Supporting Large-Scale Deliberation: The MIT Deliberatorium

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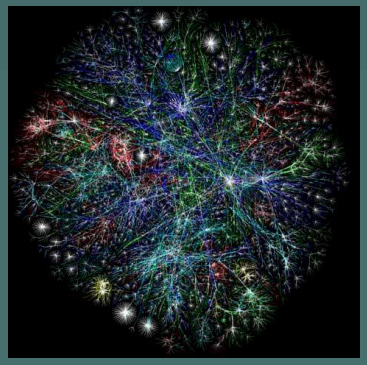
The Challenge

The Internet enables unprecedented opportunities for large-scale *knowledge sharing*



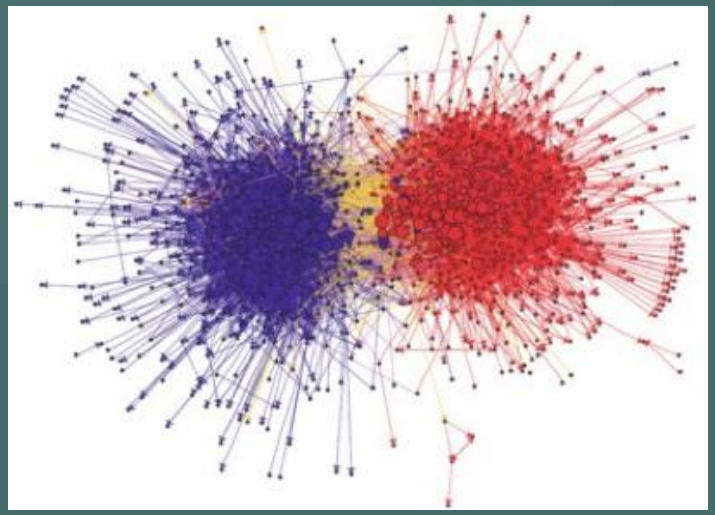
Can it foster *large-scale deliberation* - i.e. the synergistic (additive or even super-additive) channeling of many minds towards solving complex problems?

- Idea synergy
- The long tail
- Many eyes
- Wisdom of the crowds
- Many hands
- Critical mass incentives

What’s Wrong with Current Deliberation Tools?

Time-Centric Tools (email, blogs, forums …)

- scattered content
  - temporal rather than logical structure
  - balkanization
- spotty/shallow coverage
  - what's missing?
  - parallel vs cumulative
- low signal-to-noise ratio
  - what's already there?
  - getting the last word
  - lots of low-quality material
  - no/poor quality control



A Typical Example

Intel ran a web forum on organizational health: 1000 posts from 300 participants

A team invested 160 person-hours to summarize these posts (10 minutes a post)

They found lots of redundancy, little genuine debate, and few actionable ideas

In the end, most of the ideas came from the analysis team itself

What About Wikis?

It's true: wikis are organized *topically*, one article per topic

But: wiki articles by their nature capture *consensus*. When applied to controversial topics, they:

- produce "least-common-denominator" content
- involve massive time-centric discussions and wasteful "edit wars"
  - **e.g. Wikipedia on climate change**
  - **Article: 6500 words**
  - **Talk pages: ~1.5 million words**
- and thus are prone to the same limitations as other deliberation-support technologies

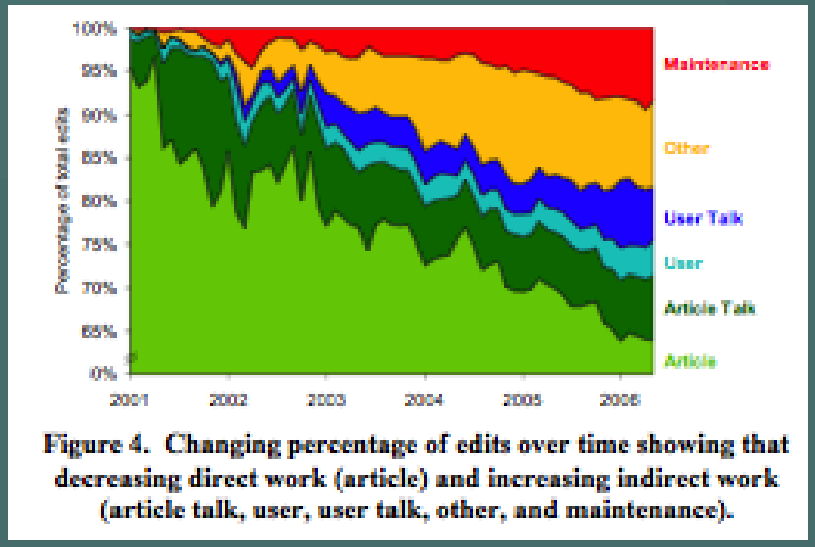


Figure 4. Changing percentage of edits over time showing that decreasing direct work (article) and increasing indirect work (article talk, user, user talk, other, and maintenance).

Kittur, A., B. Suh, B. A. Pendleton and E. H. Chi (2007). He says, she says: conflict and coordination in Wikipedia. SIGCHI Conference on Human Factors in Computing Systems.

Idea Sharing/Q&A Tools

Idea sharing tools present questions each linked to collectively generated and rated answers

But: sheer volume undercuts added-value

- Redundancy: Google project10tothe100 generated 150,000 ideas, mostly repetitions or minor variants of each other - they needed 3,000 volunteers & 9 additional months to sort through
- Lock-in: users tend to rate only the highest-rated ideas, ignoring potentially superior ideas buried below (cf Watts & Sagalnik)
- Volume vs depth: users tend to submit lots of simple ideas, instead of a few detailed ones, because there is no mechanism for collaborative refinement

Incomplete and often flawed content

Hard to find the good stuff amongst all the noise

Argument Mapping Can Help!

Argument mapping can address these limitations by the simple but powerful trick of organizing contributions by topic, rather than by time.

Contributions are broken down into issues, ideas, and arguments; each unique point occurs just once in the place it logically belongs

 issue	a problem that needs to be solved
 idea	an approach for addressing that issue
 /  argument	an point for (pro) or against (con) an idea

What government policy can best meet our targets for reducing greenhouse gas emissions?

Use carbon tax

Use cap and trade

Prone to be gamed by industry

You're right - see EU experience

How will certificates be distributed?

Given away for free by the government

Sold to the highest bidder

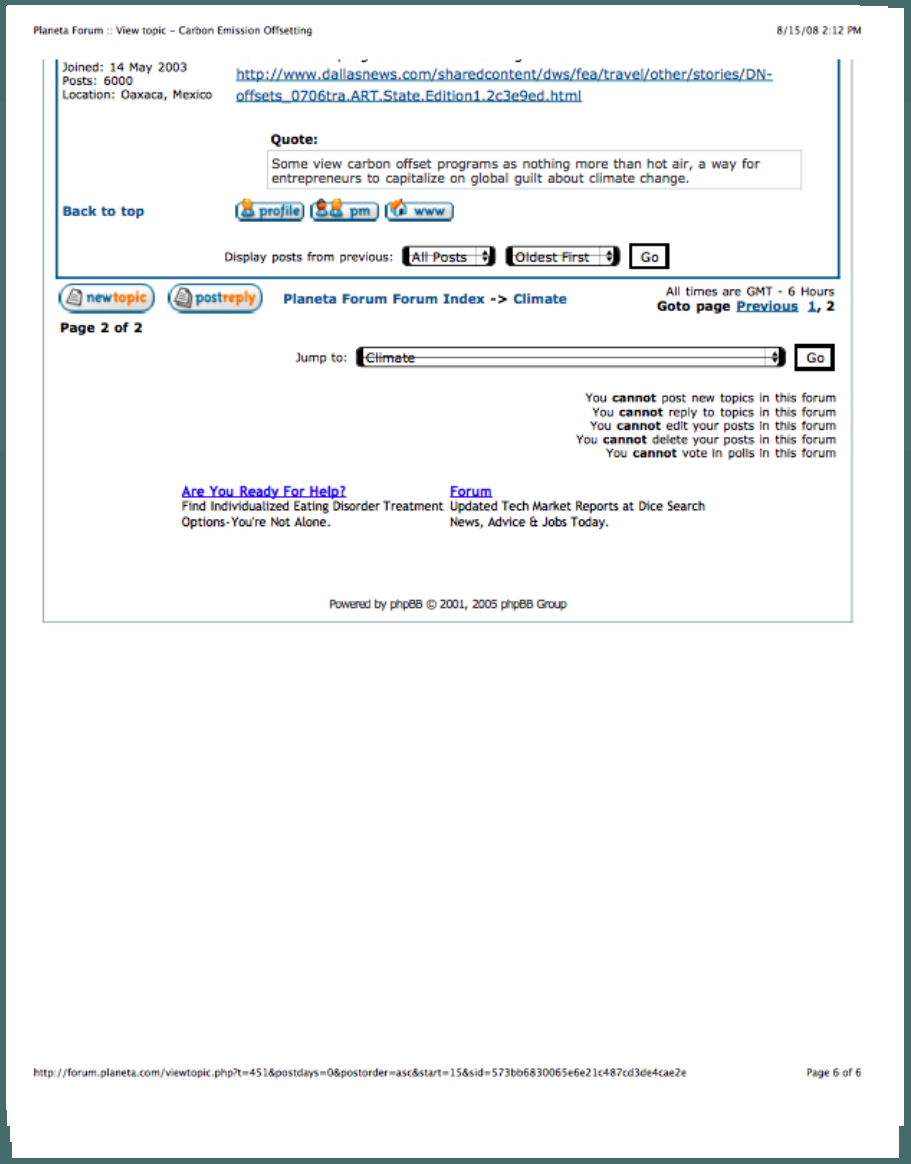
Better, more complete content (easy to find gaps, rate)

Small voices can be heard (not lost in the crowd)

Easier to find the good stuff (organized and compact)

An Example

Planeta.com (5/1/08) had a 13-page discussion on carbon offsetting pros and cons



Planeta Forum :: View topic – Carbon Emission Offsetting 8/15/08 2:12 PM

Joined: 14 May 2003
Posts: 6000
Location: Oaxaca, Mexico

http://www.dallasnews.com/sharedcontent/dws/fea/travel/other/stories/DN-offsets_0706tra.ART.State.Edition1.2c3e9ed.html

Quote:

Some view carbon offset programs as nothing more than hot air, a way for entrepreneurs to capitalize on global guilt about climate change.

Back to top profile pm www

Display posts from previous: All Posts Oldest First Go

newtopic postreply Planeta Forum Forum Index -> Climate

All times are GMT - 6 Hours
Goto page Previous 1, 2

Page 2 of 2

Jump to: Climate Go

You **cannot** post new topics in this forum
You **cannot** reply to topics in this forum
You **cannot** edit your posts in this forum
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Are You Ready For Help?
Find Individualized Eating Disorder Treatment Options-You're Not Alone.

Forum
Updated Tech Market Reports at Dice Search News, Advice & Jobs Today.

