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Treball final de grau

GRAU D'ENGINYERIA INFORMÀTICA

**Facultat de Matemàtiques i Informàtica
Universitat de Barcelona**

**Citizen Participation: Norm
consensus in virtual communities**

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Abstract

For a long time, communities have delegated the task of defining and enforcing rules to a selected few. In online spaces, this could be moderators in a forum, and in real life, politicians. The Internet is a powerful tool that allows many people to communicate directly with each other in real time. Using these new possibilities to create spaces where people can propose and discuss norms that they want for their own communities should be a priority goal for society as a whole.

Everyone should be included in these discussions, so usability is extremely important for these projects. Users have to understand and feel comfortable with the tools they have at their disposal to fully participate in the creation of norms.

The aim of this project is to analyze and improve the usability of an existing virtual community prototype, in which users can propose norms and argue in favor or against them. Finally, the website is tested with humans in order to assess their reaction to the proposed system.

Resum

Durant molt de temps, les comunitats han delegat la tasca de definir i fer complir normes a una minoria selecta. En espais online, aquests podrien ser els moderadors d'un fòrum, i en la vida real, els polítics. Internet és una eina poderosa que permet a moltes persones comunicar-se directament en temps real. Utilitzar aquestes noves possibilitats per crear espais on la gent pot proposar i discutir normes que volen per les seves pròpies comunitats hauria de ser un objectiu prioritari pel conjunt de la societat.

Tothom hauria d'estar inclòs en aquestes discussions, així que la usabilitat és extremament important per aquests projectes. Els usuaris han d'entendre i sentir-se còmodes amb les eines que tenen a la seva disposició per tal de participar plenament en la creació de normes.

L'objectiu d'aquest treball és analitzar i millorar la usabilitat d'un prototipus d'una comunitat virtual existent, en la qual els usuaris poden proposar normes i argumentar a favor o en contra d'aquestes. Finalment, la pàgina web s'ha testejat amb humans per tal d'avaluar la seva reacció al sistema proposat.

Resumen

Durante mucho tiempo, las comunidades han delegado la tarea de definir y hacer cumplir normas a una minoría selecta. En espacios online, estos podrían ser los moderadores de un foro, y en la vida real, los políticos. Internet es una herramienta poderosa que permite a muchas personas comunicarse directamente en tiempo real. Utilizar estas nuevas posibilidades para crear espacios donde la gente puede proponer y discutir normas que quieren para su propia comunidad debería ser un objetivo prioritario para el conjunto de la sociedad.

Todo el mundo debería estar incluido en estas discusiones, así que la usabilidad es extremadamente importante para estos proyectos. Los usuarios tienen que entender y sentirse cómodos con las herramientas de las que disponen para poder participar plenamente en la creación de normas.

El objetivo de este trabajo es analizar y mejorar la usabilidad de un prototipo de una comunidad virtual existente, en la cual los usuarios pueden proponer normas y argumentar a favor o en contra de éstas. Finalmente, la página web se ha testeado con humanos con tal de evaluar su reacción al sistema propuesto.

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Keywords

User participation, citizen participation, norms, arguments, usability

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Chapter 1

Introduction

1.1 Motivation

Humans are social creatures, and we are all part of different communities. Some of those communities are virtual, for example social media websites, or forums. Others are in real life, for example a community of friends, co-workers, neighbors, or even the citizens of a town. Communities need rules to function, which are usually decided by a group of leaders, which could be politicians, or moderators on a forum.

These norms decided by a minority are not always fair or wanted by the majority of the members of the community. If people perceive the rules of their community to be unjust, they are going to be unhappy and less inclined to follow them. If a community wants to be truly democratic, all members should decide on the norms they want together, in a way that allows everyone to participate in an equal way.

To achieve this, members of the community presented in this project can propose new norms to their community and expose their arguments in favor or against a given proposal. Users can rate the arguments that are presented to them, which are aggregated to get the rating of a particular norm, which can then be implemented in their forum.

This project aims at improving the usability of this system, so that the members of the community can actually understand it and use it as intended.

1.2 Objectives

The main goal of this project is to improve the usability of the already existing website prototype. In order to do so, the first objective is to analyze the website and others similar to it, in order to compare them and detect flaws in the design. Then, an alternative design has to be chosen and implemented. This new design should be easy to understand and use. The last aim of this project is to conduct a test with real human users to prove the effectiveness of the new design.

1.3 Background

This project expands on the application prototype that was previously developed, and utilizes the norm theory and aggregation operators that were created in the following works:

- Josu Mendizabal-Borda: Multi-agent System Simulation of a virtual community. (Artificial Intelligence master thesis. 2015.)
- David Sanchez-Pinsach: Prototype development (Artificial Intelligence master thesis. 2015.).
- Marc Serramià: Aggregation operators for the combination of argument rankings into norm valuations (Mathematics final degree project. 2016).
- Martí Soler: Natural Language Processing for the detection of arguments' similarity to compact on-line debates (Computer Science final degree project. 2016).
- International workshop "Collective Intelligence for the Democracy" at MediaLab Prado (Madrid) from November 18th to December 2nd 2016. Project entitled: "Citizen participation tool for norm consensus".

Other associated publications and presentations to this project are:

- Juan A. Rodriguez-Aguilar, Marc Serramia, Maite Lopez-Sanchez. Aggregation operators to support collective reasoning. *Modeling Decisions for Artificial Intelligence (MDAI)*. Lecture Notes in the (Springer-Verlag) LNAI vol. 9880 (doi: 10.1007/978-3-319-45656-0_1), pp. 1-12, 2016.
- Jordi Ganzer-Ripoll, Maite Lopez-Sanchez and Juan Antonio Rodríguez-Aguilar. "A multi-agent argumentation framework to support collective reasoning". 2nd Workshop on Conflict Resolution in Decision Making (COREDEMA 2016) in the biennial European Conference on Artificial Intelligence (ECAI 2016) 29th-30th August 2016, The Hague (Holland).
- Marc Serramia, Maite Lopez-Sanchez, Juan Antonio Rodriguez Aguilar. "Aggregation Operators to Compute Norm Support in Virtual Communities" 10th Workshop on Advances in Preference Handling (MPREF 2016) in IJCAI 2016 (25th International Joint Conference on Artificial Intelligence), July 9th, 2016, New York (USA).
- Maite Lopez-Sanchez, Juan Antonio Rodriguez Aguilar, Marc Serramia, Jordi Ganzer-Ripoll. "Decentralised moderation: bringing democracy to the Internet" work presentation at unconference "Initiatives for open democracy and a decentralised Internet" at Democratic cities. Medialab-Prado. Madrid. Spain. 25-26th May. 2016.

Chapter 2

State of the Art

Citizen and user participation in the creation of norms is still a novel field, but there are already many contributions to it in the market and literature. On the theoretical side, there is research on norms, argumentation, user empowerment, aggregation methods etc. In this project, the focus is going to be on already available websites that have found ways to implement these methods to create user participation and argumentation. This section will introduce a representative selection of these websites and analyze the way they present information to the users and how they can interact with the websites.

2.1 Loomio

Loomio is an online tool designed to assist small groups with collaborative decision-making processes. For example, a group of co-workers, friends, or a family.

First, the members of the group have an open discussion about their problem. They can voice their opinions and also add context to their discussions, like photos or links. Whenever a member of the group feels like it, they can create a concrete proposal. Within a time limit, the members of the group can vote for the proposal. A vote can be in agreement of the proposal, in disagreement, an abstention (if the user does not feel strongly either way) or blocking, which is a stronger disagreement for serious concerns. When users vote, they have to explain why in a short sentence, so the main points of the discussion are highlighted.

Users can change their vote if they change their mind due to new information, or simply because of the discussion between the group. If the users do not reach an agreement, a new proposal can be made. Old proposals are still visible to allow a greater understanding of the evolution of the discussion. The members of the group decide when the discussion is finalized, ideally if they have reached a solution that everyone voted for.

The goal of this software is to help groups of friends, co-workers, roommates, etc. to discuss their issues in a simple and easy way that makes everyone feel included. This way, they can make decisions that everyone understands and agrees with.

