Sometimes they are combined with commercial system development and software engineering methods e.g. [5]. Moreover, contemporary ICT solutions are often different, also affecting PD. While the past decades and the second and third PD generation much focused developing ICT artefacts and (large-scale) systems from scratch current applications are extensively built on available off-the-shelf technologies requiring ICT reconfiguration rather than development [4]. Finally, the past decade has seen a rapid spread of mobile applications in terms of cellphones, tablets and applets that are accessible anywhere, not the least relevant as an enabler of citizens engagement.

2.5 PD for the future: implications for application in public sector governance forms

PD is not a single approach. Rather it is a diverse and multi-voiced effort where development and design takes place from various ideological standpoints e.g. [7], [59]. On one hand, we have studies that advocate a return to PD's democratic roots and original values and tend to focus on these aspects rather than on specific PD techniques and tools. Then we have the studies at the other side of the spectrum stressing the need to increase PD's formalization and usability not the least if it should be applied to rapidly changing and complex societal and organizational contexts involving numerous heterogeneous stakeholders.

As to practical challenges, the argument that PD is time-consuming and ineffective, given the time needed to contact and motivate stakeholders to participate over time and engage in design groups, to facilitate meetings, adhere to democratic principles, and offer a point of focus for stakeholder contributions, is still put forward, e.g. [25], [2]. Several studies also argue that the challenges increase with the development of large-scale complex systems, inter-organizational and cross-sector collaborations where it is necessary to identify and represent multiple stakeholders, actively involve different user groups, and sustain different needs, not least in the public sector [17], [25], [56]. [60]. [7] note that when applying PD in contemporary domains, users tend to comprise much less well-defined groups who rather encompass multiple cohorts of stakeholders with only partially shared interests. This in its turn challenges the PD axiom that all those affected by a system should have an actual say in all decisions related to it, i.e. the issue of user partcipation versus respresentation.

In relation to public sector governance, both [55] and [61] noted the difficulty in involving civil citizens since they constitute a markedly diverse end-user group in comparison to workplace settings, where most of the involved stakeholders can immediately be identified and can relate to a PD project. It has also been argued that even if the citizens may want to participate, their ability to do so is limited [24]. Several studies conclude that user involvement in e-government design and research to date has been insufficient [25], [62] where challenges include disagreement between users and authorities regarding the envisioned tasks, and unclear target user groups [62] [63]. Further, a lack of methodologies and "knowhow" in relation to the PD context has been reported [26]. In relation to we-government, it has been pointed out that the fact that civil citizens most often are not a permanent part of the organization involved in the collaboration and design task at hand constitutes a substantial practical problem [17].

In summary, many challenges associated with applying PD seems to have remained over decades and generations. Some of them have become more pronounced with new domains, larger and less defined user and stakeholder groups. To involve civil citizens in PD seems to involve some specific practical challenges. What then does this have for implications for future PD applications in emerging public governance forms, e.g as regards stakeholder representation and methodological choices? Taking a slightly different perspective, what potential does PD have to bring back political values front core by enabling citizens to be active parts in delivering public services? Next, we will address the questions in the context of we-government, linking the overview to a case example of applying PD in the Swedish emergency response system and describing how we successively and methodologically had to handle the design challenges that arose in the project.

3. Practical example: the Enhanced Neighbors Project

The Swedish emergency response system is currently undergoing substantial reorganization. This means that the professional response organizations (i.e. the municipal rescue services, the police, the alarm centers, the ambulance services) are increasingly involving and collaborating with other societal sector occupational groups (e.g. home care personnel/nurses, guard companies, taxi drivers, caretakers), non-profit organizations) and civil citizens in first response. This partial shift in Swedish emergency response reflects the described public sector governance trends. Through the years 2011 to 2016 we have been involved in several of these collaboration projects, participating in their development and studying them as emerging forms of co-location, cross-sector collaboration, co-use of resources, and we-government.

The specific case, or practical example, stems from Enhanced Neighbors, a project involving civil volunteers as first responders. It takes place around the city of Sundsvall, which has a population of 125 000 and is situated in a sparsely populated area in the north of Sweden. The project at the time involved about 50 volunteers in five remote villages situated at a distance from Sundsvall that makes it impossible for the rescue services or ambulance services to reach the village in less than 25 minutes. The civil citizen volunteers in the villages receive basic training, for example, in cardiopulmonary resuscitation (CPR) and extinguishing of small fires, and are alerted by the SOS Alarm center using basic SMS technology

when an emergency such as a traffic accident, drowning, heart failure, and certain types of fires occur nearby. The volunteers usually reach the emergency site before the rescue services and can provide first aid and other supportive actions while waiting for the rescue services and (sometimes) the ambulance to arrive. Participation is voluntary and the volunteers start their tasks while waiting for the rescue services, but they never replace them.

As far as ICT is concerned, in addition to SMSs, the volunteers communicate with the Sundsvall rescue services through the project website. However, this in between alarms, not during a response operation. In a related project, Dynamic Resource Allocation, a decision support system was under development and subsequently implemented by the time of the study. The system is provided by the Swedish national alarm center, SOS Alarm, and is currently used by all SOS operators and rescue services in Sweden. Sometimes other occupational groups are also are dispatched as first responders by the system. The SOS Alarm intention is that volunteers shall be successively be integrated as an alarm resource, and this was first experimented with in the Enhanced Neighbors project.

The entire project context can thus be viewed and analyzed from a we-government perspective. Enhanced Neighbors aims to develop collaborative processes and ICT support between authorities, response organizations, and certain groups of civil citizens, that is, volunteers in sparsely populated rural areas, and let the latter take on certain tasks for their co-citizens and society as a whole. As to the specific PD application, it is possible to view it as an example of how PD has spread to the public sector and the domain of civic engagement [7]. It further reflects their observation that the end-product no longer has an exclusive ICT artifact focus but can also include improved further collaborative work between parties. The current technology in the project builds on available SMS applications. Dynamic Resource Allocation in its turn aims to carry out a technical and organizational integration of civil citizens into an existing, extensively used authority alarm and decision support information system. We can thereby make parallels to the notion of [4] that contemporary PD often needs to deal with ICT reconfiguration rather than with development from scratch.

