

# Elaborating the WARE Method for eParticipation Requirements

Øystein Sæbø, Tero Päivärinta, Jan Helge Austbø and Svein Sundfør Scheie

## Abstract

eParticipation systems are often directly targeted at citizens. However, as a group of potential users, citizens form a heterogeneous and unpredictable group, which makes requirements elicitation a challenging issue. Based on recently developed ideas for wide audience requirement engineering (WARE), this chapter discusses and elaborates a method for eliciting citizen requirements for eParticipation. The method elaboration was conducted in connection with a project in southern Norway, where young people's requirements for becoming active e-participants in society were mapped. Based on these experiences, we discuss the use and usefulness of the WARE method and suggest ideas on how to further develop the WARE method for eParticipation purposes.

**Keywords** Ware method · eParticipation

## 1. Introduction

eParticipation involves the extension and transformation of democratic communication and decision-making processes mediated by information and communication technologies in society [11]. eParticipation projects have, in a majority of cases, had only modest impact on public participation [4]. One reason for this is the lack of understanding the demand side requirements of eParticipation, that is, the public's incentives and needs to participate [1].

As a potential means to tackle this issue, we discuss and elaborate the wide audience requirement engineering (WARE) method [13]. The WARE method is designed to address information system development (ISD) projects where stakeholders may not be able to express their needs specifically, the target group may be scattered outside a single ISD environment and end users may be difficult to reach [15]. This chapter focuses on the use and usefulness of the WARE method in an eParticipation project. The project explored young people's interests in eParticipation in local matters. We wanted to find out (whether and) how the WARE method could be used to elicit requirements for eParticipation from young people. Based on our experiences we suggest potential improvements to the WARE method.

The chapter is organised as follows. After a short introduction to the eParticipation area we briefly sketch the WARE method literature. Then we present results on how WARE was utilised when analysing requirements held by the youth in southern Norway on eParticipation. We suggest potential improvements to the method, and we summarise by suggesting further research on WARE itself and on utilisation of the WARE method for eParticipation purposes.

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## 2. eParticipation

By definition, eParticipation aims at reversing the trends of declining political engagement, disconnections between citizens and their elected representatives and a consequent decline in the legitimacy of political institutions. The democratic idea depends fundamentally on effective communication among citizens, politicians, officers and other stakeholders [3, 16]. Information and communication technologies (ICT) and, particularly, Internet technologies are often considered to represent a potential solution to these problems—offering new possibilities and opportunities for political participation [4]. A variety of technologies have been used to help with these initiatives—including discussion forums, blogs, wikis, chat rooms, geographical information systems, decision support systems, voting systems and web and pod casts, in addition to the standard web sites and e-mail services routinely provided.

Except in a handful of success stories, eParticipation projects have rarely had any large influence on public participation [10]. Reluctant key stakeholders [7] and a lack of knowledge on how ICT could be designed to support various democratic systems and ideas [9] are some reasons for the limited success. eParticipation projects are often characterised by unclear and poorly formulated objectives [11] by a large variety of stakeholders, including citizens, politicians and government officials, possessing a wide variety of requirements and interests [1] and by lack of knowledge on how ICT relates to varying democratic ideals and objectives [10].

Little research has focused on young people's perspective on online participation for democratic purposes [6]. But what are such interests of the youth concerning online participation? How could we elicit their interests concerning eParticipation purposes? These questions were investigated in a qualitative case study, whose objective was to investigate young people's needs and expectations towards eParticipation projects. Based on these characteristics, the WARE method was chosen to study young people's interests and requirements in eParticipation.

## 3. Wide Audience Requirement Engineering (WARE)

The WARE method is designed to address major challenges in requirement elicitation for ISD projects aimed at heterogeneous end users and has the following characteristics [14]:

- (potential) users have little knowledge on how to describe functionality for the suggested product and technology;
- end users may not be available or controllable (as assumed by many traditional ISD methodologies);
- end users' and the developers' cognitive ideas may vary substantially, complicating the opportunity to develop aggregated models of the suggested system;
- it appears difficult to develop requirement specifications based on traditional techniques.

Tuunanen [13] suggests an eight-step WARE model to address these shortcomings. The model is illustrated in Fig. 82.1 and further explained based on Tuunanen's work.