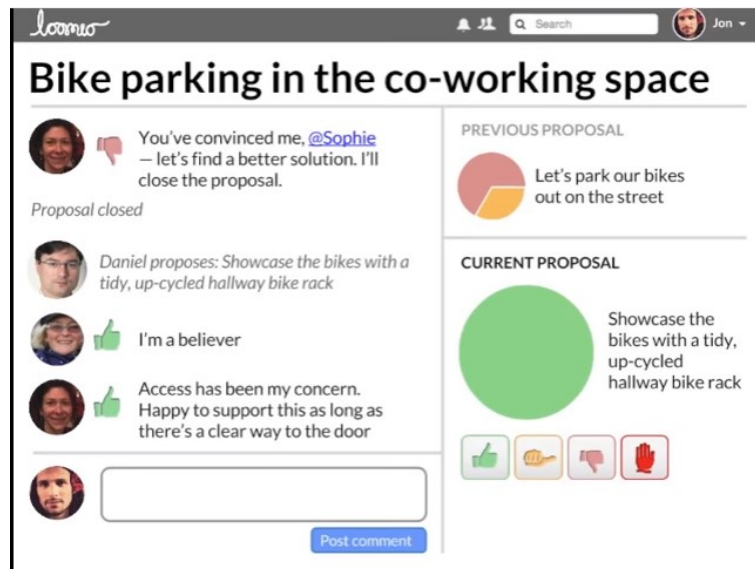


Figure 2.1: Loomio's interface

As for the interface, which can be seen in figure 2.1, the title of the proposed norm is written in a bigger font above the discussion. Underneath and on the left are old propositions, and the votes for or against it in the form of a circle chart. Further down, the current proposal is displayed slightly larger than the previous proposals. The circle chart representing the votes is also present, and under it are the icons that allow users to vote.

The votes are represented with the aid of symbols and colors, and no words are used. The use of universal symbols, such as thumbs up for a positive vote, thumbs down for a negative vote, and a thumb to the right for an undecided one, is enough. A symbol of a hand that is understood to mean "halt" or "stop" is used to signify blocking. This is accompanied by the use of colors. Green to mean a positive vote, yellow undecided, light red means a negative vote and a dark red a block.

On the left of these charts and icons are the user actions and opinions. An action, such as creating a new proposal, is written in light gray. The actual arguments that the members of the group write, are in a darker color, and if the opinion includes a vote on a proposal, the corresponding icon is next to the text. Also next to it is a photo of the user who has made the argument, so the members always know who has said what. Underneath the existing arguments is a textbox that allows the users to post a new comment.

2.2 Baoqu

Baoqu is an open-source tool that allows large numbers of citizens to discuss ideas and proposals for their city. To begin a discussion, users are divided into groups of 5 people,

where they can discuss their ideas and start proposals. If a proposal is supported by at least 4 of them, the group Levels up and becomes part of a larger group of 25 people. There the process starts again, and new proposals that even more people agree with can be made. Every user can only support at most 10 proposals at a time, so users have to really think about which ideas are most important to them. User can also back proposals from other groups, importing them to their own group.

If a person is stuck in a group with other people who do not want to collaborate or simply do not agree on any proposal, they can start again in a new group. This causes the user to lose all the levels they accumulated, to discourage constant group-changing whenever there is a difficulty in the discussion.

At the end of the event, all the users can see statistical results about which proposals have gained the most support, how many participants there were, how many commentaries and ideas were made etc.

Baoqu tries to solve the extremely complex problem of having a discussion with a lot of participants, such as the citizens of an entire town, and not just a small group of people who already know each other. By starting in small groups, everyone can explain their ideas and discuss them, and if the idea is good enough, it will eventually reach the whole group.

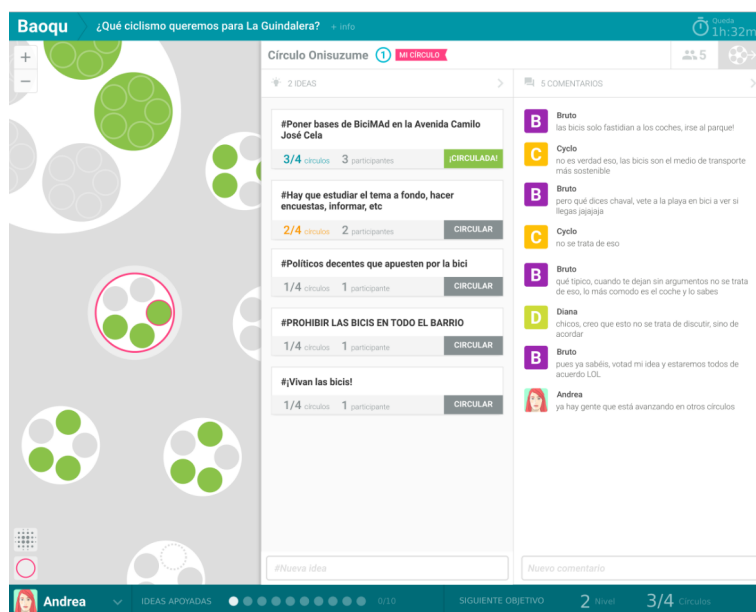


Figure 2.2: Baoqu's interface

When analyzing the interface in figure 2.2, one can see that the first third of the screen is occupied by a graphical representation of the groups that are discussing ideas at that

very moment. Each user is represented by a green dot, and each group by a white circle around them. In the biggest groups, the dots represent groups of five. In the second third is a list of the proposals of the group, and underneath the number of people who support each one. A rectangle next to it is colored green if the proposal is backed by enough participants. In the last third of the screen are the arguments made by the users, accompanied by their photo and user name.

On the screen where the results are posted, the users can see a straightforward list of the proposals that have gotten the most support during the discussion, as well as other data such as the number of participants, ideas and commentaries generated, as well as some links of interest about the topic that was discussed.

2.3 Decide Madrid

Decide Madrid is a website where citizens of Madrid can create their own proposals and vote for them. Proposals are filtered by a group of volunteers that eliminate proposals that are racist, sexist, illegal, etc.

If a proposal is on the site, users can discuss it and vote for it. If a proposal gets the necessary support (at least 1% of the census of Madrid[2]), the next step begins. During the decision phase, which lasts 45 days, people can vote if they are for or against the proposal. If more people are for it than against, the town hall of Madrid will try to implement it.



Figure 2.3: Decide Madrid's interface

Decide Madrid is a first step to get citizens to be able to make their own proposal and get their ideas heard, but actually no proposal has ever gained enough support to reach the town hall[3]. It is also a somewhat basic system, since it only supports voting for a

proposal, so if a user does not like a proposal, they can only comment on it, which has no actual effect other than allowing users to state their opinion. This means actual discussion of the issues is not really incentivised.

As for the design of the interface in figure 2.3, we can see that proposals can be sorted according to a few criteria, like newest or most voted. On the main site with the list of proposals, the user can gather some information about the proposal apart from the title, for example the number of comments, date of creation, topics that the proposal concerns etc. On the right the citizens can see how many people have supported the proposal already and how many more the proposal needs to get to the next phase. Here is also the button that allows users to back the proposal.

2.4 Appgree

Appgree is a web and mobile application that aims to help groups decide what opinion they agree with the most. It can be used by small groups or be open to participation to all users on the application. It uses the algorithm DemoRank, which is based on the idea that a small group of people chosen at random can be representative of the whole group.

First, a person or entity has to make a question, and any user can respond to it. Then, Appgree creates a sampling of users for each answer. The users in the sample group have to rate the answer (either in favor or against it), which is done anonymously. If the sampling groups are small, Appgree repeats the process eliminating the answers that received the worst ratings, so the next sampling groups can be bigger, since there will be fewer answers to rate. Then, Appgree presents the results, ranked from the opinion with most support to the one with least support. To calculate the support, the rating, the sample size and the median rating of all answers are combined.

In the interface, first we see a list of questions. When the user clicks on any of them, it takes them to the page of the individual question, seen in figure 2.4. The user can either give a new answer, start rating answers or view which answers have the highest support right now. The answers are presented horizontally, with their approval rating represented as the percentage of users who have rated the answer favorably.

Appgree is an interesting way to know which opinions a group agrees with the most. Nevertheless, its sampling system only works if a very large number of users participate in the process.

