# Actory: A Tool for Visualizing Reputation as a Means to Formalize Informal Social Behaviour

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**Abstract.** In order to investigate and challenge a normative liberal democratic view of participation, we propose an experimental system based on differences in reputation and user activity. Based on democratic meeting techniques and social media, basic principles for a groupware are formulated containing typical democratic features such as voting and discussion, but taking reputation and user activities into account and clarifying the individual's activities in relation to the group. The prototype stands in contrast to commonly used internet forums by highlighting differences in reputation and activity and making these visible and changeable by its users thus shedding some light on status and reputation issues in internet forums and groupware.

**Keywords:** E-Participation, Diversity, Discursive Democracy; Collaboration online.

## 1. Introduction

In the early discourse on the Internet and e-democracy, the absence of the body and its attributes (e.g., sex, race, age) suggested the Internet to be a neutral place where different people could come together and develop a deliberative democratic discourse [1], [2]. In this ideal speech situation participants would reach consensus on rational grounds and technology would diminish differences between people, regarding body, time and space. This view of Internet technologies as a neutral medium that fosters consensus still characterizes many of the contemporary attempts to use the Internet as a forum where participants from different groups, officials and politicians can meet [2-5].

Gender research concerning new media argues that social media such as chat rooms, online games, etc., are far from neutral places where participants are treated equal, but instead are places where gender, race, ethnicity and other grounds of discrimination are just as prominent as in other social contexts and that hierarchies and status are reproduced on-line [6-10]. In practice, communication technology may reinforce differences between individuals and groups in society, rather than bringing diverse groups and perspectives together [11], [12].

In the fields of political science and political philosophy, the Habermasian idea of a deliberative democracy has been widely discussed and developed [4], [13-15]. However, in technological development in the area of e-government a more nuanced

understanding regarding the importance of form and structure in democracy is seldom articulated [5], [16]. Instead, what is mostly emphasized is the ability to create a neutral place for deliberative discussions, where the view is that technology can enable a stronger democracy [17]. Even in a more radical democratic perspective, where difference on a societal level is emphasized and the importance of separatist counter-publics is put forward, in-group equality is taken for granted. And despite the rapid growth of social networks that indicates that the political discussion takes place elsewhere than at governmental web sites, efficient technology design to support representation and analysis is lacking [5].

In an exhaustive review of current research on e-participation, Sæbø et al [16] discuss a technological agenda for the field. They lament that most software are adaptations of existing technologies without much technological innovation, that the internet is treated as a distinct artefact and that technological solutions are mostly taken for granted (with the exception of systems for e-voting). They suggest that a technological research agenda could focus more on developing novel tools with less resemblance to existing ones.

It seems that there is a gap between a more theory driven research were technology most often is seen as given, and a technology driven research where theory is seen as given. We bridge this gap and instead of treating technology as something neutral, we treat it as a culture production where norms and social practices are expressed in the system design.

As a starting point we challenge the presumption that members of an interest group are equals. Instead of developing a system based on an ideal speech situation, we suggest a system based on the opposite, a technological tool that takes people's difference into account and even makes it the point-of-departure. The research question in this paper is: *How then should a system based on diversity be conceived? And how is it possible to visualize power structures in the system's design without emphasizing them?*

In order to find guidelines for the design of such a system, we have looked in to democratic meeting techniques and social media practices.

## 2.   Democratic Meeting Techniques

Following the theory by Robert A. Dahl [18], Hemberg [19] has created a model of democracy that is useful as a way of measuring participation on different levels, from countries and organizations, to smaller interest groups. Five criteria are stated for fulfilling the ideal democratic situation:

1)   Participants are equal members
2)   Participants sets the agenda together
3)   Participants can fully participate in the discussion
4)   All participants have the same status when decisions are taken
5)   Everyone have an enlightened understanding of the discussion

These criteria can be used to analyse any situation from a participatory perspective, in order to find methods to improve democracy in the actual situation. Thus democratic

meeting techniques are not a fixed set of methods, but a way of maintaining the reflexive process on a daily basis.

