Learning to Navigate through Controversial Datascapes.
The MACOSPOL Platform

Final report

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Although the expression “science in society” has spread everywhere in Europe, it is not yet clear what it really means. There is still the idea of a flow of knowledge produced in esoteric places —laboratories, universities, research centre— which then trickles down to the general public who should be informed of its achievements or prepared to handle its novelties. The flow goes from Science *to* society at large. To be sure, there is also another idea which does not rely on some unidirectional flow of knowledge but rather on a highly complex set of multidirectional channels: it is truly science *in* society. And “society”, this time, does not mean the general public to be enlightened by a pedagogical diffusion of Science capital S, but a multiplicity of sites and institutions that includes industries, governments, NGOs, activists, dissidents, scientists, journalists, concerned scientists and many other sources of interests and passions for or against this or that piece of science and technology. For the first version —from Science to society—, there exists a large body of practice, namely the *teaching* and *popularization* of *validated* scientific *results*. For the second version —the sciences in society— there exists no common ground and no shared body of practice.

It is in order to take some steps toward devising this common ground and defining a shared body of practice that we have completed from January 2008 to December 2009, the European project MACOSPOL. In this acronym all the words count: ***MApping COntroversies in Science and technology for POLitics.***

Controversies.

The word might be shocking at first, since Science, capital S, is precisely supposed to stop controversies and to achieve an indisputable closure, contrary, let’s say, to the vagaries of the human souls and the ever expanding and impossible to close political and ideological conflicts. And yet, it is enough to look at a newspaper to see that the word “controversy”, provided it is given the meaning of the *whole process* that covers *all the steps* from complete uncertainty to final closure, is the best way to describe the mass of *issues* with which administrators, scientists and citizens have to deal with on an everyday basis. Let us think about the dispute over the transformation of the climate, the necessity of vaccination against the H1N1 flu, the disappearance of the red tuna, the reasons for sending humans in outer space, for building a demonstrator of atomic fusion for civil use, the evaluation of Iran nuclear potential, or the real ecological benefit of calculating carbon foot print, and so on and so forth, the list of issues is endless, as well as the various and constantly changing patterns of uncertainties.

Naturally, this state of affair is not new and the public has been as interested and as puzzled by scientific and technical novelties in the past as now. What has changed, however, is that the sources of authority have been put into doubt so that, today, to make up one’s mind about one of those questions, one cannot simply go to a textbook, or open an encyclopedia, or listen to a lecture by some respected authority and set one’s mind to rest and say “case closed”. The sources of authority have been multiplied as well as the challenges to authority. The disputes flare at the early stages of discovery —

and even some time before any discovery has been made or any danger has been revealed. Even more disorienting: the researchers themselves might be in total disagreement with one another, launching out in the open disputes which, in earlier time, would have been taken place inside closed doors. And as if those disagreements among scientists were not enough, you can count on the global media sphere to multiply the sources of dissents, making it impossible for the general public as well as for the experts to decide whether a dispute is opened because of a well grounded doubt or because some industry lobby is fighting against its closure —as in the case of the cancer-causing smoking of cigarettes— or some totally cranky conspiracy theory.

Faced with such a rather chaotic situation, the temptation is great to fall back on some nostalgic vision of the past and to long for a return to a strict order of command and a streamlined production of knowledge. Let us keep talking of science as a final and incontrovertible body of validated knowledge coming from an undisputed set of experts and trickling down to the general public. The other solution is to take for granted that the state of controversies in science and technology is there to stay, and that, on the whole, it's a *good* evolution —provided we find some ways to *navigate* through this set of dissenting voices.

Mapping *controversies.*

And that's exactly what the MACOSPOL consortium has endeavored to do: instead of lamenting the loss of authoritative voices, why not inventing ***navigational tools to map*** the different sources of ***dissent*** and to follow the controversies in their various states of uncertainties. Instead of focusing only on the established facts to background as much as possible the sources of dissents, what would happen if we were able, on the contrary, to foreground as systematically as possible the changing sets of positions triggered by a specific issue?

Such an endeavor would be utterly impossible without the generalization of ***digital techniques***. Paradoxically, some of the same innovations that have created in part this chaotic situation of multiple sources of dissents, have also created the *tools to get out of it*. In other words, the poison is also the remedy. MACOSPOL is predicated on the idea of using as much as possible the digital techniques available to navigate the vast field deployed by those same techniques.

