FEDERATED EPARTICIPATION SYSTEMS FOR ELECTRONIC DELIBERATION ON ENERGY AND ENVIRONMENTAL ISSUES

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As electronic participation systems are becoming widely available, promoting the public debate on a variety of issues, a new challenge is emerging: how to organize, access and present multi-format supportive documentation from various sources. The more wide-spread eParticipation systems become, the more difficult is for the participants in electronic debates to find and relate documents, legal information or policy statements, on the issues discussed. In this world of multiple sources of unstructured and diverse information elements, the presented approach proposes the concept of federated eParticipation systems, able to dynamically locate and channel information from existing, diverse sources. The proposed architecture includes multimedia content management tools, syndication mechanisms and ontologically supported mechanisms, in an effort to provide the users with the proper information for supporting opinions and decisions. As a first application, energy and environmental issues are considered, which constitute an important subject of the European Union policy agenda, as well as a common issue for discussion at local and municipal level.

1. Introduction

Electronic participation (eParticipation) has hitherto been almost uncritically promoted and emphasized as having great potential of transforming relations between administration and the public, and expected to help reform the classical model of democratic involvement. In this context, Arnstein claimed that the involvement of the public in decision-making represents a distribution of power from the authority to the citizens, even almost 40 years ago [1].

During the last years, both the research and the public administration communities have realized that Information and Communication Technologies (ICT) have the potential to support and enhance the participation of citizens and organisations in the formulation of public policy. Information and communication technologies can open new channels of communication between citizens, politicians and public administration. Likewise, they should help to overcome the lack of support and trust in the political system and the negative attitude towards politics, which can be observed in many countries [2]. According to the Organisation for Economic Co-operation and Development (OECD) 'all OECD member countries recognise new ICTs to be powerful tools for enhancing citizen engagement in public policy-

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making' since 'the unprecedented degree of interactivity offered by new ICTs has the potential to expand the scope, breadth and depth of government consultation with citizens and other key stakeholders during policy-making' [3]. The European Union's (EU) i2010 eGovernment Action Plan stresses that 'ICT has great potential to involve large numbers of citizens in public debate and decision making, from municipal to European level', and it defines the full exploitation of the capabilities offered by ICT for 'strengthening participation and democratic decision making' as one of its basic priorities [4]. Various types of ICT tools and applications are reported in the literature as having potential to support and enhance citizens' engagement in all the stages of public policy-making [2,3, 4-8].

Although existing literature recognizes and emphasizes the high potential of ICT for supporting and enhancing public participation in policy-making, difficulties have started to appear already: Due to the multiplicity of the proposed solutions but also due to the ever-expanding volume of information online [9,10], the needed supportive information on key policy issues may be diverse in format, unstructured, difficult to retrieve, or just hard to interrelate with the deliberation subjects. This way, users are usually deprived of an important capability of eParticipation systems – that is to be exposed to various sources of opinion support, ranging from legal documents, policy declarations to multimedia information (such as webcasts, videos or images) and IT systems outputs.

Within this context, the main research question is to provide a mechanism for effectively annotating and channelling existing information sources relevant to a deliberation subject – thus allowing the electronic participants to utilise supportive material in the best possible way. Furthermore, citizen and businesses participation will have to be empowered by effective mechanisms for presenting on-line content and adding identified extra resources to the online debate.

In the present paper, a new architecture for eParticipation systems is proposed, which includes multimedia content management tools, syndication mechanisms and ontologically supported query mechanisms, in an effort to provide the users with properly structured information for supporting opinions and decisions. As a first application, energy and environmental issues are considered, which constitute an important subject of the European Union policy agenda. The overall approach is applied and tested in real operational conditions within the eParticipation project "FEED: Federated e-Participation Systems for Cross-Societal Deliberation on Environmental and Energy Issues", co-funded by the European Commission under the FP7 eParticipation Initiative.

The paper is structured as follows: Section 2 describes the current status in European Union. Section 3 describes the overall objectives, methodology and technical architecture of the approach. Section 4 provides the usage scenarios and application within the Energy and Environment context, while section 5 summarizes the findings to date.

2. Current State of Practice

2.1 Future eParticipation Systems

As stated in recent e-Government related publications, instead of dialogical deliberation, political communication has tended to be monological, professionally produced and released for public consumption as a marketing exercise. For most citizens, political debate has come

to be perceived as something to watch – or to switch off [7]. Recent reports from UN and EU [11, 12] show that citizen engagement with eParticipation systems is not going much beyond using online versions of public services, in terms of real engagement in political dialogue with decision-makers.