Democratic meeting techniques as developed in critical pedagogy and in feminist-oriented movements can be seen as a development of traditional meeting techniques where one uses an agenda, rules for speaking and voting procedures. But instead of assuming an ideal speech situation where all participants are relatively equal, these techniques assume that people do not participate on equal conditions, that they have different capacities to participate, and that they are treated differently depending on interacting power structures. One method to increase participants' awareness of the importance of power structures is to observe the conditions for dialogue in the meeting situation; e.g. who gets the most space and attention, who is ignored, and how domination techniques are used [19]. Different communication forms produce different results, and people are more or less at ease when expressing them selves depending on the situation. In a critical and feminist pedagogic perspective the importance of a diversity of communication forms that takes peoples' different capabilities and experiences into account is therefore emphasized [20-23].

An informal discussion can be seen as a complex value system where participants control the stage by for example encouraging or ignoring some and going into heated argumentation with others. There are several meeting techniques that emphasize complexity and offer diverse possibilities for debate to encourage different kinds of participation styles. Open space technology is one example where both written comments and informal oral discussions are used to come up with an agenda [24]. The ambition is to create the agenda together, and prepare it in self-organized groups in an organic but efficient process, before any decisions are taken.


## 2.1 Technology and discursive democracy

There are several examples of digitally mediated self-organized systems that contain functionality similar to those used in democratic meeting techniques. Wikis are such a concept where many of the aspirations of deliberate democracy are fulfilled [25]. Referring to Dryzek, Costa [26] defines blogs and wikis as "discursive forums"; places where peers can develop a common discourse around shared interests, discourses that in the long run can influence democratic decision-making.

Dahlberg [17] suggests that democracy in self-organized systems like social media is to be understood as an autonomous system that goes beyond the centralized power of the nation-state, and where the network is the organizational principle. In this so-called open source production decision-making takes place in the collaborative, decentralized network of peers. Communication forms associated with social media and Web 2.0 are examples where technology supports this kind of e-democracy through a mix of different discussion forms, motivating and voting systems and possibilities to extend communication in different ways; linking, liking, blogging, digging, twittering. Here value systems are created using reputation to validate content rather then using the legitimacy of conventional institutional frameworks.

Some social media also uses a scoring system in order to motivate a use of the system and to foster certain behaviour. Take for example LinkedIn that encourage

users to add information to the system in order to gain "profile completeness", which means submitting different kinds of information and adding a certain amount of contacts. But here the functionality of the system most often is just partly revealed, and far from transparent.

## 3.    System Design

Dahlberg [17] suggests that an important part of e-democracy takes place outside of the development of government initiated e-democracy projects. Instead, it occurs in collaborative decentralized interests-based networks. In order to create a system that supports and conceptualizes more autonomous decentralized parts of e-democracy, we have instrumentalized some of the norms and practices that were synthesized from democratic meeting techniques and social media discussed in the previous section. Our ambition here is to create:

A discursive forum:      The software should support development of common questions, rather than decision-making. Anyone should be able to propose an activity and implement it without the need for formal voting and discussion.

Ubiquitous voting:      informal voting should be on-going and everywhere.

Counting activity:      A person's score in the system should be created through her and others' actions. Everyone's personal score level should be taken into account when judging action.

Visualized reputation:      Informal hierarchy should be visualized

We elaborate each of these points in the following sections 3.1 – 3.4, where we describe how these norms and practices are expressed in the system design.

### 3.1    Discursive forum

Our intention is not to develop a formal voting system, but a platform that supports development of common discourses – like the development of a political agenda or as in collaborative culture production. Therefore we build on the principles of a wiki, a platform that suits discursive processes. A wiki gives the user an opportunity to develop information in collaboration with other users in a simple way. One important criteria of democracy according to Hemberg [19] is to be able to set the agenda. In a wiki, the opportunity for anyone to raise a question and create a space for the discussion around it is technically unlimited.

In a more informal grouping, the subjective experience is important and it is the individual who decides what is relevant for her to discuss and how it relates to the overall theme. Therefore we have added the feature that the user who creates a post

also controls this micro-forum, and decides if she wants to invite others in the writing process or just as commentators.

In order to make the information structure simple to use and to facilitate the development of a common discourse, we use association as a way of structuring instead of categorizing. A requirement to link a post to an earlier post forces the user to refer to at least one source within the system and this contributes to an emphasis on the development of a common discussion.

## 3.2   Ubiquitous voting

In a collaborative, decentralized network of peers, there are constant negotiations about what to do and cooperation is not steered using a centralized formal voting process. Democratic meeting techniques acknowledge that the arrangements for voting are important for participation and outcome, and therefore seek to vary forms of discussion and voting [19]. Our proposed system emphasizes different kinds of activities, and gives score not only to direct voting but to all kinds of attention: Linking, commenting, clicking a like/dislike button, and rating. These different possibilities to express meaning as a numeric value can be unrestricted or restricted in time and quantity. In the scoring process, both users and their actions are given score, creating a hierarchy not only between users but also between posts.

