Participation and e-Democracy
How to utilize Web 2.0 for policy decision-making

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ABSTRACT
This paper investigates in how to utilize ICT and Web 2.0 technologies and e-democracy software for policy decision-making. It introduces a cutting edge decision-making system that integrates the practice of e-petitions, e-consultation, e-rulemaking, e-voting, and proxy voting. The paper demonstrates how under precondition of direct democracy through the use this system the collective intelligence (CI) of a population would be gathered and used throughout the policy process.

Categories and Subject Descriptors
J.1. [Government], K.4.m [Miscellaneous], K.5.2 [Regulation], H.4.2 [Decision support]

General Terms
Design, Human Factors

Keywords
E-democracy, Web 2.0, civic engagement, deliberative democracy, participatory decision-making (policy cycle), proxy voting, collective intelligence (CI)

1. INTRODUCTION
This paper is a summary of a PhD thesis proposal. The first part of this thesis will develop a theoretical model that illustrates how modern technology could enhance the age-old process of democracy. In part two the components of this ICT model will be implemented as prototype software. In the last part this software will be applied and tested in a real-life case study by involving public consultation. The aim of the research is to gather qualitative and quantitative data for the evaluation of the software and to determine if and in what way it is able to facilitate and improve democratic processes.

The current article summarizes part one of this thesis (the research proposal). After the determination of the theoretical backgrounds and preconditions the Web 2.0 based ICT software model will be introduced, and its components exemplified. Subsequently it will be illustrated how this software would be applied in the policy process. Hereby a hypothetical case scenario will demonstrate how the civic society would use the software system to determine and resolve a policy problem. The article concludes with a summary of the benefits that the system is supposed to generate after being implemented successfully.

1.1 Forms of democracy
The origins of the word democracy are the Greek words demos (i.e. people) and kratos (i.e. rule); it refers to a form of government where the people rule in contradiction to a monarch or autocrat. This chapter outlines the three models of democracy (as described by Held, 2006) which are of relevance to the later introduced the ICT system.

The predominant form of democracy established in political reality is liberal or representative. This refers to a system of rule embracing elected officers who undertake to represent the interests and/or views of citizens within a framework of the rule of law. Apart from the periodic involvement in the elections the electorate is hereby excluded from political decision-making. This “governmental paternalism” may have caused the lack of political interest, knowledge, and responsibility among the non-participating population, and its disenchantment with politics which can be observed in so many modern societies.

In contrast to that, direct and participatory democracy refers to a system of decision-making about public affairs in which the citizens are directly involved. Although some countries like Switzerland provide participatory procedures like referendums or initiatives (cf. Huber, 2007) this form of government has scarcely been implemented. Important points of criticism against direct participation are that ordinary people (in contrast to “professional” politicians) would not be qualified to resolve complex political decisions.

A comparable form is deliberative democracy. This term refers to ‘any one of a family of views according to which the public deliberation of free and equal citizens is the core of legitimate political decision-making and self-governance’ (Bohman, 1998). This contemporary model requires deliberative procedures such as polls, e-government initiatives, as well as e-democracy programs as key features. (cf. Held, 2006)

E-democracy comprises ICT technology that seeks to enhance the democratic processes within a democratic republic or representative democracy. Although it is as political development
still in its early infancy, practices like e-petitions, e-consultation, e-rulemaking, e-discussions, e-voting are gaining ground in some modern countries. Proponents see e-democracy as a way to make policy processes more accessible and to increase citizens’ participation in public decision-making. (cf. E-democracy, Wikipedia)

Inspired by the ability of emerging internet technologies and trends like Web 2.0, wikis, or social networks to enable mass collaboration and interaction (peer-to-peer, one-to-many, many-to-one, and many-to-many) authors like Chadwick (2008), Macmillan), or Chang (2008) indicate that these technologies will have an tremendous impact on governmental service delivery, (e-)democracy, and (e-)voting. Web 2.0 refers hereby to technologies and trends in the Internet that shift the production of content from a website administrator to the users (cf. Chang, 2008).

1.2 Intention
This paper will introduce a cutting edge software system for collaborative policy decision-making and the direct voting of representatives. This software is based on a democratic model that combines aspects and features of direct/participatory democracy, representative democracy, deliberative democracy, e-democracy, and Web 2.0 technology.

The innovative approach which has been chosen in this work reflects on the recommendations of Chang and Kannan (2008) to learn and keep an open mind on how to utilize Web 2.0, to rethink the delivery of governmental information and services, and to develop an inventory of Web 2.0 issues.

Before this system is demonstrated the paper introduces an online platform that has successfully implemented Web 2.0 technologies that are relevant to the current endeavor.

1.3 A paragon for Web 2.0
Dict.cc is a free online dictionary which was created and is administrated by Paul Hemetsberger in Vienna, Austria. The main difference to conventional translation services is that its contents (i.e. English/German translations) are not exclusively created and updated by a limited number of designated authors (institutional/web 1.0 approach), but by every website visitor who decides to contribute linguistic knowledge.