2.5 Quoners

Quoners is a web application that helps groups decide what opinions they agree on. It can also be used as a tool to get poll results or market studies since open questions for all users can be created. Any person or organization can create a question and provide as

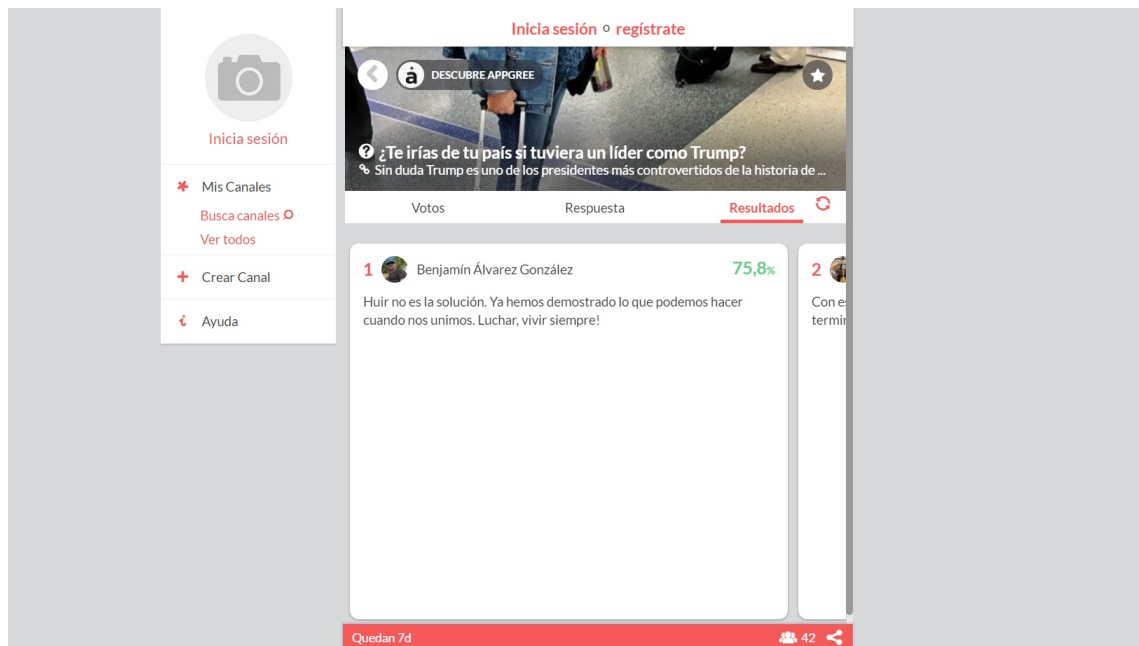


Figure 2.4: Appgree's interface

many options for answers as they want. Users select the answer they agree the most with and the result is presented in a graphic way: a horizontal bar diagram on the main page or a circle chart in the detailed page for each question.

Analyzing the interface, we can see that on the main page there is a list of questions, and the users can already see the results at that moment, along with the number of votes, number of commentaries, who created the question... On the detailed page of each question, users can see this information as well, and they can also vote for their preferred answer. The results are presented in a circle chart.

2.6 Consider.it

Consider.it is a web application that allows users to create their own forum where they can create proposals, and users can then rate them on a scale.

The first step for the user is to create their own forum with a custom URL. Then, they create the proposals they want users give their opinion on. Next, they have to share the link so users can access the forum. When users give their opinion on a topic, they have to use a sliding bar to determine whether their overall opinion is that the proposal is low-priority or high priority. Then, they have to add their pros and cons, which they can write themselves, or give support to other users' pros and cons.

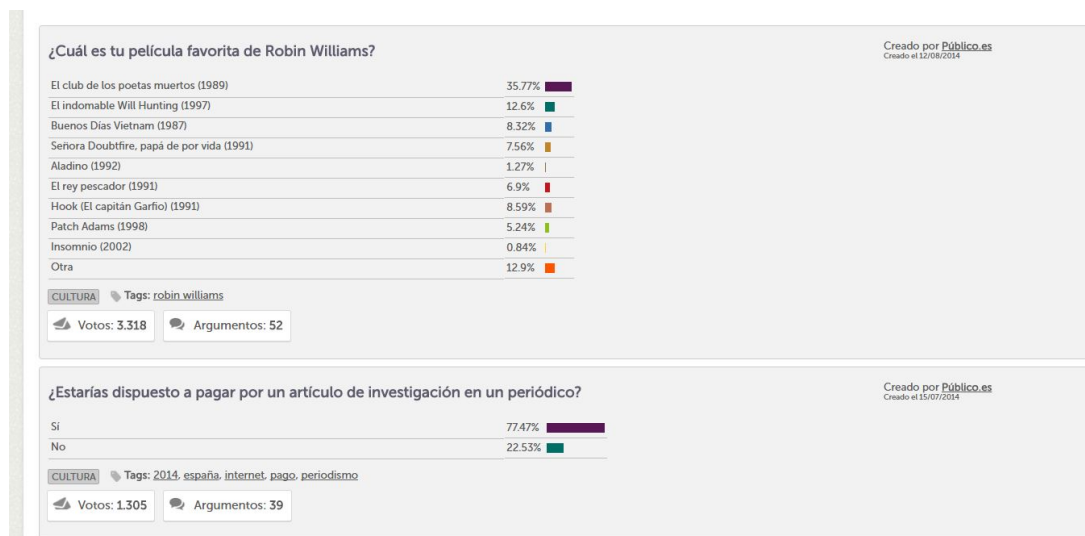


Figure 2.5: Quoner's main page

The creator of the forum can then see how much support each proposal has, how the users' opinions are distributed from low-priority to high-priority, and what the top pros and cons were for each proposal.

Analyzing the interface in figures 2.7 and 2.8, we can see that the main page consists of a list of proposals with a graphical representation of the support each one has next to it. On the page for each of the proposals, we can see a bigger version of the same graphic, and the top pros and cons other users have given. When a user wants to give their opinion, a sliding scale is used, and a box where users can add other people's pros and cons or write their own.

2.7 Parlement et Citoyens

Parlement et Citoyens is a website that allows the citizens of France to participate more directly in politics and law-making. On the website, a member of parliament can submit an issue, explaining its causes, the problem it poses, and possible solutions. Then, users can vote for, against, or undecided on the proposed solutions, explain their arguments, propose counter-arguments, and round-up their favorite commentaries.

After 30 days, the consultation closes and the site shows a cards with the arguments in favor in green and the arguments against the solution in red. Then, the member of parliament has a live video-chat with randomly chosen or voted for participants of the discussion. In the end, the member of parliament has to explain the final bill he or she takes to parliament.



Figure 2.6: Quoner's question page

The main page of the application has a list of proposals, where users can see in what stage of the decision process each proposal is and how much votes, contributions and participants each one has.

Analyzing the page of a proposal in figure 2.9, we can see that proposals have a presentation video, the number of contributions, votes and participants, and on the left there is a table of contents to guide users through the different stages in the process.

2.8 pol.is

Pol.is is a project that utilizes artificial intelligence and machine learning to understand the opinions of large groups of people. A person or entity can pose a question and users answer it. Then they can rate statements submitted by other people (using agree, disagree or pass). Then, the system creates a visual representation of user's opinions, focusing on creating "opinion groups" of people who agree on a topic. This application has been used by the government of Taiwan to get to know the opinions of its citizens[4].

In the figure 2.10, we can see the graph created by the artificial intelligence, creating groups of users according to their opinions. In the figure, we can see their opinion on the statement on the bottom of the image, showing that the users in the group on the left tended to agree with it and users in the second group did not.

2.9 Nabu

Nabu is a web application designed to help large cooperative groups to write documents that will be the starting point of real actions.

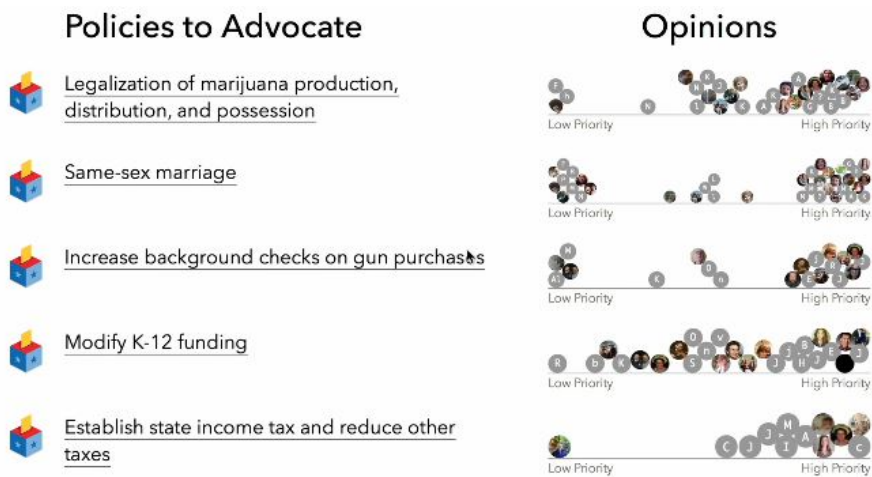


Figure 2.7: Consider.it's main page

It works by creating a tree of opinions, as seen in figure 2.11, where the lowest level of the tree (the root) represents the most abstract proposals, which branch out into more concrete proposals, and the highest level of the tree (the leaf) should be a complete document detailing the action to be taken. Each user has a limited number of "flowers", which they can use to either create new proposals, or vote for the proposals of other people. After a period of two months, the flowers become inactive, so the system does not get full of opinions from users who have left the discussion. If the user still wants to participate, they can use the flower again to support a document or create their own. To visualize how many users support a document, the branch leading to it will get thicker.