In phase 1, the pre-study phase, the objective is to define the scope of the study and provide stimuli for the actual requirement gathering [13]. The stimuli list influences phase 2, where the project is defined more in detail and participants are selected to identify a broad range of ideas to continue working with. To accumulate a satisfactory range of various ideas (around 80–90%), about 30 persons should be investigated [2]. A laddering technique [5] is utilised for phase 3, the requirement-gathering phase. Based on the stimuli list from phase 1, each participant is asked to describe a quality which she finds important. The input is organised as a chain of arguments and is further aggregated in phase 4, the model aggregation phase, where the main objective is to identify themes, organise chains of arguments accordingly and develop semantic maps, which graphically introduce findings and relationships.

Semantic maps are further adapted in phase 5 to introduce findings to the audience. Chains of arguments could be presented in a way that allows participants to look at general themes as well as detailed data and to see how these themes arise from the interviews. A seminar (phase 6) could be used to present

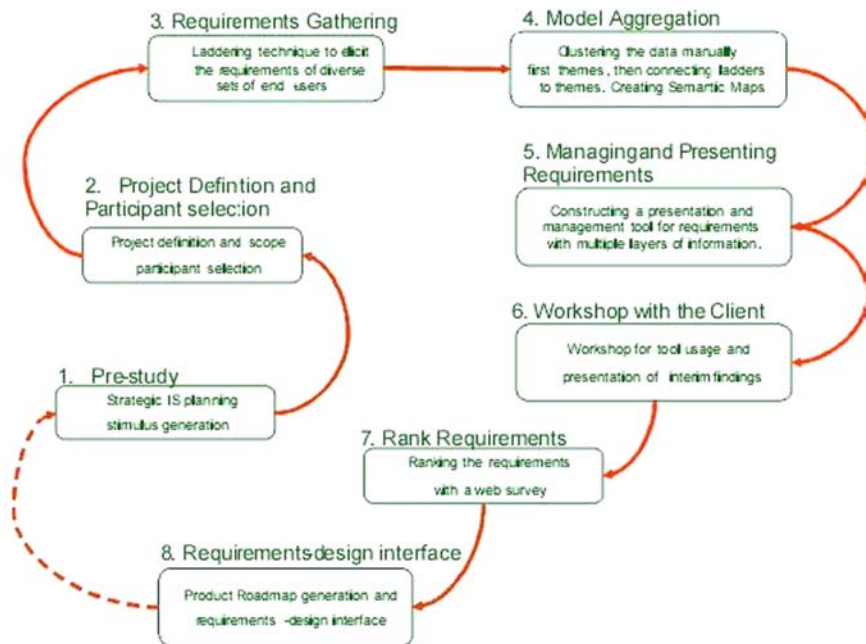


Figure 82.1. The WARE process model [13].

these semantic maps to decision makers and developers. Thus far, ideas are not prioritised, which is the main objective of phase 7. Tuunanen [13] suggests conducting a survey among potential users to prioritise and validate findings. Finally, in the requirement design interface phase, requirement analysis could be presented based on the WARE method and data-gathering activities.

#### 4. Implementing the WARE Method in an eParticipation Project

In this section, we illustrate our implementation of the WARE method, lessons learned from using the techniques and ideas on how to improve it, as well as reflection on the use and usefulness of WARE techniques for eParticipation purposes.

In the pre-study phase (phase 1) focus group interviews were conducted to gather data to create the stimuli list. Focus group interviews may identify unforeseen circumstances and a wide variety of ideas [8]. To obtain well-informed data, students attending an eDemocracy course at Master’s level were interviewed, and data were analysed according to the focus group kit developed by Morgan and Krueger [8]. Based on transcriptions of these interviews, a stimuli list was developed (Table 82.1).

Table 82.1. Stimuli list.

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Ongoing activities
One-stop integration
Well-developed user interface
Design
Marketing
Personal benefits (for participants)
Opportunity to influence
Adapted information

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In the project definition and participant selection phase (phase 2), participants were selected based on access to informants and expected competence on the area. Twenty-three informants, secondary school students aged 17–18 years, were interviewed. To further increase the outcome of the project definition phase, four additional informants were interviewed. These four were resource personnel from the local municipality and the local university, who were experienced in working on eParticipation projects.

The informants ranked important themes based on the stimuli list from phase 1. Every informant was asked in detail on the two most important topics and asked to comment on important characteristics for these two themes. Attributes, consequences and values were identified as suggested by the WARE method. Attributes represent requests towards eParticipation, values represent expectations on what to achieve by participating and consequences represent links between attributes and values [13]. To identify chains of arguments, two researchers discussed and processed the transcribed data, resulting in 897 individual statements organised into 89 chains of arguments (from 27 interviews). Table 82.2 illustrates how these chains of arguments were coded. Each statement is analysed to identify attributes, consequences, and values and coded towards open-coding categories [12].

