e-Cognocracy and the Design of Public Policies

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Abstract

Designing public policies using information technology as a communication support system is one of the most important current issues in the public policy making field. This work presents a methodology for the design and selection of public policies based on the cognitive democratic model known as e-Cognocracy. In addition to facilitating debate between representatives and the represented (deliberative democracy), this model allows for co-decision making between citizens and politicians. Furthermore, and of even greater importance, e- Cognocracy generates a process of continuing education that is concordant to the lifelong process of living sys- tems (cognitive process). The methodology contemplates multiple rounds (usually two) when incorporating the preferences of the actors implicated in decision making and takes advantage of the creative capacity of human beings when solving complex problems. At the same time, the methodology permits the evaluation of both the individual and social learning that is derived from the scientific resolution of the problem and the democratisation of the knowledge that is extracted. This methodology was applied to a real-life experience in the Spanish municipality of Cadrete.

Keywords: e-Cognocracy; Public Policy Design; e-Government; Collaborative Governance; Knowledge Society.

1. Introduction

As classical Greek (Plato) and medieval Arabic (Averroes & Ibn Jaldum) scholars affirmed, the evolution of democratic models is not an arbitrary process; it depends on interconnected necessities (Baeck, 1994) derived from human nature and the functioning of society. With knowledge of the interactions between the components that ex- plain the way society functions, humankind can correctly and suitably govern and control this evolutionary mechanism (García Lizana & Moreno-Jiménez, 2008). This paper identifies the characteristics of the new context of the Knowledge Society (Bell, 1973; Drucker, 1969, 1994; Faure et al., 1972; Stehr, 1994; UNESCO, 2005), examines recent governance models oriented towards improving social existence, pre- sents the cognitive democracy known as e-Cognocracy and proposes a methodology for its use in the design and selection of public policies. The methodology has been applied to a real-life experience concerning the design of cultural and sporting policies in the Spanish municipality of Cadrete.

The Knowledge Society (KS) can be understood (Moreno-Jiménez, 2003a) as a framework that accommodates the creativity, imagination, ingenuity and talent of human beings, based on the development of in- formation and communication technologies (ICT). In this setting, the resolution of highly complex problems requires the utilisation of the creative abilities and potential of the greatest possible number of individuals. For problem resolution to be as effective as possible, advan- tage should be taken of the opportunities offered by this new context (KS).

There are three fundamental characteristics of the KS (Moreno- Jiménez, 2003a) that must be utilised in the conjoint creation of a better society: (i) deterritorialisation; (ii) the

interconnection between the ac- tors and the interdependence of the factors; and (iii) the relevance of the individual (human factor). Deterritorialisation, or the elimination of geographical constraints, refers to the absence of a physical space in which the actors involved in the resolution of the problem are located. Interconnection reflects the potential communication between the ac- tors and is facilitated by ICT tools. Interdependence can be viewed as the frame of reference, a holistic vision of society, within which the fac- tors considered in the problem are interrelated.

Taking into account the fact that the most important of the three characteristics is the human factor, the KS aims to (Moreno-Jiménez, 2006): (i) educate the individual in aspects related to intelligence and learning; (ii) foster relationships with others, improving quality of life and societal cohesion through better communication and social harmo- ny; and (iii) facilitate the conjoint construction of the future in a world of ever increasing complexity.

In dealing with the construction of this future, it is necessary to de- velop new models of participation that can make use of the potential of the KS and respond to the challenges and needs that it generates. The determination of a model of participation that is most appropriate for a given epoch is by no means an original topic of debate and discus- sion; as Ibn Jaldun concluded more than six centuries ago (García Lizana & Moreno-Jiménez, 2008), this problem may only be resolved if the dynamic of the system is understood and the system is self-organised and adaptive.

Advances in information technologies and the progressive increase in citizens' access to the Internet have opened up possibilities for new approaches to the governance of society. The Internet and the new elec- tronic information networks have become indispensable instruments for the political expression of the organs of civil society at all levels (local, regional, national and supranational). As Manuel Castells (2002) suggests, the Internet is not only a technology but also a cultural production.

In order to respond to the new societal needs, it is necessary to examine the models of representation within the context of electronic government or e-Government: the application of ICT to Public Adminis- tration with the aim of developing a better quality of life for the citizen. This further involves (Moreno-Jiménez, 2003a) the objectives of efficiency (doing things correctly), efficacy (achieving goals) and effectiveness (doing what is right).

The main theories on the development of e-Government focus on the relationship between the citizen and the Administration (Coursey & Norris, 2008; Parent, Vandebeek, & Gemino, 2005). In the majority of developed countries, e-Government is currently in the phase of the provision of public services that involves interaction and transaction through the Internet. Not all services offered by Public Administrations can be undertaken through non-traditional channels (Van Dijk, Peters, & Ebbers, 2008) but there are more and more administrative procedures for obtaining public goods and services that can be carried out through the Internet.

There are two main spheres (Moreno-Jiménez, 2009) that can be contemplated within the context of e-Government: (i) e-Administration, oriented towards the improvement of public services offered to the cit- izens by institutions and (ii) e-Governance, understood as the processes that are based on the intervention of the citizens and their representa- tives in public decisions relative to the government of society through the use of ICT tools. This second sphere includes e-Voting, e-Democracy and electronic Cognocracy or e-Cognocracy.

e-Cognocracy (Moreno-Jiménez, 2003b, 2006; Moreno-Jiménez & Polasek, 2003) is a new democratic model that combines both direct and representative democracy, resolving many of the limitations of these two models whilst allowing co-decision making between citizens and representatives and the social creation of knowledge and continu- ing education

of the citizen by means of the democratisation of the knowledge derived from the scientific resolution of the problem.

The co-decision of the actors involved in the resolution of the prob- lem and the education (individual and social learning) associated with the debate stage are two of the characteristics that distinguish this cognitive democracy, which seeks effective Public Administration, from other e-participative and deliberative approaches (Barber, 1984; Bessette, 1980; Bohman, 1998; Dryzek, 2000; Elster, 1998; Fishkin, 1991; Medaglia, 2012; Saebo, Rose, & Skiftenes Flack, 2008; Zimmerman, 1986). These characteristics are exemplified in the ap- plication of e-Cognocracy to the design of sporting and cultural pub- lic policies in a project implemented by our research group in the Spanish municipality of Cadrete (https://participa.cadrete.es).

The structure of the rest of this paper is as follows: Section 2 explains what is meant by the design of public policies; Section 3 gives a brief outline of e-Cognocracy; Section 4 presents a systematic procedure, based on e-Cognocracy, for the design of public policies; Section 5 de- scribes a real-life application of the procedure for the design of cultural and sporting policies in the municipality of Cadrete (Zaragoza); Section 6 discusses the most significant conclusions of the experience.

2. The Design of Public Policies

Dye (1975) defines public policies as "…*everything that governments decide to do or not to do*". Lowi (1964) identifies three types of public policies: *distributive*, *regulative* and *redistributive*. There are many other typologies of public policies (Birkland, 2010): *procedural* and *sub- stantive*, *symbolic* and *material*, *innovative*, *mimetic* and *incremental*, *con- servative and liberal*, *distributive*, *regulatory*, *constituent*, *miscellaneous* etc.

Policy design can be understood as the adoption of an alternative and the establishment of the means that permit its implementation. Public policies are the group of objectives, decisions and actions that are undertaken by a government in order to solve the problems that they have to deal with at any given moment and which the citizens and the government consider as priorities.

From this perspective, the design of public policies is a process that is initiated when a government or a public administrator detects the exis- tence of a problem, or has to address the demands of the citizens, and finishes with the evaluation of the results of the actions undertaken in order to eliminate, mitigate or solve the problem or demand.