The cutting-edge Web 2.0 approach enables users to access the database and increase the quantity (i.e. number) and the quality (i.e. correctness) of its content: Users can (1) suggest new translations, (2) correct, review or verify translations of other users, and (3) report translation mistakes and delete junk entries and (4) record words for the audio voice output. A democratic voting algorithm requires the users hereby to increase the correctness of the co-created content: A new entered translation is just assumed to be correct after it has been verified by 10 other users (or after 10 users have corrected it in the same way). Vice versa this voting method applies to deletions. To accelerate this verification process more experienced contributors can raise their voting power by improving their voting accuracy (i.e. the percentage of their votes that have been accepted unchanged).

A forum serves the participants to compromise on more complex translations, and the websites’ guidelines: i.e. an act of rules that determines the formation of translations. As the forum alone does not provide the agency to define such rules democratically, Mr. Hemetsberger announced that he will implement a similar voting algorithm for the co-creation of these guidelines.

Results and Findings
Since its start in 2002 dict.cc has by this means generated content and a community that didn’t exist before. Its 8017 contributing users have entered 357192 translations which benefit a fast growing community of 46.565 registered users and about 3.5 million unique visitors per month1. The content is created voluntarily by the users. The value of this output increases with the number of participants (cf. Network effect). The community applies new Web 2.0 components as suggested by the administrator as long as this increases the value of the output. This self-selected community involves characteristics like autodidactism (self-educated “e-learning”), deliberation in a forum, self-regulation through the democratic voting algorithm, self-administration (Mr. Hemetsberger is the only website administrator) and social network sites (such as face book).

Although dict.cc is not related to governance its Web 2.0 characteristics have inspired the development of the here suggested e-democracy system.

2. THE E-DEMOCRACY SYSTEM
The application of Web 2.0 on the level of governance could imply a shift of control over its output (i.e. policies, laws; public services) from the established authorities to its customers (i.e. the people). This paper illustrates how Web 2.0 could be applied in this way. In the following it will be described how a theoretical e-democracy system (EDS) would involve both governmental and non-governmental actors in the process of policy making (i.e. common people, NGOs, lobbies, unions; public servants, politicians, parties and other political institutions). This system would strive for a co-creation of informed consensus decisions in a deliberative and collaborative way, free of polemic, mass media bias, and corruption. The EDS seeks to gather the collective intelligence (wisdom of crowd) and to utilize it for collective decision-making:

- Collective intelligence (CI) is hereby a shared group intelligence that emerges from the collaboration, competition and consensus decision making of the electorate (cf. Wikipedia, Collective intelligence; Surowiecki, J. 2004).
- Consensus-oriented are hereby such decisions that seek not only the agreement of most people, but also the resolution of minorities to reach a decision which is optimal for the whole population. (cf. Wikipedia, Consensus-decision making)

In order to achieve this goal the proposed ICT system requires software solutions that enable the actors to:

- Suggest new policy issues (→Suggestion system)
- Form pressure groups to collaborate on common interests and issues (→Lobby group)
- Particularize policy issues for the information of other actors (→Policy wiki)
- Participate in the political debates (→E-discussion forum)

1 Cf. www.dict.cc accessed 07.03.2009
2 E.g. 100000 voice recordings were contributed since the introduction of the new recording tool in early 2008
3 I.e. 400000 postings in the forum discussion
• Evaluate suggested policy strategies (Evaluation system)
• Vote policy strategies (Decision-making system)
• Determine representatives (Proxy representation)

Each of the corresponding software components offers two participation options to the citizens:
(1) Direct (i.e. participation in person), or
(2) Indirect, by delegating a proxy to participate on one’s behalf (see proxy representation).

2.1 Suggestion system
The suggestion system (SS) is the first key component of the e-democracy system. It is a public database that collects and elaborates petitions to government officials and policy makers. Every actor can suggest an observed problem, a political goal, a strategy (see: scenario example), or a candidate for a political position (see: proxy government). All petitions are listed and displayed by the SS. The hierarchy of the petition list is determined in a mutual ranking process of other actors. By mouse clicking, those who agree with a suggestion can rank it up, and those who disagree rank it down. As a result, the petition with the most proponents and least opponents appears on the first rank (and vice versa). The SS can be initiated by both governmental and non-governmental actors.

2.2 Passive initiation of the suggestion system
If an actor (e.g. citizens, governmental agency) submits a new petition, the suggestion system is initiated passively. First, the submitter has to select a policy category in the system (e.g. urban planning, education, health etc.) which relates most to the petition. If a similar suggestion has been lodged before, the system will display it. In this case, the submitter can decide either to change his proposal or to support the preexisting suggestion (by ranking it up). Just if the petition is unique it can be submitted as a new policy suggestion. Hereby a questionnaire form with guidelines specifies how the petition has to be formulated by the submitter.