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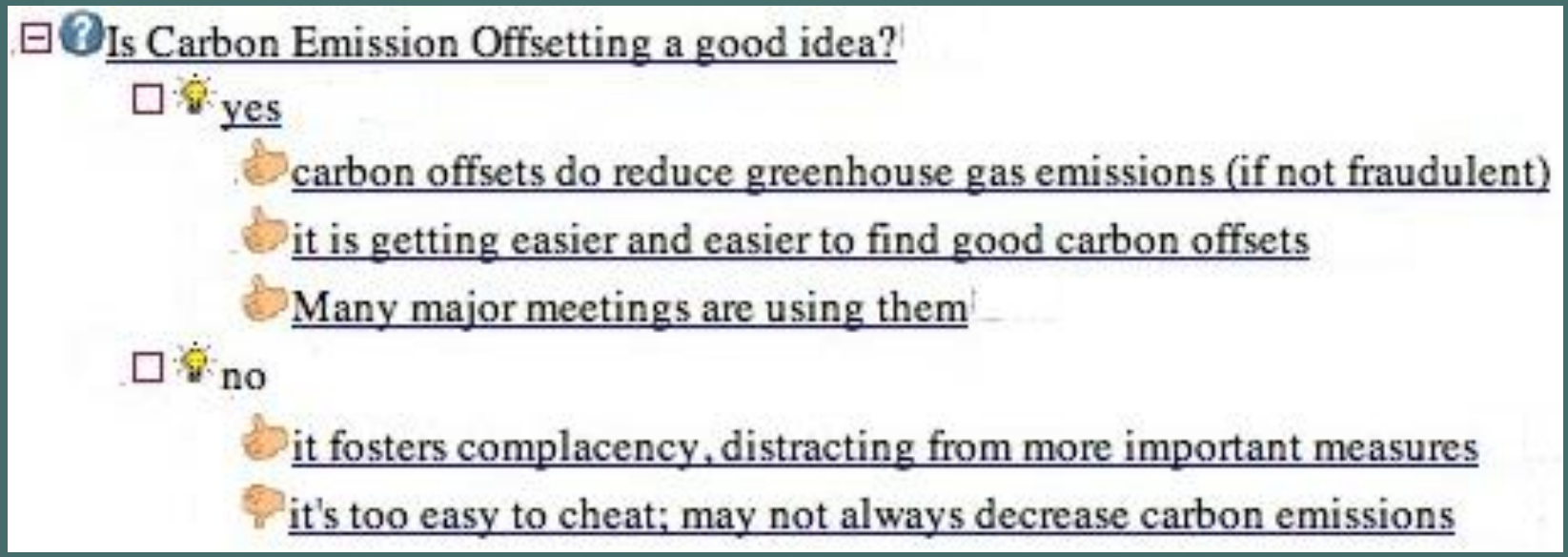
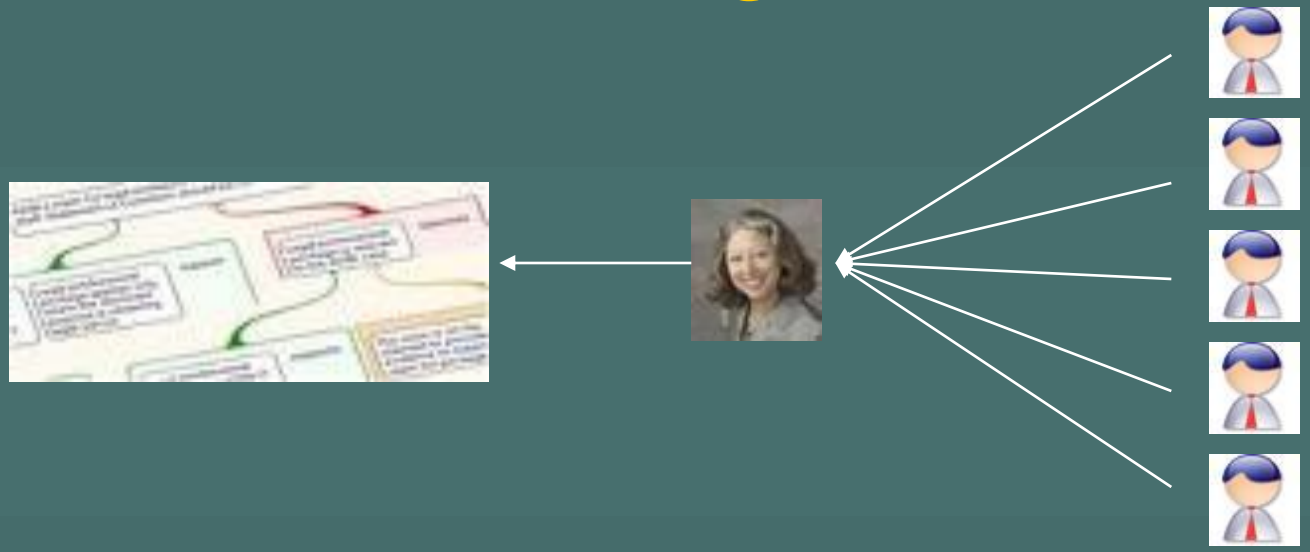
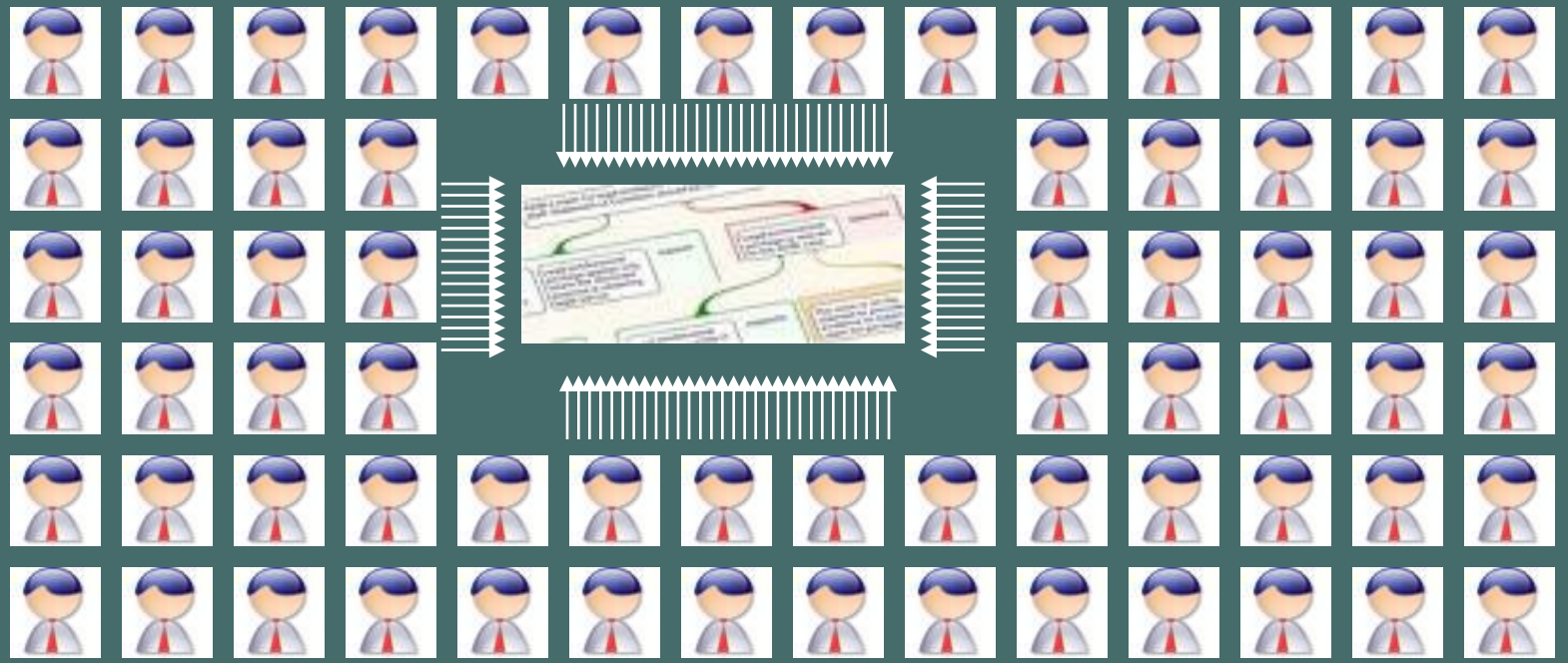
http://forum.planeta.com/viewtopic.php?t=451&postdays=0&postorder=asc&start=15&sid=573bb6830065e6e21c487cd3de4cae2e Page 6 of 6

This discussion, in argument map form, becomes:



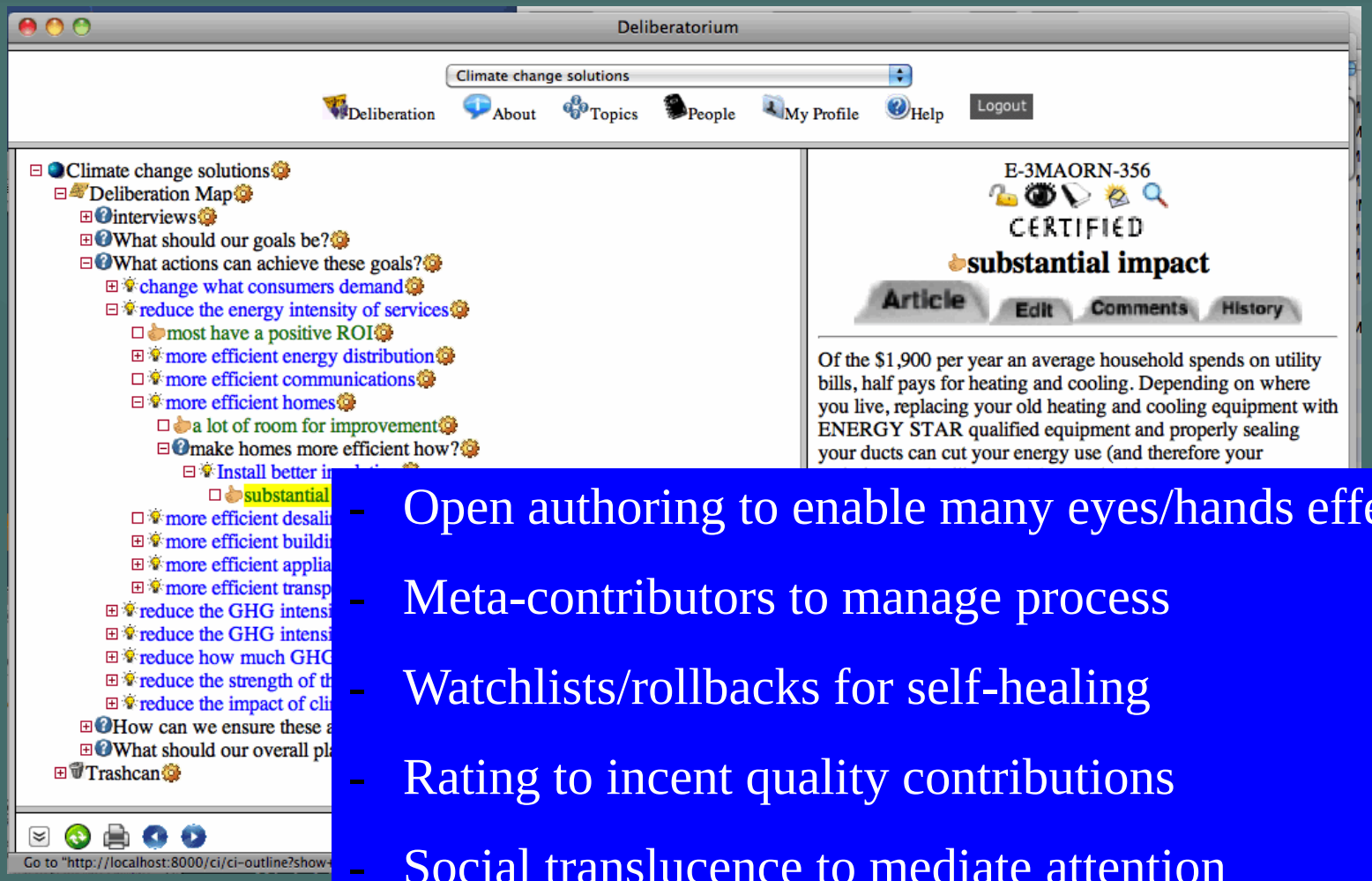
The Challenge of Scale



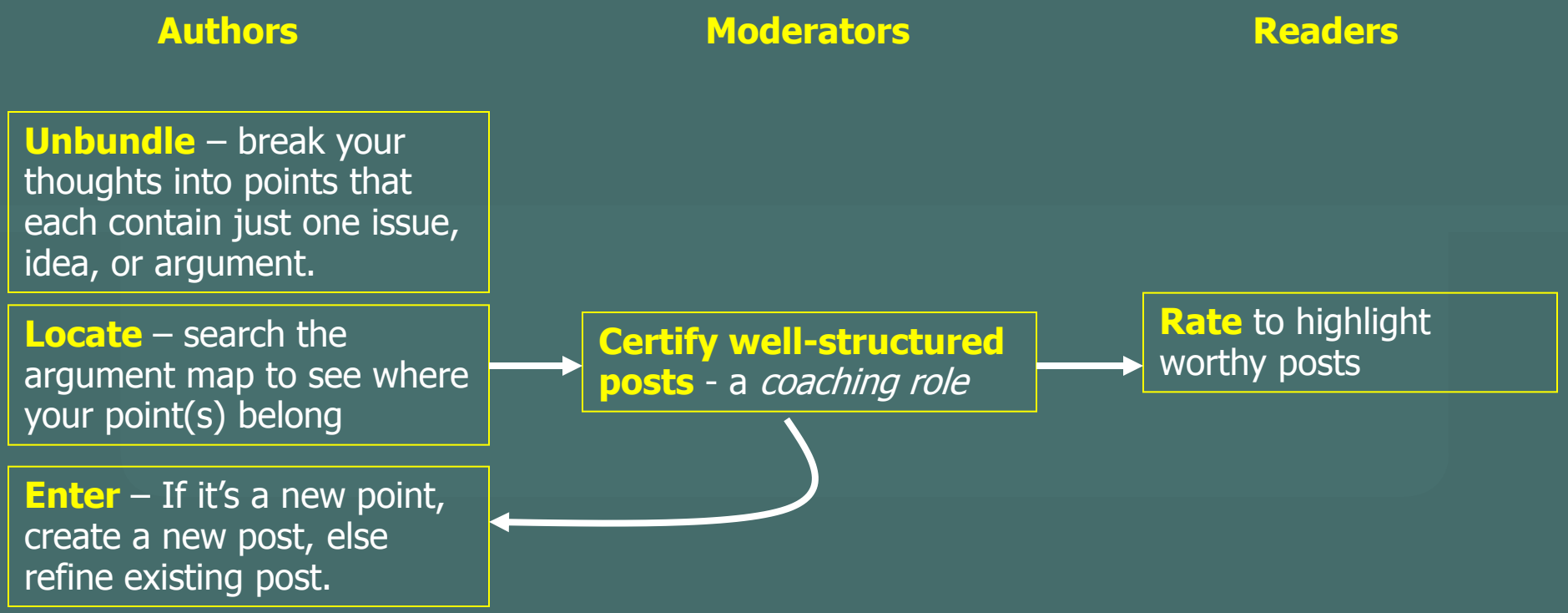


The MIT Deliberatorium

Integrates argument theory with large-scale social computing



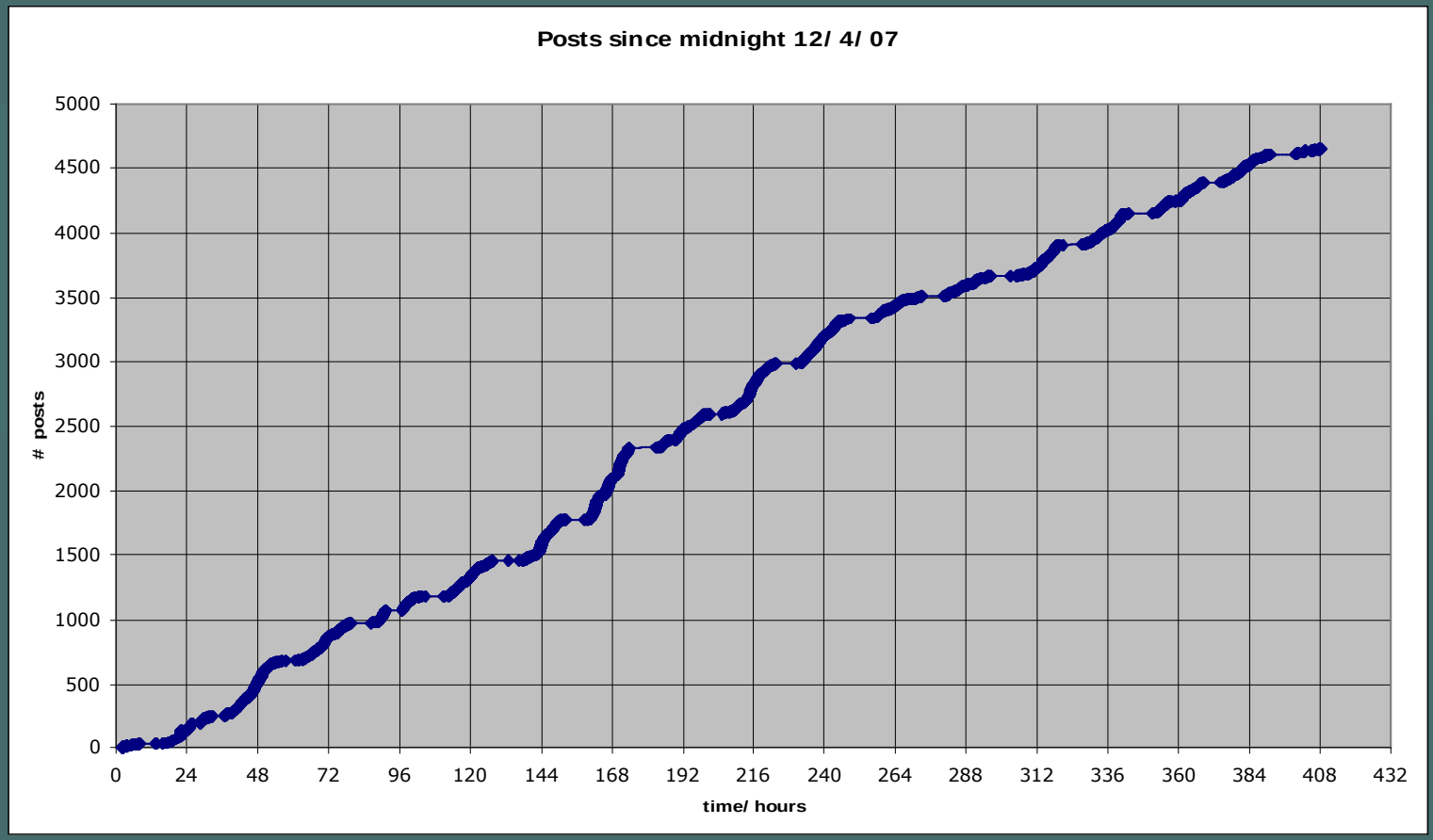
- Open authoring to enable many eyes/hands effects
- Meta-contributors to manage process
- Watchlists/rollbacks for self-healing
- Rating to incent quality contributions
- Social translucence to mediate attention


Authors
Moderators
Readers
Unbundle – break your thoughts into points that each contain just one issue, idea, or argument.
Locate – search the argument map to see where your point(s) belong
Enter – If it's a new point, create a new post, else refine existing post.
Certify well-structured posts - a coaching role
Rate to highlight worthy posts
The live-and-let-live rule: only edit a post to strengthen it
The honest broker rule: remain strictly content-neutral
Only certified posts can be viewed by readers

Major Evaluations

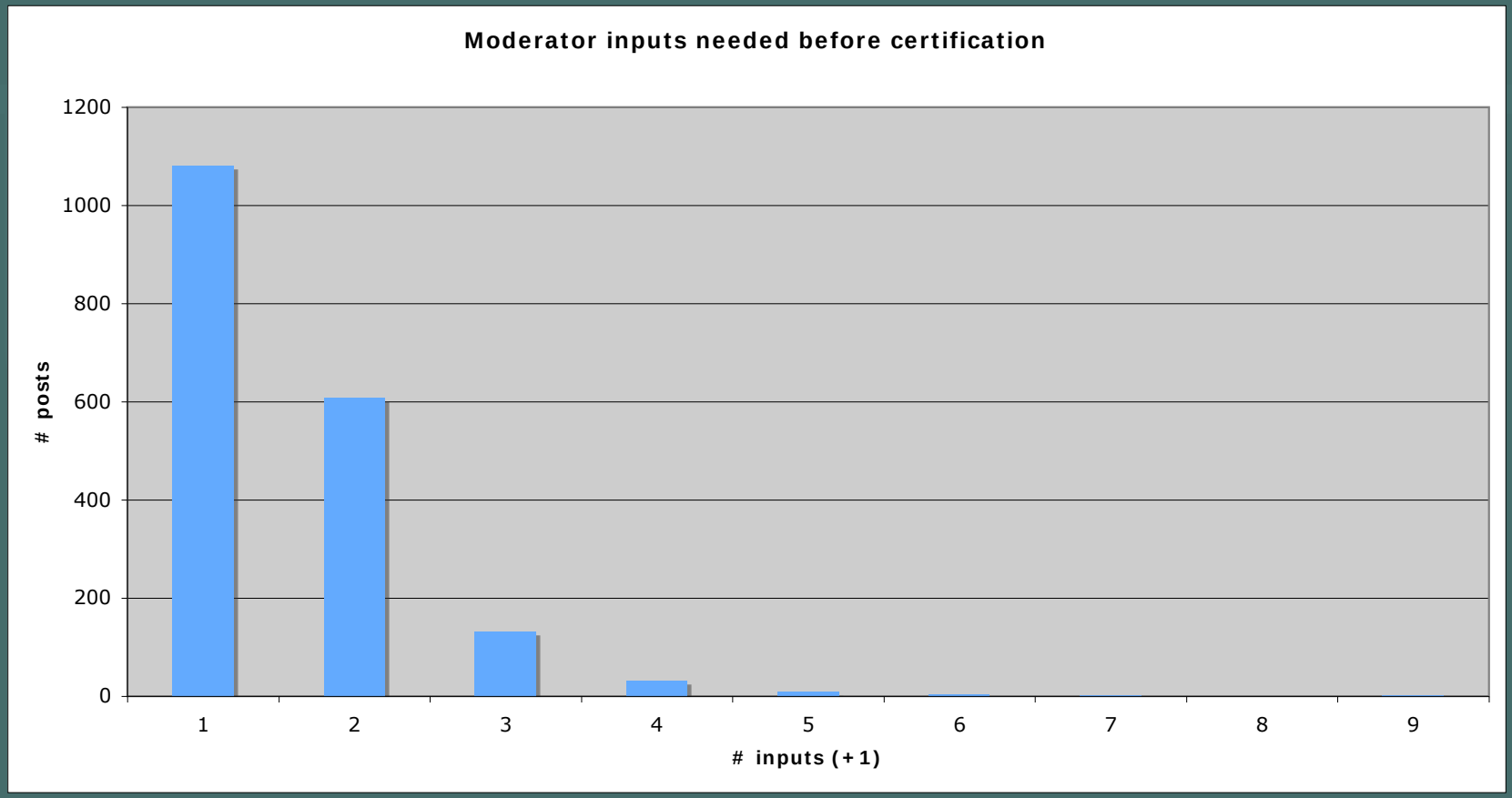
- University of Naples (Italy)
  - 3 weeks, 200 authors. bio-fuels
- University of Zurich (Switzerland)
  - 4 weeks, 300 authors, split across wiki, forum, and deliberatorium, bio-fuels
- BLM (USA)
  - 40 users, 10 agencies, water use
- Intel (USA)
  - 70 users, 2/3rds from outside, computing policy
- PD (Italy)
  - Forthcoming, hundreds of users(?), electoral law
- mWater (Spain)
  - Forthcoming, water rights

The Naples Evaluation (5.2007)