Therefore, the design of public policies can be considered as a de- cisional problem with differing aims and objectives which are very often conflictive (André, Cardenote, & Romero, 2010). Following this decisional approach, the procedure for the construction of public policies can be seen as a multicriteria problem characterised by the existence of multiple scenarios, actors and tangible and intangible criteria. The phases or steps taken to resolve multicriteria problems concerning public decision making (Anderson, 2011; Mamaqui & Moreno-Jiménez, 2009) are basically the same as those required for the design of public policies, that is to say: (1) The identification and definition of the problem; (2) The formulation of the alterna- tives for the solution of the problem; (3) The selection of one of the alternatives; (4) The implementation of the selected alternative; and (5) The evaluation of the results obtained.

The first phase in the cycle of designing public policy is the definition of the problem, this means defining the situation in which an individual or group perceives a difference between the current reality and that which is desired. Resolution consists in establishing a plan of action that can transform the current situation into the desired one. The process of identification and definition is not easy and requires the investment of a considerable amount of time and effort. Many more mistakes are made as a consequence of the erroneous definition of the problem than the poor resolution of a problem that has been correctly defined (Dunn, 1981).

Once identified and defined, the problem is placed on the agenda[2] of the public authorities. To be included on the agenda, the problem must comply with a series of conditions: (i) the issue must fall within the competences of a specific authority or the public authorities in general; (ii) the challenge, the object of the problem, must be worthy of public consideration; and (iii) the problem must be accessible to public consideration.

It is important to analyse the possible, initial, alternatives for their resolution; they are then described and characterised. It may be the case that an alternative is discounted because it does not require more study or in-depth examination, or other alternatives have arisen during the resolution process. After analysing the alternatives, the most appropriate is selected in accordance with the multiple criteria, both tangible and intangible, that have been set for the resolution of the problem. Depending, among other criteria, on cost, number of beneficiaries, urgency or relevance, the priorities are calculated by means of multicriteria decision making techniques, followed by the ranking of the alternatives.

When the problem has been defined, the objectives specified and the highest prioritised alternative selected, the next phase is the implementation of the public policy, which means putting into practice the selected alternative for the resolution of the problem. The key point in the implementation phase is what Pressman and Wildawsky (1973) referred to as "*the complexity of conjoint action*". Evaluation is the last phase in the design of a public policy and can be defined as "*the policy of the methods of systematic research with the objective of examining the design, implementation and utility of the public programmes and policies*" (Ballart & Ramio, 2000).

With the aim of optimising government actions, Public Administrations have become more and more interested in the methods of evaluation of the programmes, reforms and public policies that have been implemented. In contrast to other organisations, Public Administrations are obliged to behave in a selfless, reliable, ethical and socially appropriate manner (Chang, Li, Hung, & Hwang, 2005) whilst maintaining the efficient and sustainable management of the resources at their disposal. Given that the objective is to satisfy the needs of society it is necessary to identify and evaluate the manner in which that objective is achieved. The results of this type of analysis can lead to a review of the problem, which, in turn, can lead to a new public policy, a reformulation of the original policy or the generation of a different set of alternatives. As the Administration is responsible for offering public services and supplying public goods, the basic consideration that determines decisions must be that which is "in the best interests of society", with special attention being given to people that, for varying reasons, have difficulty in accessing those services and goods (Jorgensen & Cable, 2002; Verdegem & Verleye, 2009).

3. E-Cognocracy: the Knowledge Society Democracy

e-Cognocracy (Moreno-Jiménez, 2003b, 2006; Moreno-Jiménez & Polasek, 2003) is a cognitive democracy that combines the two most widespread democratic models: representative or liberal democracy and direct or participative democracy. In short, e-Cognocracy seeks the social creation and diffusion of knowledge relative to the scientific resolution of problems that are identified within the context of public decisions that refer to the government of society. In addition to the abovementioned objective, related to the evolution of living systems, e-Cognocracy aims to deal with some of the limitations of traditional democracy such as the lack of citizen participation and control and the lack of transparency and accountability on the part of the represen- tatives (Gargarella, 1995; O'Donnell, 1998; UNESCO, 2005), and some of the limitations of direct democracy such as populism (Haskell, 2001; Zimmerman, 1986), the paradox of voting, preference intensity and bundling (Weimer & Vining, 1999) and the lack of a global perspective in the resolution of problems (Moreno-Jiménez, 2003b).

Public decisions continue to be made by the majority, but, in contrast to representative democracy, e-Cognocracy does not exclude any ideas from the process and it enhances the citizens' capacities for creativity and innovation. e-Cognocracy endeavours to convince the citizen by means of arguments and ideas that are transmitted through the Internet (Moreno-Jiménez, 2006; Moreno-Jiménez & Polasek, 2003). Unlike the representative democracy, victory is not achieved by gaining a simple majority of 51% of the participants.

In the words of Moreno-Jiménez (2003b) "*There is no democracy without liberty and no liberty without knowledge*". Following this philos- ophy, effort should be directed at diffusing the knowledge derived from the resolution of the problem among the citizenry.

The operational mechanisms of e-Cognocracy can be seen in Moreno-Jiménez (2006, 2009). There are six steps: problem formu- lation; the first e-Voting round; the on-line discussion; the second e-Voting round; knowledge extraction and diffusion; and evaluation. From a functional point of view, this cognitive democratic model combines representative democracy (political parties) and direct de- mocracy (the citizenry) through weightings, usually proposed by the representatives who make the public decisions, which depend on the type of problem that is being considered. If the problem has a local context, the weighting assigned to the citizen would be greater (around 2/3), if the problem has an international or supranational

context, the weighting of the political parties would be greater (around 2/3).

The e-Cognocracy democratic model has the following characteristics:

1. It allows the direct implication of the citizen in decision making; this encourages participation in the democratic system and the creation of knowledge in society.

2. The combination and balance of the model is in line with the weightings assigned to the public and private participants and this eliminates the risk of an instantaneous democratic plebiscite (Haskell, 2001) and the populism that can result from the direct par- ticipation of the citizen (Moreno-Jiménez, 2003b). As Bohman (1998) suggested, e-Cognocracy makes it possible for both public and private participants to be involved in the discussion and debate.

3. The model improves the transparency of the system by making the justification of the criteria, the political parties' positions and the subsequent modifications to their electoral manifestos public knowledge. This allows confirmation of whether the decisions that are taken correspond to the electoral manifestos and makes it possible to identify the "social leaders"—the individuals whose arguments are the most popular or influential in the context of the social network.

4. It improves the control of the system as it allows both the opposition and the citizens to have immediate contact with other citizens and this obliges the parties to win the vote of the citizens on a day-to- day basis and forces representatives to be more open and honest.

5. It reduces the democratic system's dependence on minority political groups as it encourages the establishment of coalitions among ma- jority parties to reduce uncertainty and this favours positions that are more democratically supported.

6. It facilitates the continuing education of the interested population through the online discussion that takes place between the two vot- ing rounds, in line with the Rawlsian (Rawls, 1971) concept of social justice, that is to say, the equality of social opportunities.

7. It allows the easy extension and diffusion of knowledge (socialisation of knowledge) and the creation of minimum ethical standards.

8. The multicriteria framework proposed for dealing with the most specific part of the process, the citizen's direct implication, incor- porates the subjective through evaluations and judgements. An objective treatment of the subjective guarantees the *scientific nature* of the procedure that is followed. As Roy (1993) has noted, this scientific nature is generated by the rigour, transpar- ency and accessibility of the method.

If traditional democracy can be characterised by the idea of "one man, one vote" and by the fact that decisions are filtered through polit- ical parties, e-Cognocracy is characterised by the idea of "one man, many ideas" and the fact that these ideas are filtered through the citi- zenry itself, through transparent and public selection by means of the Internet.