The aim of the suggestion system is to enable not just established (political) institutions but also minorities to propose their political interests to the entire electorate (cf. popular proposal) as a specified number of supporters can force their proposal to be analyzed in the evaluation system (see below). The initiators and supporters of such a petition can form a lobby and press for the implementation of their interests (minority protection). Vice versa the opponents can form a lobby to go against it (see lobby group).

2.3 Active initiation of the suggestion system
If, on the other hand, the submission system is used by a governmental agency to call for proposals for policy issues in process, it is used actively. In this way it is used especially in the third level of the policy cycle where the public is asked to submit strategies for a policy goal (see policy cycle below). Herby people are encouraged to prepare their suggestions independently and lodge them in two or more rounds. By this means thousands of proposals are gathered in each round. After each round an anonymised summary of the suggestions and explanations is published on a public wiki page (see policy wiki below). In the following rounds people are encouraged to revise their earlier suggestions in light of the replies of the other constituents before they submit them again. Through this summary and revision process the range of suggestions should decrease (screening method) and converge towards “optimal” suggestions. The process is stopped after a pre-defined stop criterion is reached (cf. Delphi method, Wikipedia). The results should be categorized and well ordered for the subsequent ranking and evaluation process (see evaluation system).

2.2 Lobby group (network)
The suggested EDS provides a social network service (cf. face book) that facilitates the convergence and collaboration of interest groups (such as the proponents/ opponents of a petition) and politically like-minded people. This service provides Web 2.0 tools for their communication, organization, strategy, and decision-making, as well as general guidelines for the group setup. On a profile the group expresses its political interests, philosophies, believes and goals. Within the network individual groups can cooperate with each other (e.g. on common policies), merge or split up.

The aim of the social network service is to enable the civic society to form (ad-hock) pressure groups that are based on issues that are not covered by a political party (minority protection). If a lobby group accumulates a certain number of constituents it can apply as new political party, set up an e-discussion forum, a policy wiki document, apply the evaluation system, or even call for a popular vote on suggested issues; i.e. initiate a new policy cycle (see below).

2.3 E-Discussion forum
The e-discussion forum (e-DF) is the “deliberative assembly” of the hypothetical decision-making system. A (new) discussion always relates to a certain policy issue for which it engages its proponents, opponents, and indifferent actors (non-exclusiveness). Here the different lobbies, proxies, politicians, domain experts, professionals, policy analysts, NGOs, and common people can witness and contribute to the debate by asking or answering questions, making comments, giving feedback, or by calling for ad-hoc polls for internal decisions. With growing number of panelists a discussion can hereby be divided into sub focus groups in order to increase the overall efficiency; these however have to disclose their findings to the main discussion.

The aim of the e-discussion forum is to facilitate and encourage a factual, thorough, and consensus oriented discussion. The openness of the forum seeks to avoid the screening of certain topics, persons, or information - as it can be done by individual authorities of mass media providers. By ranking the contributors and their contributions, the participating majority itself determines the relevancy of discussion contents. The forum provides internal polls to the panelists in order to consent on certain issues or make petitions to other actors: By aggregating “signatures” the panelists can encourage important actors (e.g. politicians or institutions relevant to the current issue) to participate in the discussion or to comment on distinct issues. Thus, it becomes awkward for key personalities to ignore unpleasant questions, affairs or

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4 E.g. number of rounds, achievement of consensus, stability of results
stakeholders. To maximize the systems transparency and to facilitate later reviews all discussions are automatically recorded and archived.

2.4 Policy Wiki
The suggested e-democracy system provides a device that facilitates the particularization of policy issues. A policy wiki is a collaborative online document that provides general information about a certain policy issue (e.g. The Australian financial crises). A new wiki could be initiated by the supporters of a petition (lobby) and can be edited by any authenticated actor such as proponents, opponents, and indifferent people. All policy wikis together may result in a “policy encyclopedia” that covers all policy aspects and brings them in context. In contrast to the forum (where standpoints and arguments are discussed) a policy wiki intends to provide factual information such as the results of a survey or a vote. A wiki article should comprise the following components:

- Wiki title (e.g. “Suburban beer bottle pollution”; see scenario example below)
- The policy category (e.g. infrastructure, immigration, etc.)
- A brief definition and summary of the policy issue at the beginning of the article
- The status of the issue in the policy cycle and interim results of each stage (see policy cycle)
- Detailed information about the policy issue, including text, graphics, tables, photos, audio, or video material
- A contraposition of the issues’ pros and cons, and the different perspectives of the proponents and opponents
- A regularly updated summary of the findings of the e-DF
- Statistics about the participators and their contributions
- Link and references containing:
  - Internal links to the wikis of related policy issues
  - Links to related entries in the suggestion system, the discussion forum, the evaluation system, the decision-making system and the participating lobby groups
  - Links to related entries in the constitution or law
  - Links to external information and learning resources (e.g. websites of universities, research institutions, statistical offices, media platforms, etc.)
  - Links to data records of previous policy issues cycles such as data achieves of speeches, discussions, commends, suggestions, etc.