Engaging citizens in policy-making is a sound investment and a core element of good governance, since it allows governments to tap wider sources of information, find new perspectives and potential solutions, and improve the quality of the decisions reached. However, for interactive, collaborative decision-making between citizens and politicians, two key elements are required:

- Citizens must be prepared to become knowledgeable about current issues and to express opinions (particularly on new initiatives) in order to bring clarity to the decision-making processes of elected representatives.
- The state must be prepared to provide timely, comprehensive information, as well as channels of communication through which citizens can express their opinions and engage in debate.

To achieve this, semantically-rich, workflow-aware and participation-oriented systems are needed, going beyond the currently available content management technologies of Parliaments' or Municipalities' web sites. Such systems must focus on including the multiple sources of information for preparing, supporting and maintaining eParticipation.

Based on the above analysis, it is evident that there is a necessity to provide more sophisticated solutions in order to improve the deliberation process in various levels, by enhancing the public participation especially in the preparatory stages of legislation (formation and debate). The establishment of new web based platforms that promote the use of ICT tools and applications with advanced functionalities (such as information modelling capabilities, argument visualisation, enhanced searching, content federation, etc) will eventually lead to better electronic participation. Moreover, the provision of adequate supportive information in various forms, appears to be critical for providing citizens with a "feel of power" that will push them to participate, thus leading to a significant reduction of the democratic deficits.

In the following sections we present such a system capable of meeting a number of technological and participatory objectives, in particular:

- *Participants.* In "traditional" public participation the term "participant" mainly referred to citizens or organizations whose opinion or input was asked. Next generation eParticipation systems adopt a more inclusive approach, aiming to incorporate all stakeholders in democratic participatory decision-making procedure. Therefore a "participant" is any potential user that utilizes the system functionalities for its purposes. The system should provide different actors to facilitate the different participants. In many cases though these system actors should not only correspond to human participants but also other "system" participants whose role supplements or supports those of human actors.
- *ICT Capabilities (content federation).*According to its statutory nature and role in the engagement, each category of participants has different aspirations from the system and requires different capabilities. The system should provide them with these capabilities but

to do so in a way that does not exclude or obstruct other actors from fulfilling their objectives and allows for the biggest re-usability of the participants' input. For example a system should not only facilitate the citizens' need to express their opinions, as simple forums do, but should allow also administration officials to manage these input in the form of opinions or arguments expressed in the scope of a discussion. This way citizens' input, regardless of its volume, can be easily processes and re-used systematically to draw conclusions that can assist in policy making. In this case also the system capabilities should be regulated also against the adopted deliberation model.

- *Deliberation Model.* A deliberation model defines the stages of a public participation procedure as well as the engaged participants and their roles in each stage in order to reach a result or conclusion that can contribute to policy making. This social dimension must be present in next generation eParticipation systems whose purpose is not only to provide loosely coupled functionalities in a stateless manner but instead to provide an inclusive environment for all the engaged participants in a public deliberation process. Therefore it is essential that they operate on the basis of a deliberation model, either static or dynamically defined, that constitutes the instantiation of the public participation process they facilitate within the system scope.

2.2 The Energy and Environment debate agenda in Europe

As far as it concerns the debate subject that this paper targets, the world today is facing an energy and environmental challenge. This challenge, acute for Europe and shared by all Member States, concerns how to secure clean energy for Europe against a backdrop of climate change, escalating global energy demand and future supply uncertainties. If a Member State fails to meet this challenge, other Member States are eventually affected. Problems that arise outside European Union, can have an impact on the whole of the EU something that is the cornerstone for the establishment of a strong Energy Policy for Europe (EPE). The main environmental and energy issues that the new European energy policy has to deal with, taking the opinion of citizens, businesses and NGO's, extend to the following axes [13]:

- Establishing sustainability across Europe and worldwide, by reducing the greenhouse gas emissions [14].
- Securing the supply of energy by creating new energy corridors and overtaking possible economic and political risks.
- Using renewable energy sources for energy production under the disengagement from fossil fuels [15].
- Limiting the carbon dioxide (CO2) emissions by using uranium under "the highest standards of safety, security and non-proliferation, for energy production" (safe nuclear energy), [16].

It is obvious the public opinion and perception on the above issues is of paramount importance, as most of them require public agreement for the selection and application of the best option, in a "portfolio management", "cost-benefit" scenario. The European Union shall explore ways to increase access to information, and citizen participation at Regional, National and Local-Municipal levels.