3.2. E-Cognocracy and other participative and deliberative democracies

With regard to the participation of the citizen in the design of public policies, it should be emphasised that the use of ICT tools has revolutionised our daily habits and culture, the way that we relate to one another and the way in which we comprehend the world that sur- rounds us. Anonymity and the lack of intermediaries make it possible for any population group to express ideas on any political issue in the myriad of blogs, forums etc. There are new tools associated with the concept of Web 2.0 that allow the exchange of information that can

fos- ter and improve possibilities for citizen participation. We are becoming accustomed to a lifestyle where we can publish ideas which can be shared through the Internet.

Furthermore, we are a population that wants these ideas to be brought to the attention of the administrators; for the first time in his- tory, citizens can democratically participate in the world that surrounds them without having to wait for elections and this increases the legitimacy of public decision making; there are two, interrelated, elements (García Lizana & Moreno-Jiménez, 2008) that must be incorporated into the model, and this is the case with e-Cognocracy:

The establishment of procedures that capture and channel the mobilising capacity of the new technologies, their potential for tak- ing public decisions and improving the effectiveness of democracy in the government of society. The creative power of the citizen must be used for the creation of a more cohesive and improved social order.

The restitution of the original values of democracy, the direct partic- ipation of the citizens in their government (all citizens and not just the elite, as occurred in Athenian democracy) and the restructuring of the democratic system so that power is really held by the citizens, strengthening their implication in the governance of society and lim- iting the role of the new aristocrats, the 'bureaucrats of politics'.

Along with the previously mentioned characteristics, the main dif- ferences of e-Cognocracy with respect to other participative and delib- erative democracies are: (i) its cognitive and decisional orientation, it is not only deliberative or discursive—it takes advantage of the creative capacity of human beings when resolving complex problems and per- mits co-decision making between citizens and representatives; (ii) e- Cognocracy allows the incorporation of intensities in preferences and the aggregation of individual rankings to reach a collective ranking. This is one of the traditional limitations of participative democracies (Weimer & Vining, 1999); (iii) it allows for the identification of social leaders; (iv) e-Cognocracy provides the arguments that support the dif- ferent opinions, positions and decisions (Moreno-Jiménez, Cardeñosa, Gallardo, & de la Villa-Moreno, 2013); (v) it generates a process of the continuous education of the citizen that is in keeping with the lifelong process of living systems (cognitive process); and (vi) the methodology permits the evaluation of both the individual and social learning that is derived from the scientific resolution of the problem, as well as the democratisation of the knowledge that is extracted.

4. The Design of Local Public Policies using e-Cognocracy

The e-Cognocracy-based methodology proposed for the conjoint design (politicians, citizens and other political actors) of public polices in a local environment consists of 16 stages grouped in four blocks (see Fig. 1): (1) Problem Formulation, Step 1 of the e-Cognocracy methodology; (2) Problem Resolution, Steps 2 to 4 of the e-Cognocracy methodology; (3) Knowledge Extraction and Democratization, Step 5; and (4) Evaluation and Documentation of e-Cognocracy, Step 6.

4.1. Problem Formulation

4.1.1 Stage 1: *Problem presentation.* A key aspect for achieving the participation of the citizens, putting forward ideas, making suggestions and conjointly creating a better society, is to make sure that they understand the underlying philosophy and see their implication in the process as a civic virtue, as democracy was seen in ancient Greece. This task requires education on the part of the Administration which must communicate the message and generate the motivation of the citizen.

4.1.2 Stage 2: *Problem setting.* From the point of view of decision theory, it is more and more accepted that the satisfactory resolution of the problem requires appropriate problem formulation; 'a problem that is well set is halfway to being resolved'. In the past, this stage

received scant attention but it is now considered as essential in the search for effectiveness of the resolution procedure to avoid what is known as the 'Type III' error (solving the wrong problem). The context must be clearly defined, the possible scenarios must be identified and the controllable and non-controllable variables must be analysed.

4.2. Problem Resolution

4.2.1 Stage 3: Identifying the actors, factors and alternatives. Once the problem has been set by the representatives, in some cases by the citizens, the actors and their interdependencies, the factors - criteria, subcriteria of different orders and even the attributes - their interrelationships and the alternatives are identified.

4.2.2 Stage 4: *Problem modelling.* This is the joint construction of a model in which all the relevant aspects of the problem are represented. In general, modelling involves three blocks (Moreno-Jiménez et al., 1999): the first deals with the most ambiguous and open part of the problem (scenarios, actors etc.) and is usually carried out through a network that captures the interdependencies; the second refers to the most known part of the problem and includes the tangible and intangible criteria, the subcriteria of different orders and the attributes (subcriteria from which the alternatives hang) and usually takes the form of a hierarchy; the third block considers the problem alternatives and their measurements with reference to the different attributes. The final block is modelled by means of a table of effects or a payment matrix. When the problem is modelled the balance between precision and functionality must be taken into account.

4.2.3 Stage 5: Valuation I. This involves the incorporation of the preferences of the citizens and the politicians in the first round. The e-Cognocracy process usually considers two rounds in order to incorporate the creative power of the collective whilst, at the same time, evaluating individual and social learning. The incorporation of the preferences of the actors implicated in the resolution of the problem is based on Saaty's Analytic Hierarchy Process –AHP– (Saaty, 1980) and uses paired comparisons for the evaluation of intangible aspects. The use of AHP is justified as it is one of the multicriteria tools which best captures the holistic vision of reality and best responds to the needs and challenges of the resolution of problems in the KS. AHP considers multiple scenarios, actors and criteria and integrates the very large with the very small and the rational with the emotional. It is important to note that when the preferences of the citizens are emitted, the proposed procedure permits the incorporation of the intensities of the preferences and, in contrast to traditional methodologies, is not limited to a binary, exclusionary, selection for the posterior application of majority rule.

4.2.4 Stage 6: Determination of initial positions. From the judgements emitted in the previous stage, *local priorities* are determined by use of any of the prioritisation procedures commonly employed in AHP. The *global priorities* are obtained through the principle of hierarchical composition and the *total priorities*, or priorities of the alternatives in relation to the mission, of the problem are calculated through an aggregation procedure. When working with intangible aspects, and, in general, in the field of social sciences, conclusions that are extracted exclusively from precise values are meaningless. In these types of situations, the incorporation of the existing uncertainty in the emission of judgements through judgment intervals or reciprocal distributions (Escobar and Moreno-Jiménez, 2000), and calculation, through simulation, of the preferences associated with each individual is recommended (Escobar and Moreno-Jiménez, 2007). From the analysis of the rankings of the alternatives and the preference structures derived from the contemplation of uncertainty, patterns of behaviour can be identified, for example, the percentage of the population that follows each of the preference structures that are being considered.

4.2.5 Stage 7: Citizen debate and discussion. Through the use of a collaborative tool or social network software, for example, a forum, both the politicians and citizens (registered

voters or not) put forward or incorporate the arguments in favour and against the different criteria and alternatives (Moreno-Jiménez et al., 2012). The debate and discussion process begins with the presentation of the problem and the relevant information. The actors implicated in the problem then open different discussion threads based on the initial comments and messages received. Each message or comment is associated with a numerical value and a scale (the importance of the message/comment for the sender – from 1 to 10, the importance for the reader –from 1 to 10, and the readers opinion, 1 – completely against, 5 – completely in favour) that allow the contextualisation of the messages.

4.2.6 Stage 8: Valuation II. After the discussion and debate through the Internet, the implicated actors undergo a learning process that is reflected in the new preferences emitted in the second round. Following a top-down or bottom-up procedure, citizens register their opinions or judgments in a second round using the same method for the incorporation of the preferences.