**Table 82.2.** Coding of statements.

	Statement	Coding
Attribute	“... reward good articles about specific topics”	Competition
Consequence	You should be rewarded for being active	Reward activities
Value	“Youngsters become engaged if activities are rewarded”	Reward activities

Aggregation of data is necessary to utilise such large amount of data, which is the main objective in phase 4. The WARE method does not explicitly suggest any structured way to aggregate data. Here informed grounded theory techniques were used [12]. In an iterative process where two researchers conducted open coding of 89 chains of arguments individually and in comparison with each other, 11 themes were identified. By using axial coding techniques, these 11 themes resulted in 6 overall themes, illustrated in Table 82.3.

**Table 82.3.** Six main themes based on axial coding.

Themes identified from axial coding
Ongoing activity
Engagement
Attract attention
Fortify the message
Communicate
Adaptation of information towards young people

The chains of arguments were distributed to the overall themes. Two researchers conducted the analysis individually and compared the results afterwards, resulting in an initial agreement of 71.9%. The 25 chains of arguments reflecting the disagreement between the researchers were discussed and full agreement was achieved. Finally in the data aggregation phase, first drafts of semantic maps were developed to be able to communicate findings and illustrate relations between themes and chains of arguments (see Section 5).

The drafted semantic maps include relationships among attributes, consequences and values for each of the six themes (presented in Table 82.2). An online presentation tool was developed (<http://ware.austboe.com/>, in Norwegian only) in phase 5 to help decision makers and developers grasp an overview of young people’s expectations and requirements towards eParticipation services.

A seminar was conducted in phase 6 of the project. The development group from a regional project, which aims at increasing youth participation in politics, was invited and presented with the preliminary results based on the semantic maps and the presentation tools. The group’s input influenced the final results of the study. A short survey among the participants at the seminar showed that they found the results useful, but found the amount of information overwhelming.

A group of secondary school students (different from those included in phase 3) was asked to rank the requirements in phase 7. Based on their input we could rank the five most important elements (Table 82.4). The WARE method includes no formal test to validate the ranking. In order to check the statistical validity of the relative ranking in our case, Kendall’s W was calculated. The test unveiled only weak (or non-existent) similarities among the participants’ rankings, thus weakening the strength of argument. This implies that the requirements and reasoning for them vary greatly among the participants.

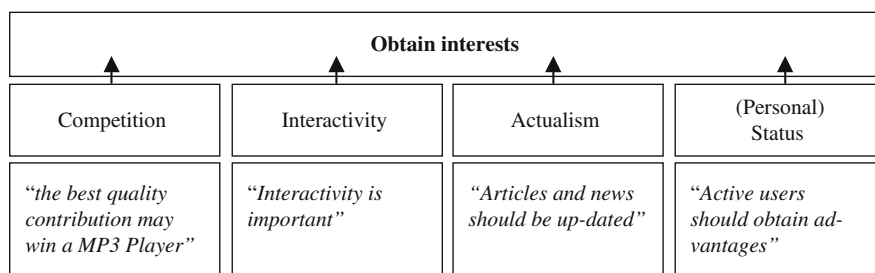
**Table 82.4.** Top-ranked themes from the rank requirement phase.

Relevance for the target group
User friendly design
Categorisation to ease navigation
Designed to claim attention
Bring in some kind of competition to market the eParticipation service

Finally the end objective for the WARE method is to come up with requirement design interface. These results are illustrated by introducing the process of developing semantic maps for one of these six major themes, which is presented in the next section.

### 5. Developing Requirement Design Interface to Support “Ongoing Activities”

The chain of arguments and statements as analysed to identify patterns and relationships. Figure 82.2 introduces one sub-category of “ongoing activities” including quotations to illustrate the coding process.



**Figure 82.2.** Examples of aggregated statements.

Based on the coding process of the chains of arguments, semantic maps for the six major themes were developed. Quotations and chains of arguments were allocated to these categories, as illustrated in Fig. 82.3. Here, the first two numbers identify a participant, the next two identify a chain of argument and the last two identify a statement. Thus 010402 refers to the first respondent’s fourth chain of argument, statement two.