A "like" option that is easy to click on is commonplace in social media in order to provide users with a possibility to quickly show their opinion. This is often combined with a rating system that demands slightly more reflection. Some blogs provide users with a set of tools to valuate and disseminate information widely through services such as Digg and Twitter. Our idea is to reconnect the value of this kind of informal voting directly to the user, and also create an understanding of the valuation process. The valuation is bi-directional; the reference is a way to legitimize the own statement, and also a way to legitimize other people who use the same reference. When linking to someone's post it adds score both to the user and the post. The amount of score can also depend on the *actory index* of the user, which is the users percentage of the total amount of score in the system, multiplied with the total amount of users.

## 3.3   Counting activity

One of the risks with visualizing communication structures is that it may make the represented structure more permanent. An important question then is how to make structures visible without entrenching hierarchies. Another question is how status should be decided. A situation where everyone rates one another in a constantly on-going voting process is not only time consuming, it can be difficult to get people to want to participate. Our solution to these two questions is to focus less on actors and more on actions. Following a critical and feminist pedagogic perspective we assume participants will give more attention to people with high status and to people in their network. Reputation most often refers to an opinion that an agent has of another agent's intentions and norms. Here we emphasize that this opinion is influenced by

socially structuring factors: People who have a high status may get more attention and their actions may be valued higher by other users. Beginners and other people can instead compensate for their low status by being more active. The system may thus work in an emancipatory way. By visualizing reputation as a way of formalizing informal social processes, we will be able to use the system for furthering understanding of structural mechanisms empirically in unequal settings.
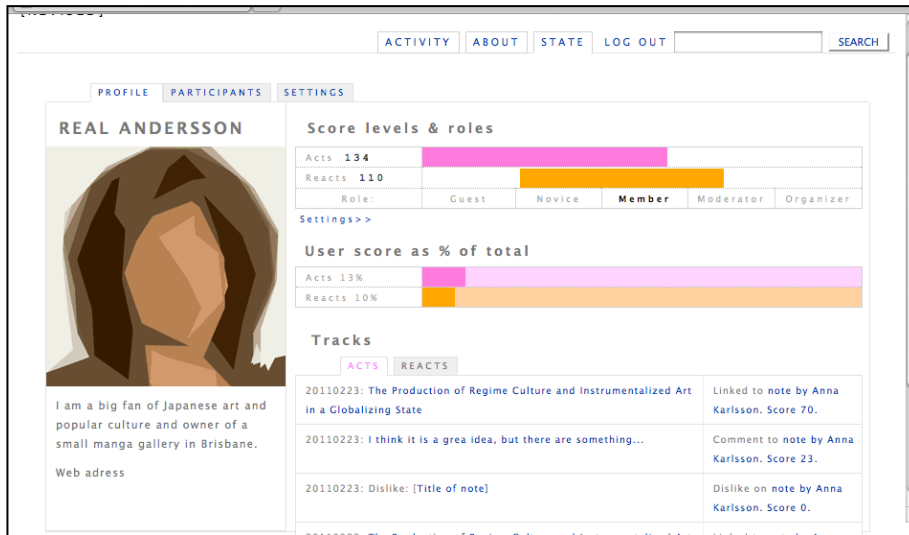