The reasons for this transformation of the poison into a remedy are easy to understand: the digital techniques have made possible to follow ***statements of opinions just as easily as statements of facts.*** Twenty years ago, the only way to trace statements from one medium to the next would have been found in scientific literature and patents through the tracking of citations. But today, not only is it possible to get almost all the scientific literature on one's screen, it is also possible to track and to trace opinions, rumors, conspiracy theories, media frenzies by using the same crawlers and navigating through the same tools. Which is exactly what is required if we wish to follow controversies where ***fact, rumors and opinions*** are mixed up.

Hence, the idea of gathering on one single ***platform*** the set of tools available — and when necessary to develop one's own tools— in order to demonstrate that to accept a state of controversy is not the same as abandoning all hopes for reason and closure.

*Mapping controversies **in science and technology**.*

Science and technology have always been controversial, but the recent expansion of controversies about them is a direct result of their very expansion throughout the whole fabric of our existence. It is in a way the very success of science and technology that has triggered this massive backlash. The so called "climategate" (the spurious disputes around the anthropic origin of climate change) is a good case in point: how could you expect a result that, if validated, would mean the transformation of every detail of our frame of life —from energy consumption to building and clothes— to be met without fierce resistance? So, the first reason why we focus on science and technology is that today rare are the social or political issues which do not contain a part of expertise —especially when one considers the social and administrative sciences as well as the natural and engineering ones.

But the other and most important reason why we focus this platform on science and technology questions is that those are also the issues which are supposed ***closed to the public because of their very complexity.*** They raise, in other words, a question of ***democracy***. And yet, public life is a sham if the most important issues which are most often in the hands of experts because of the expansion of science and technology, are also the ones which are too complex to be understood and decided upon. And the situation is not made simpler by the proliferation of ecological disputes where the intermingling of science, technology, activism and ethics is even more intractable than before.

*Mapping controversies in science and technology **for politics.***

Because of the old idea of a Science trickling down to society, very little work has been done to include scientists and engineers into the normal making up of democracy. Even though people talk of "technical democracy", European citizens are supposed to be able to voice their opinions about GMOs, global climate change or atomic energy, without any specific ***equipment***, as if naked common sense was enough. And yet, as we have just seen, the invention of such an equipment is indispensable because of the irreversible expansion of controversies.

The solution is to learn how to ***represent*** the issues. Although "representation" is a classical term to define the question of democracy, it is not always used to designate the representation of the problem at hand that political institutions are supposed to handle. And yet, if democratic institutions are to have any ***content,*** it is indispensable that we have at our disposal a way to ***map out the various positions*** regarding a given dispute where science and technology are embedded —just as we are used to do for more classical political disputes when we know it is legitimate that a large range of opinions and positions be deployed. This is why the MACOSPOL platform for the mapping of controversies aims at helping participants to deploy the full range of positions around specific issues. Those issues might be complex, but then it is all the more necessary to find ways to make them visible. What democracy has achieved for ideological, moral and ethical issues, there is no reason why it would be impossible to achieve it for scientific and technical questions.

And this is again where it is important to be able to harness the power of digital techniques. We cannot expect citizens to get inside every single issue at length and in depth. But we should be able to offer interested parties, ways to ***eyeball as quickly but also as accurately*** as possible the range of positions over a given controversy. And

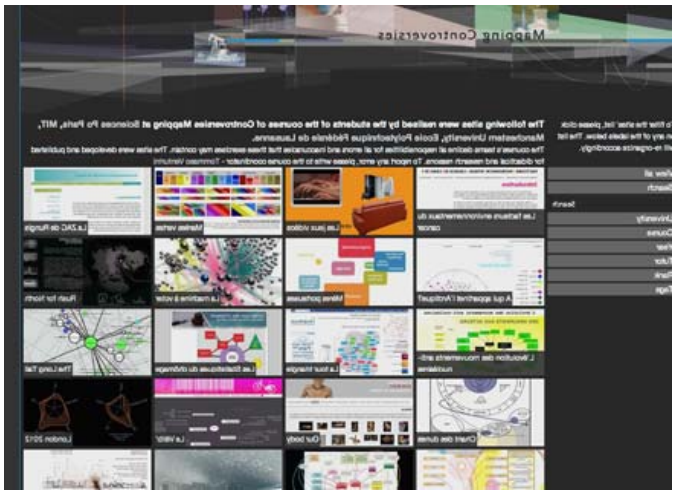
then, but only then, to guide concerned scientists, activists and citizens, if they wish to, into the procedure to form a more precise and more advanced vision of the issue at hand. Digital techniques are well fitted —provided they are somewhat modified, automated and integrated— to offer to passers by a quick look at an issue in order to detect, for example, how hot it is, how many parties are implicated in it, what are the sticky points, where is the money flowing from, which standpoint is more or less partisan than another, etc.