4.2.7 Stage 9: Determination of the new positions. Once the new preferences are incorporated, the new positions or behaviour patterns are determined by following the procedure outlined in Step 6. The new individual and collective rankings, obtained from an aggregation of the individual rankings, enable the identification of the changes in individual and collective ordering after the Forum discussion. Obviously, there will be individuals that change their preferences and priorities whilst others will maintain their positions with little alteration.

4.2.8 Stage 10: System behaviour analysis. In these types of situations, in which the unknown is much greater than the known, it is preferable to study the behaviour of the system before selecting the best alternative based on the consideration of precise values. Moving from the most general to the most specific (Moreno-Jiménez et al., 1998) this means: (i) analysing the validity of the approach, in this case, due to the reasons explained in Stage 5, we use AHP for modelling and resolving the problem; (ii) checking the robustness of the model - do the conclusions remain stable when the hierarchy of the problem is slightly modified?; (iii) considering the stability of the solutions when confronted with small changes in the judgments of the implicated actors.

4.3. Knowledge Extraction and Democratization

4.3.1 Stage 11: Assignment of messages to the alternatives and justification of positions: Based on the quantitative (intensities of the preferences) and qualitative (written messages) information incorporated in the discussion stage, data and text mining techniques are utilised to extract the arguments that support the decisions (Moreno-Jiménez et al., 2008; Moreno-Jiménez et al., 2009; Moreno-Jiménez, Aguarón et al., 2012; Moreno-Jiménez et al., 2013). From the intensities of the preferences (Moreno-Jiménez et al., 2008) the messages and comments are quantitatively assigned to the alternatives that they support. Employing data and text mining techniques, Moreno-Jiménez et al. (2009) were able to assign these same messages and comments to the different alternatives for the problem by using expert opinion and the construction of a grammar for the problem. Moreno-Jiménez, Aguarón et al. (2012) have developed a decisional tool that supports both quantitative and qualitative approaches to knowledge extraction.

4.3.2 Stage 12: Evaluation of individual and collective learning. A key aspect of the methodology that is especially related to the extraction and diffusion of knowledge concerning the scientific resolution of the problem is the identification of the social leaders: those individuals that have influenced the behaviour of others through the expression of their opinions on the social network. The learning procedure is evaluated by measuring, using quantitative methods, the changes in individual and collective preferences made after the

discussion process. To facilitate the internalisation of these changes, a graphic visualisation of the process is recommended wherever possible (Turón et al., 2008). The identification of the social leaders is a complex task that depends on the appellation given by the participants in the discussion process; the methodology allows for anonymous participation in the forum, participation under an alias or the use of the participant's real name. Due to the technological security measures employed in the evaluation procedure, it is not possible to check the real name of the social leaders. This stage can only identify the alias or names that are used.

4.3.3 Stage 13: Identification of arguments that support the decisions. Once the messages and comments have been assigned to the alternatives, the previously mentioned quantitative and qualitative procedures are undertaken (Stage 11). This allows the extraction of the arguments that support the decisions based on the list of messages in favour of a particular alternative or position.

4.3.4 Stage 14: Extraction and diffusion of knowledge. The final stage of the cognitive process is the diffusion of knowledge. This requires methodologies that are easily understood by the citizenry. Graphic visualisations are an excellent support for the democratisation of knowledge. The collective learning (social wisdom) provided by the methodology can mitigate the impact of unusual events, for example, terrorist attacks, and their influence due to media exploitation.

4.4. Evaluation and Documentation of e-Cognocracy

4.4.1 Stage 15: Effectiveness of e-Cognocracy. All assignments of public resources should conclude with an evaluation of effectiveness (Mamaqui and Moreno-Jiménez, 2009; Moreno-Jiménez, Pérez-Espés and Rivera, 2012). This requires a clear understanding of the strategic objectives and the measurement of their alignment with the decisions that are taken.

4.4.2 Stage 16: Documentation of the project. Irrespective of the process of diffusion, when implementing a project on "Electronic citizen participation in the design of public policies in the local environment", it is always advisable to fully document the experience for future reference and posterior use of the model; this usually takes the form a 'Final Report'. Other local authorities might wish to use the project as a template for projects in other municipalities in the region and, in the context of the KS, all and any municipalities with similar characteristics. It should be remembered that interoperability[1] is one of the basic requisites in the design of public policies in the local environment.

A summary of these stages grouped by blocks can be seen in Figure 1.

Block 1, Problem Formulation, refers to the initial problem proposed by the representatives or the citizens, its presentation to the actors involved in its resolution and its final setting.

Block 2, Problem Resolution, includes the two voting rounds, in which the scientific resolution of the problem is obtained using the Internet as communication support and AHP as the multicriteria decision making technique, interspersed with an e-discussion process, in which the actors justify their preferences. The online discussion is the step prior to the extraction of knowledge that takes place in third block. The discussion allows the creative capacity of all individuals interested in the resolution of the problem to be incorporated into the decision making process and this accords with Dahl's proposals (Dahl, 1989, 2000) on the improvement of democracy based on the use of ICT. The e-discussion allows the active citizens, a *minipopulus,* to complement the institutions in order to reduce the gap between the

[1] Interoperability in the context of the design of public policies refers to the fact that the methodology, the tools and the procedures used in a specific context of the Administration can be replicated in other Public Administrations. If the new context corresponds to the same level (local, regional, national or supranational), interoperability is horizontal and if it corresponds to a different level, it is vertical interoperability. When we replicate the methodology, tools and procedures in the same Administration, it can be referred to as intra-operability.

representatives/politicians, and the represented/citizens. Moreover, the e-discussion fosters, as argued by Habermas (Habermas, 1996), the co-creation of a more cohesive, fair, educated and effective society.

Block 3, Knowledge Democratization, provides the arguments that support the different positions, identifies the social leaders, the citizens whose arguments are followed by the majority of the citizens, and shares this knowledge in order to generate individual and social learning.

Finally, and as recommended for any procedure that makes use of public funds, Block 4, analyses the effectiveness (doing what is right), the efficacy (achieving goals) and the efficiency (doing things correctly) of the e-Cognocracy public policy making process.

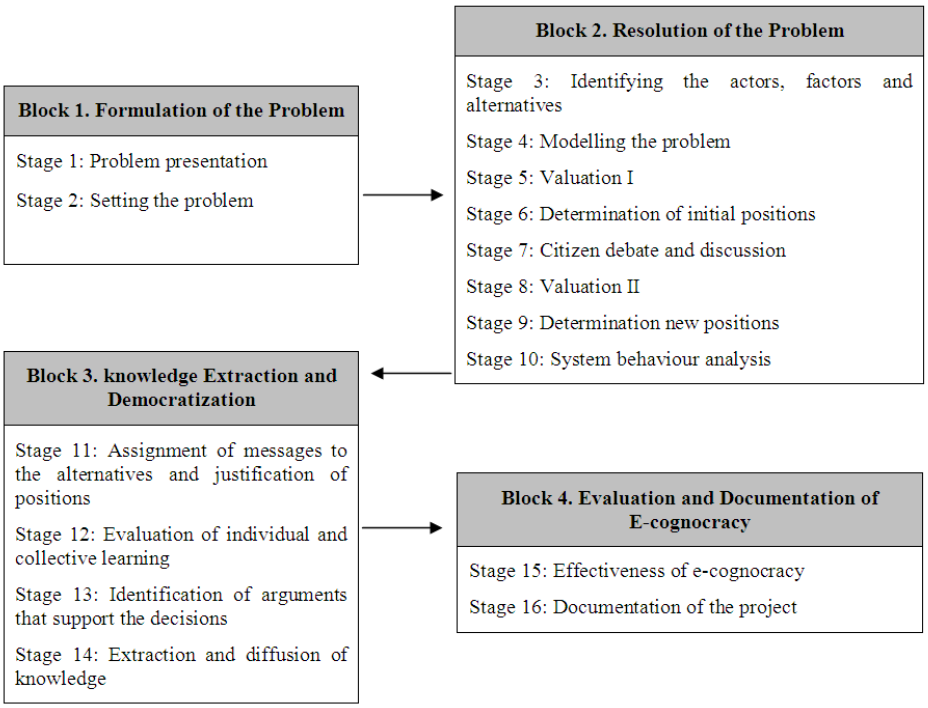

Figure 1. Blocks and stages of the e-Cognocracy based methodology.