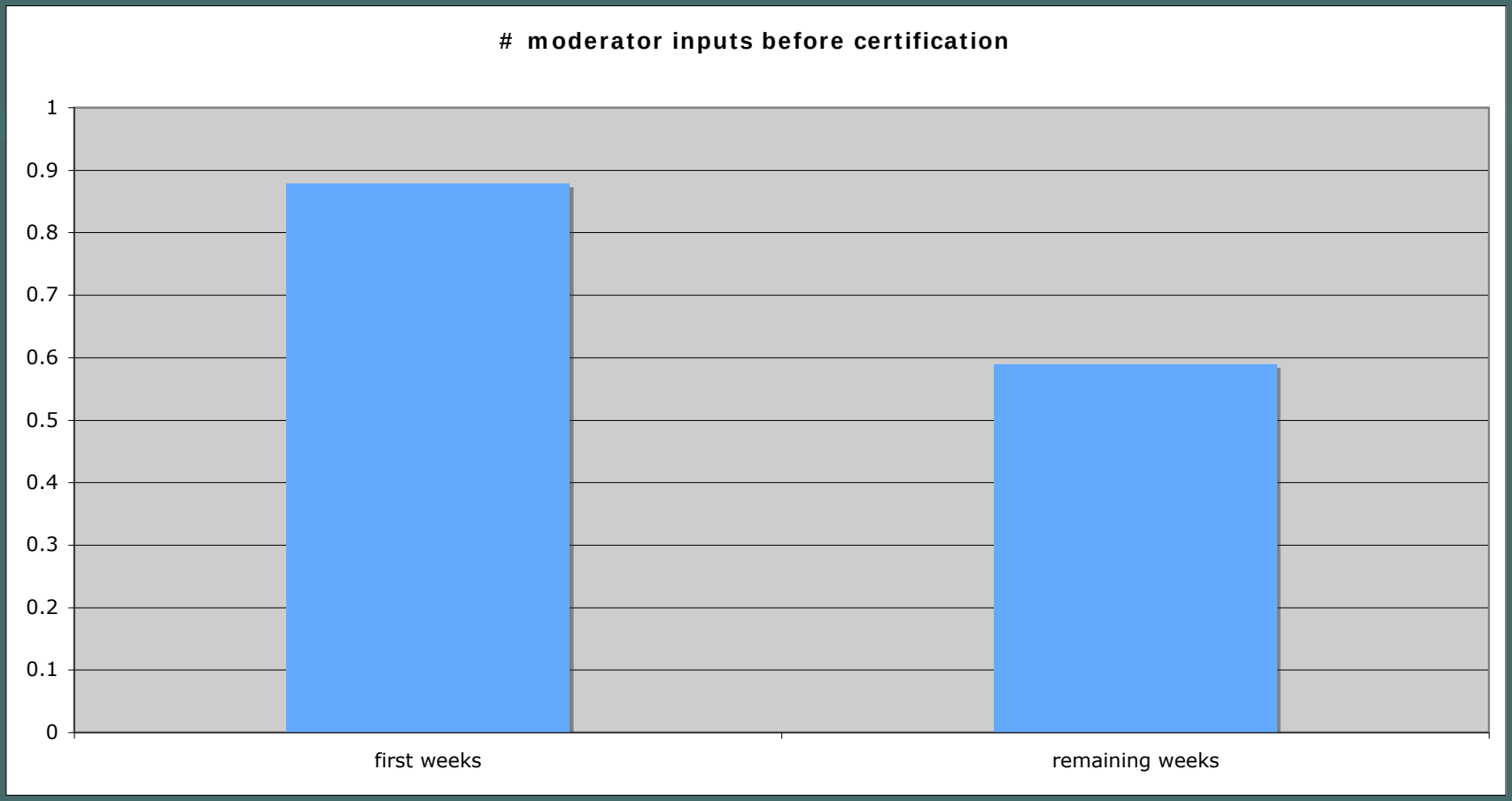
200 users, ~5000 posts, *2 moderators*

Most Posts Were Well-Mapped from the Start



About 2/3rds required no changes before certification

Users Improved Over Time



 # moderator inputs needed to get certified decreased 35% with time ($p < 10^{-8}$)

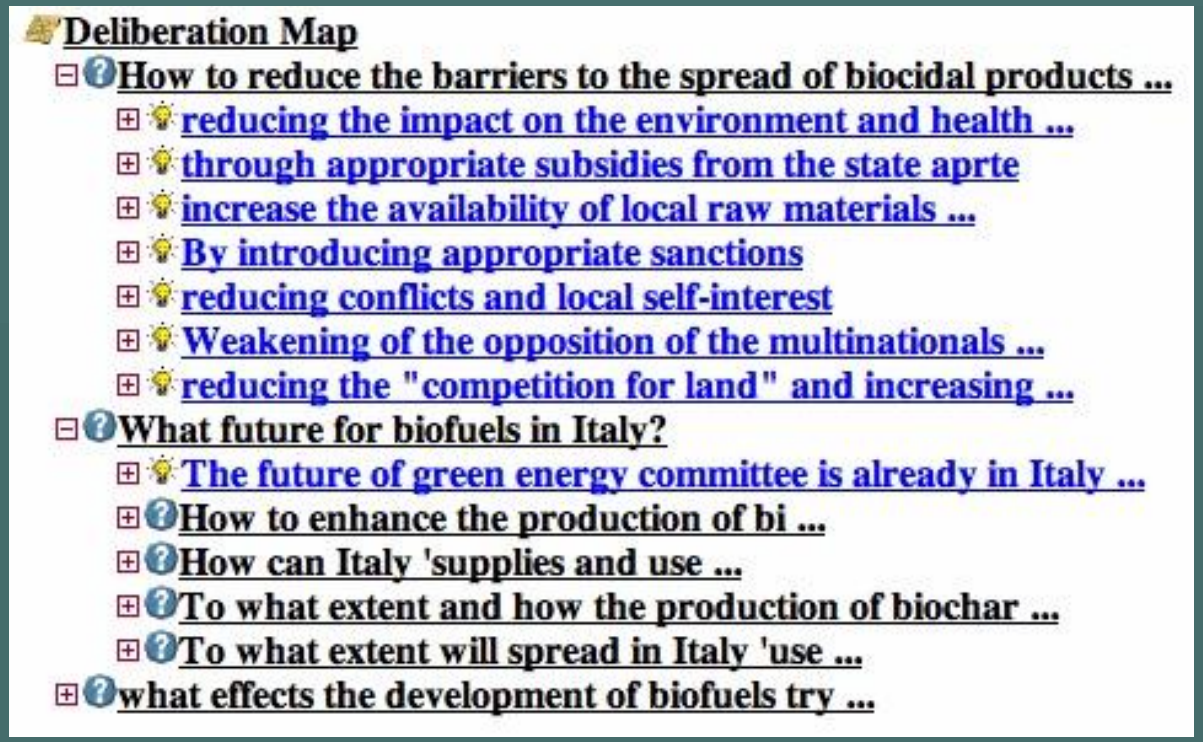
Lively Debate

Depth of argument tree	% of all arguments
1	85%
2	12%
3	2%
4	1%

About 70% of arguments addressed posts by other authors

Map Quality

a large non-expert community comprehensively covered a complex contentious topic in just a few days with *no one in charge*



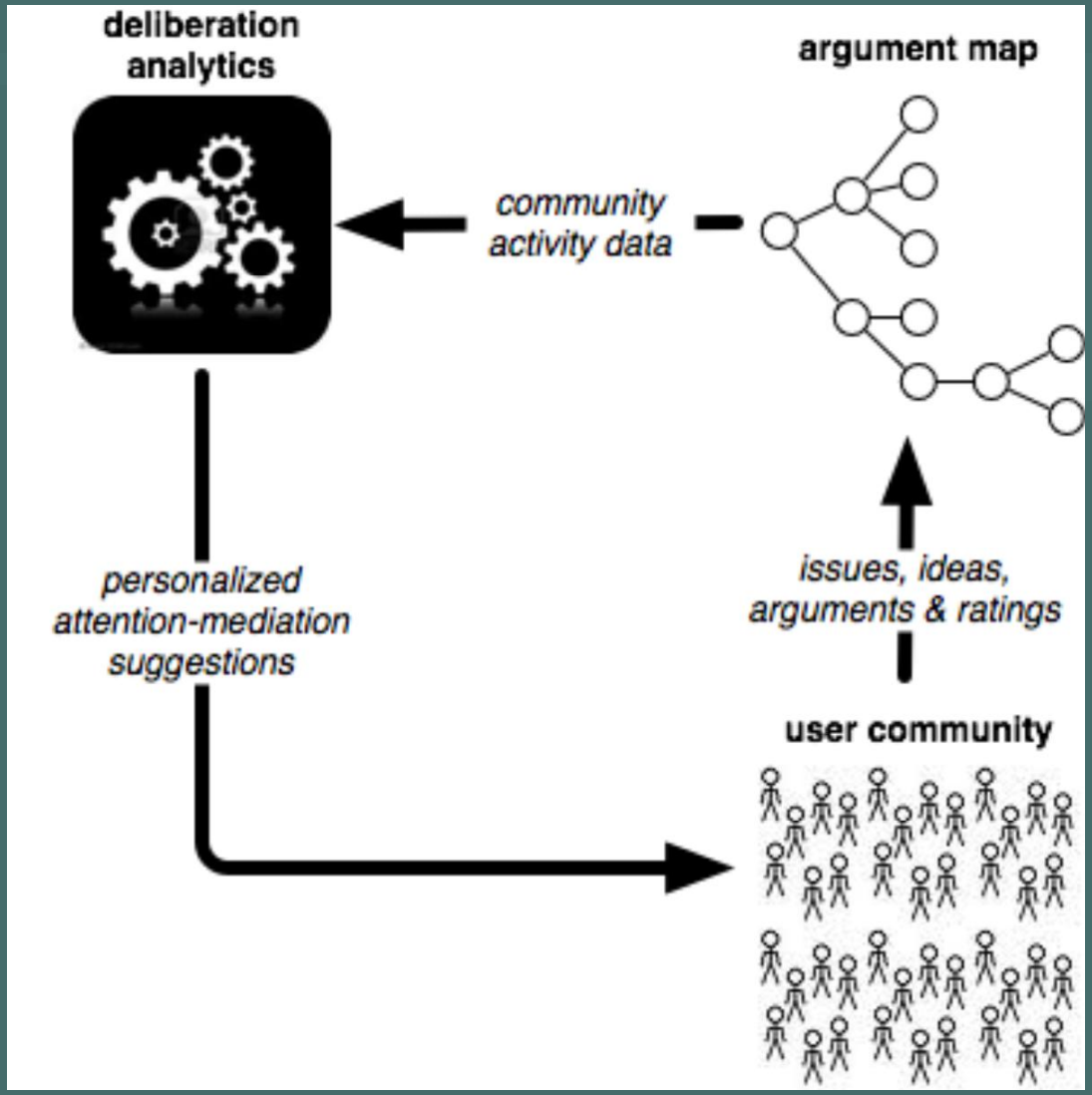
Challenges Moving Forward

- Attention mediation
  - Seeing the forest for the trees
- Crowdsourcing
  - Harnessing the crowd to radically reduce authoring and moderation costs
- Convergence
  - Finding good solutions with inter-dependent components

Attention Mediation

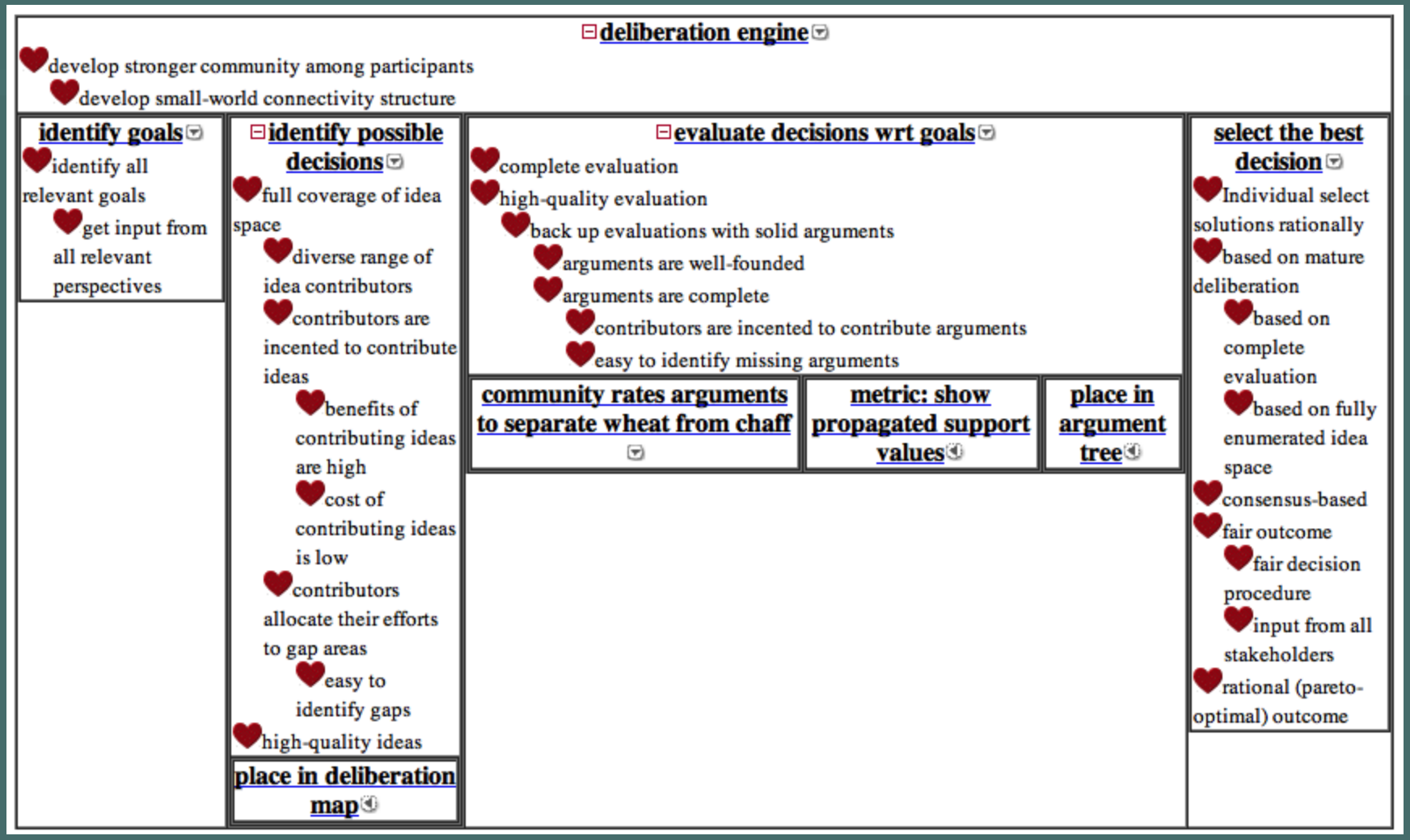
- Even moderate communities can rapidly generate very large maps too large to easily comprehend
  - See Naples map
- How can people see the forest for the trees?
  - Authors: where can I contribute most?
  - Managers: where are the problems (groupthink, balkanization …)
  - Customers: which branches are ready to “harvest”?