In a way the MACOSPOL platform has aimed at taking a few steps toward the reinvention of the ***newspaper.*** If it is true, as many have argued, that there is a direct link between the development of the newspaper —in fact a "paper platform" for various set of heterogeneous sets of information— and the development of democracy, it makes sense to predict that digital platforms able to represent complex scientific and technical issues, will help citizens and experts to ***articulate*** issues in a more democratic way. Just at the time when the future of the newspaper is very much in question, there is no doubt that the "newsdigitalplatform" will be very much in demand. The great difference between the two so far is that we possess about a hundred and fifty years of shared conventions and built in habits of thoughts to read newspapers, whereas we have yet no shared customs and standards to "read" scientific and technical issues and articulate opinions about them. It is our hope that our MACOSPOL project has began to clarify some of the problems raised by this future media equipment for technical democracy.

PART 2: WHAT IS MACOSPOL?

To develop the MACOSPOL platform we first needed:
- a body of prior practical experience on which to build;
- the expertise of different experts at the crossroad of the field of "science and technological studies" and the web technologies;
- the solution to a set of obstacles that stood on the ways of the critical path of our project (even though we knew we did not have the money to indulge into the basic research which would have been needed to solve some of them).

The body of experience has been given to us by the teaching method called "***cartography of scientific controversies***" initiated by Bruno Latour at the School of Mines at the beginning of the 1990s and which has been now extended to several other universities and that have been somewhat unified under the umbrella of the ***demoscience.org*** consortium (http://www.demoscience.org/). Without this long and variegated experience in teaching students on how to build web sites around controversies (some of them are now arrayed in the site http://medialab.sciences-po.fr/controversies/), the MACOSPOL project would have remained a pie in the sky. It is because of those many examples and of the many difficulties revealed along the way (together with the astounding progresses of the digital techniques observed during this twenty year time span) that we have been able to plan ahead and identify the obstacles that would have to be overcome first.



The home page of the demoscience repository of controversy cases

It has been important to gather in this collaborative project scholars with a dual expertise in science and technology studies and in the application of digital techniques. Strangely enough, although the field of science studies had been initially very much influenced by scientо- and biblio-metrics, this influence has almost disappeared just at the time when digital techniques began to really take off… Hence, a concerted effort to realign science studies, on the one hand, with the wealth of digital techniques. (See the list of the selected universities in the MACOSPOL consortium page 1).

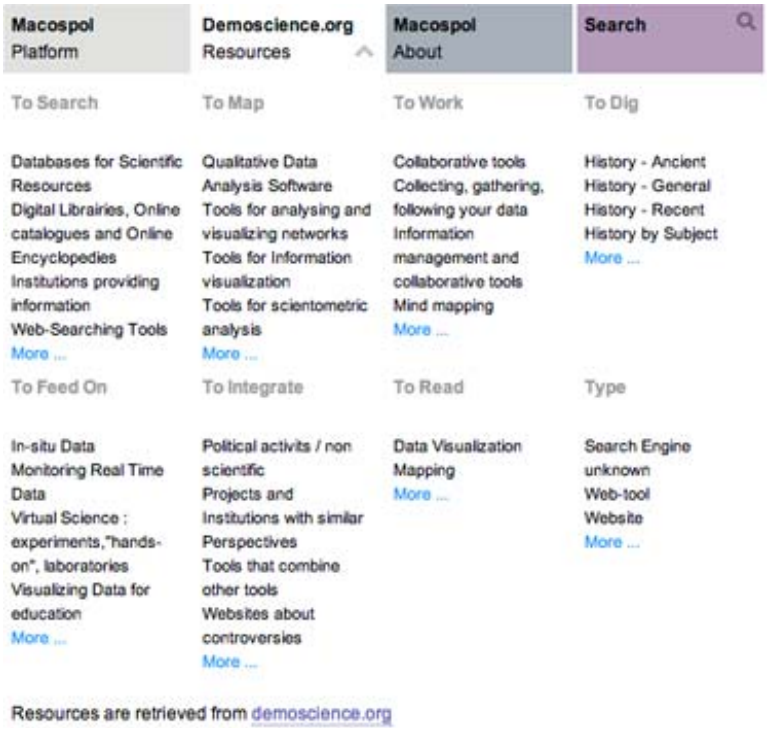
The initial task of the consortium has been to identify the obstacles along the critical path of our project —each of those questions defining the successive work packages allotted to the different participating teams:

- what are the resources already available to map controversies? It had seemed necessary to do first a ***state of the art*** since no such effort had been undertaken before (WP1 realized by the Paris team).
- is it possible to deploy a controversy that is ***sufficiently complex*** to satisfy a researcher as well as an interested party? This question could not be solved by the demoscience.org consortium since its classes mobilized only bachelor or, at best, master students (WP2 realized by the Munich and Oslo teams).
- is there any chance to solve the questions of visualizing controversies by relying on the expertise of two disciplines which have benefited for years from exceptionally ***good visual tools***? Our first choice was of course ***geography*** — because of the mapping metaphor— but also ***architecture*** or design (WP 4 and 5 realized respectively by the Lausanne and Manchester teams).
- given the novelty, heterogeneity and fragility of all the digital tools available, is there any chance to render them sufficiently ***compatible*** to reside on an easy to use common platform? It was clear from the beginning that although it would be impossible to fully integrate those tools, a certain level of technical and visual compatibility was necessary to create the shared customs and to learn how to navigate comfortably through controversial datascapes —hence the metaphor of the newspaper (WP 3 realized by the Amsterdam team).
- finally, is it possible to ***test*** the use of platform with people who are not specialists of controversy studies and who have not been involved directly in the project? We were not naïve enough to want to let our platform loose on the rather mythical "general public", but to try out two dry runs on carefully selected samples: people already interested in a specific issue (we selected the controversy over the dying out of bees in Belgium), and people not interested in a specific issue but having to deal with issues in their professional life (such as journalists, administrators, policy makers) (WP 6 and 7 realized respectively by the Liège and Vicenza teams).

These are the steps we had to take to move forward. Apart from very few variations in the distribution of funding along the way, the two-year project has followed exactly the initial plan submitted to the Commission. What had not been fully anticipated, is the extraordinary level of integration of the various work packages, since many data sets from one team have been used by other teams to test their own tools. Even though it is true that the consortium possessed already a large set of shared values, references and competences, it was gratifying to verify that the very notion of a platform had a strong effect on all participants to integrate as much as possible their different ideas.

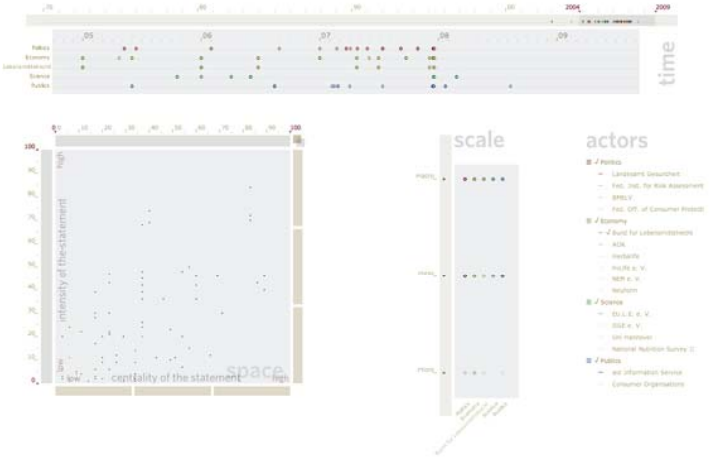
Have we lifted the different obstacles we had identified at first?

- We are able to offer to interested parties an inventory of the tools available for mapping controversies and of the examples already treated. The result is a sort of encyclopedia that will be of use for people who want to do more work in this area. (See the tutorials for more details on how to navigate the site).