The aim of a policy wiki is to encourage “informed decisions” by providing the electorate with neutral information and facts about the decision content (in contrast to decisions based on believes, emotions, and/or polemical campaigns). Complex issues would hereby be simplified in order to make them comprehensible for non-experts. The openness of the wiki seeks to avoid the screening of certain topics, contributors, or information (as it can be done by mass media stations).

2.5 Evaluation System
The evaluation system (ES) is the second key component of the decision-making algorithm. The e-democracy system imports hereby the top-ranked petitions from the suggestion system (see SS) in order to analyze them before a final decision can be made upon them. The ES conducts an online survey and addresses the population as research panel. It compromises two steps: In step one, the lobbies, experts5 (e.g. researchers, analysts, professionals, politicians), as well as the indifferent people are asked to specify the upsides and downsides of each suggested strategy, i.e. it’s positive and negative consequences for state, society and people. In step two the population is asked in a questionnaire if and in what way people feel affected by each of these consequences (e.g. directly / indirectly, short-term/long-term; intensity of impact).

Figure 1 shows the potential outcome of a survey conducted by the ES. In this case 70% of the population expects to be affected positively and 30% negatively by option B, the second of three suggested strategies to reach a certain policy goal.

The aim of the evaluation system is to make people aware of how their decisions will impact on themselves and others; e.g. if it would strongly discriminate a minority group, or if it would have negative side effects in other public domains. Based on this information the electorate is encouraged to make a (consensus) decision that is ideal for the community as a whole (and not just for the majority) and in the long run (and not just in the short run). If such an ideal solution cannot be found the discriminated minority could suggest an alternative proposal as trade-off.

2.6 Decision-making system
The decision-making system (DMS) is the last component of the e-democracy system. Here one of the prepared and evaluated strategies is chosen for implementation by means of a popular vote. The popular vote is the main direct democracy component and requires to be established by law. Such as the other components of the e-democracy system the DMS would offer the electorate two ways of participation: (1) Direct, by attending in person, or (2) indirect, by delegating a proxy to vote on one’s behalf (see Voting through delegated proxy). Although this paper does not focus on internet voting and related security issues the voting procedure is outlined here:

Voting manipulation is basically possible (a) on the side of the voting system (where the entire voting result is manipulated) as well as (b) on the side of the voters (where a voter is forced by someone to vote in a certain way). Manipulation of the voting system is strongly related to voting anonymity. The fact that it is technically impossible for the voters to control their cast after

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5 These experts are chosen by the proxy system (see below)
submission makes secret ballots vulnerable for manipulation (esp. the vote-tallying).

Therefore this paper suggests an online voting variant that combines both voting anonymity and transparency: Every voter is issued a paper list of TAN codes by a public authority. These codes are applied as anonymous electronic signatures: Each TAN is unique in the entire electorate and authorizes one citizen for exactly one popular vote (one-time password). Thus, even if it is intercepted (e.g. in a “man-in-the-middle attack”) the data thief could use it just to manipulate one vote. Following example will illustrates the voting procedure:

If for example I (a citizen) want to participate in a popular vote (e.g. by using an internet computer) I first have to authenticate as valid voter in the e-democracy system (username and password). Here the DMS displays my voting options. Once I have made my choice (by ticking the corresponding boxes) I have to sign my vote by entering a TAN code from the list. Immediately after submission my “signature” appears on an official voting website which is accessible for everyone (transparency). This site schedules each TAN next to its submission time in a list under the chosen voting option. A service counts the votes as they are entered and displays the percentage of the electorate that has voted already. After everybody has voted (directly or through a proxy) people are required to verify the voting result by counter-checking from another internet computer. As only I know my TAN no one else can link my vote to me (anonymity). For the case that my vote was manipulated (e.g. by a hacker or by someone who forced me to vote in a certain way) the DMS provides a service through which I could report this to an authority and thus cancel my vote. If many people would report manipulated results the whole vote would be declared as invalid (reliability). Just if after a certain period of time no manipulations are reported the result becomes valid.

3. THE POLICY CYCLE

This part of the paper introduces a guideline for the application of the introduced EDS in the policy process. The four stages of the present decision-making process were adopted from Bridgeman & Davis’ (2004) model of the Australian policy cycle. The main innovation is that the full range of policy processes are accessible for all citizens and that “consultation” and “evaluation” are not further individual steps, but practices conducted by the electorate throughout the whole policy cycle.