**Fig. 1.** Html-prototype of the system showing user score levels & roles.
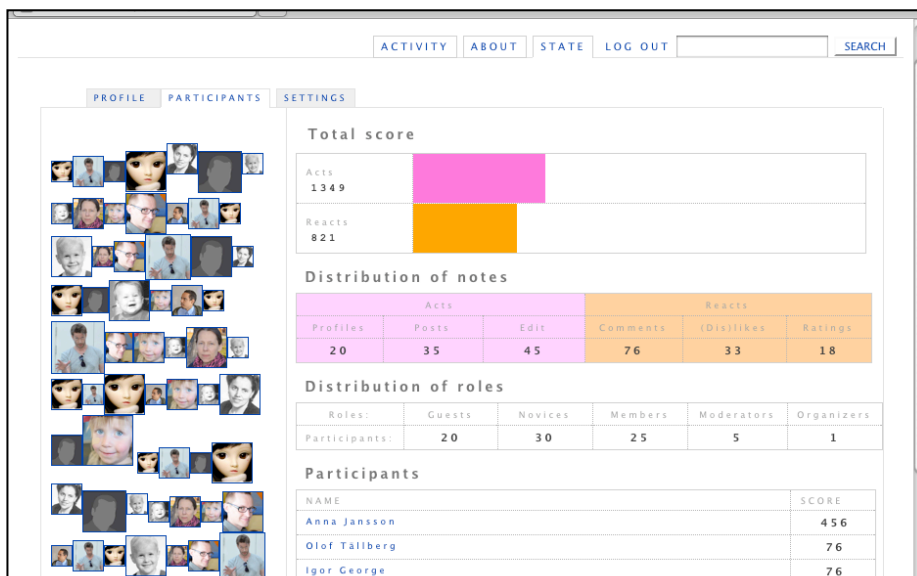


**Fig. 2.** Html-prototype of the system showing total score and distribution of roles.

### 3.4  Visualized reputation

If we assume that groups always are structured and power distribution within the group thus is more or less unequal, a transparency of the structures can clarify user strategies and system rules in an empowering way.

We start with the premise that users receive recognition through the way they use the tool, and that others' reactions also depend on the status they attribute to the user due to structuring factors such as gender, class, ethnicity.

The system consists of three different parts: *Activity*, *About* and *State*. *Activity* is where new activities are suggested and debated inside a group, and *About* is were the result of the collaborative work is manifested outwards, *State* is where the individual score is visualized and roles and score levels are set.

Of these three parts, *State* stands in focus here. Participants' State is in turn measured in two ways: through the activities users report and by the reactions from others on these activities. User score level thus depends on the score of the activity the individual creates in the system (Acts) and the score others give the individual actions in the system (Reacts). Depending on the purpose of the system, the setting of the score and thus the emphasizing of either Acts or Reacts can be changed.

### 3.6  Summary of design principles

The system can be summarized in five design principles as follows:

1. A discussion forum, like a wiki, that supports open source cultural production. Users have the right to edit their own posts, and to delegate this right. Association structures the information.

2. Informal voting is done constantly and in different fashions: Linking, commenting, liking/disliking, and rating.

3. The score users give depends on their total score level. Users' total score depends on own activity and the score other gives users' activity. User and posts percentage of all scores are dynamic and depends on the total distribution of score among users and posts.

4. Transparency and visualization clarify user strategies, system rules, roles and rights.

The system can thus be described as a wiki combined with an evaluation system that tracks all activities users do, or the activities that others are doing in relation to the user. Any comment, like / dislike or a link being made gives scores. Each new score affect other scores in all parts of system, as each users score level index is calculated in relation to the total amount of score in the system. Furthermore, how many scores are given (by making comments, links, like / dislike, grades) depends on who gave the reaction. As user actory index is constantly changing, and as some old posts might be updated with new links and comments, history can also be said to be constantly changing as each post dependents on the changes in the total system.