Slide Your Overall Opinion

Low Priority ←  → High Priority

Others' Cons

-  1-1240's trigger law allows the slightest majority to convert *any* school, high performing or failing. [\(read more\)](#)
10/7/2016, 1 comment
-  Charter schools will require their own entity of fiscal and social oversight which may burden an already struggling system.
10/6/2016, 0 comments

Give your Cons **Give your Pros**

- It will remove funding from public schools. [\(read more\)](#)
10/4/2016, 12 comments
- Research on **charter** schools indicates that more than 80% have the same or worse outcomes for students than traditional public schools.
10/7/2016, 2 comments

Drag a Pro from the right

or • [Write a new Pro](#)

Others' Pros

-  Charter schools give a place for struggling students in the public school system to turn to; instead of dropping out of school completely.
10/1/2016, 6 comments
-  Teachers meet the same requirements as in all public schools, but they get more flexibility in the classroom.

Figure 2.8: Adding an opinion on Consider.it



Généraliser les consultations en ligne



Publié par [Patrice Martin-Lalande](#) & [Luc Belot](#) dans [Démocratie & Citoyenneté](#), le 17 novembre 2016

511 contributions 5203 votes 659 participants

Partager -

ÉTAPES

1	Présentation	>
	Terminé	
2	Consultation	>
	Du jeudi 17 novembre 2016 au mardi 17 janvier 2017 à 23:59	
	Terminé	
3	Synthèse	>
	Du mercredi 18 janvier 2017 au samedi 18 février 2017	
	En cours	
4	Réponses	>
	Du mercredi 18 janvier 2017 au samedi 18 février 2017	
	En cours	

Présentation

Les consultations en ligne : une initiative récente, des expériences concluantes

Parlement & Citoyens a été créé en février 2013 afin de permettre aux parlementaires volontaires et aux citoyens de rechercher ensemble les solutions aux problèmes du pays. Sujet inexistant il y a encore 3 ans, ces consultations en ligne que nous organisons sont devenues rapidement source d'intérêt puis d'expérimentation.

- La loi d'interdiction des pesticides à usage non agricole, initiée par le sénateur EELV Joël Labbé sur Parlement & Citoyens, a été votée en janvier 2014.
- La consultation République Numérique, initiée par Axelle Lemaire dans le cadre de son projet de loi, a réuni 21.000 participants et permis l'intégration de 4 nouveaux articles et de 90 modifications d'article. L'enquête de satisfaction réalisée auprès des participants a dévoilé que 97% d'entre eux souhaiteraient renouveler l'exercice.
- D'autres expériences telle que la consultation Egalité Citoyenneté ou la loi sur la biodiversité ont largement contribué à faire connaître (et apprécier) cette nouvelle pratique.

Vers une généralisation des consultations en ligne ?

Patrice Martin-Lalande a déposé en avril 2016 une première proposition de loi organique « visant à généraliser la consultation publique en ligne sur les textes de loi avant leur examen par le Parlement » signée par une cinquantaine

Figure 2.9: A proposal on Parlement et Citoyens

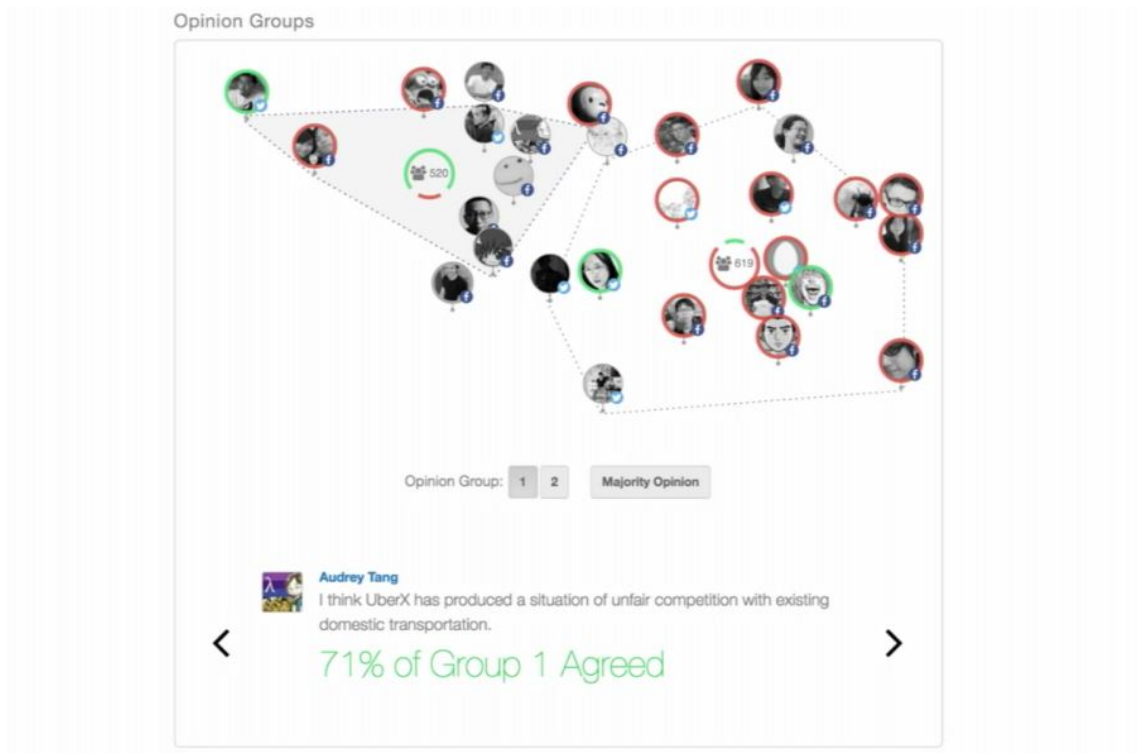


Figure 2.10: A graphical representation of opinion groups in pol.is

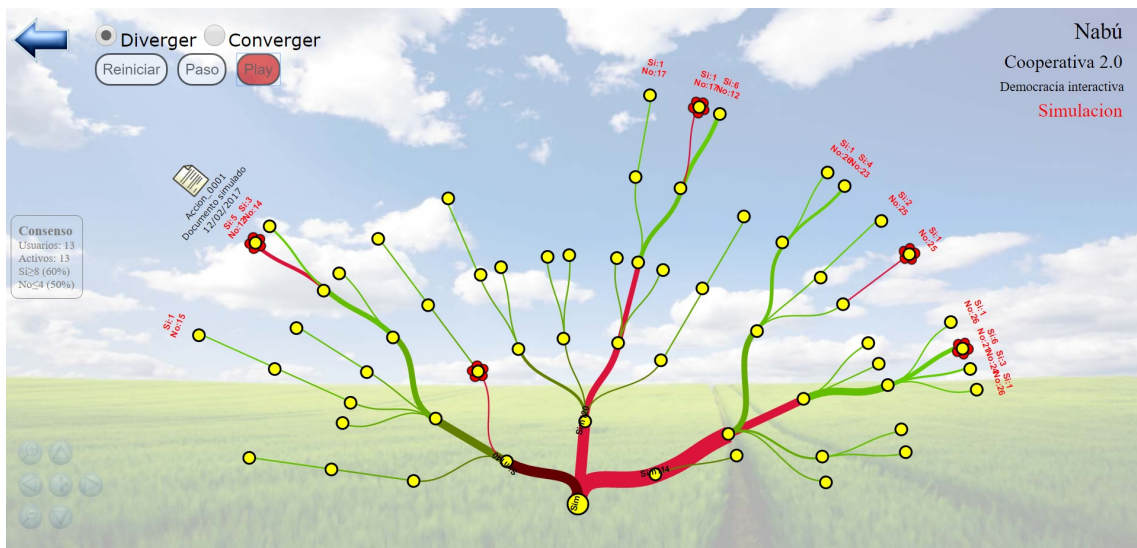


Figure 2.11: A simulation of a discussion in Nabu

Chapter 3

Design

This chapter will briefly describe how the existing web application is structured and specifically how the norm/argumentation section works. When David Sánchez Pinsach developed his first version of the web application, he performed a user test that revealed some interface problems[6]. Therefore, the main aim of this project to improve the usability of the application. The changes that were made during this project will be listed and explained according to usability heuristics.