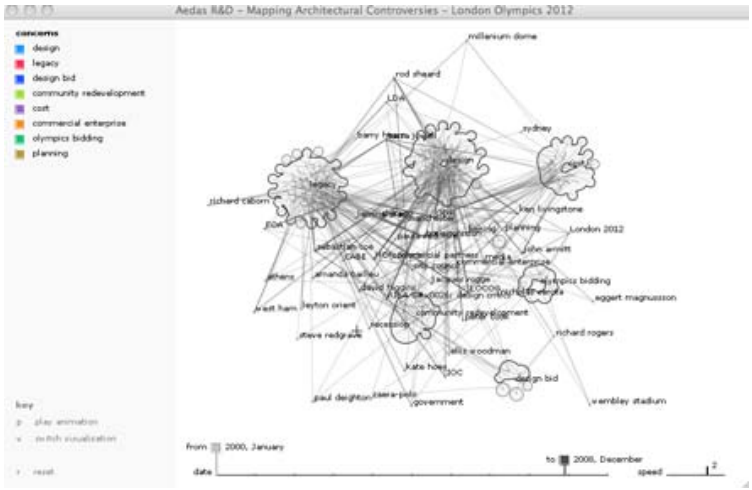


The home page for WP1.

- A great many innovations have been explored in the mapping of interested parties. This is the core of the project since as long as it is impossible to find one's way into controversial space, no progress will be made. In that sense we were right to think that geography and architecture were two crucial sources of visual innovations.

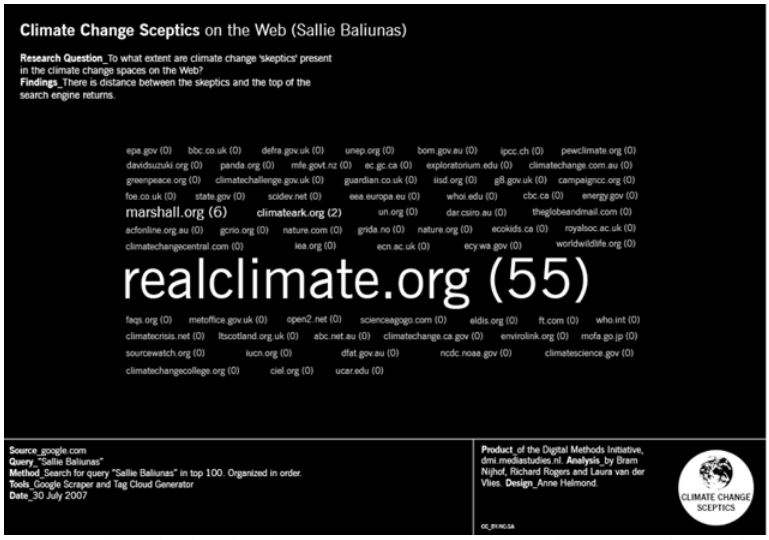


New treatment of the Munich controversy by the Lausanne team



Visual innovation of the Manchester team to represent issues and networks in motion (about the London controversy).

- Many tools have been devised and assembled around the key notion of quick detection of standpoints (especially the measure of partisanship, a question of great interest for the parties who want to eyeball a controversy).