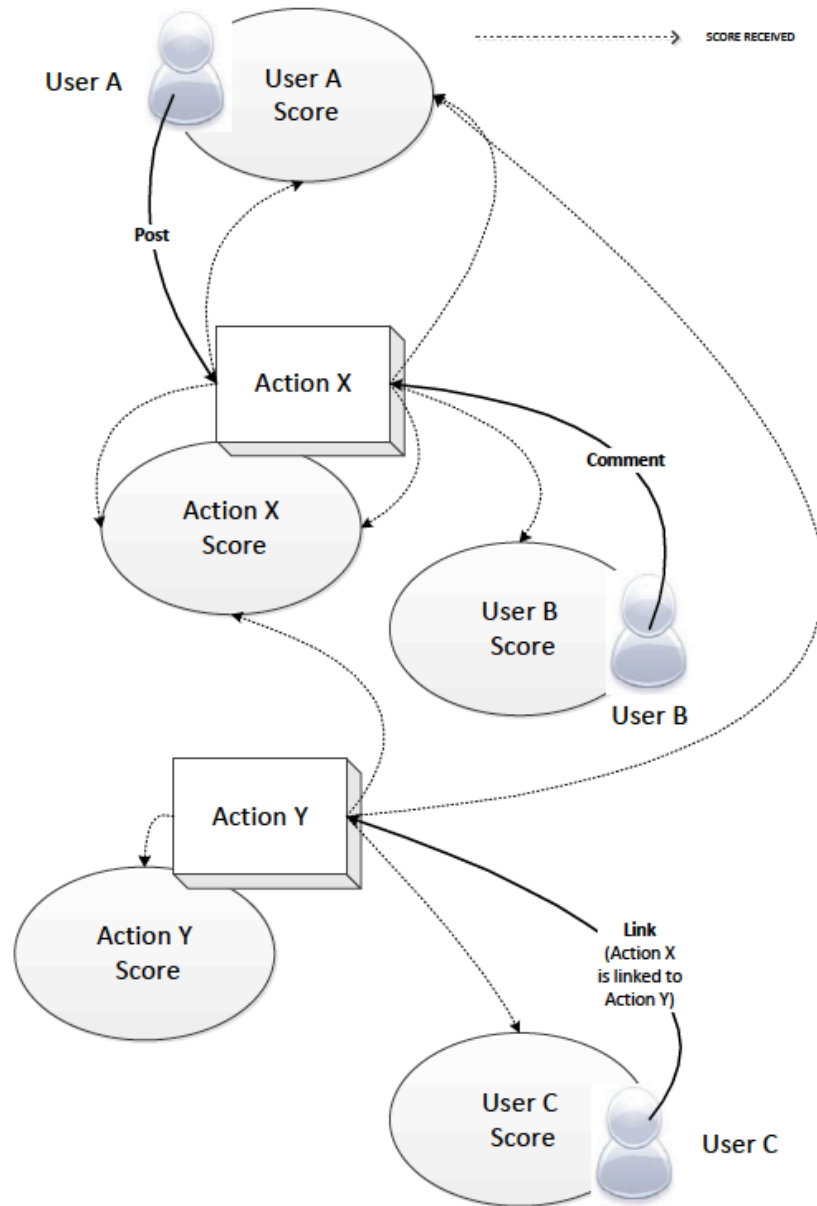## 4.    The logic of the scoring system and an example with three users



**Fig. 3.** Distribution of score between users when posting and commenting.

Part of the distribution of score between users when posting and commenting is illustrated in figure 3. Both users and their activity receive a score. Furthermore, a distinguishing mark of our system is that scoring is multi-directional. When for example commenting on a post the commenting user gets score, as well as the post itself and the owner of the post. When writing a new post and linking to another post, both post owners receive score.

The starting point for the illustration below is user "A" making a post about an activity ("X"). User "B" shows interest in and comments upon the post. Users A and B get scores for their respective postings, and A also gets score for receiving attention from B. Activity "X" get scores in a similar manner. Then, user "C" posts activity "Y" which links to activity X. User C and activity Y get score for the posting of Y, while user A and activity X get scores because Y linked to X.

In order to distribute the score we provide a mechanism for obtaining a *actory index* for each user. The index should based upon balancing the user's activities and the attention given to the user, categorizing different events as either belonging to "Acts", or "Reacts". Events falling within the Acts category are actions triggered by the user herself, such as placing a new post or liking another post. We also put emphasis on other people's reactions to what the user is doing, and place events indicating that attention is given to the user in the Reacts category. Each event $E$ involves a set of users, i.e. the user initiating the event and the users subject to the initiating user's attention. We will label the set of users affected by an event $E$ with $U_E = \{*u_x, u_y, \ldots, u_z\}$ where * indicates that the initiator of the event is $u_x$. For instance, if the user Fred links to the user Mary, then $U_E = \{*u_{Fred}, u_{Mary}\}$.

Each event then yields a number of score points for each member of $U_E$. In order to satisfy the design principle 3, we propose that the magnitude of score points awarded to each user from an event should be 1) dependent on whether the user is the initiator of the event or subject to attention, and 2) based upon two pre-defined mappings each mapping an event to a positive score value. The mappings are called the *action score function $v(a)$* and the *actory index impact function $s(a)$* where $a$ is an action event. An example of $v$ and $s$ is given in Figure 3 in the "Score" and "Score level impact" column respectively. Now, given the occurrence of an event initiated by the user $u_x$, the user $u_x$ is first awarded with Activity score points according to $v(a)$. Further, each user in $U_E$ is awarded with React score points according to an React score function, here labeled as $f(a, u)$, taking an action event $a$ and the user subject to attention $u$ as arguments and defined as

$$f(a,u) = \begin{cases} 0 \text{ if } u = u_x \\ v(a) + v(a) \cdot s(a) \cdot \mu_x \text{ otherwise} \end{cases}$$