3.1 Related work

The entire project experience in terms of collaboration success factors, challenges and ICT needs when using civil volunteers in emergency response hase been reported as a domain specific case study in [64]. The study is not about the PD process. Also, in related work, we have identified various challenges in emerging forms of collaboration such as unclear legal issues and responsibilities, difficulties in the categorization of tasks, diversity in education and background of users, and the not yet clearly defined character of the new forms of collaboration. This in relation to co-location of professional response organizations and to cross-sector collaboration involving guards, home care nurses, caretakers and fire day time personnel e.g. [17], [60], [65], [66]. Within these projects, we have sometimes applied PD activities for development of the emerging public sector governance forms and tried to capture and document PD challenges and needs for adaptation [17]. We have also developed a domain specific framework for formalization of the participative processes and applied it to a case of co-location of professional response resources [67]. A study of specific relevance to the current study is a triple case study involving Enhanced Neighbors and two other projects of co-location and cross-sector collaboration in emergency response [17] focusing on thematic analysis of identfied common challenges for common user-centred design approaches. This study includes a continuation of this work and is different from the former in that we 1) focus explicity on we-government and civic engagement with new and more detailed data; 2) adress methodological and practical and solutions to the challenges identified and 3) take a pronounced PD perspective.

3.2 PD process in Enhanced Neighbors

The project had been in progress for half a year when we were involved during the period May 2014 to June 2015. Our task was to support the development of the collaboration between the rescue services, SOS Alarm, and the volunteers, identifying volunteer needs for support and to investigate how they could be practically and technically integrated in the decision support system for dynamic resource allocation. In total, we were initially four researchers. Two of us, one of whom is the author of this study, have a background in information systems development and PD. The third works in infra-informatics/logistics and the fourth is a policy analyst. During the entire study period we took notes of the PD aspects in a project diary following each development/design/data collection moment. We then used the diary for collective retrospective reflection and analysis on the PD application in Enhanced neighbors, in relation to previous research and our own experience in similar, yet different settings.

When we entered the project, we knew that we wanted to apply PD, explicitly focusing on the end-user volunteers. We had found from previous research (see e.g. [18] who also stress the importance of civil citizen user participation when developing emergency response but actullay do not involve them), and from our own experience with co-location and co-use of resources that this perspective is often left out [17], [60]. That is, the response organizations stipulate what the civil citizens need without actually consulting them. We therefore initially set out to form a design group consisting of user/volunteer representatives from all five villages, one representative from the rescue services and one representative from SOS Alarm who were both involved in the project. Our plans were to meet at least four times each time involving one or two full days (due to the distance between us and Sundsvall, which is about 500 kilometers, more than four gatherings were deemed to be practically difficult). We also wanted to apply hands-on PD techniques and activities, mainly in the form of scenarios and future workshops, since we had found this to be beneficial in the previous projects on co-location and co-use of resources. At the same time, we were aware of potential practical problems of involving the civil volunteers in a design group over time, as this had been reported by previous research e.g. [24], [61]. We also had experienced similar

problems when working with semi-professionals who were to share resources but were difficult to gather jointly since they worked different shifts in different occupations. As the study progressed, the original plan was not deemed possible and we adapted our work process and PD activities accordingly.

3.2.1 Challenge: forming and retaining a design group

We rather quickly found that retaining a design group with the volunteers over time would not be practically feasible. This confirms previous research stating that designing for civil citizens is different then designing for for end-users who belong to a work setting or other organizational context directly related to the development task [61]. In Enhanced Neighbors, the volunteers have no organizational affiliation, and many of them have regular jobs and work during the day. Further, the associated difficulties were aggravated due to the specific project context of a rural, sparsely populated area with long geographic distances. The five participating villages were spread out and far from Sundsvall and this constituted a major obstacle to holding regular design meetings.

Solution: interviews and focus groups

As one solution, we decided to introduce semi-structured interviews and focus groups to capture the current project picture, preconditions for further development, and needs for (ICT) support, i.e., to conduct organizational analysis and intial task analysis. Interview methods refer to the qualitative research paradigm [68] rather than to PD explicitly. At the same time they display several similarities to user design groups, if focusing on the interviewees' situation and needs. In particular, focus groups aim to capture group dynamics displayed and the interviewer acts merely as o moderator [69]. The use of qualitative research methods in PD is not new; for example they have been applied in ethnographic studies of contextual inquiry [70]. The use of interviews and focus groups have been less common, even though they exist (see [23]who initially applied in-depth interviews with planners and focus groups with civil citizen in their design project on involving citizens in municipal planning). But [7] in their 2015 overview points out ethongoraphy as still commonly used in the PD early organizational analysis phases, preceding protyping and design.

We first conducted semi-structured interviews with the project manager/fire chief, with the SOS Alarm operator handling the alarm calls, and with an SOS Alarm technician responsible for the integration of volunteer resources into the decision support. Additionally, we held three focus groups with volunteers in three villages. All interviewees were asked about their experiences in the new collaboration forms, including perceived strengths, problems, and further needs, including ICT support. The semi-structured interviews were held at the Sundsvall fire station. However, we had to travel to each village to hold the focus groups (with six, four, and three interviewees in the respective group). Also, we were able to visit only three of the five villages, again because of the geographic distance. We also conducted a semi-structured interview with a volunteer in a fourth village. Thus, we could at not actively involve the users of in all villages/end-users but hade the majority of villages somehow represented. We also achieved representation in terms of differences in age and gender, and background in the volunteer focus groups. We were able to hold two of the focus groups during day-time since many respondents were retired or working shifts. The third was held in the evening.

3.2.2 Challenge: carry out needs analysis and joint PD activities

The future workshop is a design technique that has long been associated with PD. It allows users to reflect on their work situation and needs for improvement in order to identify realistic and innovative solutions and needs for ICT support. The workshops are usually divided into the critique phase, the fantasy phase, and the implementation phase. The first phase focuses on the work situation, potential problems, and needs for improvement. Futuristic solutions to the identified needs are the focus of the second phase. In the third phase, the identified solutions are transformed into realistic, organizationally and technically feasible implementations. It is often recommended to devote at least a full day to the workshop to go through all the phases [71].