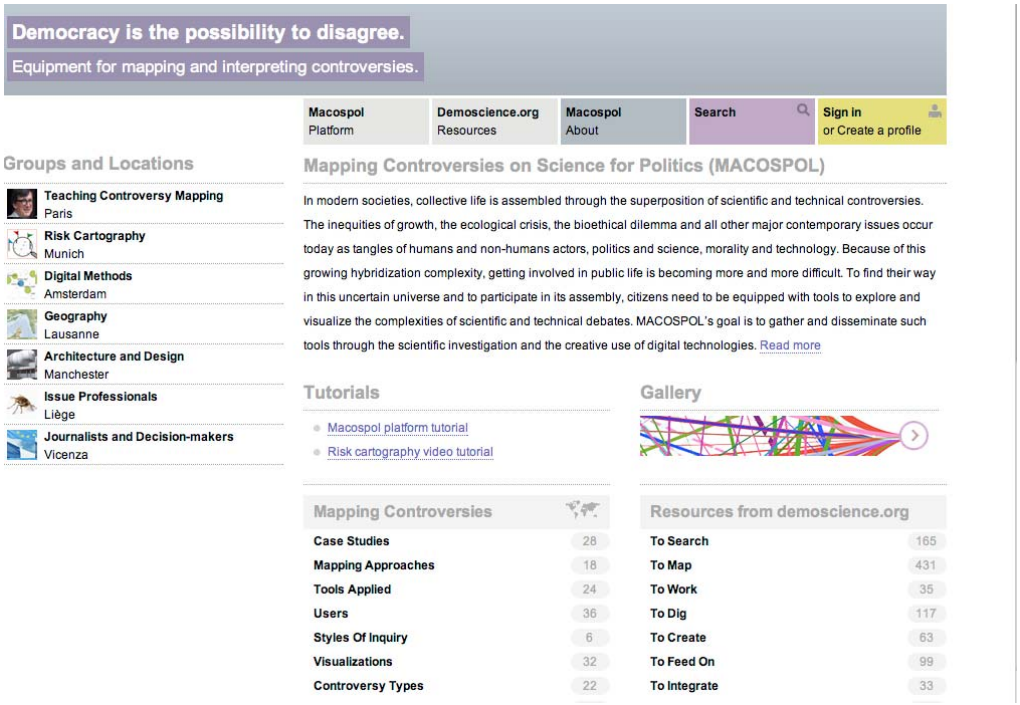


Lippmannian device by the Amsterdam team to detect partisanship in controversies

- Many problem remains as to how the public may make use of the available tools. Our two tests showed that no matter how easy to use the tools assembled on the platform, considerable additional work had to be made to make use of them, to learn how to articulate a position, and to dig the necessary information (especially when the issue is complex). From the feedback received during the last of the two dry run (the Venice one), it is clear that the equipment we devised might be much heavier than what is needed for journalists and administrators usually to reach a conclusion. It is obvious that no tool and no platform will ever replace the properly political and scientific work necessary to get interested in an issue and then to want to dig into it.

Thanks to this considerable amount of work, we are now able to launch the platform for test by different types of users. It is this platform (that we are going to render sustainable by continuing feeding new resources, examples and tools into it) that is the practical result of the MACOSPOL project. The platform can be visited by:

- watching the "teaser" that present the whole project;
- following the various tutorials spread inside the various pages;
- inquiring about the different teams and work packages (on the left part of the window);
- learning about individual tools or following individual examples of already mapped controversies (probably the safer way to get started).



Home page of the MACOSPOL platform

AFTER MACOSPOL

Now that the platform is launched and operational, the real tests are coming:

-First, is it possible for people who have no experience in STS and no knowledge of the digital tools to use the platform for their own projects?

- Second, how the platform itself is going to grow and be integrated in the practice of Macospol partners and new interested parties?

-Third, are the tools and examples made accessible in the platform sufficiently coherent to create habits of thoughts similar to those we have learned in reading the newspapers?

-Fourth, is it possible for the same techniques and the same datascapes to gather, on the one hand, experts and scientists or engineers, and, on the other hand, administrators, activists or concerned citizens?

All of those challenges depend on another one: is it possible that the development of digital techniques allow the tools we have assembled, developed and tested to feed on the same types of data basis than the ones available to scientists and scientific institutions? This last challenge is of immense importance if we take seriously the word "datascape".

The expression "technical democracy" will remain an empty term as long as it is not possible for the citizens of this so called ***democracy*** to be equipped with the right ***instruments*** to navigate in common a shared space where the issues at hand are ***represented***.

If we have reasons to hope that our efforts have not been in vain, it is largely due to the fact that we have been all engaged in monitoring, developing or teaching scientific and technical controversy mapping. No matter how difficult it seems to meet those five challenges, we have been constantly encouraged by the enthusiasm of our students, the reception of our peers in the field of science and technology studies, the newly expressed interest of many scientists and experts for a new way to present their endeavors to the public, and finally the daily experience of meeting journalists, activists, politicians who are all clamoring for organizing the new controversy space in which they all reside and which is here to stay.

In that sense we feel that MACOSPOL has achieved its objective, fully justified its presence inside the Science ***in*** Society call and we wish to thank all of those inside the project, inside our various institutions and in the Commission for their support. We want especially to thank all the students whose inventiveness has been the real motor of our project and the members of the public who in many occasions have accepted to test our platforms and give us their feedback.