The purpose of the suggested e-policy cycle is to justify political action (e.g. the introduction of a new law) in front of the electorate. Before any decision is made following questions should be answered: Is there an actual need for political action? What problem does it seek to solve? What is the common goal that it seeks to achieve? What strategies are available to achieve this goal? And: What consequences will each of them have? After implementation it should be analyzed collaboratively so that following questions can be answered: Was the common policy goal reached? Was the initial problem solved? If not: What went wrong and why? Who is responsible? How to proceed with the issue? These questions should be answered throughout the policy cycle which involves four stages:

1. Problem definition,
2. Policy goal definition,
3. Option evaluation & decision-making and
4. Implementation & evaluation.

Each e-policy cycle conducted in that way and the answers to the questions is recorded in a wiki (replicability). The following scenario example will demonstrate these four stages.

3.1 First stage: Definition of a policy problem

Egbert, a citizen authenticates in the system and suggests a new problem on the suggestion system (passive initiation of the SS): “Empty beer bottles and other rubbish on footpaths and other public places in district K”. Here Egbert’s suggestion attracts the attention of other people who have made similar observations and thus support his suggestion. In order to inter-exchange more efficiently they found a lobby group in the social network service and set up a new discussion in the e-discussion forum. In a deliberative process it turns out that the problem is not just perceived in district K but in other parts of the city and the country as well. The group decides to set up a new policy wiki on issue with the title “Suburban beer bottle pollution”. They use it to record their individual observations, attach photos on a digital map, and to particularize the unwelcome situation for the information of other citizens. After a while the discussion is picked up by local media stations. The media reports attract more people to the discussion and the issue gains momentum. Eventually a detailed user generated problem report emerges on the wiki: Rising amounts of empty beer bottles are found on public places in all states of the country, especially in suburban areas where public street cleanings are less frequent. The problem is predominantly caused by alcohol consumers in the age between 18 and 25 during weekends and public holidays. The lobby group finds more and more supporters for their issue in the electorate. After the minimum required number of citizens has converged, the supporters decide in an internal poll to propose a popular vote. Now the decision-making system comes in operation for the first time. The question “Is ‘Beer bottle pollution’ a national problem that requires political intervention?” is addressed to the local electorates of all states of the country.

In the states W, N and V a majority of citizens supports the proposal and thus confirm the new policy problem. A new policy cycle addressing the issue is initiated and proceeds to the next level (goal specification, see below). In state Q however the required majority is not reached. Here the lobby continues its endeavor individually but the policy cycle stagnates.

3.2 Second stage: Specification of a policy goal

At the beginning of the second stage of the cycle the people of W, N and V are asked to specify a common goal. This goal should contrast the problem (Suburban beer bottle pollution) and its later achievement should be clearly measurable (measurement criteria). Everyone is asked to lodge a suggestion into the suggestion
3.3 Third stage: Choice of a policy strategy

Level three is the key part of the policy cycle. As here a decision about the political action has to be determined, the degree of direct participation reaches its peak. At this point the suggestion system is initiated by the government who asks the public to submit strategies for reaching the common policy goal (cf. active initiation of the SS). The main question “How can bottle free suburbs be accomplished most efficiently with the available resources” is separately addressed to the populations of W, N and V who serve as research panel. The suggested answers range from “introduction of biodegradable bottles” to “complete ban of alcohol”. Through mutual ranking processes the issues are brought in a hierarchical order on which top three suggestions occur: (1) Higher frequency of public street cleanings in the suburbs. (2) Higher fines for littering. (3) Introduction of deposits on all bottles. These results are published on the policy wiki and a discussion about them starts in the e-discussion forum.

In a next step the evaluation system (ES) is applied to estimate the likely impact of each of the three strategies. Now political analysts, corporations, the different lobbies and other experts determine the positive (+) and negative (-) consequences of each strategy by using another Web 2.0 application. As a result the ES shows the strength and weaknesses of each suggestion. A short summary shows:

1. Option one (“More street cleanings”) may solve the problem (+), but on the other side increase public spending for hiring extra cleaning personal (-).
2. Option two (“Higher fines”) could improve the situation (+), but would on the other side require more police patrols in the designated areas (+) and thus increase public spending (-).
3. Option three (“Deposits bottles”) could solve the problem (+), but could have a negative impact on the sales of beverage and liquor and thus on the economy (-).

Subsequently people determine how they feel they will be affected by each of the consequences. As a result the ES highlights what percent of each state’s population feels positively / negatively affected by the consequences. After the electorate has informed about the impact of the strategies it calls for a popular vote to decide upon them. Hereby state W decides for option one, state N for option two, and state V for option three. The results are published on the wiki. As the individual strategies are now determined, the policy cycle proceeds to implementation and evaluation (see next level).

3.4 Fourth stage: Implementation and assessment of the policy strategy

Now the three states implement their individual strategies. Hereafter the populations are encouraged to observe if the endeavors are leading towards the defined goal or not:

- (W) Because of the stronger economic growth the budget in state W is sufficient to hire extra cleaning personal. Here the situation can be improved.
- (N) State N has to finance the additional police patrols on deficit. Although the efforts have no significant impact on the problem, the suburban population appreciates the higher police presence for security reasons.
- (V) Against the protest of the beverage and liquor industry, state V enforces the deposit system for all glass and plastic bottles. While the negative impact on beverage sales is surprisingly low, the empty bottles disappear from public areas completely. Observations reveal that people bring their bottles back to the shops and that discarded beer bottles are being picked up from public places because of their deposit value. Additionally the subsequent recycling saves the bottlers material cost.