In Enhanced Neighbors, our original plan was to arrange two half-day workshops within design group meetings. The challenge of PD being time consuming has been noted many times and over PD generations, e.g. [25], [41] [61] and we also knew from our previous experience of applying PD to various contexts, several of them public sector that full-day gatherings are seldom possible [10], [11], [17] . Again, the geographical distance and the fact that volunteers are not part of the established organizational context turned out to be specfic obstacles to long joint gatherings. We also intended the initial focus of the workshops to be on needs analysis, that is, on improvements regarding the collaboration itself including ICT-supported solutions to identified problems. However, in the interviews and focus groups it had become clear that we had to start from scratch. We had thought that the collaborative processes and associated tasks were relatively set since the project had been in progress for half a year. Instead, it proved to be impossible to separate organizational/task and needs analyses.

Solutions: modified scenario-based future workshop, exercise and after-action-review

We managed to arrange one (out of the planned two) half-day future workshop with the interview representatives from the rescue services and SOS Alarm and with eight of the 13 volunteers from the focus groups. Three out of five villages were represented. The future workshop was arranged at the fire station and took place in the evening so that the end-users could participate. Since many of the tasks had to be identified, formulated, clarified, and negotiated from scratch among the rescue services and the volunteers, instead of taking the current (work) situation as point of departure, we decided to

use four scenarios, briefly describing the different types of accidents where volunteers were alerted. We used those to help identify related tasks, needs and solutions. The use of scenarios in PD has been common from the beginning, including in other recent public sector PD projects e.g. [4], even though not as parts of future workshops.

In addition, we performed a hands-on experiment where we (or rather, the rescue services) simulated a traffic accident near a village about a 20-minute drive from Sundsvall. Following the exercise, we immediately held an after-action review (AAR). AAR is not a PD technique but originates from the military domain where it is a common method for enabling participant feedback after training exercises [72].

We had not initially intended the experiment/AAR to contribute to the development of the collaborations nor to be seen as PD activities. The exercice main purpose was to test the practical technical integration of volunteers into the decision support for dynamic resource allocation. However, given that we had not been able to conduct as many design group meetings and workshops as planned, we decided that we needed to use the experiment/AAR explicitly also as a participative hands-on practice actively involving the volunteers and the response organizations, refining existing needs and identifying additional. Of course, we could also have used various group exercises, role-plays and gaming that has been part of PD toolboxes from the very beginning, e.g. [29], [73]. However, we felt that similar tools would not suffice the current context since tasks and roles were much undefined. Rather, the volunteers must have some kind of simulated reality that they could act in and relate to.

In the exercise, the volunteers, the rescue services, and the ambulance services were simultaneously alerted to the car accident by SOS Alarm. The entire exercise was observed by three of us, two placed at the incident site and one in the SOS command and control center. We also used a computer tool that made it possible to record (audio, video) the exercise and to make time stamps and note observations in real-time. In the AAR, the volunteers together with the other exercise partcipants, in a large group, were envited to recapitulate the exercise using an automatically generated and modified PowerPoint presentation as support. They were asked to reflect upon what had happened and why, what worked well, what worked less well, and what needs for further development of collaborations and ICT they had identified during the exercise. The exercise and AAR were conducted in the evening. As to representation, the experiment/AAR involved 15 volunteers along with representatives from the rescue services, SOS Alarm, and the ambulance services. Here, we thus managed to gather more stakeholders in a joint session than in previous data collection and PD activities.

We thus started out with the aim of establishing a design group and ended up with various combinations of qualitative methods, methods for user participation, PD techniques, and hands-on experiments. An overview of end-user and stakeholder participation and representation relating to different PD activities, methods and tools is provided in Table 1. As we will discuss later, we did not have all potential stakeholders represented this stage. However, we deem that within the immeadiate project context, we managed to achieve sufficient representation of the Enhanced Neighbors primary end-users (volunteers), secondary end-users (SOS Alarm operators, firefighters in current project), and other stakeholders (response organizations that will collaborate with the volunteers).

Table 1. End-users and other stakeholders participating in PD activities in Enhanced Neighbors

PD activity	Primary end-users	Secondary end-users	Other stakeholders
Semi-structured interviews	A volunteer who could not participate in focus group (telephone interview)	SOS Alarm operator, Rescue services manager/project leader	SOS Alarm technician
Focus groups	6 + 4 +3 volunteers	-	-
Future workshop/scenarios*	8 volunteers	SOS Alarm operator	SOS Alarm technician, rescue services manager
Experiment/AAR**	15 volunteers	3 rescue services firefighters including the fire chief (rescue services manager), SOS Alarm operator	2 ambulance services personnel

* The semi-structured interview respondents from the rescue services and SOS Alarm also participated in the workshop.
**All the volunteers that had participated in the focus groups and future workshop also participated in the experiment. The rescue services manager here acted in his role as fire chief.

3.2.3 Challenge: ICT reconfiguration for heterogeneous stakeholders in undefined work contexts

In Enhanced Neighbors, stakeholders include both established actors, e.g. members of the municipal rescue services, the ambulance services, and SOS Alarm, and non-established actors, i.e. the end-users/volunteers. That public sector PD projects often involve numerous stakeholders is nothing new; it has been reported on and studied several times, e.g [2], [56]. PD has also over the years has been criticized for lacking in formalization, a specific design methodology or means to identify and involve large user and stakeholder groups e.g. [9], [11], [33].

However, there is a perceived additional complexity in the case of Enhanced Neighbors. The collaborations are new to all involved stakeholders. As to the volunteers, a few of them have experience with rescue operations, as part-time firefighters, and others have medical experience, as nurses and other medical personnel. However, the majority of end-

users have no previous work experience related to their intended new tasks. As emergencies occur comparatively seldom in small villages in sparsely populated areas the majority of the volunteers had not yet responded to a real alarm at the time of the study. The rescue services have decided on and described what type of alarms the volunteers are alerted on. Part from that, only basic principles, tasks, roles and responsibilities, and training in CPR and fire extuingishment have been provided. In comparison to information systems development and PD in general, this constitutes a marked difference since in most settings those tasks and work processes that will be developed and supported with ICT are known beforehand (even if the work processes may be in need of improvement and redesign). Here, the specific tasks that will be need to be attended to at the incident site were not known by the end-users or negotiated among stakeholders.