3.1 Norm Crowdsourcing

The web application prototype named Norm Crowdsourcing constitutes the current implementation of the proposed solution to user participation in the creation of norms. The application is a forum for football fans that allows registered users to post content such as messages, links or photos in different sections (Forum, Image&Video and Reporter). This content can be normal content or spam content.

3.1.1 Norms and argumentation

In the Norms section of the website, any registered users can propose norms. The norms users can propose are limited to prohibiting spam in certain sections of the website. Then, users can add brief arguments either for or against this norm. These arguments can be rated using a 5-star voting system. One user can add as many arguments as he or she wants, but can only rate a single argument once. During this project, arguments were given the attribute of relevance, which is calculated using the following formula:

$$relevance = 0.6\left(\frac{Rating}{5.0}\right) + 0.4\left(\frac{Number\ of\ Ratings}{Total\ of\ Ratings}\right)$$

Figure 3.1: Formula used to calculate relevance

The rating users have given this argument is normalized and given a weight of 0.6. The number of users who have given this argument a rating is normalized by dividing it by the total number of people who have rated arguments of this type for this norm, and given a weight of 0.4.

The ratings of these arguments are then aggregated to give a rating to the norm itself[7]. After a certain amount of time that is selected when creating the norm, the norm stops being under discussion and becomes either active or inactive, depending on whether it reached the minimum rating. If the norm is active, users are expected to obey the norm when posting in the forum. If it is inactive, users can still read the discussion in the Norms section, but the rule does not have to be followed.

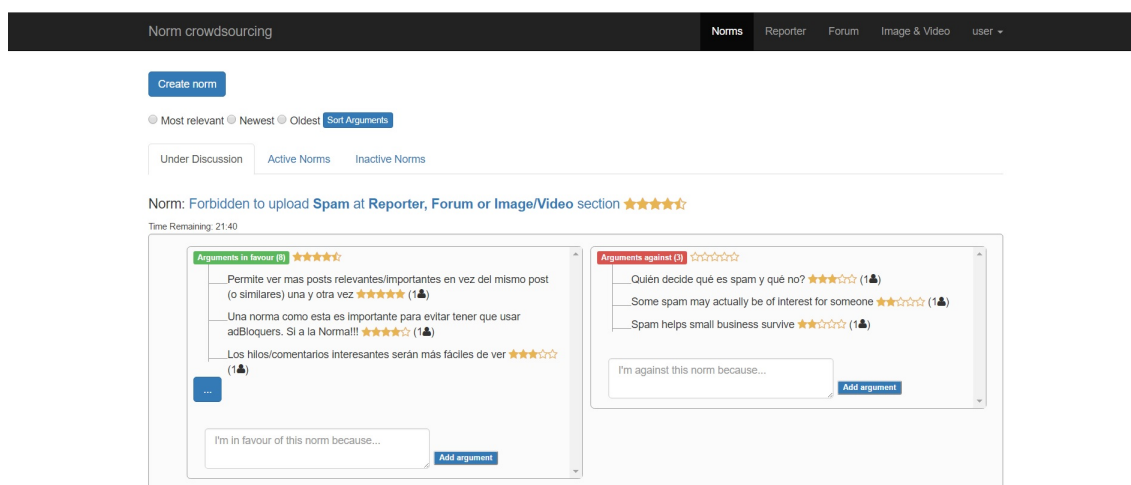


Figure 3.2: Main norm page

3.2 Usability Heuristics

To create improvements for this project, the main theoretical basis used were the Nielsen Usability Heuristics, developed by Jakob Nielsen together with Rolf Molich in the early 90's. The final set was released by Nielsen in 1994. These heuristics were meant to be used as "rules of thumb" rather than as specific usability guidelines[5].

1. **Visibility of system status:** The system should always keep the user informed about the current state.
2. **Match between system and the real world:** The application should use real world words, phrases and concepts that are familiar to the average user.
3. **User control and freedom:** When users make a mistake they have to have an easy way to undo their action.

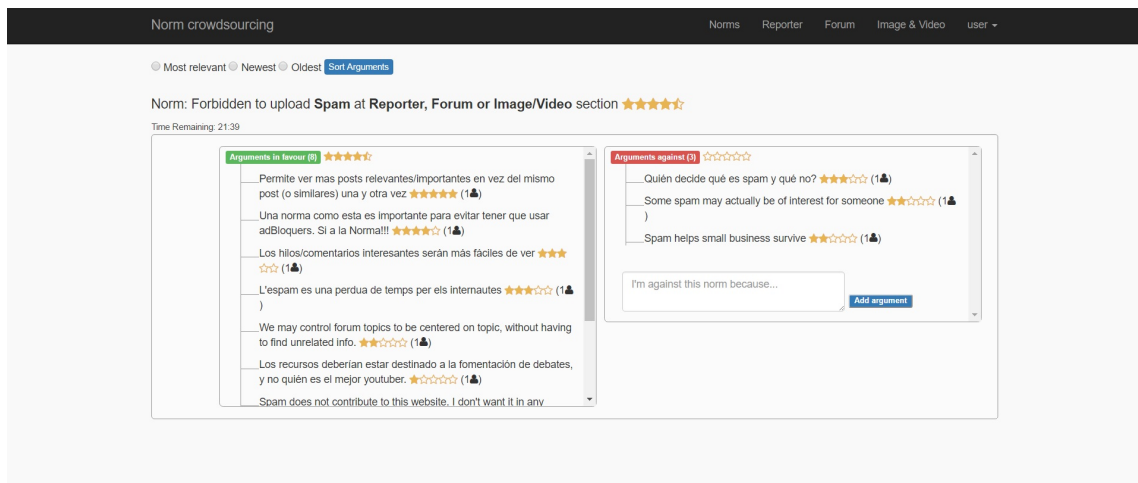


Figure 3.3: Norm detail page

4. **Consistency and standards:** Website elements such as icons and wording should follow the same conventions.
5. **Error prevention:** Users should be prevented from making mistakes.
6. **Recognition rather than recall:** Users should not have to remember excessive quantities of information. Information, instructions, objects, options etc. should always be visible.
7. **Flexibility and efficiency of use:** Expert users should be able to use some short-cuts, while inexperienced users do not feel confused.
8. **Aesthetic and minimalist design:** The interface should have no irrelevant information.
9. **Help users recognize, diagnose, and recover from errors:** Error messages should be in plain language, explain the problem and indicate solutions.
10. **Help and documentation:** In case the users need extra help, there should be documentation available to them.

3.3 Changes and improvements

- **It is not possible to propose a norm more than once.** In the previous version, it was possible to create a norm proposal more than once. It was decided that this was not logical since it would be possible for one proposal to be approved and for the other one to be declined. In the current implementation, if a norm has been proposed it can not be proposed again, regardless of the outcome of the first proposal.

- **Replace "positive arguments" with "arguments in favor".** In the previous version, the arguments in favor of a norm were called positive arguments. Some users did not understand this, since positive is a very general term that can have several meanings depending on the context. To create a match between real-life phrasing and the terms used on the application, this was replaced with "arguments in favor". This wording is a lot more clear and does not produce confusion.
- **Put the norms section in the header of the application.** Previously, to get to the norms section, users had to click on their username in the header section, and then click on "Norms" in the menu that appeared. Since the website had to be more focused on the norms, this link was moved to the main header section.
- **Place the arguments for and against a norm in two columns.** Previously, users had to first scroll through all the arguments in favor, and then through all the arguments against a norm, since these sections were placed one above the other. The discussion is easier to understand, and more aesthetically pleasing, if the arguments are placed in two columns next to each other. Moreover, it also helps users understand the contrast between the arguments "in favor" and "against".
- **Clicking on the norm title takes the user to the detail page of the norm.** Now, if users click on the title of the norm, it takes them to the detail page of the norm, where they can only see that norm and all of the arguments made about it.
- **Only three arguments are visible from the main page.** On the main page where all the norms are listed, users used to see all of the arguments made in favor or against it. Now, on the main page there are only three arguments of each type visible. This makes the page easier to navigate, especially if a norm has a lot of arguments, and users quickly see all the norms of the type they are currently viewing (Active, inactive or under discussion).
- **Each argument section has a scroll bar.** Arguments in favor and arguments against both now have a scroll bar, so the sections do not get too long if there are a lot of arguments.
- **The "..." button takes the user to the detail page of the norm.** On the main page, if there are more than three arguments of one type, a button appears that allows the user to go to the detail page and view the rest of them. The text on the button is "...". This was chosen instead of "More" or other text so that the overall design would feel minimalist, and to use a well-known symbol. Every user will know what "..." means in this context so there is no need to use more text.
- **Arguments can be ordered by relevance.** Arguments can now be ordered by relevance, which is a new attribute of the arguments class that was added to the database. It is calculated using the formula seen in figure 3.1. This formula was decided so that arguments with a lot of support could be easily viewed, as well as arguments that generated controversy.