At the end of the policy cycle the electorate is asked to assess if the policy goal was reached by comparing the predefined goal (“Clean suburbs: No more empty bottles on public places”) with the accomplished situation. In the corresponding popular vote just state V confirms that the problem was solved. Thus, the policy cycle ends in V. In the light of the success of V’s strategy the electorate within states of W and N disagree and press for returning to the discussion on the solution strategy. In these states the policy cycle returns to the third level (i.e. choice of a policy strategy).

4. COLLECTIVE INTELLIGENCE & LEARNING

Through the ongoing processes of collective observing, suggesting, discussing, evaluating, ranking, commenting, voting, adjusting, and revising via Web 2.0 tools, the DMS gathers the collective intelligence (CI) of the people. That is a shared group intelligence that emerges from the collaboration, competition and consensus decision making of the constituents:

Collaboration: In order to bring a policy issue into public awareness, it’s initiators have to cooperate with their supporters. Hereby ICT and Web 2.0 technologies facilitate citizens initiated collaborative research (cf. "beer bottle" wiki problem report) and enables the contributors to interact from different places and at different times. As the collaboration between experts and common people would rather be upon shared problems, common ideas, and political goals it may be more cohesive and efficient than the collaboration based on party affiliation.

Consensus decisions: As minorities have equal rights to participate in the policy process they have better chances to promote their concerns to the electorate by suggesting their issues, starting a wiki or a discussion about them, or initiating a popular vote.

Competition: In order to be considered for implementation, policy suggestions have to compete with each other, i.e. get ranked higher, be better evaluated, and finally voted. Competition in the
DMS would however rather be between issues than between people (politicians or parties).

As the electorate is confronted with the results of its own decisions, people can learn individually and collectively about the consequences of their actions and contributions. Therefore the e-policy cycle can be seen as a learning cycle or collective feedback loop through which the electorate gradually improves its decision-making skill (see Figure 2). Efficient decision makers could hereby represent actors with lower skills (see proxy representation).

![Figure 2: Collective learning in the e-policy cycle](image)

5. PROXY SYSTEM

The direct democratic and participatory aspects of the suggested e-democracy system require the citizens to participate throughout the whole policy process. I.e.

- To prepare decisions: Inform about policy issues, make and rank suggestions, contribute to the debates and wikis;
- To make decisions: Participate in popular votes; and
- To evaluate decisions: Observe the policy process and judge its success.

Such tasks are usually conducted by designated governmental authorities such as politicians, ministers, or public servants. Although the tools of the e-democracy system (EDS) itself would facilitate the participation, these tasks could overburden the average citizen in the following ways:

- Knowledge constraint: The average citizen may not have the required education, knowledge or practical experience to contribute to all policy issues in a meaningful way (especially not to more complex ones).
- Disposition constraint: Even with the required educational background a person could have no interest in certain political issues or the overall process (political apathy).
- Time constraint: Even with education and interest people may lack time for participation.

Another problem could be overrepresentation: The openness of the policy process leads to a self selection of the participants who contribute directly to the discussion forums, wikis, and other decision components. Therefore people with a particular interest or strong opinion on a certain topic (like environmentalists or other activists) are more likely to participate and could thus bias or polarize the outcome.

To address these and other problems related to direct participation the EDS provides a final component: The proxy system allows each citizen to defer certain or even all the participatory tasks to freely selectable proxy representatives. Every actor who is willing to legally take over the participatory tasks of others becomes a proxy representative - whereby the represented persons become their principals. A proxy could be a trusted person or institution such as an educated friend, a domain expert, a certain politician, a political party, or a lobby group. (cf. Yamakawa, 2007). The task of the proxy is to represent the principals equally in the political debates (forum), wikis, and votes in and hereby to counterbalance the bias of potential overrepresentation. The intention behind the proxy system is to enable citizens’ participation even if they are constrained by knowledge, interest, or time. It bridges the gap between direct participation and representation through a designated government.

In the following it will be demonstrated how proxy delegation applies to popular votes on the decision-making system.

5.1 Popular voting by proxy delegation

A citizen can participate in a popular vote by voting directly on an issue (e.g. a certain policy strategy) in the decision-making system, or indirectly by delegating a proxy to vote on his/her behalf. In that case the proxy adds the weight of his principal’s vote to his own one. He can then choose to vote directly or name a further proxy to vote on his behalf. Hereby the second proxy accumulates the voting power of the first one and his principal (proxy chain). There is no limit on the number of representatives who can serve at a given time. The principals (citizens) retain the right to change their proxy or vote autonomously at any time before the vote. If a principal changes his mind in the last moment and wants to vote directly, his vote will override the one which is casted through the proxy chain (flexibility of the proxy system).