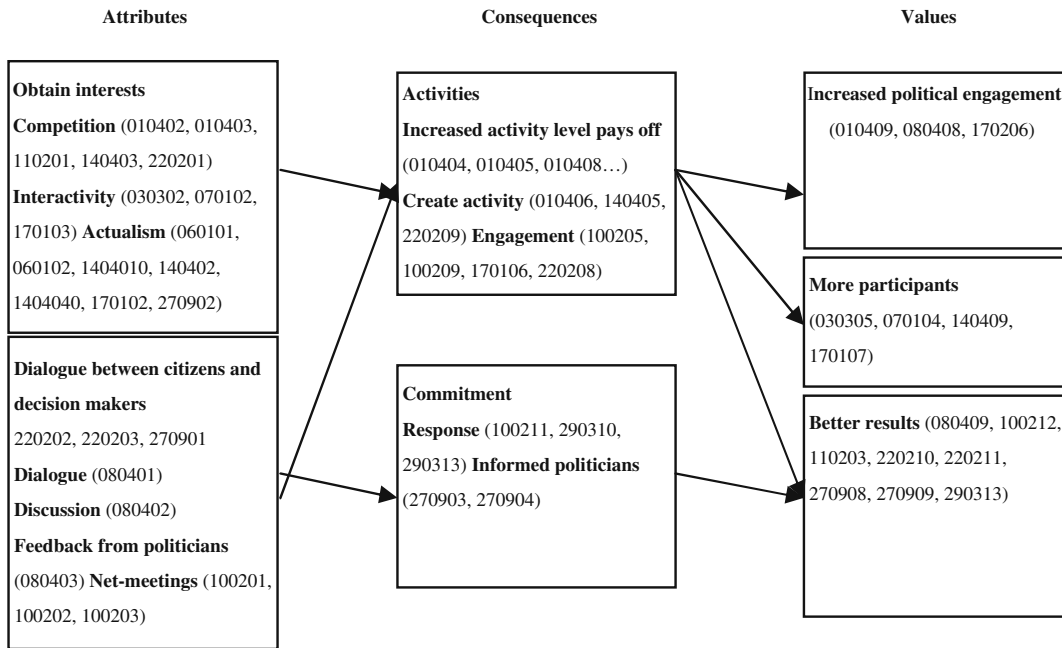


Figure 82.3. Statements allocated to the theme, “ongoing activities”.

Findings indicate that it is important to establish some interests based on dialogues between young people and those involved in making decisions. Politicians should be present since the driving force for continued participation is to achieve some results from previous contributions. The eParticipation project could introduce some benefits for active participants, e.g. by introducing various status levels. Figure 82.4 introduces the summarised semantic map for the topic.

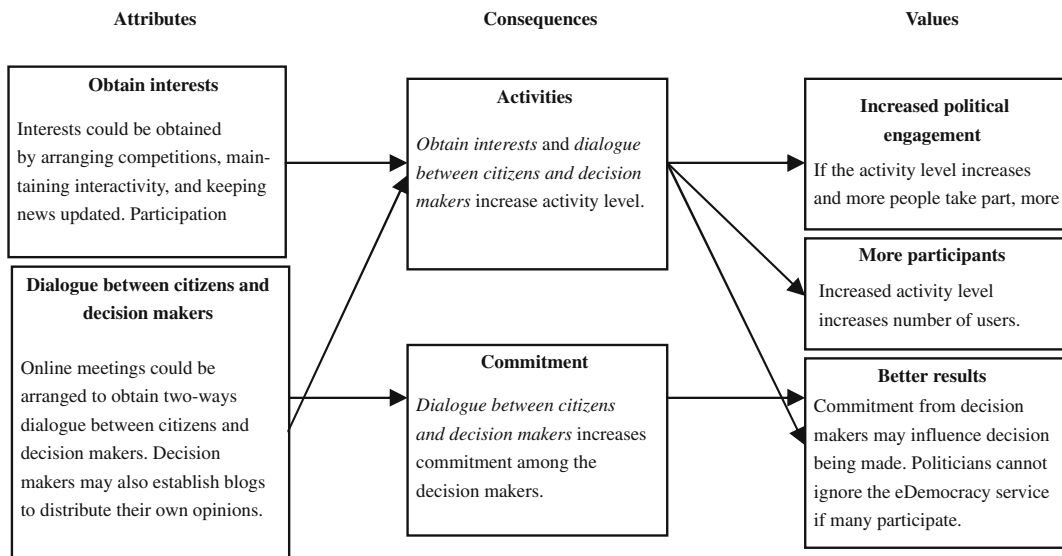


Figure 82.4. Semantic map for “ongoing activities”.