- **Three tabs sort the norms by status on the main page.** Previously, all type of norms appeared in order of creation on the main page, whether they were under discussion, accepted (active) or rejected by the users (inactive). This was a big source of confusion for the users, so three tabs were added to the page to separate the norms according to status.
- **The textbox to add a new argument appears under the existing arguments.** Previously, users had to go to another page that consisted of only a textbox to add an argument to the discussion. To promote flexibility and efficiency of use, a textbox was added below each type of argument, so users could add it to the conversation without having to change the page.
- **The "add" button appears next to the textbox and now says "add argument".** Before, the button to add the argument appeared below the textbox and just said "add". This confused some users as it did not seem connected to the textbox and its meaning was ambiguous. Now, it says add argument, and appears next to the textbox which was made a bit smaller.
- **The number of existing arguments appears next to the type of argument.** Next to the text that says "argument in favor" or "argument against", the number of arguments of that type was added.
- **Users can sort the arguments according to relevance, newest or oldest.** Users can now sort the arguments according to three categories: relevance, the newest arguments or the oldest ones. This way users have more control over how they want to follow the discussion and how much of it they want to read.
- **Arguments can now be up to 140 characters long.** Previously, arguments could only be 100 characters long, and one test user noted that this was too short. The character limit was increased to 140, like in the social community Twitter, to keep arguments short and to the point, but allowing a bit more freedom of expression for the users.

3.4 Comparison with other applications

Since the structure and improvements made to Norm Crowdsourcing (the application developed in this project) have been explained, we can make a brief comparison with the applications presented in chapter 2.

The rating system in this application is the most complex, presenting the user with a 5-star rating system, whereas in Loomio users can use positive, undecided, negative or blocking votes, Parlement et Cityones and pol.is have three possible votes (agree, don't agree, undecided), Appgree has a positive or a negative vote, Decide Madrid, Nabu and Baoqu only have a supporting vote, and in Quoners the answers are predefined. Thus, in our application users can express their feelings about the arguments in a more nuanced way.

In Norm Crowdsourcing, users can see three arguments for each norm in the main page. This way, they can get an idea of the discussion that is happening for each one. This is not implemented in any of the applications described in chapter 2.

In this application, the creation of the norm, arguments and ratings are all anonymous. This was decided because this way users have more freedom of expression and will say what they are really thinking. In applications designed for people who do not know each other, knowing who has decided what is generally unnecessary. Loomio, Baoqu, Parlement et Citoyens, Nabu, pol.is and Decide Madrid are not anonymous, and in Appgree only the voting process is anonymous. Quoners and Consider.it have the option of stating an anonymous opinion.

Chapter 4

Development

4.1 Technologies

This project was designed as a web application with a client-served architecture to make it accessible and easy to use. The users can access the website, which is hosted at a web server, by means of a regular browser application. In this section the technologies used in this project will be briefly described.

4.1.1 Yii2

Yii2 is a high-performance modern PHP framework for developing web applications. As a framework, it has several interesting features like MVC (Model-View-Controller), DAO (Data Access Object), caching, authentication and role-based access control, security, error handling etc. Initially, it has a very high learning-curve but when used to it, this framework allows the programmer to save a lot of time. It also has some scripts provided by the community and a well described API.

4.1.2 Xampp

XAMPP 2 is the most popular PHP development environment because it is a completely free, easy to install and use Apache distribution containing MySQL and PHP. It also includes the Phpmyadmin package, which is one of the most popular web applications to manage the MySQL datasets.

4.1.3 Database

The database of the project was developed with MySQL, which is an open-source relational database management system. It has an extremely good performance, is stable, and has very extensive documentation, as well as community based solutions.

4.1.4 Bitbucket, Git and SourceTree

This project was developed using Git as a version control software to track changes in the code. The hosting service chosen for it was Bitbucket, which supports both Git and Mercurial. The client used during the development of this project was SourceTree, which is a free git client that has some interesting features, such as easy branch management, discarding of files, visualization of changes in the working copy etc.

Chapter 5

Evaluation

The goal of this chapter is to study if the proposed interface actually works properly and evaluate how the users feel about it. A test was conducted with a number of students who were assigned two different roles, either users who were in favor of spam or users who were against it. After the experiment, they filled a brief questionnaire about their experience.

5.1 Configuration

This user test was conducted with 17 students of the Distributed Artificial Intelligence class of the University of Barcelona. So, all participants were finishing their degree and had experience with computers and web applications both as users and as developers. As part of the survey, the students were also asked about their participation in virtual communities (Question 1 of the questionnaire). Along with their age and gender, this information is represented in table 5.1. Analyzing their answers, we can see that most of them participate in virtual communities, although there are also a few who do not, or not as much. In figure 5.1 we can see the participants during the test.

5.2 Test

At the beginning of the test, users were given a presentation document which included a description of the purpose of the web, their role during the test and the tasks which they had to perform. Each user was given two usernames and passwords to use during the first and second round of the test (see appendix 6.1 and appendix 6.1).

Before the test, two norms ("Forbidden to upload Spam at Forum section" and "Forbidden to upload Spam at Reporter section") had already been proposed on the application, and were open to discussion. During the first round, one half of the group were acting as good users, which are users that don't want spam on the application. These users were supposed to come up with arguments in favor of prohibiting spam, rating these type of arguments favorably and the others negatively. The second half were acting as spammers,

	Gender	Age	Participation
	M	25	3
	M	26	3
	M	24	5
	F	22	2
	M	25	4
	M	25	2
	M	34	3
	M	22	4
	M	25	4
	M	23	4
	F	23	5
	M	23	4
	M	29	2
	M	25	4
	F	27	1
	M	32	5
	M	23	5
Median		25	4
Max		34	5
Min		22	1
Average		25,47	3,53

Table 5.1: General traits of the testers



Figure 5.1: Students testing the application

users who are in favor of spam, and had to write arguments against the prohibition of spam, giving a high rating to like-minded arguments and low rating to the others.

After 10 minutes, the roles were reversed, so the users who had acted as good users were now acting as spammers, and vice versa. Now the users had to discuss the second norm. After the same amount of time, the experiment was concluded. Finally, the participants of the experiment had to answer some questions about the experiment and the usability of the application (see appendix 6.1).

5.3 Results

After the test, the results of the questionnaires and the interactions of the users with the application were analyzed. The users performed the tasks they had been assigned without errors, for example making an argument in favor of banning spam in the section for arguments against it. This was an important improvement regarding the user test done with the original application, during which users made this mistake[6]. It should also be noted that that test was conducted with master students, so they had a higher education level.

In figure 5.2 we can see the results of the test in terms of how many arguments were made, what rating each type received, and the final rating of the norm. We can observe that in the second test users already knew the system and gave more arguments of each kind, and that in general, both kind of arguments had high ratings. It can be concluded that users like supporting ideas similar to their own more than rating opposing arguments negatively. During the experiment, the students created a lot of arguments very quickly, and then rated the other user's arguments.

To give examples of some of the arguments with higher ratings that the users gave for the norms:

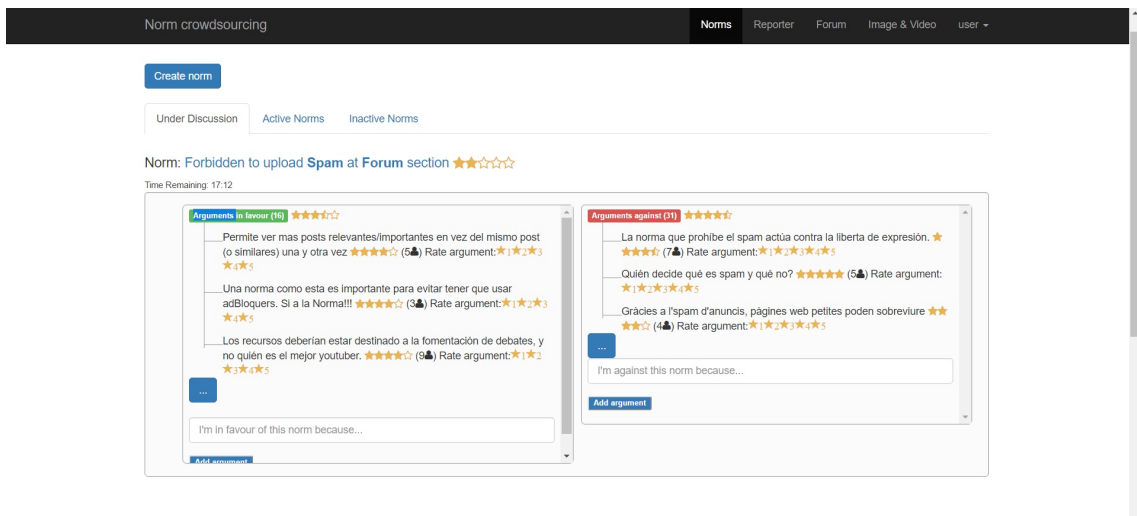


Figure 5.2: Norm from the first experiment

- "Una norma como esta es importante para evitar tener que usar adBloquers. Si a la Norma!!!!"
- "Permite ver mas posts relevantes/importantes en vez del mismo post (o similares) una y otra vez ★★★★★ (5★) Rate argument:★1★2★3★4★5"
- "Una norma como esta es importante para evitar tener que usar adBloquers. Si a la Norma!! ★★★★★ (3★) Rate argument:★1★2★3★4★5"
- "Los recursos deberían estar destinado a la fomentación de debates, y no quién es el mejor youtuber. ★★★★★ (3★) Rate argument:★1★2★3★4★5"
- "Atrae a trolls y otros personajes indeseables a las comunidades online."

And against them:

- "Quién decide qué es spam y qué no?"
- "La norma que prohíbe el spam actúa contra la liberta de expresión."
- "Gràcies a l'spam d'anuncis, pàgines web petites poden sobreviure"

The answers they gave to the questions can be seen in table 5.3, and the statistical analysis of them in table 5.4. The first 4 questions were more general, to understand the participants interest in norms, and the following 5 were specifically about the application and the user test. In the following subsection, the results to each question will be analyzed individually.

5.3.1 Questionnaire

- **Q1: Do you participate in virtual (social) communities?** This question was asked to determine the general profile of the test subjects. A majority of the users were familiar with online communities, but a few of them stated that they did not participate in them, or to a very low degree.

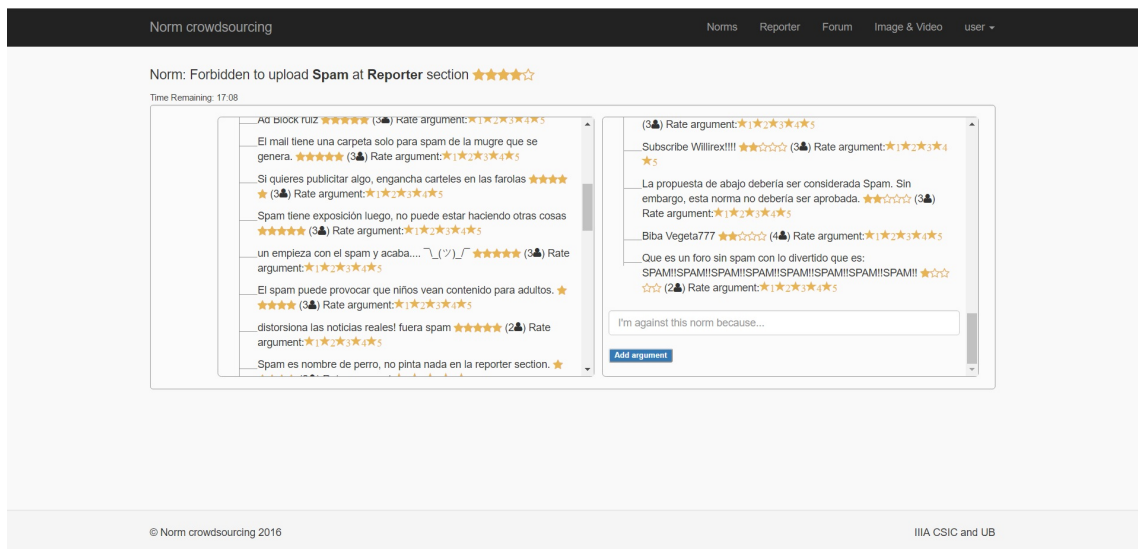


Figure 5.3: Norm from the second experiment

	Norm 1	Norm 2
Arguments in favor	16	40
Arguments against	31	36
Rating in favor	3,98	4,77
Rating against	4,71	4,21
Norm rating	2,06	3,8

Table 5.2: Results of the test

- **Q2: Do you think norms are useful in social communities?** The majority of users gave a very high importance to norms in these communities, even those that do not participate in them as often.
- **Q3: Do you prefer to decide your own norms rather than having moderators?** The test users were a lot more divided on this question, with few of them giving a high mark but a lot of users appear more undecided or reticent to decide their own norms, even if they do think norms have a great importance.
- **Q4: Would you like to participate in the discussion about norms?** Similarly to the last question, this one also had a wide range of answers, reaching from 1 to 5. It seems that while users generally recognize the importance of norms, some of them prefer not to be involved in the process of discussing or deciding them.
- **Q5: Did you easily follow the discussions on norms in this community?** This ques-

tion also has more divided opinions, although the mean response is above medium. So, there are definitely things to improve to make the average user follow the discussion better. It could also be that these difficulties arise from the content of the discussion. Since a test per definition will have no lasting impact on its subjects, it is not entirely possible to create a discussion the way it would be on a real online community, where the proposed norms would actually be implemented or discarded. Because of this, some of the content of the discussion were jokes, or irrelevant arguments, that make any actual discussion more difficult to follow.

- **Q6: Was it easy to understand how much support a norm or argument had?** Responses to this question were higher, with the average being 3,647. So, it seems that users were able to understand the star rating system both in the case of individual arguments and norms.
- **Q7: Considering individual argument ratings, did norms get reasonable aggregated ratings?** This question had moderately positive answers, with only a few students ranking it below medium. It seems that the aggregated ratings are working, although if further tests with more subjects indicate a problem, they could be improved.
- **Q8: Was it easy to add new arguments to the discussion?** This is the question that has received the highest answers of all of them, with a median of 5 and an average of 4,294. It can be concluded that adding new arguments to the discussion is not a problem for the users, and thus, the change has proven to be useful.
- **Q9: In general, how usable was the website?** Despite its intrinsic complexity, this last question about the general usability of the website had an average rating of 3,471, with only two users giving a rating below the medium value. So, although there are elements that can be improved, it can be said that this is a positive result and the majority of users think that the website is usable.

At the end of the questionnaire, the students were asked to provide some ideas or suggestions if they wanted to. These suggestions were:

- Too many trolls: One student suggested that there were too many trolls (people who make deliberately offensive or provocative online posts) in the discussion. Of course this can't be avoided completely, especially in a test where some people rated these arguments highly. Still, a system could be implemented where arguments with a very low rating would be hidden from view.
- The text field should allow more characters: This suggestion was implemented.
- Users should know which arguments they have read or voted for: Users can only vote for arguments one time, so if they can not vote for it, they know that they have already voted.
- Arguments should have counter-arguments: This has been added to further work suggestions. It would be an interesting way to have more dialogue between the

ID	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
1	5	5	2	4	3	5	4	5	4
2	3	5	3	1	2	2	1	5	3
3	3	3	2	2	1	4	2	4	2
4	5	5	4	5	3	4	3	5	5
5	2	4	4	4	4	5	3	5	3
6	4	3	4	5	4	5	4	5	4
7	2	2	5	4	2	3	1	3	4
8	3	5	2	4	3	4	3	5	3
9	4	4	3	3	4	2	3	2	3
10	4	5	2	4	5	3	4	5	4
11	4	5	3	1	5	5	5	5	3
12	5	5	2	4	4	4	5	5	5
13	4	4	2	2	4	4	4	5	5
14	2	4	3	4	2	3	3	4	3
15	4	4	3	2	1	4	4	5	3
16	1	4	2	3	4	3	2	3	3
17	5	4	5	5	3	2	4	2	2

Table 5.3: The results of the questionnaires

users, but this would completely change the two-columns model, since there would necessarily be arguments in favor in the arguments against section, and vice versa. The current model of rating commentaries works because it is clear that every commentary has to be either for or against the norm. If every argument allows a counter-argument, the end result would probably be closer to a traditional commentary section, and the ratings would end up not being accurate.