![Figure 3: Direct and indirect voting via proxy (cf. Wikipedia)](image)

The proxy representation system is based on the work of Green-Armytage, J. This paper covers just the main functionalities.
Proxy voting would enable the (indirect) participation of people even in complex decisions. As certain issues are difficult to grasp entirely by individuals they require the collaboration of different domain experts, policy representatives, and the people who will be affected by the decision. The following example will illustrate how these actors interact to find a solution. The bottom line in figure 3 represents an electorate confronted with a complex decision. Those who lack of knowledge, experience, and/or time to inform about the issue delegate proxies (center line) according to their trust or political affiliation. If they provide the required expertise they vote directly, otherwise they re-delegate known domain experts to vote on their behalf. In figure 3 the three experts in the top line make the final decision by voting directly. They represent the interests of the proxies in the center-field as well as their principals. The “center-field proxies” serve as intermediaries to forward the principals interests to the corresponding experts. They qualify as such by providing all-round expert knowledge and through their connections to various research institutions and domain specialists. The experts on the other side are additionally required to simplify complex issues (e.g. in the policy wikis) in order to provide the principals enough information for an appropriate delegation or even to vote directly.

5.2 Anonymity and security
The voter anonymity and security could be maintained even in a proxy chain: The voter had to transfer his TAN code through the proxy chain to the final proxy who enters it to sign his/her vote. By this means the principal could check which vote the proxy has casted on his/her behalf by looking up the voting results on the official voting website. In this case just the final proxy could verify the genuineness of the vote. (cf. DMS)

6. Representation options (proxy settings)
Proxy representation would be available for all participatory tasks and all stages of the policy cycle. In the individual proxy settings of the e-democracy system each citizen could specify for which tasks and in which policy domain he/she wishes to be represented by which proxy. Proxies could be delegated just for the preparation of decisions (i.e. making and ranking suggestions, contributing to the political debates and wikis; evaluating strategies and policies etc.), or for the actual decision-making as well (i.e. attending the popular votes). Through the proxy settings a citizen could scale his/her individual degree of participation between no representation (i.e. total autonomy) and full representation whereby one or more representatives would take over all participatory tasks in all policy domains.

As a consequence the proxy system combines the best features of direct democracy and representative democracy. Figure 4 illustrates this spectrum. It shows the decision-making process for four domains in the decision-making stage of the policy cycle. A policy goal in each of the four domains (Finance, Energy, Education, and Infrastructure) can be reached through three proposed strategies (a, b, c). The graphic demonstrates how three constituents of the electorate, a political activist, a businessman, and a pensioner, participate in this popular vote.

Figure 4: The proxy representation system
The activist waives representation. He votes in all areas directly. The businessman chooses part representation. As the issues in the domains ‘finance’ and ‘infrastructure’ relate to his business and as he provides the relevant knowledge, he votes there directly. He has however no special interest in ‘education’ and in ‘energy’ issues. Thus he delegates the liberal party (A) and a trusted energy expert (B) to vote in these domains on his behalf. The pensioner prefers full representation like in a traditional democracy and delegates the conservative party (B) to represent him fully in all domains. Hence he does not have to participate anymore unless he wishes to do so.

6.1 Evaluation of proxy performance
The e-democracy system offers a function where people could leave feedback and rate their proxies in order to give other principals information about their satisfaction with their representation. A statistic tool provides key performance information (i.e. the quantity and quality of a proxy’s contributions to the forums, wikis, evaluation and the decision-making system):

General information: Name, age, education, interests etc.; proxy availability in policy domains, tasks, stages of the cycle

Public trust in proxy: How many principals have delegated which tasks to the proxy and for which domains?

Experience of a proxy: Time in service and quantity of contributions to the individual system components
- Number of suggestions & rankings to the SS
- Number of evaluations in the ES
- Number of contributions to debates and wikis
- Number of attended votes in the DMS

Efficiency of the proxy: Quality of his/her contributions
- Percentage of strategies voted by the proxy that have achieved the policy goal after implementation
- Percentage of people who have supported the proxies’ suggestions and of petitions which have reached the evaluation system
- Percentage of contributions to debates and wikis that were accepted

In contrast to superficial characteristics these hard facts serve the electorate as informational basis to delegate their proxy representatives. They would substitute costly policy campaigns.

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As a measure to counterbalance overrepresentation of extreme opinions caused by the aspect of self-selection.
6.2 Proxy government

Through proxy delegation the electorate could vote representatives directly into the different governmental positions and domains. If for example a majority of citizens would appoint a skilled expert as proxy for the decision-making in the domain ‘infrastructure’, he or she would become the decisive authority in this domain (comparable to an infrastructure minister). The other proxies in this domain and the non-represented direct participants would be the opposing force (comparable to an opposition). The difference to a traditional representative government is that principals (in contrast to voters) would retain the right to vote directly on an issue if necessary (e.g. to resolve a conflict). This right would limit the power of the authorities and call them to a high accountability for their actions.