5. The real-life experience in the municipality of Cadrete (Zaragoza)

This section describes a real-life experience in the design of public policies in the municipality of Cadrete (Zaragoza) that took place in April 2010. This initiative in electronic participation (https://participa.cadrete.es) based on e-Cognocracy was the third such local project undertaken in the region of Aragon by the Zaragoza Multicriteria Decision Making Group (http://gdmz.unizar.es). The project involved the design of cultural and sporting policies in the area. There were two main objectives: (i) that decisions relative to the distribution of the budget assigned to cultural and sporting activities should be conjointly made by politicians and citizens; (ii) the encouragement of debate and discussion and the implication of the citizens in making public policy decisions, more specifically, to publicly present the arguments that supported the decisions that were taken.

The model proposed for the budget assignment was a hierarchy with four levels: the goal or mission in the first level; two criteria (Cultural and Sports) in the second; six subcriteria, three for each criterion, in the third level and four alternatives (children, youth, adults, pensioners) in the fourth level. In order to foster participation it was decided to incorporate a new group of

actors, in addition to politicians and citizens: the neighbourhood associations, whose role would be to stimulate participation.

Therefore, there were three implicated groups with different weightings assigned by the representatives, following the suggestions of previous experiences (http://www.zaragoza.es/ciudad/presupuestos-participativos/) and trying to balance the importance of the groups in this specific context: (i) the *politicians* or the public representatives, with a weighting of 40%; (ii) the *citizens*, with a weighting of 44% and (iii) the *neighbourhood associations*, with a weighting of 16%.

Voting options in the consultation were: vote with electronic National Identity Card, and vote with username and password. Both options were open to citizens over the age of 18 on the electoral register of the municipality. Votes could be cast from personal computers with an Internet connection or by means of local council computers set up for the purpose and located at the municipal library and the town 'Cyberspace'. In order to exercise the right to vote, citizens, politicians and associations had to register with the citizen participation census based in the Town Hall for the two weeks pervious to the process, up to two days before the first round of voting. The census of the actors that complied with the participation requisites and the weighting assigned to each one is shown in Table 1.

Table 1. Electorate and weightings

Actors	Census	Weight
Citizens	1,949[*]	44
Politicians	11	40
Associations	15	16
Total	1,975	100

* Older than 18, with the right to vote in 2008, according to the Aragonese Institute of Statistics

Voters were able to determine the proportion of the economic and financial resources that would be given to each of the four population segments: Children (0-14 years), Youth (15-29), Adults (30-64) and Pensioners (over 65). A hierarchy of two criteria (cultural and sporting) and six subcriteria was designed. Three subcriteria were associated with cultural aspects: Education, Identity and Leisure, whilst the subcriteria for sporting aspects were Physical Development, Entertainment and Social Relationships.

5.1 The temporal sequence

The process comprised the following steps that correspond to the 16 stages of the methodology suggested in Section 3 for the design of public policies and to the structure of the e-Cognocracy democracy model (Moreno-Jiménez, 2003b, 2006; Moreno-Jiménez and Polasek, 2003):

Block 1. Problem Formulation

1. *Presentation and Setting the Problem*: this took place at the end of 2009
2. *Information and Training:* January-March, 2010.

Block 2. Problem Resolution

3. *Structuring* the problem in accordance with the methodology of the Analytical Hierarchy Process (Saaty, 1980): March 2010. This includes the identification of the elements and the hierarchical modelling of the problem (Stages 3 and 4).
4. *First Round of Voting:* the implicated actors (politicians, citizens and associations) registered at the Town Hall in the week before the first round of voting. They were given a username and a password. Registered participants were able to incorporate their preferences (cultural or sporting) between 1.00 p.m. and 12.00 midnight on the 8th of April

2010. This corresponds to Stage 5 of the methodology and revealed the actors' initial positions (Stage 6).

5. *Discussion* (Stage 7)*:* Between the 8th and 16th of April, an Internet Forum was used for debate. The Forum was open to everyone who wished to participate, even if they had not registered to vote. Different colour codes were used for Forum messages sent from registered participants and the non-registered participants.
6. *Second Round of Voting:* Registered participants were able to cast their votes between 12.00 midday and 7.00 p.m. on the 16th of April. The voting screen format can be seen in the Annex to this work. This step includes Stage 8 (valuation), Stage 9 (final positions) and Stage 10 (behaviour analysis).

Block 3. Knowledge Extraction and Democratization (Stages 11 to 14)

7. *Justification of positions and identification of arguments*: A total of 256 messages and comments were given by the participants in the e-Participation experience. From these comments it was possible to extract relevant information about the decision making process. However, due to the heterogeneity of the responses and the small sample sizes, it was not possible to identify arguments with a statistical significance. This prevented the measurement of the individual and social learning derived from the resolution process. A more detailed analysis of this stage can be seen in Moreno-Jiménez, Aguarón et al., (2012). This step corresponds to Stage 14 of the proposed methodology.

Block 4. Evaluation and Documentation

8. *Evaluation* (Stage 15): After the second round, the voters were asked to evaluate the experience by means of a questionnaire devised to analyse the effectiveness of e-Cognocracy in the design of public policies. There were 51 questions grouped in 7 sections: (i) The System of Citizen Participation; (ii) The Creation of a Better Society; (iii) Motivation; (iv) Evaluation of the Technological Support and Applications; (v) Evaluation of the Information; (vi) Evaluation of the Support Personnel and (vii) Overall Evaluation. The analysis of these results is currently the subject of a study (Moreno-Jiménez, Pérez-Espés and Rivera, 2012) that aims to establish a new methodology, based on structural equation models, which will consider the behaviour of democratic models from the point of view of their effectiveness, efficacy and efficiency (EF^3-evaluation).
9. *Presentation of Results* (Stage 16): The closing act of the Cadrete project took place on the 23rd of April 2010. The results were presented (https://participa.cadrete.es) and there was a prize draw among voters that the council had funded with the aim of encouraging participation.

6. Results

Cadrete is a municipality located 12Km south of the city of Zaragoza. According to the National Institute of Statistics, its population in 2009 was 2,777. The Aragonese Institute of Statistics[2] records that in 2008, the electorate of Cadrete was 1,949. In April 2010, the Mayoress of Cadrete was a member of the conservative *Partido Popular* (PP), who led the council in a coalition with the Aragonese Regionalist Party (PAR).

The methodological support employed for the project was based on the Analytic Hierarchy Process (AHP), a multicriteria system developed by T.L. Saaty (Saaty, 1980). The approach begins with the construction of a hierarchy (Figure 2) that covers all aspects relevant to the problem that is being considered. The preferences of the participants are then incorporated by means of pairwise comparisons of the elements under consideration, in accordance with Saaty's fundamental scale (Saaty, 1980). Finally, the methodology aggregates the values

[2] http://portal.aragon.es/portal/page/portal/IAEST/IAEST_0000/IAEST_08

throughout the hierarchy to obtain the preference for the alternatives with respect to the objective of the problem.