## 6. Discussion

The WARE method was introduced in the eParticipation research project since the characteristics of the project coincide with the characteristics of the methodology. The youth area of eParticipation research still lacks integration and structure [1], where a number of case studies are presented without any well-organised data-gathering techniques. The WARE method suggests stepwise data-gathering approach, which may address some of these shortcomings. Due to our experiences we argue that the WARE method has proved to be a promising candidate for further research projects similar to the eParticipation project introduced here.

Primarily the WARE method offers structure to the research projects and the data-gathering techniques. The stepwise approach systematises the analytical process, focusing on relations between various elements. Moreover, the WARE technique also introduces the semantic maps, simplifying the presentation to decision makers and major interest groups at the end, and increases the opportunity to discuss findings with participants dynamically throughout the project since these semantic maps present a large amount of data in a structure which is (hopefully) well suited for communicative purposes.

The WARE method focuses on relationships among attributes, consequences and values. Thus, for ISD purposes, the WARE method could help identify connections among characteristics of the system (attribute), the purpose (the value) of including these characteristics and how to achieve these purposes (the consequences). Some of the findings in our case study relating to the eParticipation area are already discussed in existing research literature (which is not introduced here due to our focus on the WARE methodology, not on eParticipation). But the WARE methodology and the semantic maps identify relationships between these elements, which are not present in existing literature.

The structure and relationships identified by introducing the WARE method appear clear and convincing. Thus it is timely to question the strengths of these relationships as they arise from a qualitative study. Both the starting argument (the stimuli list) and the end product (the semantic maps) are based on qualitative and interpretative approaches. These semantic maps should be seen as one interpretation of the data, not *the only* way to structure the data.

### 6.1. Suggested Improvements to the WARE Method

The WARE method in the contemporary research literature is still in its infancy. Hence, a few adaptations may appear useful for its adoption and further application. Based on our experiences we suggest some improvements on how to utilise the WARE methodology in projects similar to our eParticipation project.

First, the WARE method does not suggest any formal techniques to develop the stimuli list in phase 1. The stimuli list is highly important since participants are asked to comment and prioritise topics based on this list. Explorative data-gathering approaches could be utilised. Focus group interviews could explore a wide variety of ideas [8] and have proved to be a promising approach in our research project.

Second, the WARE method lacks clear indications on how to analyse raw data into aggregated data models. We argue that formal data analysis approaches are needed. Here we introduced a grounded theoretical approach. Although we admit that a full-scale grounded theoretical analysis is neither conducted nor possible (since the study is arguably well informed by theories and approaches), the coding techniques from grounded theory were useful.

Third, more effort should be made on continuous presentation of findings to both participants and decision makers. The online presentation tool (<http://www.austboe.com/webware/modell.htm>, in Norwegian only) made it possible for interested parties to look at the aggregated models (illustrated in Fig. 82.4) and, at the same time, look at details like chains of arguments and individual statements. The simplified presentation of findings presented as semantic maps is, from our point of view, an important strength of the WARE method since these maps allow for continuous discussion and feedback on findings from various stakeholders.

Fourth, our experiences suggest re-ordering phases 6 and 7. Participants at the seminar (phase 6) found the results interesting but overwhelming. The rank requirements in the following phase (phase 7) might help organise a large amount of data, based on importance.

Finally, as mentioned above, calculating Kendall's W did not support the ranking in phase 7. These tests are usually introduced in more quantitative studies. Despite this, we argue that the test is relevant for our purposes since a major contribution from utilising the WARE method is supposed to be ranking of identified elements based on importance. In our study we could not rank importance based on any evident input. To be able to rank importance, more work is needed to develop (or utilise) better ranking techniques.

## 7. Conclusion

This chapter introduces and elaborates the WARE method for eliciting citizen requirements in eParticipation projects. The conducted study on identifying young people's interests in eParticipation projects explored the method and gained insights on its strengths and weaknesses. Based on our experiences we argue that the WARE method is a promising candidate for analysing eParticipation projects, since such projects (focusing on the public's needs) are characterised by heterogeneous users, unclear ideas on what to achieve and non-controllable end users. The WARE method introduces a structured approach to identifying requirements, unveiling relationships that are not currently present in the eParticipation literature.

More effort is needed to further develop the WARE method for eParticipation purposes. More formal data-gathering techniques should be introduced in several phases to further validate the method. Better presentation techniques could improve the communication strength of the method, by presenting semantic maps for interested parties throughout the process.

The WARE method is still in its infancy and should be developed further for increased practical usefulness. More studies are needed to improve the WARE method and our knowledge on how the WARE method could be used for eParticipation purposes.

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