Where $\mu_x$ is the actory index for the initiating user such that the actory index of the initiating user affects the number of score points awarded to the user being given attention. For example, if a user with a actory index of 0.5 links to another user's post, the other user gets reacts score point of $70 + 70 \cdot 0.5 \cdot 2 = 140$. If a user places a post that links to herself, the user receives 140 points for the action of placing a new post

and then zero for the self-attention. Note that this is just one suggestion of defining the functions needed. For instance, if self-attention is desired or should be rewarded $f$ could be redefined accordingly.

Now, let $\{u_1, \ldots, u_N\}$ be an enumerated set of all users in the system and let $t_i$ be the total amount of score points awarded to the user $u_i$ since the launch of the system. Then the reputation index $\mu_i$ for this user is given from the proportion of $u_i$'s score points relative to the sum of all awarded score points scaled by the number of users in the system such that

$$\mu_i = N \frac{t_i}{\sum\limits_i t_i}$$

The rationale for scaling by $N$ is twofold, first to enable a static reference value of one which is the index value obtained when the sum of all awarded score points are equally distributed among the users, and second to account for a wider value range for the actory index in a system of many users, thereby visualizing the difference in score to a seemingly greater extent. Different behaviours may then be stimulated and rewarded by redefining the react score function, and the actory index impact function. This suggested logic was implemented and tested as an Excel spreadsheet using a scenario with three fictional users involved in a discussion that consisted of 28 activities.

In the example in figure 4, a new post gives high score. In essence, all kind of activity could be promoted or denoted. For instance, dislike might be deemed an important feature, as the ability to express negative feedback might be relevant. Such behaviour should probably not be rewarded to a great extent to enable fruitful discussions, but could be interesting to explore in some situations.

Features such as *like/dislike* provide an easy way of expressing an opinion that does not demand much in terms of critical thinking. In the example in figure 4, those actions are therefore not associated with high scores relative to other actions. For instance, to *rate* something is a more cognitively demanding action compared to liking or disliking, which motivates its higher minimum value in the example. The rating is also supposed to be done in relation to history, motivating why votes from users with higher status are given a higher reward.

A consequence with having such a dynamic system where values and variables can be changed and effect history is that the system has to keep record not only of peoples' scores and scores attached to posts and comments, but also connect these scores to different behaviours and differentiate between scores given from different actions. The score given can also have more then an informative and symbolic function. If attached to roles it creates kind of a game where users level up and get extended rights by earning value with in the system.

| Activity type | Activities | Score | Actory index impact |
|---|---|---|---|
| **Acts** | new post | 140 | 0 |
| 35% | edit | 10 | 0 |
| | comment | 20 | 0 |
| | like | 10 | 0 |
| | dislike | 0 | 0 |
| | rate | 20 | 0 |
| **Reacts** | comment | 20 | 2 |
| 65% | liked | 10 | 3 |
| | disliked | 10 | 2 |
| | Linked | 70 | 3 |
| | rated 1 | -15 | 2 |
| | rated 2 | -10 | 2 |
| | rated 3 | 10 | 2 |
| | rated 4 | 30 | 2 |
| | rated 5 | 45 | 2 |

**Fig. 4.** Example of parameter values. The setting is just a template; users can change the roles, variables and score.

In the example of settings of roles and rights in Figure 5, the "Guest" has the right to read and comment on others posts and like them, but can't create own posts or rate others posts. In order to become a "Novice" the user has to gain the score 100 and made at least five "comments" and three "like". As a "Member" the user has rights to do everything except edit public pages. In order to do this the user has to level up to "Moderator"; witch demands a sustainable contribution to the sake. To become an "Organizer" with the right to set the values and thus being able to co-create the rules, the user has to be invited by an organizer.