Moreover, insurance and financial compensation matters came successively to play an important part. In the interviews and focus groups, it became evident that these issues were largely unattented. This includes who would have legal responsibility if something should happen to volunteers at an incident site, or if volunteers should cause harm to victims or damage material or property. When talking to the rescue services about what current laws and regulations say on the matter the project manager said:

> "I am not really sure. I hope their home insurance covers it."

However, when we talked to a counselor, he was of the opinion that the volunteers do not have sufficient protection but rather maintain a "middle" position in the current Swedish legal system. Further, the volunteers are not compensated for any expenses they may incur in relation to a rescue operation, such as gas and medical equipment and investments in defibrillators and reflective vests. Initially, the respondents were fine with this. But some months later, in the future workshop, they requested some financial support to be able to continue their engagement.

On the other hand, the off-the-shelf SMS technology used was available to the volunteers from the beginning of the project through their very own cellphones, even though the SMSs needed extended functions. In a long-term perspective, they will be integrated into another already in-use system at SOS Alarm, using existing geographical positioning coordinates. The circumstances clearly only reflect the research overview discussion on how different PD generations have moved from production technology and centralized mainframes to decentralized applications and mobile technology accessible to (almost) anyone at anytime. As been mentioned earlier, they also confirm recent observations that contemporary PD is much about re-configuring and improving rather than developing ICT [4], [74]. Actually, re-configuring and extending the SMS function also came to be very much about organizational, legal and ethical dilemmas. For instance, since the villages are small, it is often possible for the volunteers to identify a victim by reading or googling the address in the SMS they receive. In one of the focus groups, it became clear that most of the respondents were more willing to respond to an alarm if they knew the victim:

> "If it happens in the village and you know that it is a neighbor, you go of course, but if there is, say, a traffic accident up by the main road, it may take too long to get there anyway."

In addition, while the basic ICT support was in place at the time we entered the project basic material and equipment (blankets, first aid kits, reflective vests, road kons e tc) were not. They were identified in the subsequent PD activities and particularly in the experiment, the absence of basic equipment was much apparent.

Solutions: interdisciplinary design teams, user innovation and frameworks

The above made us experience a situation where we had to take a much broader focus on developing the collaboration itself than we had anticipated. First, we decided to extend our research/development team to include a juridical expert carrying out an investigaton on what legal changes or extensions are required or what collective insurance need to be provided by the municipalities, if volunteers in emergency response are to attain sufficient legal protection. We also hired an additional policy analyst looking into potential agreements between municipalities and insurance companies and into the issues of economic compensation. We thus strengthened the interdisciplinary character in the subsequent development work.

As to further developing and extending the existing SMS functions/ we deemed this as a much more straightforward process, once ethical and legal issues had been addressed. Actually, the fact that the volunteers' ICT support is based on their cellphones and parts of their regular use of SMSs and applets has enabled user innovation, i.e., the users themselves rather than suppliers suggest innovation and functionality in ICT development [24]. Volunteers gradually proposed more and more direct functionality, both in the PD related activities and as the project progressed after we left and more volunteers were successively alerted on real alarms. Several proposed functions have been added to the current SMS solution. One example is a Google Maps link to the current location of the incident, which was regarded as a more short-time straightforward feasible solution than the initial proposal from one of the focus groups:

> ".....an app that directly showed the position [of the incident]... then it would have been really easy."

Other examples include the telephone number to the internal command at the Sundsvall rescue services and checklists that have been integrated in a prototype app for handling the alerts.

For adressing PD aspects of formalization and stakeholder representation in a setting where much effort hade to be devoted to analyzing the collaborations and related tasks, we applied the context-specific framework that have been iteratively developed and applied in other emergency response contexts of co-location and cross-sector collaboration (See 3.1 and [67]). Its 15 dimensions include incident type, role, attitude, training, background, tasks and responsbilitiy, availability/accesability, communication, ICT, emergency supplies, organizational structure, leadership, costs/benefits, environment, regulation and legal issues. We used the framework as a means to identify potential primary stakeholders and structure interview questionnaires and in developing the future workshop scenarios to ensure that all aspects deemed important in the collaboration were covered. Applying the framework for instance helped us to identify the lack of regulations and sufficient legal protection for the volunteers. We also used the framework in the future workshop and in designing the scenarios to maintain focus. The user participants were thus somewhat more controlled than is usually the case in future workshops, but mainly in relation to how the scenarios were presented and structured. They were then allowed to associate freely in relation to each scenario. In Table 2 we summarize the most important study findings presented in Section 3.

Table 2: Study findings summarized in terms of project characteristics, identified PD challenges and how they were addresses practically (solutions) in the Enhanced Neighbors project

Project characteristics/PD challenges	Practical solutions
To form and retain design group and carry out PD activities in context where users do not have organizational belonging and are geographically dispersed over large area	Abandon traditional design group and try to achieve stakeholder repspresentation and involvement by combination of qualitative data collection methods (interviews, focus groups), adapted PD tools (scenario-baased Future Workshop) and hands-on exercise/simulation/AAR Achieve flexibility in PD activities to be conducted during evenings and weekends
Broad collaboration/change process with undefined tasks, responsibilities and regulations ICT artefacts available and in use at PD process start	Intensive initial focus on stakeholder and organizational analysis with extended interdisciplinary design team (e.g. additional policy analyst and legal expert) Merge organizational and needs analyses including joint formulation and negotiation of tasks and supported by hands-on practice, e.g. scenarios and exercises ICT reconfiguration and user innovation Framework support for formalization, structure and coverage of relevant collaboration aspects
Heterogeneous stakeholder group; not all stakeholders identifyable at project start	Successive identification and involvement of stakeholders Framework support for stakeholder identification

4. Discussion

In the following, we discuss the study results, relating them to overall pre-requisites for user participation in informations systems development in public sector governance and to implications for PD in we-government/civic engagement initiatives.