The form, structure and size of the proxy government would be determined by the electorate using the proxy system. While the size (i.e. the ratio of indirect to direct participation) would reflect the electorates’ satisfaction with its performance, the structure would be the result of the collective proxy settings.

**Decision conflicts** within a potentially fragmented proxy government (e.g. where none of several smaller representatives has assertive decision power) would be resolved in the evaluation system (see ES) and by increasing the ratio of direct voters in the decision process (see DMS). Just if a consensus decision cannot be achieved the principle of majority rule would apply.

7. INTRODUCING THE NEW SYSTEM

Before the suggested e-democracy system could be implemented following preconditions had to be fulfilled:

**Precondition 1: Digital divide**

e-Readiness, i.e. ICT infrastructure is available to and accessible for everybody, and e-Inclusion, i.e. the vast majority is enabled to and knows how to use ICT (cf. Arm Huber, 2007). Furthermore factors like the level of education, the rich/poor ratio, the religion effect, the geographic and/or the historic legacy of a country/population, etc. could restrict or limit the use of the system. Although these conditions and factors are of utmost relevance the scope of this paper is just on the process of participation.

**Precondition 2: Direct democracy**
The here suggested e-democracy system would require at least two direct democratic procedures: (a) A popular proposal: the right of a specified number of citizens to propose a petition to the entire electorate. (b) A popular vote: the electorate decides upon the implementation of the petition (e.g. the introduction or change of a law). (cf. Huber, A. 2007)

**Precondition 3: Clear authentication**
To provide its integrity the EDS needed to authenticate each citizen clearly in order to avoid illegal entries (especially in popular votes).

If the EDS seeks to be implemented in a traditional political system this would require a transition period and strong civic education programs in ICT and politics.

Most of its components - such as the suggestion system, the social network service, the discussion forum, the policy wiki, and the evaluation system - could however go online immediately as they alone have no decisive power. These components could be applied in any representative democratic system as they would not require any change of law or constitution. People would be encouraged to participate and contribute in order to gather political experience and to test the system. The established government would hereby gather policy suggestions, public opinions (substitute for opinion research), and other empirical data relevant for their decision-making.

Before the e-democracy system could be applied and used in the way described in the paper the corresponding direct democratic procedures (popular initiative and vote) needed to be established in law. In this case the decision-making system could initially just be utilized for issues (or domains) of minor complexity and relevance (such as the beer bottle pollution). Other issues could be added incrementally according to the success.

The proxy delegation system could be established by changing the traditional election system. Hereby the old (representative) government would stay in charge but be gradually transformed into the new proxy government. Once the transition is completed the electorate could start voting new representatives directly into the different governmental positions and domains.

In order to involve citizens without ICT access or experience or ICT deniers into the e-democracy system, the new proxy system could run parallel to the traditional voting forms (e.g. voting on paper in voting chambers) during the transition period. Although these participators would not have access to the full range of democratic options this option should not be disregarded.

8. CONCLUSION

Such as Web 2.0 has changed the principle of the creation of website content in a relatively short period of time it could similarly change the principle of how governments function. The collaborative, autodidact and self-regulatory characteristics that can be observed on online platforms like dict.cc or Wikipedia could hereby similarly improve the quality and performance of governance while saving public spending.

The presented e-democracy system provides a new perspective on Abraham Lincoln’s definition of democracy “Government of the people, by the people and through the people”. If implemented successfully it would not just be beneficial in various ways but could also solve a variety of common political problems:

- The “e-policy process” would be accessible and transparent for all citizens (vs. corruption). This civic inclusion may increase the citizens’ interest, knowledge, and willingness to participate in politics (vs. voter apathy).
- As a result of the collaborative process the people could function as perpetual online research panel with a high sample size. This panel may produce remarkably efficient political, economical and social predictions regarding the future (wisdom of the crowd, collective intelligence).
- Influential commercial lobbies (e.g. from industry and finance) would have to justify their political interests and suggestions in front of the entire electorate and not just in front of a relatively small group of governmental officials (justice; vs. manipulation).
- The proxy system could accomplish equal opportunities for all citizens to take over political functions; independent from
financial issues, physical appearance, race or gender (equality of opportunities). Proxy representatives would become fully accountable for their decisions as these would be recorded electronically. If the electorate is not satisfied with the decisions it could dismiss individual proxies and leave the rest of the government untouched (stability). As many people would be involved in proxy delegation, patronage, nepotism, and similar corruption would become more difficult. Besides, the cost of elections and political campaigns could be saved and applied elsewhere.

9. REFERENCES


[16] Yamakawa, H., Yoshida, M., Tsuchiya, M.; Toward Delegated Democracy: Vote by Yourself, or Trust Your