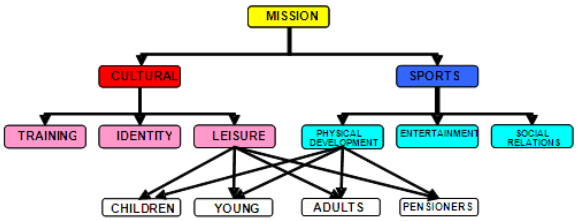

Figure 2. Cadrete project hierarchy

The consultation consists of two rounds of voting interspersed by a discussion stage. As shown in Table 2, in the first Cadrete vote[3] there were 43 participants, of which, 37 were citizens, 3 were politicians and 3 were neighbourhood associations; this represents a weighted participation of 14.96% (2.17% of the census total). In the second round[4], there were 41 participants – 35 citizens, 4 politicians and 2 neighbourhood associations, a weighted participation rate of 17.60% (2.08% of the census total).

It is clear from the analysis of the evolution of the vote in the two rounds that, in absolute terms, the variation is minimal, although the reduced number of voters means that the relative variation, at least among the politicians and neighbourhood associations, was significant (±33,3%), though minimal (±1) in absolute terms. Participation increased from 14.96% to 17.60%, a rise of 17.68%. In the first round, the voters favoured cultural criteria (53.46%) over sporting criteria (46.53%).

Table 2. Voting in the 2010 Cadrete project

Participants	Census	Voters 1st round	Percentage	Voters 2nd round	Percentage
Citizens	1,949 (*)	37	1.9%	35	1.8%
Politicians	11	3	27.3%	4	36.7%
Associations	15	3	20%	2	13.3%
Total	1,975	43	2.17%	41	2,08%
(weighted)			14.96%		17.6%

* Citizens over the age of 18 in 2008 according to the Aragon Institute of Statistics (IAEST)

As shown in Table 3, in the second round, the preference for cultural criteria increased to 56.58%, the preference for sporting criteria decreased to 43.42%.

Table 3. Priorities of the criteria according to the groups of actors

Voting round	Criteria	Citizens	Politicians	Associations	Total
1ª	**Cultural**	57.64%	53.35%	39.33%	53,46%
	Sporting	42.36%	46.65%	60.67%	46,54%
2ª	**Cultural**	62,56%	50,47%	54,88%	56,58%
	Sporting	37,44%	49,53%	45,12%	43,42%

After the first round of voting, the Forum was opened for discussion and debate[5] until the day before the second vote. As shown in Table 4, there were 61 messages, 37 referring to

[3] The results of the first vote can be seen at https://participa.cadrete.es/resultadosobtenidos.htm#ronda1.
[4] The results of the second vote can be seen at https://participa.cadrete.es/resultadosobtenidos.htm#ronda2
[5] The results of the Forum vote can be seen at https://participa.cadrete.es/resultadosobtenidos.htm#foro.

cultural criteria and 24 to sporting criteria. There were 195 comments made to the messages, 114 on culture and 81 referring to sport.

Table 4. Number of Forum messages and comments

FORUM	Culture	Sport	Total
Total messages	37	24	61
Total comments	114	81	195
Total	151	105	256

The discussion procedure began with identification by means of username and password given in the Forum or by password assigned by the municipal authorities. The Forum was organised by the themes of culture and sport and participants could send new messages or comments or simply view existing comments and messages that were grouped by the seven subcriteria considered by the problem (https://participa.cadrete.es).

Each message and comment included three quantitative evaluations that were later used to identify behaviour patterns: (i) the importance given by the sender of the message or comment, on a scale of 0-10; (ii) the importance given by the reader of the message, on a scale of 0-10; and (iii) an evaluation of the opinion. It should be noted that the Forum was at all times anonymous, there was no way to identify the person that made a particular comment. Participation in the Forum required observance of some basic standards of behaviour[6] and there was a facility for reporting any comment that did not comply with the Rules of Use.

In the Cadrete experience, arguments that supported the different positions of those implicated in the resolution of the problem were identified. With respect to the messages and comments that were written in the Forum, in the "Cultural" section, those that had the greatest impact referred to "free-time", with 18 messages (48.65% of the total). In the case of the "Sports" section, the messages assigned to the subcriteria "entertainment" represented 41.67% of the total. From this data, it can be concluded that the inhabitants of Cadrete, prioritised enjoyment and entertainment, as expressed in the Forum. The messages that received the greatest number of comments were those related with cultural trips, open-air activities, the organisation of more festivals and other similar activities.

Tables 5 and 6 show the number of messages assigned to the two criteria: cultural and sporting, in terms of the 6 selected Subcriteria: education, identity, leisure, physical development, entertainment and social relationships.

Table 5. Subcriteria of cultural criterion

CULTURAL	# of messages	Percentages
Education	10	27.03%
Identity	9	24.32%
Leisure	18	48.65%
Total	37	100%

Table 6. Subcriteria of sportive criterion

SPORTIVE	# of messages	Percentages
Physical Development	8	33.33%
Entertainment	10	41.67%
Social relationships	6	25.00%
Total	24	100%

[6] Available at: https://participa.cadrete.es/ayuda/index.htm#debateindex.

From the messages and comments received in the forum, it was clear that there were social leaders that, even in the network, were able to encourage participation and have an influence on the think- ing and actions of others. Depending on the attractiveness of the message, the relationship with the issue, its relevance or the possi- bility of implementation, a given message received a greater or lesser number of comments. For example, there were some messages which did not receive any comments whilst others received as many as 10 additional comments, creating small debates in which in- dividual and social learning was engendered and from them (the comments), the extraction of knowledge is allowed (Moreno-Jiménez et al., 2013). In future papers, our research group will focus on patterns of behaviour, trends and decisional opportunities which explain and determine the behaviours of the social leaders and seek to quantify their influence on the rest of the participants, in a similar manner to previous experiences, such the Gran Scala pro- ject (Moreno-Jiménez et al., 2008, 2009).

A detailed description of the stages followed by the participants in the collaborative governance process can be seen at https:// participa.cadrete.es (in Spanish). The final percentage of the total budget assigned to the four alternatives was: Children 33.41%; Youth 30.09%; Adults 18.45% and Pensioners 18.05%.

6.1 Discussion

The e-Cognocracy-based methodology was applied to a real-life situation concerning the electronic design of cultural and sporting policies in the municipality of Cadrete, near the city of Zaragoza. There were three social actors: the politicians, the citizens and the neighbourhood associations, with respective weightings of 40%, 44% and 16%, and two systems for the implication of the citizens: Electronic National Identity Card and Username with Password.

From a technical and methodological point of view, the project was a great success; the system for authentication and security, the incorporation of preferences, the identification of individual and collective priorities and the discussion forum all functioned perfectly. This sharply contrasts with a similar, e-voting project undertaken by the Barcelona City Council on plans to restructure the Diagonal, one of the main thoroughfares of the city. The Barcelona project had serious problems in the aforementioned technical areas of the process (Moreno-Jiménez and Velázquez, 2011) and cost the council more than 3 million euros. The successful Cadrete project, on the other hand, was of insignificant cost to the local council as the personnel belonged to a Research Group funded by the Regional Government of Aragon.

The least successful aspect of the Cadrete project was the level of participation (2.08% of the total population and 17.60% of the weighted population). There are a number of factors that influenced this figure, the most significant of which are:

(i) The lack of interest stimulated by the problem – probably the most important factor. In the Presentation stage, the citizens favoured a controversial "*hot potato*" as the issue to be resolved by the e-Cognocracy project but this was rejected by the research team (GDMZ) as it believed that a polemical or politically sensitive issue might lead to the local council withdrawing its support for the project.