4.1 Emerging we-government initiatives: pre-requisites for user participation

Civil society has long existed but civil citizen engagement in public services is not unproblematic. In a historical perspective public consultation and citizen participation has experienced many policy dilemmas and failures often relating to burecrautic resistance and public authorities' fear of citizen involvement making them less effective and loosing control [22]. However, lately, societal trends of civic engagement have been on the increase and noticed in diverse areas, e.g., neighborhood watch programs, park clean-ups, health care, and emergency management [16,] [17], [18], [19], [20], [21]. Contemporary initiaves, in many respects rather reflect a strive to increase public sector effectiveness (e.g. to shorten response times in the case of emergency response) or at least to create redundance in societal systems and resource-strained organizations.

Relating this to information systems development, if the joint work processes and the ICT support of the civic engagement initiatives do not work properly, consequences in different areas, not least in health care and emergency response, can of course be devastating. User participation in design again becomes crucial but has to handle substantial practical challenges. Since resource scarcity of public authorities lie behind the majority of the initiatives, limited time and

organizational resources are usually set aside for user participation, e.g. [14]. The issue is further complicated by the fact that civil citizens to not reside in an organizational context. In our study both these circumstances were visible in the difficulty to retain a coherent design group over time and in that the rescue services personnel generally had to set aside much more time than had been formally planned for the project working evenings and weekends to carry out activities such as training the volunteers. On other words, there is a paradox of short-term organizational resource-constraints versus perceived long-term gains of user participation present.

On the other hand, there are also a number of possibilities related to the rapid spread of modern technology. [75] point out how ICT artifacts are becoming increasingly ubiquitous and have resulted in a search for new styles of governance that will promote higher levels of transparency and citizen engagement. [63] argue that the spread of social media and ICT has created greater transparency and major opportunities to facilitate co-production of materials between governments and members of the public. In our study, the motivation to participate in the project and PD activities over time was high among both the response organization personnel and the volunteers. Explanations may include that in we-government initatives, civil citizens have from the beginning chosen to engage in certain tasks for the benefits of society and their co-citizens. [61] described the difficulty in motivating civil citizens in comparison to workplace settings, where most of the involved stakeholders can be immediately identified and relate to a PD project. In Enhanced Neighbors, the volunteers on the contrary shared a common ground and project objective – collaboration with the professional rescue services and acting as first responders. User participation and stakeholder representation was a practical, not a motivational challenge. This indicates that PD indeed has potential to be applied in successfully in we-government initiatives, if the practical difficulties, both general and posed by the specific public sector setting, are addressed and handled.

4.2 PD implications: learning from the past to handle the future

Int light of societal development, the role of contemporary PD is not primarily that of protecting workers from alienation and ergonomic deficienes of technology, or driven by ideological values of workplace democracy. In other words, a pronounced defensive approach does no longer make sense. On the contrary, ICT itself has became a tool for empowerment and increased transperancy between, in this case, public authorities and civil citizens. In a wider perspective, we-government initiatives can thereby be seen as chance for PD to once more bring political values to the forefront, as they actually, besides the public sector efficiency and redundancy motives, cleary develop the skills and competences of the citizens involved. PD can here be an important means to increase the space for the citizens, let them act, interact and propose design solutions that in the long-run benefit and increase the very same initatives, thereby contributing to public sector policy making in which citizens play a more emphasized role. For this development to take place, what is needed is a discourse focussing on how PD can be applied allowing to build – or re-configure - systems making civil citizens - more effective when they use them. This study contributes by highlighting a number of specific issues where we can we learn from the past and present for future fruitful applications of PD in public sector innovation, emerging governance forms, civic engagement and we-government.

4.2.1 Institutional transformation and ICT reconfiguration in emerging collaboration forms

As described in the research overview, [7] noted how contemporary PD is not exclusively or primarily about ICT artefacts but equally about improving collaborative settings and processes. Similarly, [63], in a study of a Danish multimedia library, noted how the PD process came to be as much about transformation of an institution as about ICT design. [56] seek to address the challenges of the aging Japanese society by using PD to create a sustainable social infrastructure based upon a holistic understanding of the social welfare system. The Enhanced Neighbour initiative is indeed about extending and transforming the practice of emergency response. The related work processes are new and partly or entirely unknown both for the rescue services and for the civil citizens. Practical solutions in the PD related activties involved an initial broad organizational focus involving stakeholder identification and involvement, defining and negotiating tasks and responsibilities, handling legal aspects and introducing interdisciplinary perspectives and multifaceted development teams. It seems plausible that PD in similar institutional transformation public sector contexts will not only experience similar challenges by will also need to address them similarly. In addition, sufficent time and resources must be spent on organizational analysis and early design. Given the resource-constrained character of the environment, the major related PD challenge will likely be to to persuade public sector authorities on long-term returns on investment in user participation, to enable them to provide the financial means, the personnel and the stakeholders. Studies focusing on potential cost-benefits of applying PD might be a way to address this challenge.

That organizational analysis require substantial time and effort to enable the basis for proper technology development is no new phenomenon. It has been suggested that PD should focus active end-user participation where it is most needed, e.g in needs analysis and iterative design (e.g. [10], [11]). In our study, it is evident that the PD processs came to be mainly about development of new collaborations, new tasks, and about identifying basic equipment needs. We percieved ICT re-configuraton and development of the SMS application as rather straightforward once organizational and ethical issues been addressed It was thus possible to balance the more intensive and resource-demanding initial efforts with more concentrated work around ICT re-configuration and extension, once central issues of the collaborations had been addressed.