| | Rights | Score | Actory index impact | Roles | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Guest | Novice | Member | Moderator | Organizer |
| Acts | new post | 140 | 0 | | | x1 | x2 | |
| | edit | 10 | 0 | | | x3 | x3 | |
| | comment | 20 | 0 | | x5 | x10 | x15 | |
| | like | 10 | 0 | | x3 | | x10 | |
| | dislike | 0 | 0 | | | | | |
| | rate | 20 | 0 | | | | x5 | |
| | | | | 0 | 100 | 200 | 500 | |
| Reacts | comment | 20 | 2 | | | x5 | x5 | |
| | liked | 10 | 3 | | | x5 | x10 | |
| | disliked | -10 | 2 | | | | | |
| | linked | 70 | 2 | | | | x1 | |
| | rated 1 | -15 | 2 | | | | | |
| | rated 2 | -10 | 2 | | | | | |
| | rated 3 | 10 | 2 | | | | | |
| | rated 4 | 30 | 2 | | | | | |
| | rated 5 | 45 | 2 | | | | | |
| | | | | | | 200 | 500 | |
| | *Total score needed* | | | 0 | 100 | 400 | 1000 | Invitation |

**Fig. 5.** Thresholds, amount and total score of user activity related to roles and rights. The setting is just a template; users can change the roles, variables and score.

## 5. Discussion

Initially we asked ourselves how a system based on diversity could be conceived. Our system emanates from the idea that most people are not equal, but have different motives, status, time, experiences etc. that they bring to the collective work. As a way of supporting this diversity we have devised abilities to express opinions in a variety of fashions; linking, posting, commenting, liking/disliking and rating. Here each participant can set the "agenda" by creating new posts, which others can comment on and edit if the post-owner wishes so. In this way each issue has an owner who can choose to what degree she wants to involve others in the development.

As a way of visualizing the diversity among users we have purposed a system that measures users' own activity but also others' reactions towards these activities. Here we assume that users will react differently to other participants based on the status position they attribute to the actor. In this way we avoid a situation where participants judge the status of other participants directly and where status attached to a certain participant is emphasized. Instead the participants' status in the system changes dynamically and depends both on own actions and others' reactions, as well as the changing values of all users and posts in the system. Thus, we have created a system that recognizes and expects hierarchies without linking them to any designated identity position. This fits well with the idea of status and power as being created in relation to others and that cannot be assigned a fixed category. Instead, power and status are dynamically created at the intersection of a variety of fluid structures.

One might ask what the system says about the structures at stake and how they interact, or what other factors outside of the system might be relevant. But these issues are not our ambition in the current research phase. Instead, the ambition is to direct the attention to the existence of informal structures by using quantitative measurements that can be easily understood and changed by the participants. By highlighting informal structures created in group-processes these structures can be discussed and influenced. The Actory platform thus recognizes the importance of status and also indicates how individuals can navigate the structure and create room for action through their own initiatives and strategic alliances with others. Further empirical research on the platform in use will investigate how users interact with each other and the system.

There are systems that already contain features that can support a large variety of democratic meeting techniques. Wikis and other social media provide broad possibilities for expression and work well in supporting democratization processes on a global scale. These already contain legitimizing functions that are based on reputation. We take those functions one-step further by making them explicit and modifiable. In other words, we create a tool that can be applied for developing a democratic competence, and shed light on the possibilities and difficulties of acting collectively. The possibility to create different rules for communication and to visualize reputation also opens up possibilities to use the system as a way of researching the importance of differentiation processes in online group communication.

## 6. Conclusion

We have proposed a groupware that takes diversity and power into account, influenced by social theory and democratic meeting techniques. The resulting system is a prototype of collaborative software where participants' reputation is measured and transformed through a dynamic voting process. The participants' score level is created by their own activity but also by others' reactions towards these activities: links, likes / dislike, rating, commenting. These same actions and reactions also form the group' collective agenda. Importance is thus given not only to users' activity but also users' status. We assume that users will give score not only based on the actual activity but also based on the status position they attribute the actor. The status position we assume depends on level of closeness as well as on intersected factors like gender, class, age and ethnicity. By measuring participants' activity in relation to each other's actions instead of their rating of each other we visualize the presence of structuring factors rather then the actual structure. Participants advance in the system by gathering score and can based on score level be given different possibilities to influence the rules.

The system will be further developed towards two different uses:
1) A collaborative tool for interest based networks. This tool can serve as a way to draw attention to individual initiative by visualizing how reputation is created in the system by the user and in collaboration with other users. By

using the score as a way to dynamically create roles and provide rights, informal roles in the group are visualized and formalized and thus become easier to understand and influence.

2) A research tool for empirically analysing the significance of status, role, transparency and motivation in-group processes. The system can be set up differently for different experimental purposes and groups.

Testing the prototype currently being developed is planned for the coming months.

## 7.    Acknowledgements

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