(ii) The lack of an institutional culture of participation – Previous GDMZ e-participation projects for the Zaragoza City Council (http://www.zaragoza.es/ciudad/presupuestos-participativos/) found that opposition parties tend to automatically oppose the proposals of the parties in power (Moreno-Jiménez and Velázquez, 2011). This has proved to be the case with all Aragonese political parties of all political colours, and obviously discourages the participation of those who support the opposition parties. This suggests that actions to foster institutional participation are necessary for increased participation by the citizenry.

(iii) The originality of the procedure followed for the incorporation of the preferences of the citizenry may have led to the abstention of citizens that felt less competent in the use of ICT or analysis tools. It should be pointed out that, in contrast to the Barcelona Diagonal project, the Cadrete vote was not limited to the selection of one option from a discrete set of elements but it incorporated the intensities of the preferences in terms of the criteria and subcriteria and the alternatives considered in the hierarchical modelling (AHP) of the problem, and this is obviously much more complicated and demanding. We believe that regular use of this methodology would lead to greater understanding by the citizens who would be more comfortable with its use and this would encourage increased participation.

An easy-to-use procedure for eliciting the preferences, an institutional culture of participation and the importance of the issue are necessary conditions but not sufficient to guarantee citizen participation in public decision making. The key factor is the development of an *individual culture of participation*, in other words, the motivation that could cause a person to feel the need to be involved in the resolution of public policy problems. It seems that the individual's contribution to the conjoint construction of a better society through the utilisation of their wisdom and knowledge is a factor that motivates implication. It is vital that the individual citizen is conscious of the value and utility that their contribution has to the common wellbeing of the population and that this is recognised by society.

With regards to the e-discussion stage of the e-Cognocracy methodology, the Forum was developed for the generation and exchange of information and the interaction of the participants in the design of cultural and sporting policies in Cadrete, thereby creating a virtual area for communication and collaboration. The small number of responses and the open discussion made it impossible to utilise the GDMZ Text Mining tools for the extraction of knowledge occasioned by the discussion process.

From a practical point of view, the messages and comments emitted in the Forum allowed the authorities to obtain information on the opinions of the citizens concerning cultural activities, in particular, the preferences for youth activities, something that was unknown to that date.

The creative capacity of the collective in the resolution of complex problems and its potential in the construction of knowledge concerning the politicians and their actions and reputations are the two factors that would most motivate the implication of the citizen. These ideas accord with most of the seminal proposals for e-Participation in public policies and democracy (Dahl, 1989; Putnam, 1993; Habermas, 1996; Held, 1996).

7. Conclusions

This work put forward an original methodology made up of 16 stages (Figure 1), grouped into 4 blocks (Proposal; Resolution; Democratisation of Knowledge and Evaluation), for the systemisation of the global process of the design of public policies in the context of the democratic model known as e-Cognocracy.

The new methodology is based on two fundamental concepts: (i) the consideration of multiple actors (politicians, citizens, associations etc.) in the conjoint establishment of a better society, and (ii) the cognitive orientation of the global process, that is to say, the continuing education of the citizens and of society in general as the basis for the effectiveness of the democratic model. It must not be forgotten that, in accordance with the evolution of living systems (Moreno-Jiménez, 2003a), only the species that are capable of learning and adapting to their context survive. The proposed methodology increases the capacity of institutions to solve highly complex problems related with public decision making, particularly decisions concerning strategic planning.

In spite of the low level of citizen participation (17.6% weighted participation), the e-Democracy experience undertaken in Cadrete made it clear that voters preferred to assign greater economic resources to cultural activities for children. The percentages assigned to each of the four population segments (the alternatives) by the Cadrete vote were respected by the political representatives and incorporated into the municipal budget approved for 2011 (https://participa.cadrete.es/documents/Presupuesto2011.pdf).

From the preferences and comments made in the forum, it was possible to extract relevant information, in particular, on the cultural aspects that were less known to the representatives than the sporting options.

The heterogeneity of the responses and the small sample size of the clusters impeded the extraction of arguments with statistical significance and this prevented the measurement of the individual and social learning derived from the resolution process.

The characteristics of the real-life case study, a rather aseptic case aimed at avoiding political confrontation, made it difficult to appreciate the true possibilities of e-debates in political discussions. It is hoped that the problem that will be dealt with in the next real-life experience will generate sufficient interest among the citizenry so that the potential of Text Mining tools in political debate will be fully utilised and understood.

The effectiveness (doing the right thing) of e-Cognocracy in the design of public policies was empirically confirmed by the results of the survey undertaken at the end of the Cadrete experience (Moreno-Jiménez, Pérez-Espés and Rivera, 2012), although the small sample size did not allow all of the conclusions to be generalised. This question, and a new methodology for the extraction of the arguments that support the decisions, will be the subjects of a future study and paper.

The project was implemented in a local context (the municipality of Cadrete). Our objective is to extend this work to regional, national and even international environments. Moreover, the task of encouraging citizen participation must continue, alongside efforts to mitigate the complexity of current public voting processes.

References

Anderson, J.E. (2011). *Public Policy Making*. WADSWORTH Cengage Learning.

André, F.J., Cardenote, M.A, & Romero, C. (2010). Designing Public Policies. An approach based on multicriteria analysis and computable general equilibrium modeling. *Lecture Notes in Economics and Mathematical Systems 642*. Springer.

Ballart, X., & Ramio, C. (2000). *Ciencia de la Administración*. Tiranch lo Blanch. Valencia. Spain.

Barber, B. (1984). *Strong Democracy: Participatory Politics for a New Age*. University of California Press, Berkeley.

Baeck, L. (1994). *The Mediterranean Tradition in Economic Thought*. Routledge, Londres y Nueva York.

Bell, D. (1973). *The coming of Post-Industrial Society, N.Y Basic Books.*

Bessette, J.M. (1980). Deliberative Democracy: The Majority Principle in Republican Government. In R. Goldwin and W. Schambra (eds.), *How Democratic is the Constitution*, Washington: American Enterprise Institute, 102-116.

Birkland, T.A. (2010). *An introduction to Policy Process. Theories, Concepts and Models of Public Policy Making*. M.E. Sharpe, USA.

Bohman, J. (1998). The Coming Age of Deliberative Democracy. *Journal of Political Philosophy* 6(4), 400-425.

Castells, M. (2002). *La dimensión cultural de Internet*. Universitat Oberta de Catalunya.

Chang, I. C., Li, Y. C., Hung, W. F., & Hwang, H. G. (2005). An empirical study on the impact of quality antecedents on tax payers' acceptance of internet tax-filing systems. *Government Information Quarterly* 22(3), 389–410.

Coursey, D., & Norris, D. F. (2008). Models of E-government: Are they correct? An empirical assessment. *Public Administration Review* 68(3), 523–536.

Dahl, R. (1989). *Democracy and its critics*. New Haven: Yale University Press.

Dahl, R. (2000). *On democracy*. New Haven: Yale Nota Bene.

Dryzek, J. (2000). *Deliberative Democracy and Beyond*. Oxford University Press, New York.

Dunn, W.N. (1981). *Public Policy Analysis.* Englewood Cliffs, Prentice Hall.

Drucker, P. F. (1969). *The Age of Discontinuity. Guidelines to our Changing Society*. Harper & Row. New York

Drucker, P. F. (1994). *The Age of Social Transformation. The Atlantic Monthly* 273(11), Boston, http://www.theatlantic.com/election/connection/ecbig/soctrans.htm

Dye, T.R. (1975). *Understanding Public Policy.* Englewood Cliffs, Prentice Hall.

Elster, J. (1998). Introduction. In J. Elster (ed.), *Deliberative Democracy*, Cambridge University Press.

Escobar, M.T., & Moreno-Jiménez, J.M. (2000). Reciprocal distributions in the Analytic Hierarchy Process. *European Journal of Operational Research* 123(1), 154–174.