[24], in their comparison of PD, user-centred design and user innovation in relation to e-government concluded that the latter was least suited for involving civil citizens, due to that they lack the necessary tools and skills. As to we-government, the conditions for user innovation seem to have been more favourable where PD actually gradually turned in this

direction. The volunteers accessed a mobile technology they extensively used in their daily life. With growing experience, they proposed added functionality to the SMS application as part their first responder engagement. They also successively adapted functions to overcome legal obstacles and technological constraints. An example is the google map link, which they suggested as alternative when they realized that they could not have they name of victims in the SMSs (according to the Swedish Personal Data Act) and would not have access to the GPS solution any time soon. This is similar behavior to what [55] noted in a case study of designing technology-enabled communication services for civil citizens using PD, and that they call infrastructuring. In their study users/citizens innovatively worked around regulatory issues of radio broadcasting. In both these cases of civil engagement, ICT thus became a fundamental catalysator and contributor to the space of possible action and interactions of its users. Already in 1998, [71] discussed how PD and ICT design/CSCW could strenghten each other e.g. by connecting studies of work and system design and by CSCW technology being further developed, modified and integrated into various settings using PD techniques. The connection again seem to be highly relevant in public sector settings relying on modern, mobile and instantly accessible ICT to enable new work environments and collaborations. In other words, ICT and PD can be combined to enable civil citizen empowerment, taking active part in re-fonfiguration and proposing own design solutions. A necessary step in this direction is adopting as guideline for PD to develop situated applications and to make them open to meta-design and re-configuration.

4.2.2 Representation of heterogenous stakeholders using context-specific frameworks

The challenges of having large groups of heterogeneous end-users and stakeholders represented and involved in design have been pointed out in various PD studies. Within the public sector context, [56] noted how previous PD methods that recommend identifying all stakeholders at once, e.g., MUST [76], did not work well in the context of social welfare services, where there are many different types of stakeholders. Instead, the identification turned out to be an ongoing issue. Since there was no ICT agenda from the start, many stakeholders, e.g., the owner and users of the target ICT system and those who would benefit from it could not be identified until later. [55] report similar experiences in their study of the technology-focussed neighborhood intervention where the end-users themselves – civil citizens – during the design process realized gaps in technological capabilities and expertise which they solved by reaching out to external stakeholders and technology experts. [2] experienced difficulties in managing a multitude of stakeholders in a large-scale Danish health care sector project. [23], in the Aarhus e-government project involving citizens in municipal planning, noted the difference of planners versus citizen users where "nearly all individuals living in a communinity can be defined as citizens" (p. 90).

Our study reflects much of the above but there are also obvius differences. The primary end-users, administrators, and managers of the ensuing collaboration where known at the start of the project. The civil citizens representatives were not as heterogenous as in more traditional e-government projects (even though they differened in age, ICT experience etc). On the contrary, they were a delimited group of citizens who had volunteered for the first responder assignment and who sometimes hade similar background in terms of competences (medical skills, basic fire exutinguishing). This left us, and problably other we-government initiatives, with an easier task as to identifying the characteristics of the primary end-users, than in e-govermement or civic engagements projects directed towards entire communinites. On the other hand, many secondary stakeholders were identified as the study progressed and will need to be involved subsequently. Examples include the Swedish Civil Contingencies Agency (MSB) and additional stakeholders at SOS Alarm, which will both need to make some financial investment into future ICT support and integration in dynamic resource allocation. In addition, the municipalities themselves and insurance companies will need to be involved as to the issues of collective insurance and financial compensation for volunteers' expenses. In conclusion, it seems that most PD projects in emerging public governance forms need to continually address stakeholder identification and representation stepwise and thouroughfully, incrementally developing e.g. new collaborations.

In the study, we used a context-specific framework developed to support stakeholder identification and to ensure that we covered all aspects of the collaboration under development. This can be compared with the idea of [2], who experimented with using means-end hierarchies known from cognitive systems engineering as part of a strategic analysis of the stakeholder groups. However, for specific frameworks to add efficiency and formalization to stakeholder identification and other PD processes, there is a need to set aside intial time to develop them. Therefore, they are probably best used where they can be applied in several subsequent projects, e.g. in emergency response and similar public sector settings. We also deem the use of the framework in this and similar projects as beneficial with regard to formulating templates for interviews and triggering innovation while keeping the focus on future workshops where there has been no real task at hand to start from [17], [67].

4.2. 3 Combining qualitative research methods and PD techniques in situated contexts

In any PD context, it is crucial to address identified challenges by targeting the approach and design techniques to the current situation or project. Over the decades numerous methods for active user participation, techniques and tools have be applied, used, and evaluated in PD research, e.g. organizational games, role-playing, games, organizational toolkits, future workshops, and storyboarding, e.g [73], [77], [78]. Also qualitative ethongraphic inspired methods such as contextual inquiry and interpretation sessions have been applied and still are [7], [70]. However, in the current we-government/civic engeagement context many of the above methods and tools were not feasible. Retaining a design group with active end-user participation over long periods of time was quickly ruled out as an option and with this also many of the commoly applied PD techniques. For instance, organizational games and role-playing are difficulty to carry out when there are no common organizational setting to play in and no clearly defined roles and tasks. As to qualitative methods,

contextual inquiry also seem inpossible to carry out when the common context is actually not identified and clear to the end-users and ethnography in general presumes an organizational setting or existing situation to study.

Instead, we chose a methods combination suited to the specific civic engagement context (civil volunteers spread over a large geographic area and sometimes not available at day-time). This included qualitative methods in terms of, semi-structured interviews (response organizations) and focus groups (volunteers), a scenario-based future workshop and an exercise/car accident simulation/AAR. The combination of interviews and focus groups in some respects equals the approach take initially in the [23] Aarhus project exploring PD for citizen deliberation in public planning. It may be argued that interviews and focus groups, even though the latter display some similarities to design groups, are data collection methods that enable user representation rather than active user participation. However, in retrospect we percieved that in particular the focus groups revealed many user needs directly suggested by the respondents. They also provided us with the necessary baseline for the collaborative setting and made use realize how much was not set in the the project context in terms of tasks, responsibilities, legal matters etc. This made it possible for us to plan the reminder of the study and extend our design team accordingly. Taking this together with the Aarhus project experience, the approach seems suitable for future PD initiatives in citizen enagement, as a replacement or complement to the design group.