Deliberation Analytics

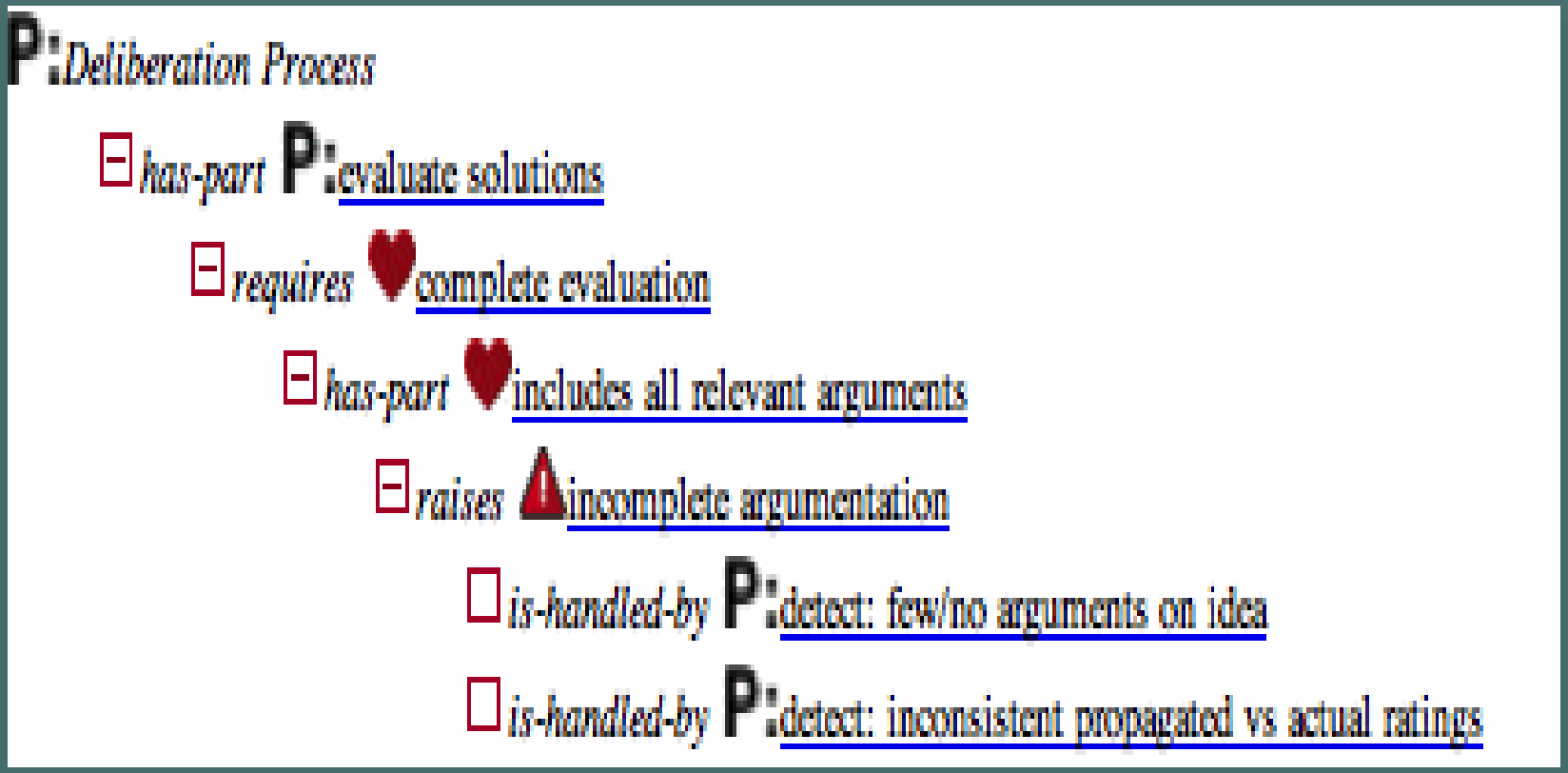


Emergent effect: everyone works where they personally can *do the most good*

“ideal” deliberation model



Goals -> Exceptions -> Handlers



Other Examples

- Author alerts
  - posts interesting to people like me
  - controversial topics
  - irrational bias
- Topic manager alerts
  - Balkanization/preaching to the choir
  - Groupthink/attentional focusing
- Customer alerts
  - Issues to ideas to arguments to rating
  - Reduced rating churn

(over 120 metrics so far)

Using standard techiques …

- Singular vector decomposition
- Social network analysis
- Clustering
- Belief propagation

The Surprising Power of Large-Scale Argumentation

Large-scale argument maps allow *much* more powerful analytics than conventional social media

- a little formalization goes a long way
- a little information (per user) in abundance is a lot

Acknowledgements

- *Collaborators*
  - *Abraham Bernstein, University of Zurich*
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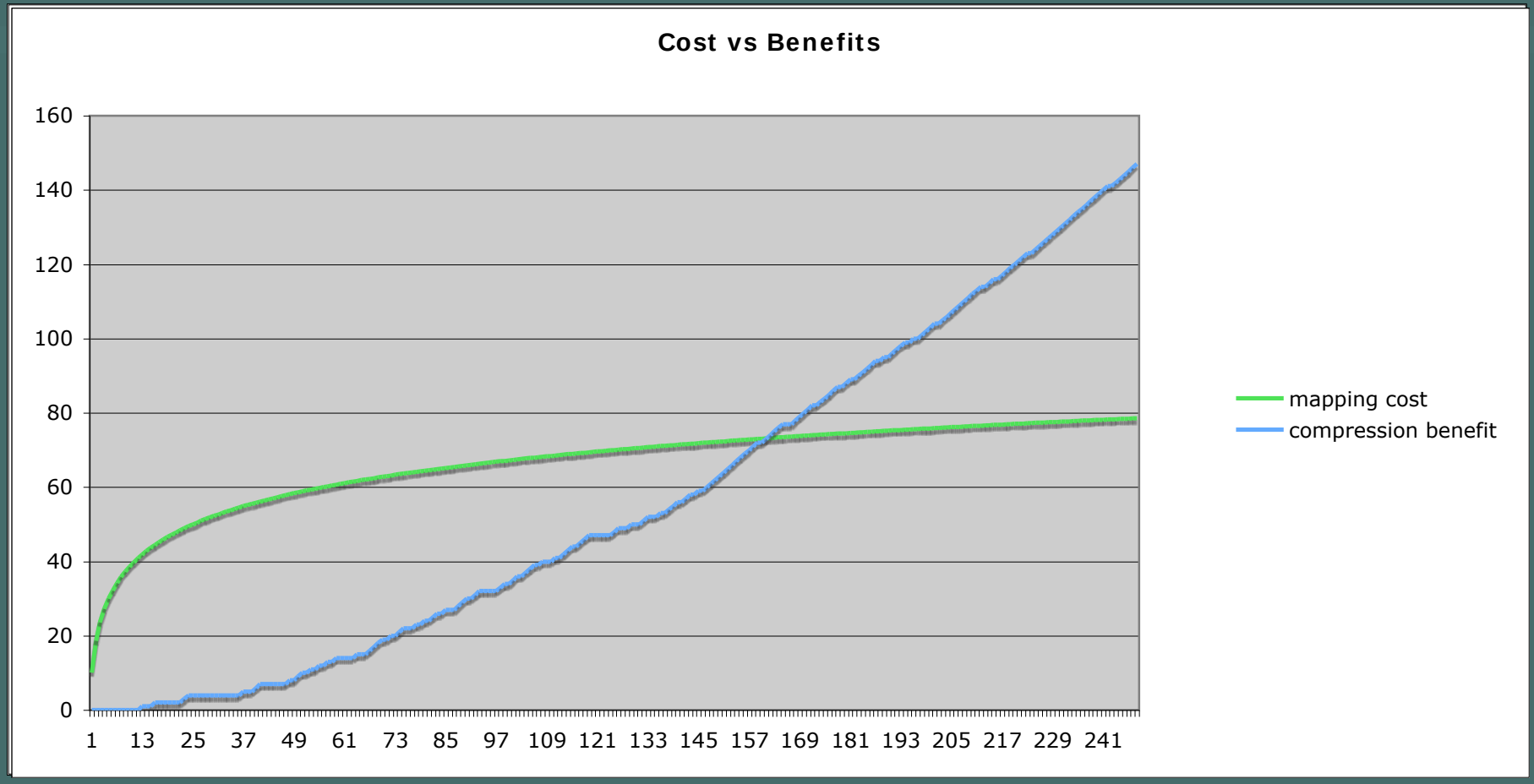
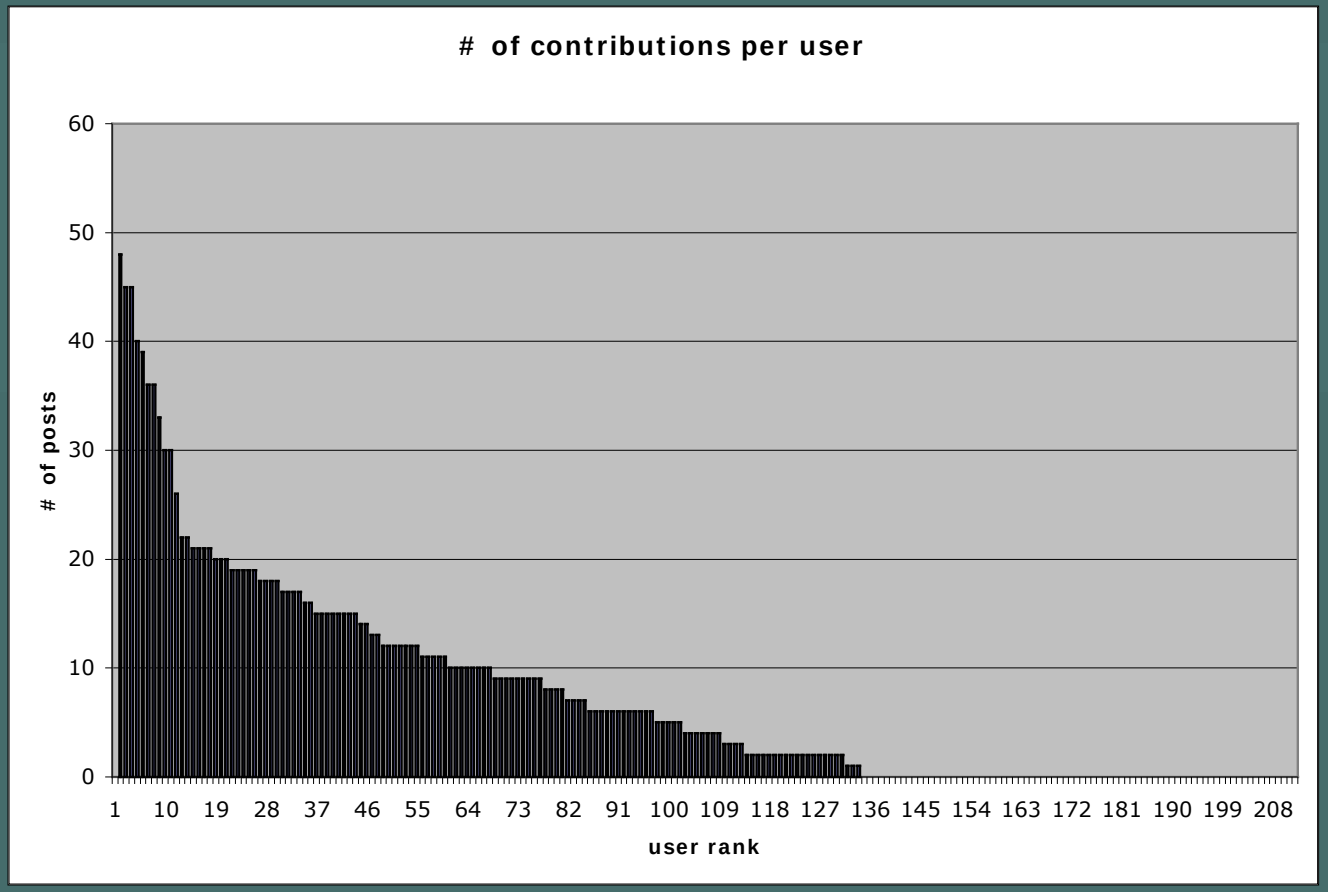
  - *Maggie Wang, Hong Kong University*
- *Funding*
  - *National Science Foundation*
  - *Intel*

Incentives
a cost/benefits analysis


Cost vs Benefits
160
140
120
100
80
60
40
20
0
1
13
25
37
49
61
73
85
97
109
121
133
145
157
169
181
193
205
217
229
241
mapping cost
compression benefit

Moderators = super-users



Background Materials

Technical Issues

- How enable high-quality *structure*?
  - Many people are poor at argument mapping
  - Large volume may lead to competing issue skeletons
- How enable high-quality *content*?
  - Controversial topics elicit sabotage, gaming, noise
- How manage impact of *change*?
  - Changes have non-local impacts in an argumentation structure
- How mediate *attention sharing*?
  - How deal with sheer size of complex issue spaces?
  - How ensure systematic coverage without co-location & central mediator?
  - How avoid balkanization & lost voices? How maximize cross-fertilization?
- How determine *consensus*?
  - In complex domains, issues are *interdependent*, creating vast decision spaces
  - Simple selection must give way to *collective nonlinear optimization*

How enable high-quality content?