Finally, other important environmental and energy issues also exist at local and municipal level, on issues like environmental planning and land usage for various activities, waste

management at local and municipal level, or environmental permissions for specific economic activities – including energy generation or consumption.

3. Objectives and Methodology of the Approach

The main objective of the proposed approach and the FEED project is to apply a new concept in e-Participation by allowing users to have seamless access to existing federated content that matches their needs for information on the several aspects of a debated issue, as well as to informative material about the specificities of the deliberation procedure in the scope of which an issue is considered. This way the level of knowledge for eParticipation users is enhanced both around the essence of issue at hand, as well as of the procedural aspects of the deliberation process it is engaged, thus their participatory ability to contribute to the procedure through opinions that can create an impact is significantly augmented. Through FEED, federated content is contextually annotated according to the debated issue and process specifics allowing the platform users to perceive it as a coherent body of information to be used in the various stages of a deliberation procedure. As illustrated in Figure 1, this is achieved through an architecture capable of:

- Integrating already developed tools, such as structured forums, data and multimedia content management systems, argument visualisation systems and storage facilities in a unified system (see [17 -21] for existing eParticipation and Argumentation Tools).

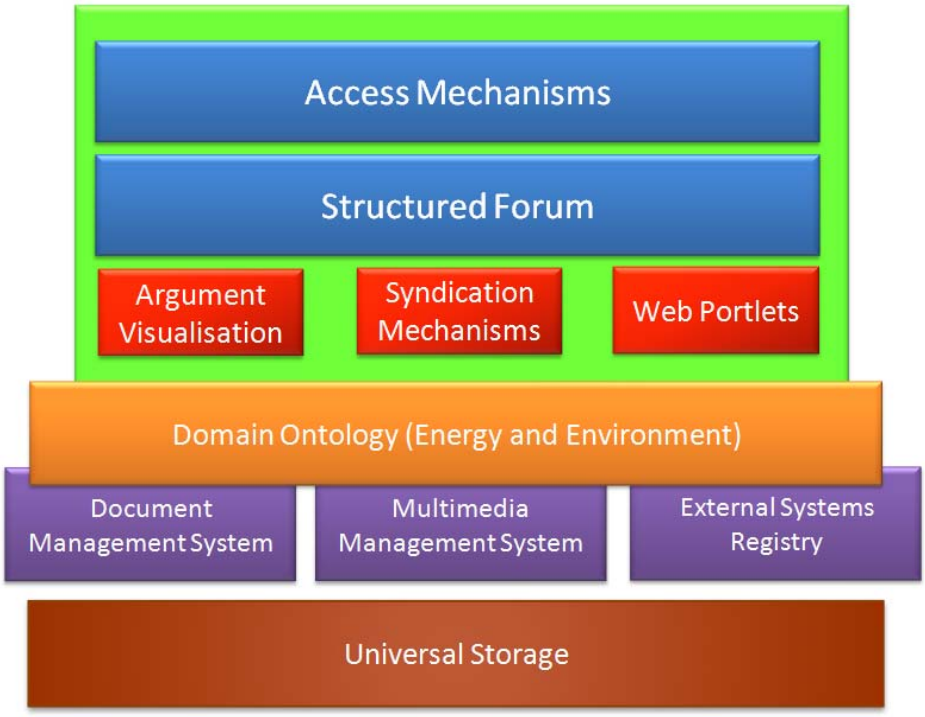

Figure 1: Architecture of an eParticipation System with Federation Capabilities

- Contextually annotating provided information and explanatory material, to enhance the comprehensibility and participation capabilities of the public. To this end, ontologies and metadata schemas are developed for the semantic annotation of information elements according to the Energy and Environment domain, so that all involved parties can easily locate the necessary information with the use of internet-based retrieval tools.

- Providing advanced syndication mechanisms, for dynamically locating and integrating existing content through the Internet, on the debated issue.

4. Use of the Federated eParticipation Systems

The operation of such an enhanced eParticipation system should not pose extra requirements to administrators, moderators of the process, or final users. Envisaging the use of the system at a municipality, on an issue concerning Fossil Fuels Usage, the steps for initiating and using such a system are as following, as also depicted in Figure 2:

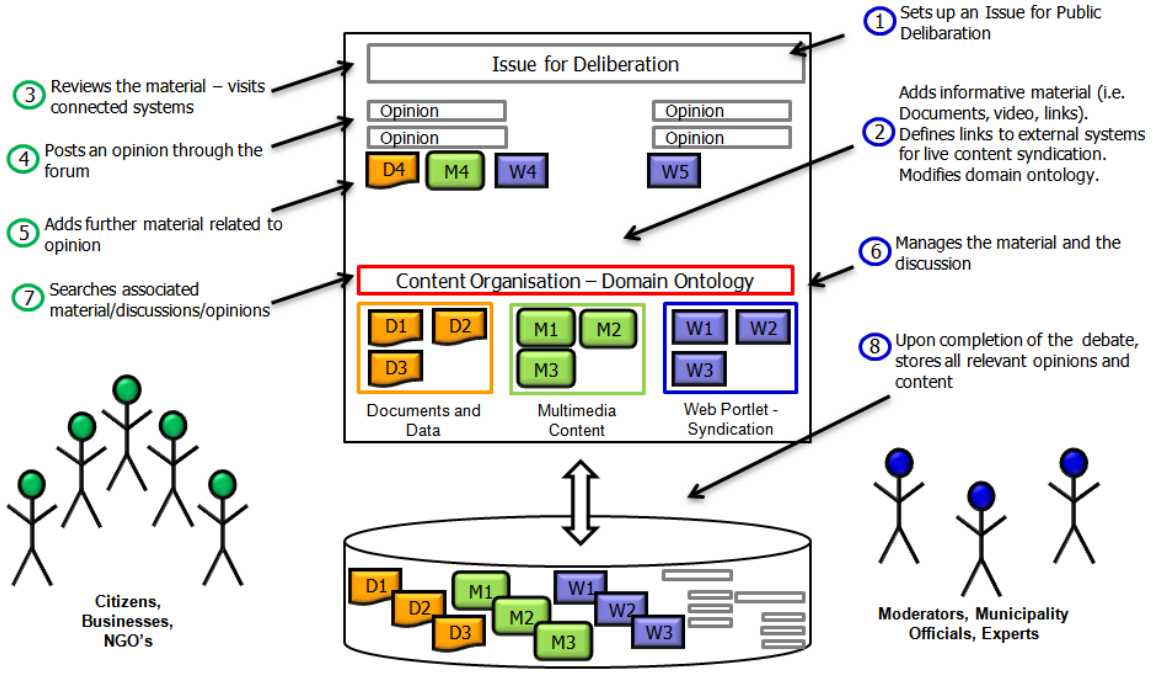

Figure 2: Architecture of an eParticipation System with Federation Capabilities

- The moderator is setting a new issue for the debate, storing all the necessary material in the system information base and relating information elements with points of the debate. The moderator has the ability to define specific stages or actors in the debate, according to the deliberation model that is described in the domain specific ontology, relate content to them and assign access privileges to different categories of participants (Step 1).
- Then, the moderator is declaring additional sources of information, through linking and querying information systems through the system External Systems Registry. This way, generic sources of information (such as Internet Search Engines or Multimedia Content Provision Web Sites) or specialised sources (such as Research Databases, EUR-LEX or Parliament Sites) can be linked to provide dynamically updated material (Step 2).
- The eParticipants are then allowed, according their role in the system and the stage of the deliberation procedure, to enter the eParticipation system, express their opinions but also provide additional supportive information through linking to external systems or attaching documents, multimedia content or internet links (Steps 3,4 and 5)
- During the electronic discussion, the Moderators can continuously modify the Domain Ontology, provide more terms and explanations, visualise the argumentation and manage the annotated material according to the users input. The system can incorporate "social" dimensions, allowing users to grade the provided content as to its relevance, usefulness or quality, creating this way rankings about the provided information that allow the system

administrator to remove any irrelevant or poor-quality material. This way participants are not overwhelmed by the provided information and have the ability to locate easily the most relevant material for the debated issue (Step 6)

- Finally, towards completion of the debate, the users may jump to other relevant deliberation processes and, upon completion, the Moderator or the Administrator may store the whole debate in a retrievable way (Steps 7 and 8).

In this scope an adopting organisation can choose among different integration approaches, specifically:

1. Full Integration-Dynamic Ontology Support. In this approach there is seamless integration with the existing infrastructures of the organisation or with other existing content repositories residing on the web as well as full support for ontologies that specify dynamically (that is not hardcoded) main platform features.
2. Partial Integration-Hardcoded Ontology Support. In this approach there is a partial integration with the existing infrastructures of the organisation and other existing content repositories through a simple web service interface for posting questions as well as support for ontologies but not through components that have dynamic features.
3. No Integration-No Ontology Support. In this totally lightweight approach there is no integration with any external system, and also no ontologies are implemented in the system except only from rudimentary content interrelation functionality that is purely user driven.