As for the scenario-based future workshop, similarities can again be drawn to [23] who used fictive dilemmas and scenarios in relation to design and prototyping of actitvities that were rather knew to the citizens, i.e., muncicial planning. The combination thus seems particularly suitable when the situated context is entirely new to the end-users, partly undefined and not negotiated with the other stakeholders. We perceived it to stimulate creative thinking and resulting in concrete user needs, with the framework support providing the intital task context.

In retrospect, we however deem that the (scenario-based) exercise and the following AAR were those most useful as regards identifying concrete user needs and obscurities in the current collaboration. In the focus groups, the volunteers had seen their assignment as relatively clear. In the exercise, when they actually responded to an alarm and carried out first response at the incident site several unclarities were made visible. Examples include insufficient clarification of routines and task responsibilities, e.g., regarding when the volunteers should withdraw (when the rescue services arrived and started cutting the crashed car), who had the community defibrillator, and where to put the volunteers' cars so as not to block the road for the rescue services and the ambulance. It was also not clear who of the volunteers were in contact with the rescue services and when the latter was expected to arrive. Also many basic needs and ICT requirements emerged first in the simulated "real" situation, e.g., checklists, first aid material, directions to the incident site, and information on the number of casualties. It may be argued that real exercises are costly and resource consuming. On the other hand, we deem them, if possible, as extremely valuable when the situated context is new to the users. As for AARs they are not part of traditional PD toolboxes but are explicitly used for participant feedback; something that previous studies [e.g. 11] have suggested that PD focus on. In the study, the AAR served to elaborate and expain many of the things with hade observed during the exercise, from a group perspective, identifying and elaborating on the user needs.

4.3 Transferability of findings to emerging public sector governance forms

Our empirical data is based on a project example taking place in Swedish emergency response. The study should primarily be viewed as a contribution to the on-going debate on PD in new computing contexts, addressing how a planned PD approach was successively and pragmatically modified and applied to a we-government/civic engagement initiative in the public sector. Of course, any project will need to do their own modicidations and every final combination of methods will depend on the specific project context. However, we believe that several of the applications can inspire other civic engagement and public governance initiatives. Of course, we do not claim to solve all potential challenges associated with PD but rather provide some suggestions as to how they may be approached in emerging public sector governance forms.

As for potential transferability of the findings to similar contexts, as described in Section 3.1 we have studied different emergency response contexts relating to co-location of professional response organizations and non-profit organizations, and cross-collaboration of rescue services with, e.g., guard companies, social services, and home care nurses (semi-professionals). In many respects, the related work in similar emergency response settings point at similar challenges. It has been practically difficult to involve the end-users over time using the traditional design group approach. For instance, in the cross-sector setting involving semi-professionals in collaboration with the municipal rescue services, we applied a similar PD process stretching to integration of the new collaborations and including the development of checklists, applicatons for handling alarms, and triage apps. Here, we also had to gradually adapt PD activities, which turned out to evolve around defining basic material equipment and on re-configuring and extending existing mobile ICT solutions. The need for an initial broadening collaborative scope of the development process and incremental development, stakeholder identification and interrogation challenges, unclear tasks, responsibilities, work regulations, and legal issues, are other identified commonalities also in the other settings [17], [60], [66]. The framework has been applied to co-location and cross-sector collaboration in emergency response and deemed applicable also in these contexts, without needing to change the dimensions from setting to setting [67].

As to civic engagement, we-government and emerging public governance forms in a wider perspective, we have of course less empirical grounding. The area is new and emerging. On the other hand, many of the initiatives display a similar character: newness of assignment with undefined tasks and related obscurities concerning legal protection on a "new job", civilians not belonging to the established organization, resource constraints e t c. Therefore, it seems reasonable

be that many of the PD challenges are similar to those displayed in the study and may be possible to address by similar approaches and PD activities, or context/project specific versions thereof.

However, there are also perceived differences in various emergency response contexts. For instance, we deem that volunteers' level of motivation to participate were generally higher than that many of the semi-professionals in the cross-sector collaborations, much related to that the former perform their entire engagement on a voluntary basis whereas this is not always the case for the semi-professionals. The latter circumstances will most likely render practical design work increasingly difficult and require that even more effort will need to be spent on negotiation and prioritization of competivitive tasks in two different work settings [17]. Moreover, a specific characteristic of Enhanced Neighbors was that it was situated in a rural sparesly populated area where the long geographic distances was one of the motivations behind the entire project idea. This meant that we had to perform most of the development work in evenings or travel to the users. These challenges should be less prevalent in urban settings in which many of the new governance forms take place. In the cross-sector collaboration project, to gather end-users group by group at day-time was not deemed a challenge but to gather users from different societal sectors jointly and continuously was. Here, we experimented with having two design groups interacting with each other, so that we could be able to proceed with development work.

Performing PD activities in evenings is not a feasible solution for many projects. Alternatives can include to used online social media channels and ex situ evalutions for data collection from and direct interaction with end-users [17]. The latter was explored in the Aarhus e-goverment project where the civil citzens could access prototype versions of mobile technology based planning tools at home or at work [23]. In the Enhanced Neighbor context it is, however, notable that when we, followed up our study a year later with a test of a mobile app prototype to support the alarm process (this is not part of our current study results) we (once more) had to abandon orginal plans on doing this ex situ. The civil volunteers simply did not want to participate if we did not come to Sundsvall do download the app and perform the test together with them.

4.4 Evaluation and future work

Following our participation in Enhanced Neighbors, we have recieved informal feeback of the user participants and the Medelpad rescue services that, our involvement in the project, which has by now expanded to include more than 10 villages, has yielded positive outcomes. Collective insurance documents for the volunteers have been signed between the Sundsvall municipality and an insurance company, following the outcome of the juridicial investigation. Also several of the basic equipment needs have been sustained. At regional and national level several municipalities and SOS alarm currently use our experiences and recommendations when applying the concept of using volunteers in a rapidly increasing number of municipalities in Sweden. We have also participated in providing decision-basis management information to the Swedish government as regards the possibilities to enable more legal and organizational space for volunteers and semi-professionals to engage as first responders.