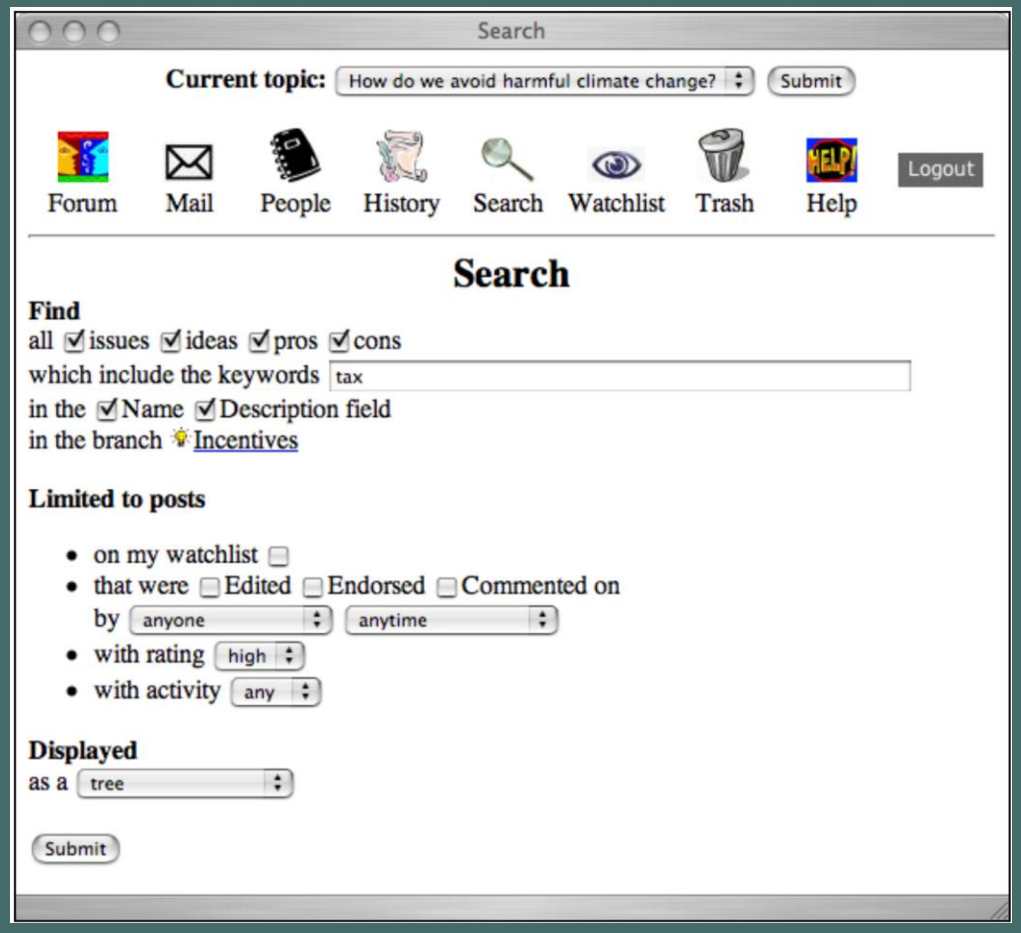
- Wiki “anyone can edit anything” model
  - Ensures diverse perspectives and self-healing content
  - Amateurs can over-write experts -> motivation issue
  - Muddies credit assignment for reputation tracking
  - Controversial topics lead to edit wars
- Forum “one author many commentors” model
  - Encourages expert contributions
  - Single author bottleneck
  - Posts are usually static, so comments do not impact quality
- Collaboratorium design choices
  - Anyone can create a post
  - Only authors (*or their designated proxies*) can edit it
  - Anyone can make/endorse suggestions
  - Users get credit for highly rated posts *or* suggestions
- Intended consequences
  - Each post represents a single perspective
  - A committed self-selected cadre gathers to express that perspective as clearly and fully as possible, enriched by substantial community feedback
  - Alternative perspectives are captured in *separate* posts - no need for edit wars

How enable high-quality structure?

- Initial issue ‘skeleton’ created by experts
- Search tools find matching branches, annotated with activity level
  - So users can find *most-attended* relevant branch
- Intended consequences
  - Fracturing is reduced by coherent initial skeleton
  - Users usually put posts in right “ballpark”
  - Editors ensure proper argument mapping
  - Users are motivated to develop argument mapping skills
  - “stigmergic” self-reinforcing convergence process

How manage impact of change?

- Watchlist and search functions, extended to notify users about changes to *linked* posts, to enable self-healing



How mediate attention sharing?

- Active, “hot”, and highly-rated branches are visually salient and can constrain search
- Users can tag items as “hot” (using token budget)
- Users can create/search for “calls-for-input”
- Intended consequences
  - You feel part of a team because you can “see” it act
  - Users rapidly exploit “fertile” areas (stigmergy) and attend to posts that need improvement

How enable consensus?

- A special “proposal” branch consists of unique *combinations* of ideas from other branches
- New proposals can extend existing ones
- Users can endorse proposals
- Intended consequences
  - Users pool expected utility judgments to guide a collective optimization search process

Strategic Issues

In what *contexts*, with what *people,* will this give good results?

Possible Applications

	Exploration	Convergence
Citizenship	*	
Change agents	*	
Governance	*	
Science		
Engineering		
Business	*	
Education		

A trail of crumbs …

- Can we design a *sequence* of applications that develop self-sustaining communities for a broadening range of uses? e.g.
  - Start with wikipedia for climate change interventions, to develop a knowledge base and expert community
  - Invite change agents/businesses/executives to use the idea handbook and pose questions to the community
  - Develop enough credibility/impact to become the forum of choice for policy debate

Our approach

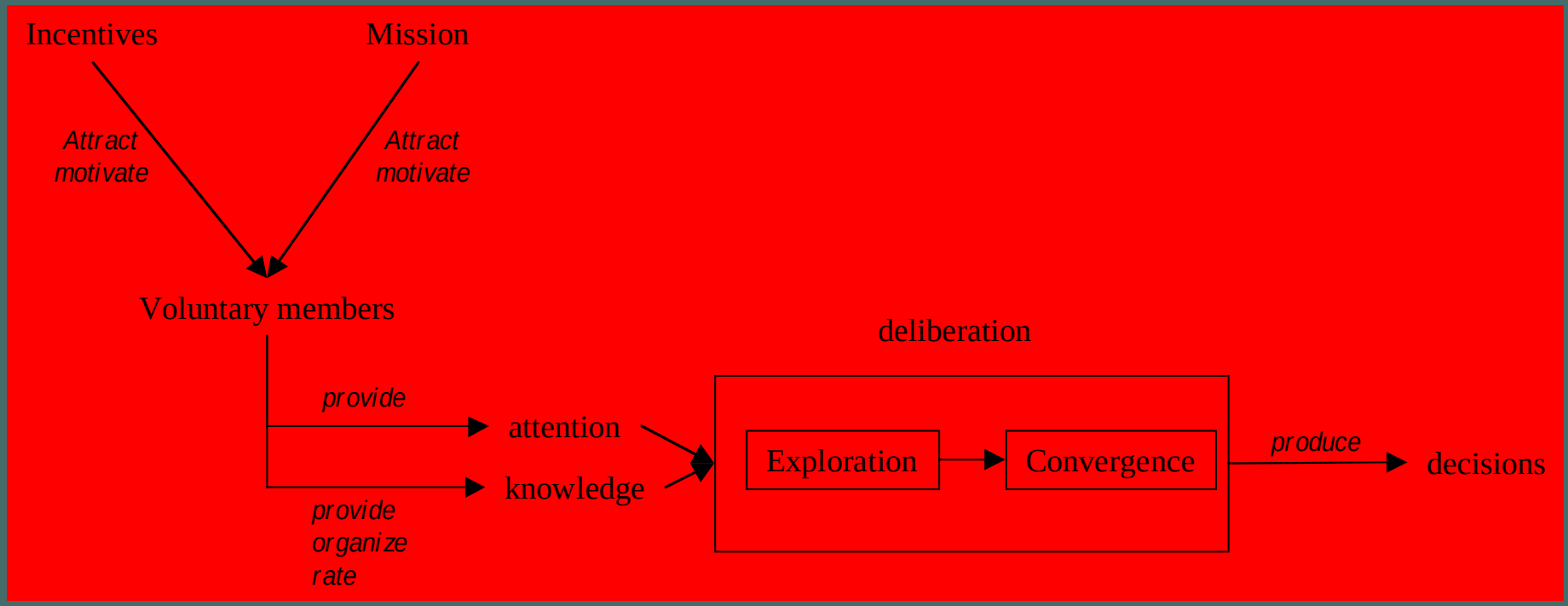
Technical: Trade-off between scalability and structure, defining suitable formats for on-line arguments, Argument evaluation and scoring (quality & impact), Robustness to attacks and unfair ratings, …

Organizational: Roles & rules, Incentives, Manage the trade-off between exploration and convergence, …

Strategic: identify users and stakeholders, critical mass, companies and other organizations involvement, …