Escobar, M.T., & Moreno-Jiménez, J.M. (2007). Aggregation of Individual Preference Structures. *Group Decision and Negotiation* 16(4), 287–301.

Faure et al. (1972). *Learning to be. The World of Education Today and Tomorrow.* UNESCO/Harrap. Paris/London,

Fishkin, J. (1991). *Democracy and Deliberation*. Yale University Press, New Haven, CT.

García Lizana, A., & Moreno-Jiménez, J.M. (2008). Economía y Democracia en la Sociedad del Conocimiento. *Estudios de Economía Aplicada* 26(2), 181–212.

Gargarella, R. (1995). *Nos los representantes. Crítica a los fundamentos del sistema representativo.* Mino y Dávila. Buenos Aires.

Habermas, J. (1996). *Between facts and norms: Contributions to a discourse theory of law and democracy*. Cambridge, Mass: MIT Press.

Haskell, J. (2001). *Direct Democracy or Representative Government. Dispelling the Populist Mith.* Westview Press, Oxford.

Held, D. (1996). *Models of Democracy*. Cambridge: Polity Press.

Jorgensen, D., & Cable, S. (2002). Facing the challenges of e-government: A case study of the city of corpus christi, Texas. *SAM Advanced Management Journal* 67(3), 15–21.

Lowi, T.J. (1964). American Business, Public Policy, Case-Studies and Political Theory. *World Politics* 16, 677–715.

Mamaqui, X., & Moreno-Jiménez, J.M. (2009). The effectiveness of e-Cognocracy. In M.D. Lytras et al. (Eds.) WSKS 2009. *Lecture Notes in Artificial Intelligence* (LNAI) 5736, 417–426. Springer-Verlag.

Medaglia, R. (2012). eParticipation research: Moving characterization forward (2006-2011). *Government Information Quarterly*, doi: 10.1016/j.giq.2012.02.010.

Moreno-Jiménez, J.M. (2003a). Los Métodos Estadísticos en el Nuevo Método Científico, In Casas, J.M. & Pulido, A. (Eds.), *Información económica y técnicas de análisis en el siglo XXI*. Instituto Nacional de Estadítica, 331–348.

Moreno-Jiménez, J.M. (2003b). Las Nuevas Tecnologías y la Representación Democrática del Inmigrante. En ARENERE, J.*: IV Jornadas Jurídicas de Albarracín* (22 pp.). Consejo General del Poder Judicial. TSJA, Memoria Judicial Anual de Aragón del año 2003, p. 66.

Moreno-Jiménez, J.M. (2006). E-Cognocracia: Nueva Sociedad, Nueva Democracia. *Estudios de Economía Aplicada* 24(1-2), 559–581.

Moreno-Jiménez, J.M. (2009). Participación Ciudadana Electrónica en el Diseño de Políticas Públicas Locales. Dirección Gral. Participación Ciudadana, Gobierno de Aragón (http://aragonparticipa.aragon.es/images/stories/2011/DOCUMENTOS_Y_ENLACES/PUBLICACIONES_PROPIAS/Investigaciones/e-cognocracia.pdf).

Moreno-Jiménez, J.M., Aguarón, J., Cano, F.J., & Escobar, M.T. (1998). Validez, Robustez y Estabilidad en Decisión Multicriterio. Análisis de Sensibilidad en el Proceso Analítico Jerárquico. *Revista Real Academia de Ciencias Exactas, Físicas y Naturales* 92(4), 387–397.

Moreno-Jiménez, J.M., Aguarón, J., Escobar, M.T., & Turón, A. (1999). The Multicriteria Procedural Rationality on Sisdema. *European Journal of Operational Research* 119(2), 388–403.

Moreno-Jiménez, J.M., Aguarón, J., Cardeñosa, J., Escobar, M.T., Salazar. J.L., Toncovich, A., & Turón, A. (2012). A Collaborative Platform for Cognitive Decision Making in the Knowledge Society. *Computers in Human Behavior* 28(5), 1921-1928.

Moreno-Jiménez, J.M., Cardeñosa, J., & Gallardo, C. (2009). Arguments that support decisions in e-Cognocracy: A qualitative approach based on text mining techniques. *Lecture Notes in Artificial Intelligence* (LNAI) 5736, 427–436. Springer-Verlag.

Moreno-Jiménez, J.M., Cardeñosa, J., Gallardo, C., & de la Villa-Moreno M.A. (2013). A new e-learning tool for cognitive democracies in the Knowledge Society. *Computers in Human Behavior* 2176. 10.1016/j.chb.2013.04.027.

Moreno-Jiménez, J.M., Escobar, M.T., Toncovich, A., & Turón, A. (2008). Arguments that support decisions in e-cognocracy: A quantitative approach based on priorities intensities. *Communications in Computer and Information Sciences* (CCIS) 19, 649–658. Springer.

Moreno-Jiménez, J.M., Pérez-Espés. C., & Rivera, P. (2012). EF^3-Evaluation of the e-Cognocracy: Effectiveness, Efficacy and Efficiency under the perspective of structural models. *WSKS 2012 Proceedings*, Rome, 20-22 June.

Moreno-Jiménez, J.M., **&** Polasek, W. (2003). E-democracy and Knowledge. A Multicriteria Framework for the New Democratic Era. *Journal Multicriteria Decision Analysis* 12, 163–176

Moreno-Jiménez, J.M., & Velázquez, M. (2011). Algunas notas sobre participación electrónica municipal en España. Dos experiencias reales en el 2010: Cadrete (Zaragoza) y Barcelona. *Revista Eletrônica de Sistemas de Informação* 10(1), doi:10.5329/RESI.2011.1001002.

O'Donnell, G. (1998). "Accountability horizontal". *La Política, nº 4*. Barcelona, Paidós.

Padioleau, J. G. (1982). *L'Etat au concret*, PUF.

Parent, M., Vandebeek, C., & Gemino, A. (2005). Building citizen trust through e-government. *Government Information Quarterly* 22(4), 720–736.

Pressman, J., & Wildawsky, A. (1973). *Implementation*. Berkeley.

Putnam, R.D. (1993). Making Democracy Work. Civic traditions in modern Italy, Princeton, NJ: Princeton University Press.

Rawls, J. (1971). *A Theory of Justice*. Belknap Press of Harvard University Press.

Roy, B. (1993). Decision science or decision-aid science? *European J. of Operational Research* 66, 184–203.

Saaty, T.L. (1980). *The Analytic Hierarchy Process*. McGraw-Hill, New York.

Saebo, Ø., Rose, J., & Skiftenes Flack, L. (2008). The shape of eParticipation: Characterizing an emerging research area. *Government Information Quarterly* 25, 400–428.

Stehr, N. (1994). *Knowledge Societies: The Transformation of Labour, Property and Knowledge in Contemporary Society*. Sage. London

Turón, A., Moreno-Jiménez, J.M., & Toncovich, A. (2008). Group Decision Making and Graphical Visualization in e-Cognocracy. *Computación y Sistemas* 12(2), 183–191.

UNESCO (2005). *Towards Knowledge Societies*. UNESCO World Report, available at http://unesdoc.unesco.org/images/0014/001418/141843.pdf.

Van Dijk, J.A.G.M., Peters, O., Ebbers, W. (2008). Explaining the acceptance and use of government internet services: A multivariate analysis of 2006 survey data in the Netherlands. *Government Information Quarterly* 25(3), 379–399.

Verdegem, P., & Verleye, G. (2009). User-centered e-Government in practice: A comprehensive model for measuring user satisfaction. *Government Information Quarterly* 26(3), 487–497.

Weimer, D. L. & Vining, A. R. (1999). *Policy Analysis. Concepts and Practices.* Prentice-Hall. New Jersey

Zimmerman, J. F. (1986). *Participatory democracy. Populism revived*. Praeger, NY.