One user also noted that he liked how this system gave users a lot of freedom of expression.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Median	4	4	3	4	3	4	3	5	3
Max	5	5	5	5	5	5	5	5	5
Min	1	2	2	1	1	2	1	2	2
Average	3,529	4,176	3	3,353	3,176	3,647	3,235	4,294	3,471

Table 5.4: Statistical results of the questionnaire

Chapter 6

Conclusions and Future Work

Norms are an important component of social communities, and virtual spaces in particular offer a lot of possibilities to implement ways for users to decide their own rules. This way, users will be more likely to follow their own rules. Usability is very important for these types of projects, since they have to be understood by all kinds of users, even if they are not very familiar with web applications. The structure of a website can directly influence what kind of discussions users have and whether they can reach an agreement or not.

In this project, different ways to implement norm proposals and discussions in social communities have been studied. The existing application has been improved according to usability principles and tested with real users. This test revealed that users think that norms are a very important part of these communities, and they reported that they had a positive experience with the website.

6.1 Future Work

There are a lot of different ways in which this project can be expanded and improved. Some suggestions are:

- **Generalizing the website:** At the moment, the application is a forum for football fans. The general structure could be very easily made into a website about any topic, so there could be different kinds of norms, sections and content.
- **Dependencies between norms:** Norms could have relationships between them, for example the application could detect that two norms are mutually exclusive, or that a norm makes another one redundant. There could also be parent-child relationships, where one norm depends on the existence of another one.
- **Further usability improvements:** The rating system could be simplified, arguments could have counter-arguments, arguments could contain images or other content, graphics could be added to represent statistical results of discussions...

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Appendices

TASK good- spammer

Norm crowdsourcing

Introduction

You are involved in a test for evaluating *norm crowdsourcing*, a prototype of a virtual (social) community where users discuss about participation rules (norms). This document contains a brief description of the website and the test you are about to do. We would like to stress that we are evaluating *norm crowdsourcing* and not the tester (this is not an exam you should pass). We encourage you to **be aware of your thoughts and impressions** along the test, since you will be asked about your opinion by completing a survey at the end of this test.

Norm crowdsourcing is a website where the user can: upload and view predefined contents; complain about contents uploaded by others; and create and discuss about the virtual community norms. The website is structured in three main sections ("The reporter", "Forum" and "Image & video"). The goal of this web is to allow users to decide and manage participation rules required to keep a good atmosphere in the website, so all the participants feel comfortable with the published contents and no additional moderation is required. Users discuss participation rules (norms) by providing and rating arguments in favour and against them. Once a norm has enough support by the user community, it becomes active and participants are asked to comply with them.

Test

During this test, you will be asked to join two subsequent tests regarding norm discussion:

- First test: You act as a good user
 - **Login** to <http://nug.iiia.csic.es/> as **goodX** (password: pwgoodX)
 - Go to the "Norms" area
 - Discuss about first norm "Forbidden to upload Spam at Forum section" for 10 minutes:
 - **Add and rate arguments in favour** of this norm.
 - Logout when indicated by test organisers.

- Second test: You act as a spammer.
 - **Login** to <http://nug.iiia.csic.es/> as **spamX** (password: pwspamX)
 - Go to the "Norms" area
 - Discuss about second norm "Forbidden to upload Spam at Reporter section" for 10 minutes:
 - **Add and rate arguments against** this norm.
 - Logout when indicated by test organisers.

TASK spammer- good

Norm crowdsourcing

Introduction

You are involved in a test for evaluating *norm crowdsourcing*, a prototype of a virtual (social) community where users discuss about participation rules (norms). This document contains a brief description of the website and the test you are about to do. We would like to stress that we are evaluating *norm crowdsourcing* and not the tester (this is not an exam you should pass). We encourage you to **be aware of your thoughts and impressions** along the test, since you will be asked about your opinion by completing a survey at the end of this test.

Norm crowdsourcing is a website where the user can: upload and view predefined contents; complain about contents uploaded by others; and create and discuss about the virtual community norms. The website is structured in three main sections ("The reporter", "Forum" and "Image & video"). The goal of this web is to allow users to decide and manage participation rules required to keep a good atmosphere in the website, so all the participants feel comfortable with the published contents and no additional moderation is required. Users discuss participation rules (norms) by providing and rating arguments in favour and against them. Once a norm has enough support by the user community, it becomes active and participants are asked to comply with them.

Test

During this test, you will be asked to join two subsequent tests regarding norm discussion:

- First test: You act as a spammer.
 - **Login** to <http://nug.iiia.csic.es/> as **spamX** (password: pwspamX)
 - Go to the "Norms" area
 - Discuss about the norm "Forbidden to upload Spam at Forum section" for 10 minutes:
 - *Add and rate* arguments **against** this norm.
 - Logout when indicated by test organisers.
- Second test: You act as a good user
 - **Login** to <http://nug.iiia.csic.es/> as **goodX** (password: pwgoodX)
 - Go to the "Norms" area
 - Discuss about the norm "Forbidden to upload Spam at Reporter section" for 10 minutes:
 - *Add and rate* arguments **in favour** of this norm.
 - Logout when indicated by test organisers.

SATISFACTION SURVEY

Norm crowdsourcing

Participants' name _____ Signature _____

Please answer these questions considering 1 as very low, 2 as low, 3 medium, 4 high, and 5 very high

1. Do you participate in virtual (social) communities?				
1	2	3	4	5

2. Do you think norms are useful in social communities?				
1	2	3	4	5

3. Do you prefer to decide your own norms rather than having moderators?				
1	2	3	4	5

4. Would you like to participate in the discussion about norms?				
1	2	3	4	5

5. Did you easily follow the discussions on norms in this community?				
1	2	3	4	5

6. Was it easy to understand how much support a norm or argument had?				
1	2	3	4	5

7. Considering individual argument ratings, did norms get reasonable aggregated ratings?				
1	2	3	4	5

8. Was it easy to add a new argument to the discussion?				
1	2	3	4	5

9. In general, how usable was the website?				
1	2	3	4	5

10. What did you like?, what do you think is missing?, ideas or suggestions are welcome...

INSTRUCCIONS WEB

#Connectar-se via ssh al servidor

```
ssh root@nug.iiia.csic.es
```

#Instalar apache2, mysql, php i java

```
apt-get update
```

```
apt-get install apache2
```

```
apt-get install mysql-server
```

```
(set mysql root password)
```

```
mysql_secure_installation
```

```
apt-get install php5 php5-mysql
```

```
apt-get install default-jre
```

#copiar la carpeta socialNorms que conte la web (pot tardar varies hores, depen de la conexio)

#en el meu cas ho he fet amb scp amb la comanda:

```
scp -r ./socialNorms root@nug.iiia.csic.es:/var/www/
```

#Si es té un altre servidor, fer servir l'adreça corresponent (per exemple, root@tetris.iiia.csic.es:/var/www/)

#Canviar el directori servit per l'apache

```
change line 12 of etc/apache2/sites-avaliable/000-default.conf
```

from:

```
DocumentRoot /var/www/html
```

to:

```
DocumentRoot /var/www/socialNorms/frontend/web
```

#Canviar les rutes que calgui, si abans portaven socialNorms/frontend/web, s'ha de borrar aquesta part

#Configurar la base de dades (cal el password que hem introduït al instal·lar mysql)

```
mysql -u root -p
```

```
(inside mysql)
```

```
CREATE DATABASE yii2advanced;
```

#Crear usuari i donar-li accés a la bd (en el meu cas usuari socialNorm password 2p5kza3)

```
GRANT ALL ON yii2advanced.* to 'socialNorm'@'localhost' identified by '2p5kza3';
```

```
connect yii2advanced
```

```
source /var/www/socialNorms/yii2advanced.sql
```

```
exit
```

#Configurar la web perquè es connecti a la base de dades

```
nano /var/www/socialNorms/common/config/main-local.php
```

change DB,username and password

default: yii2advanced, root and ''

#Donar dret de modificació a algunes carpetes a l'usuari de l'apache (en el meu cas www-data)

```
chgrp www-data /var/www/socialNorms/frontend/web/assets
```

```
chmod g+w /var/www/socialNorms/frontend/web/assets
```

#Reiniciar apache perquè s'apliquin tots els canvis

```
service apache2 restart
```

#Un cop està funcionant es pot apagar l'apache amb:

```
service apache2 stop
```

#I tornar-lo a engegar amb:

```
service apache2 start
```

#Si es volen reiniciar tots els missatges/normes/usuaris/etc... es pot crear una nova base de dades

#Connectar-se a mysql amb qualsevol dels dos usuaris (jo utilitzare el socialNorm)

```
mysql -u socialNorm -p
DROP DATABASE yii2advanced;
CREATE DATABASE yii2advanced;
connect yii2advanced
source /var/www/socialNorms/yii2advanced.sql
exit
```