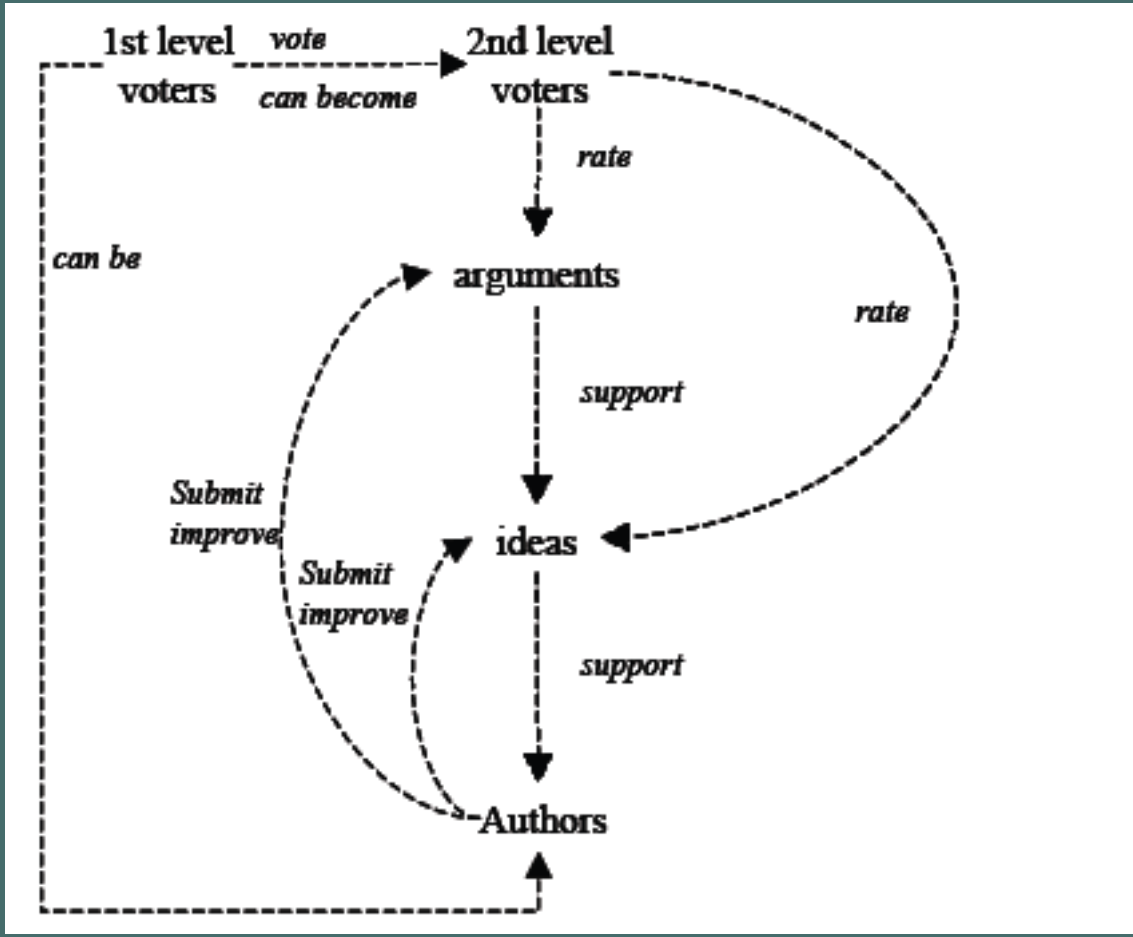
Design the argumentation community

On-line community as a virtual organization



Design the argumentation community

The on-line argumentation process in a proxy democracy scenario

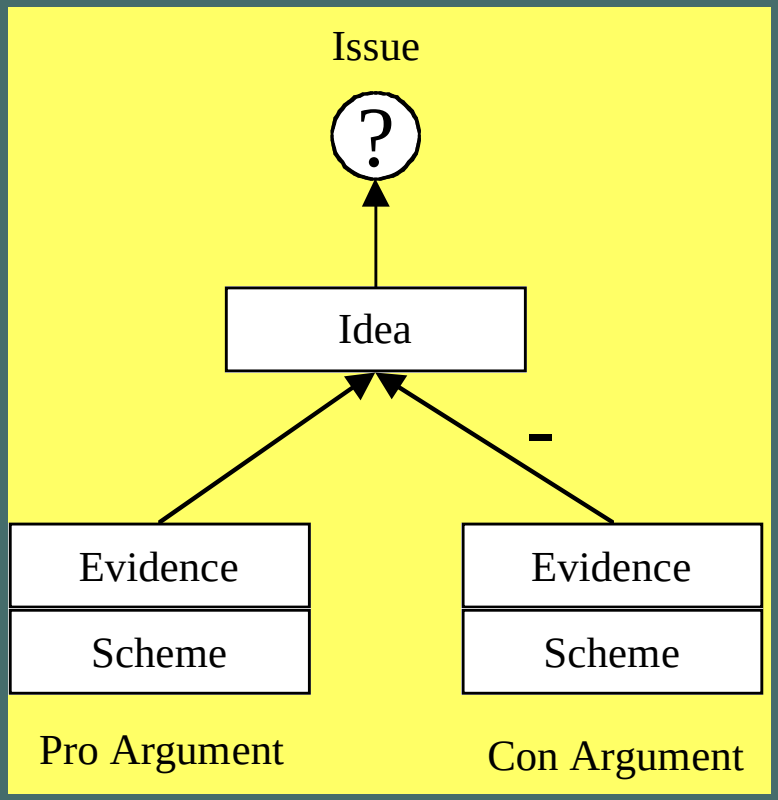


The design of the knowledge format

IBIS
Concklin, 2003

Argument Scheme
Walton, 2006

Ground+warrant
Toulmin, 1959



Scale-Enabled Incentives

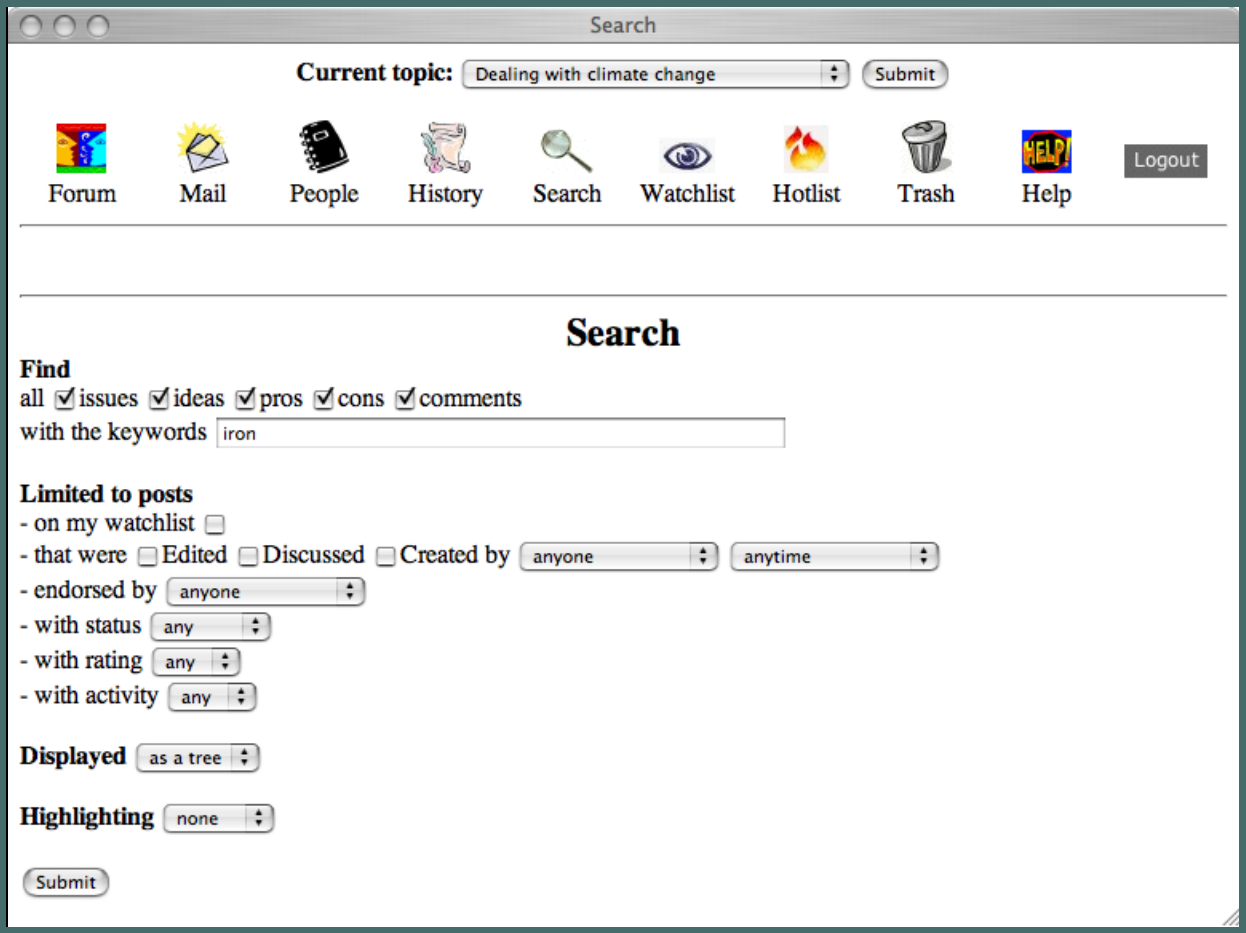
- Finding your tribe
- Having an impact (becoming a hero)
- Reputation
- Networking
- Profit
- Self-definition
- Entertainment
- Self-development

Virtuous Emergence

- Idea synergy
- Diversity (the long tail)
- Wisdom of the crowds (Condorcet jury theorem)
- Many eyes
- Many hands
- Small worlds (connecting people)
- Quality competition
- Ad hoc organizations
- Matchmaking (tasks to resources)
- Economies of scale
- Building communities
- Bird's eye view

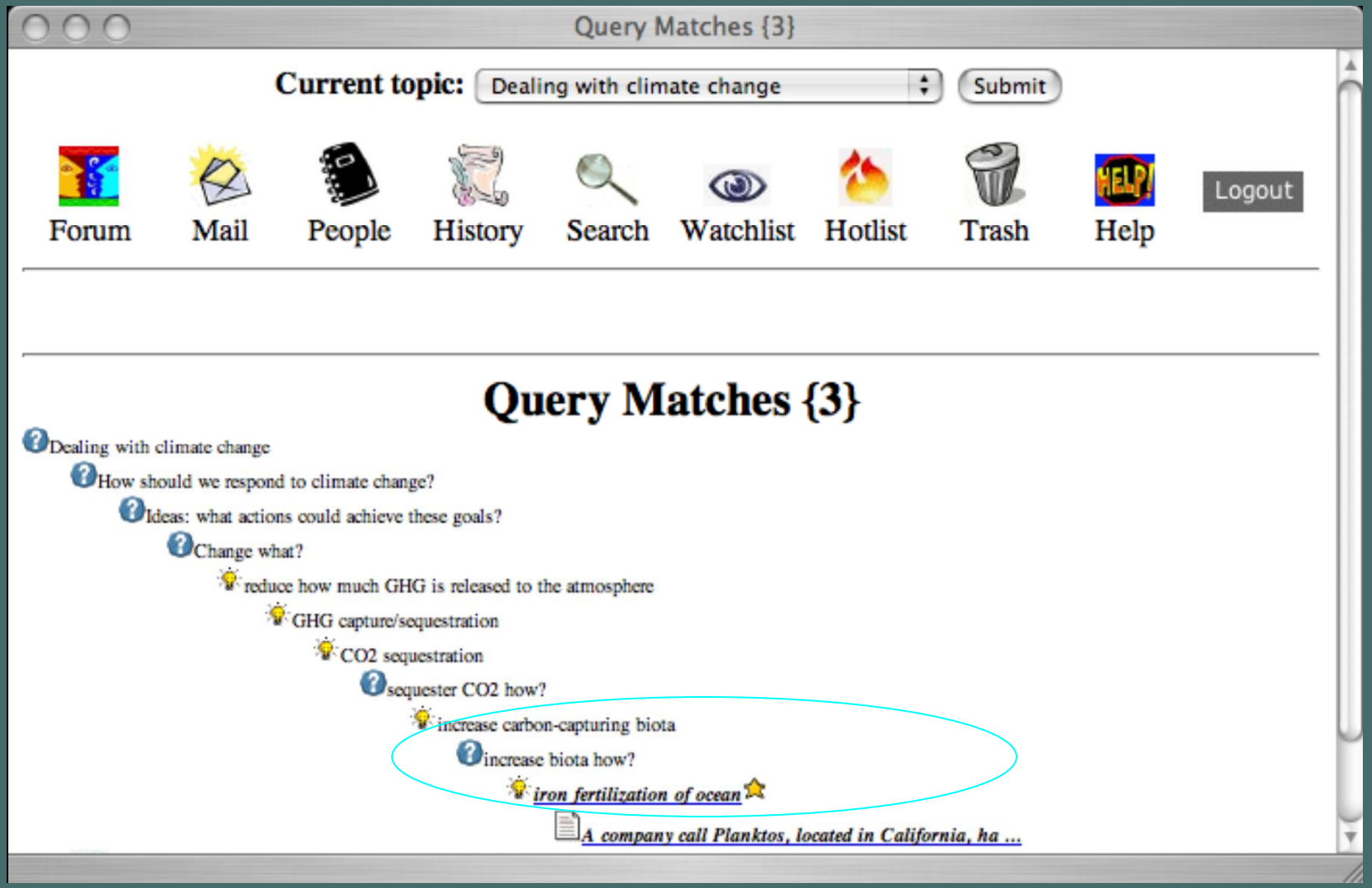
A Scenario

Kara, an MIT PhD student, wants to learn more about something she read in the newspaper, about a plan to add iron to the oceans to help with climate warming somehow. So she uses the search function to look for articles that mention iron:



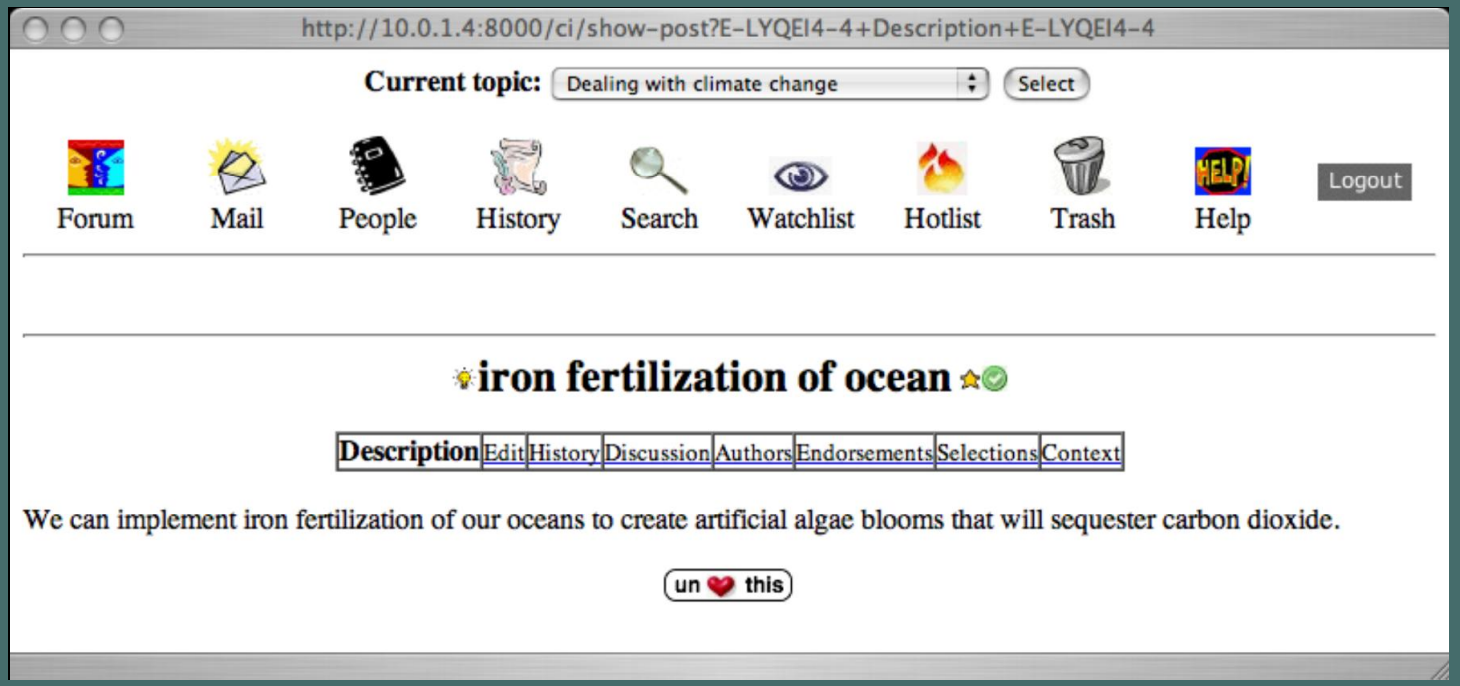
A Scenario

… and finds a relevant match



A Scenario

… she clicks on the article

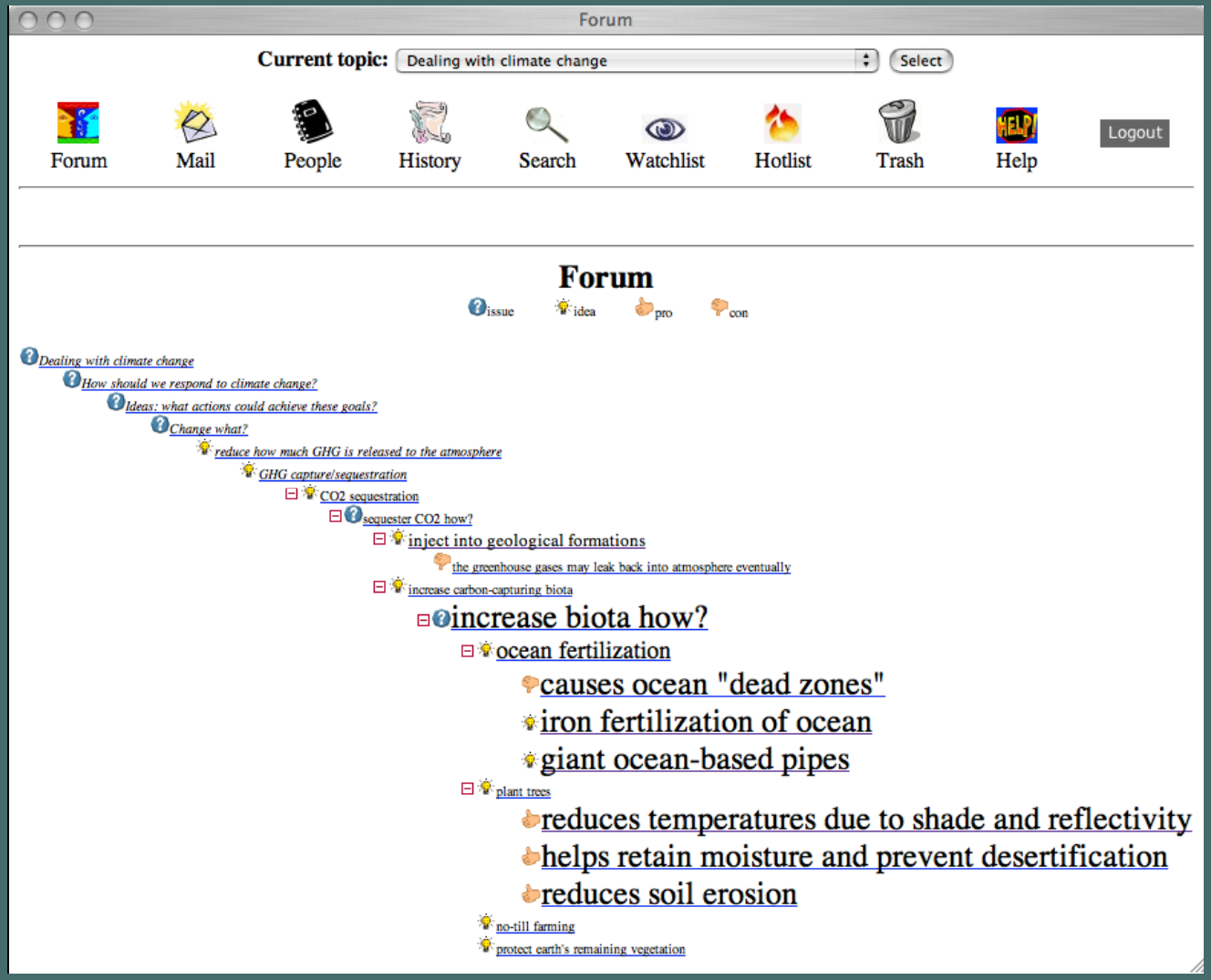


A Scenario

Now she can see why people would consider putting iron in the ocean: it encourages the growth of living things that sequester carbon dioxide, a greenhouse gas. Interested in learning more, she clicks on the discussion tab to see what comments other people have left on the topic

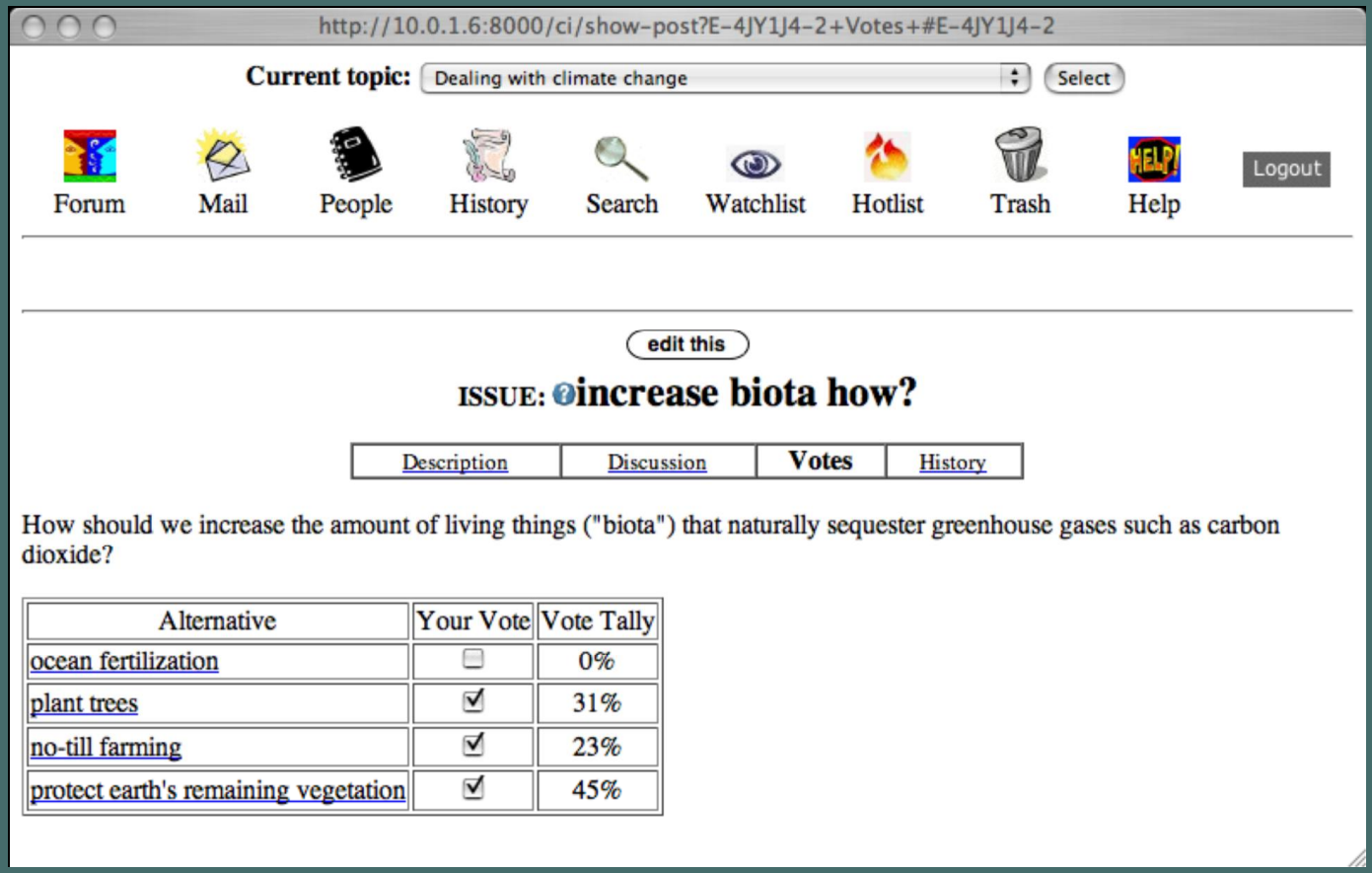
A Scenario

She can see that iron fertilization is controversial. It's time to step back and see if the same goals can be achieved with fewer negative effects. By looking at nearby articles in the topic tree, she can see that there are other ways to sequester greenhouse gases by encouraging plant growth, which have fewer negative points, judging from the "pro" and "con" articles linked to them, than ocean fertilization



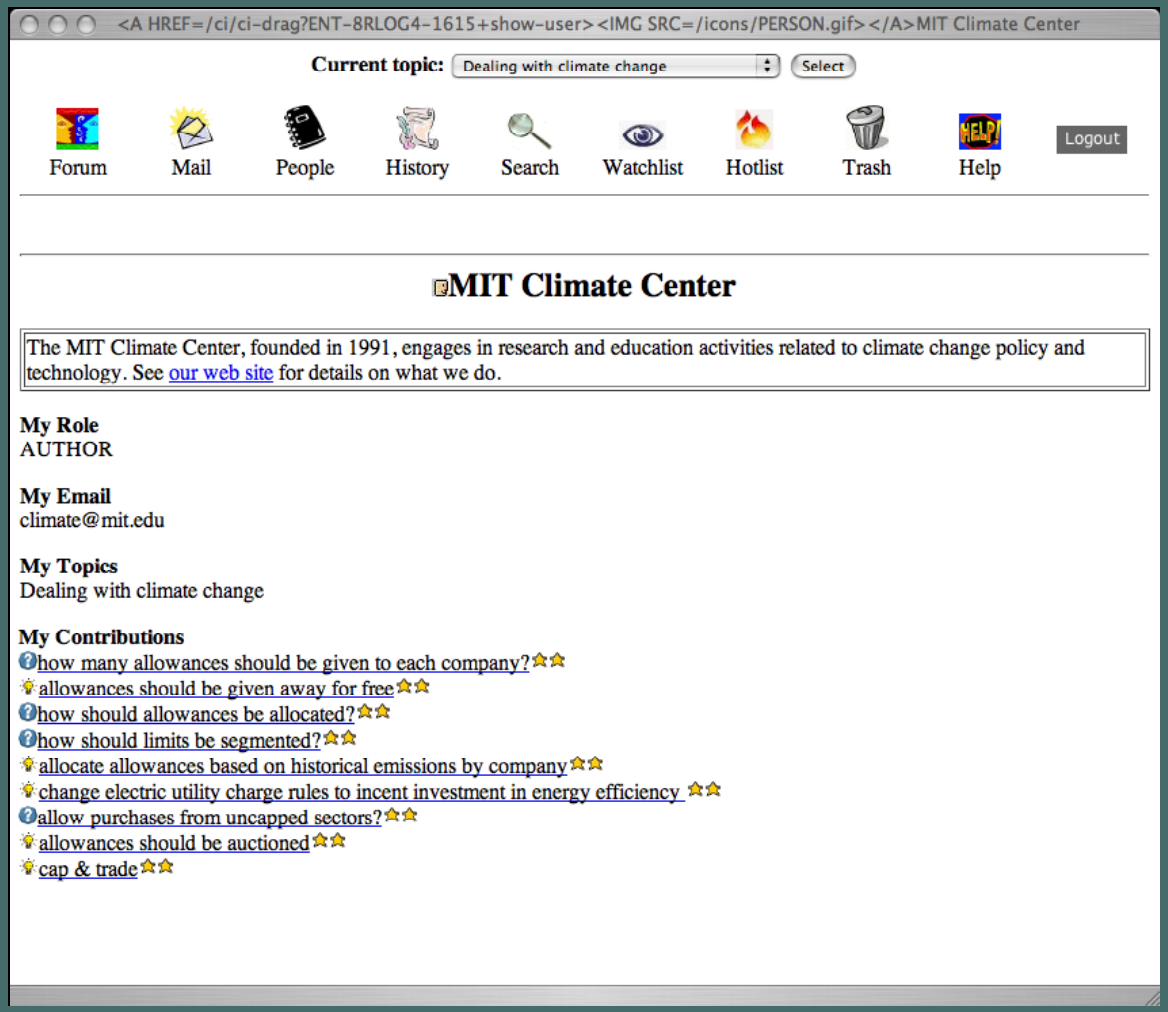
A Scenario

Kara sees that the topic has a score and she also knows that these scores are not like a traditional poll, but that they keep into account people votes as well as the strength of the pro's and con's supporting or attacking the arguments.



A Scenario

Kara found that she was particularly influenced by articles that were authored, or endorsed, by organizations she felt she can trust. Every user has a reputation score and a collaboratorium home page where you can learn about their interests, as well as see what they have contributed. When Kara found an article she liked, she checked out the author's home pages to learn more about them. She could see, for example, that the Climate Change Center at MIT has authored many highly-rated articles: she'll keep her eye out for their work in the future.



A Scenario

Kara was impressed by the depth and breadth of the contributions. The material covers a wide range of topics, ranging from ideas for making houses more energy-efficient, to climate-related governmental policies.

The contributors represent scientists, educators, policy makers, engineers and so on from think tanks, corporations, university research centers, and NGOs from around the world. Many are able, by virtue of their access to specialized expertise and sophisticated simulation models, to make authoritative contributions concerning the strengths and weaknesses of different climate-related technologies and policies.

People of all background and political stripes are represented. Everybody gets to make their own pitch, and all the ideas or arguments on a given subject appear side-by-side so they can be compared directly with one other. Nobody can dominate the discussion because each idea and argument appears just once, in its own article. There seems to be a real community ethos built around the idea of careful well-founded critical thinking. You can tell: the highest-rated articles, and the most active and respected members of the community, all seem to reflect this aspiration.