5. Concluding Discussion

This paper investigated the potential of eParticipation systems that will be able to utilise existing information sources from a vast variety of internet systems and electronically available documentation or multimedia content. In an effort to make deliberation support more efficient, such systems have to integrate existing tools but also provide a practical solution for interrelating debate issues, opinions and annotated content. To be applied within the FEED FP7 project, the proposed approach integrates existing forum and argumentation support systems with content management and storage tools providing the missing building blocks in the form of Syndication Mechanisms and Domain Ontologies, targeting the Energy and Environment domains. User groups up to now include municipalities from Czech Republic, Greece, the Netherlands and United Kingdom, targeting important issues for the local communities. The main advantages of the approach are shown to be:

- The ability to provide extensive supporting material for a debate, without having to manage or store it locally.
- The exploitation of the content syndication in such a way that new issues may dynamically appear from the interconnected information sources on a selected issue.
- The ability to handle data, multimedia content and visual argumentation within the same environment.
- The central part of the Domain Ontology, that provides for common understanding on the issues to be discussed.

Further work will be directed towards tackling limitations with interconnecting to non-interoperable internet information sources, the creation of metadata schemes for semi-

automatic discovery of sources and systematic appraisal of user feedback during the first trial applications.

References

[1] Arnstein. S.R.: A ladder of citizen participation. American Institute of Planners Journal, vol. 35, 1969, pp. 216-224

[2] Organization for Economic Co-operation & Development (OECD), Citizens as Partners: Information, Consultation and Public Participation in Policy Making, Paris, France, 2001, see: www.oecd.org.

[3] Organization for Economic Co-operation & Development (OECD), Promises and Problems of e-Democracy: Challenges of Online Citizen Engagement, Paris, France, 2003, see: www.oecd.org.

[4] Commission of the European Communities, i2010 - eGovernment Action Plan: Accelerating eGovernment in Europe for the Benefit of All, COM (2006) 173, Brussels 2.04.2006.

[5] Macintosh A., Davenport E., Malina A., Whyte A., Technology to Support Participatory Democracy, in: Grönlund, A. (ed), Electronic Government – Design, Applications and Management, IGP, 2002, pp. 226-248.

[6] Grönlund A., e-Democracy: in Search of Tools and Methods for Effective Participation, Journal of Multi-Criteria Decision Analysis, Vol. 12, 2003, pp. 93-100.

[7] Coleman S., Connecting Parliament to the public via the Internet - Two case studies of online consultations, Information, Communication & Society, Vol. 7, No. 1, March 2004, pp. 1–22.

[8] DEMO-net, Report on current ICTs to enable Participation, Deliverable 5.1, accessible from http://www.demo-net.org/

[9] Efthimios Tambouris, Naoum Liotas, Konstantinos Tarabanis, A Framework for Assessing eParticipation Projects and Tools, Proceedings of the 40th Hawaii International Conference on System Sciences – 2007

[10] MOMENTUM Project, Coordination Action of the European Commission funded eParticipation Projects, accessible at www.ep-momentum.eu

[11] United Nations (2005) Global e-Government Readiness Report, New York. Available from http://unpan1.un.org

[12] Online Availability of Public Services: How is Europe Progressing? Web Based Survey on Electronic Public Services, Report of the Sixth Measurement, June 2006. Available from http://europa.eu.int

[13] European Commission, An Energy Policy for Europe, 2007

[14] European Environment Agency. Other data are European Commission unless otherwise stated

[15] "Energy for the Future – Renewable Sources of Energy. White paper for a Community Strategy and Action Plan" - COM(97) 599.

[16] Nuclear Illustrative Programme, European Comission, 2007.

[17] Conklin J., Dialog Mapping: Reflections on an Industrial Strength Case Study, in: Kirschner, P., Buckingham Shum, S. and Carr, C. (eds), Visualizing Argumentation: Software Tools for Collaborative and Educational Sense-Making, Springer, London, 2003, pp. 117-136.

[18] Gordon T. F., Richter G., Discourse support systems for deliberative democracy, In: Traunmüller, R. (ed). Proceedings of EGOV 2002, Aix-en-Provence, France.

[19] Karacapilidis N., Papadias D., Computer Supported Argumentation and Collaborative Decision Making: The HERMES system, Information Systems, Vol. 26, No 4, 2001, pp. 259-277.

[20] Atkinson K., Bench-Capon T., McBurney P., PARMENIDES: Facilitating democratic debate, in: Traunmüller, R. (ed.), Electronic Government, LNCS #3183, Springer, Berlin et al, 2004, pp. 313-316.

[21] Compendium Argumentation Tool: http://www.compendiuminstitute.org