In future research, we will attempt to perform a more structured evaluation of the PD process in similar projects. For instance, further research is needed to assess and evaluate the usefulness of context-specfic frameworks in stakeholder identification and for sorting and structuring early design phases. Here, it would be interesting to look more thoroughly into the relation between the context-specific framework and the stakeholder stepwise identification and involvement process, to investigate more thouroughly to that extent the framework can support early identification of both primary and secondary stakeholders. Moreover, our study addresses challenges related to the early design phases of organizational and needs analyses. In other studies we have proposed more extensive PD activities that also cover later phases of design, implementation, and evaluation [17] and this is a trace that can be continued in future work. More research is also needed to identify the commonalities and differences when applying PD to different civic engagement/we-government initiatives and other public governance forms, especially in interrelated areas such as health care, emergency response, and large-scale crisis management.

In the next step, we will apply the intital concept developed in Enhanced Neighbors to a project in the municipality of Botkyrka and Södertälje, Sweden in which volunteers will also act as first responders but this time in socio-ecomically exposed urban areas with high crime rates and cultural diversity. This will enable us to make comparisons as to general applicability of the volunteer concept itself but also of the relevance of the PD applications suggested, in different yet similar civic engagement contexts. It will also provide a chance to further look into the potential of PD as tool for empowerment and skill promoting, this time for societal marginalized groups.

5. Conclusions

Contemporary society has to deal with continuos global challenges including financial crises, climate changes, natural disasters, increased socio-economic gaps, urbanization with, depopulation of rural areas, aging populations, migration streams, war and terrorism. Of course, civic enagement is not the answer to all of them, or the only answer to any of them. Still it is possible to see a trend in many western societies to create redundancy of societal resources in the public sector to be able to maintain delivery of public services in times of substantial challenges and scarce financial and professional resources. Civil engagement and we-government is one of them negotiating the social contract where citizens are required to take over some responsibility from public authorities. As we stated in the study civil citizen engagement is no new phenomena but recent public governance/we-government initiatives nevertheless have some own characteristics resulting in specific challenges. To bring active user participation to the new contexts is crucial, not the least with respect to

emergency response where malfunctioning collaboration or ICT support can have devastating consequences, even leading to loss of lives.

Many contemporary PD applications mirrors the challenges with studies adressing social welfare, non-profit organizations, underdeveloped countries, marginalized societal groups (e.g. homless people), and in projects directed towards e-government, civic engagement and communities of interests. As for the specific we-government initatives it is important to note that they are not in themselves driven by motives of democracy or citizen empowerment; rather they are part of public authorities increased efficiency, cost-effectiveness and rendundancy strives. But interestingly enough, and a major conclusion from our study, is that the initatives may well have consequences that can be formulated in terms of enhancement of skills and empowerment and PD has the potential to play an important part in this development. In Enhanced Neighbors, the volunteers have received training in first response and first aid and have indeed acquired new skills and enhanced their competence in emergency response. In terms of the PD process, user participation will most likely in the long-term lead to better ICT artefacts and working public sector collborative processes. But there is also the potential for a re-politicisation of PD in the creation of moments for space, action and the empowerment of citizens by having them representation in design activities and ICT artefacts, and in enabling their partcipation in public policy making and service delivery.

For the potential to be realized of the various challenges identified in this specific public sector/we-government context must be indentified and addressed in related PD activities and through methodological choices. Our study contributes by identifying a number of challenges with related suggestions on how they can be handled, relating them to previous PD research:

Representation and involvement of heterogenous stakeholders. The challenge is not new; rather it has been repeatedly been pointed out by PD research that this is a substantial dilemma requiring incremental identification and involvement, not the least in relating to large systems and public sector settings. In our study, we also introduced a context-specfic framework in this incremental process. The study also implies that we-government initiatives might be in a favorable position as to previous e-government/civil engagement initiatives. Even if the stakeholders are many, the end-user group itself is delimited and highly motivated as the civil citizens have taken on the engagement out of own intrest from the very beginning.

Desgining for new working practices, undefined tasks and responsibilities. The challenge seem spefically relevant to emerging public government forms/we-government initiatives. In the study, we addressed it by replacing the traditional design group approach with a combination of qualitative research methods with scenario-based future workshops and real exercises/simulations supported by after-action-review. To apply semi-structure interviews and focus groups as explicit methods for user participation are not commonly observed in PD research but has been noted in other studies involving the PD/civil citizen combination; thus seeming a possible way ahead in the setting. Exercises and real simulations of new collaborative work practices are of course much valuable, if affordable. The AAR is new in PD contexts but showed particularly useful for envisioning a future service or joint practice among the stakeholders and for indentifying related needs.

To balance intial effort-intensive, organisational analysis with effective ICT re-configuration. That contemporary PD applications often need to deal equally (or more) with organizational/institutional transformation than exlusively ICT development have been pointed out in several recent studies, not the least in the public sector context. The notion being highly relevant for emerging public governance forms and we-government we contribute specifically with pointing out the need for interdisciplinary design teams, above all incorporating policy science and juridicial perspectives.

User innovation and infrastructuring. In relation to traditional e-government it has been suggested that PD is more suitable than user innovation for involving the citizens. Our study on the contrary showed how the project and PD gradually turned into the direction of user innovation. Similar findings emerged from the reported on Aarhus PD project where civil citizens engaged in a joint effort on municipal planning. A conclusion would be that when increasingly ICT knowledgeble citizens do have access to an infrastructure and share a common engagement/task – as in the emerging we-government context - this will enable own user initiatives and sphere of activity, also contributing to their empowerment.

A relevant question in direct relation to the study is what then actually distinguishes future applications of PD in new public sector settings from e.g. user-centered design and user innovation? A more general question is to what exent the research disciplines information systems and policy science can benefit from each other when applied to public governance, reflecting the recent proposed merge of digital government and public administration research [79]. In any case, we believe that to retain the distinction – and the gains – future PD approaches need to continue to deal with the issue of somehow representing and reaching out to all groups of end-users and primary stakeholders. Also, continuous user feedback and evaluation must take place during the entire design process, and principles and methods for this should be worked out.

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