

Supporting Large-Scale Deliberation: The MIT Deliberatorium

Mark Klein

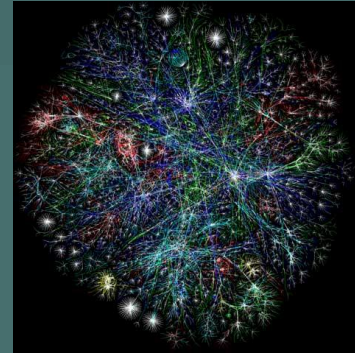
MIT Center for Collective Intelligence

<http://cci.mit.edu/klein/>



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?

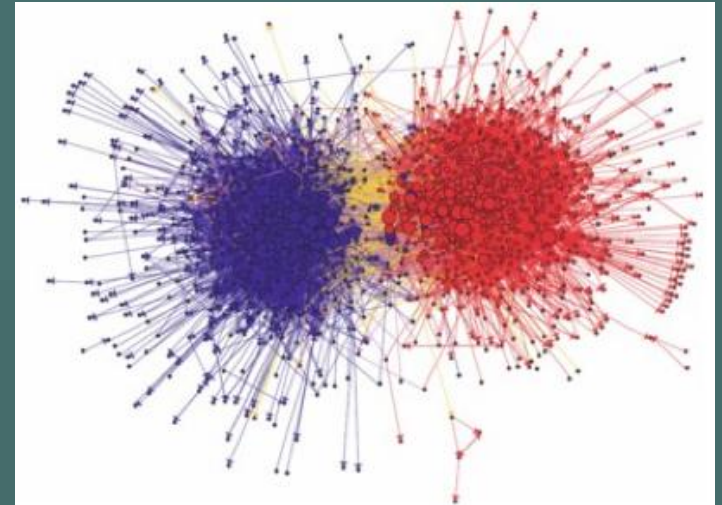


- ◆ Idea synergy
- ◆ The long tail
- ◆ Many eyes
- ◆ Wisdom of the crowds
- ◆ Many hands
- ◆ Critical mass incentives

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

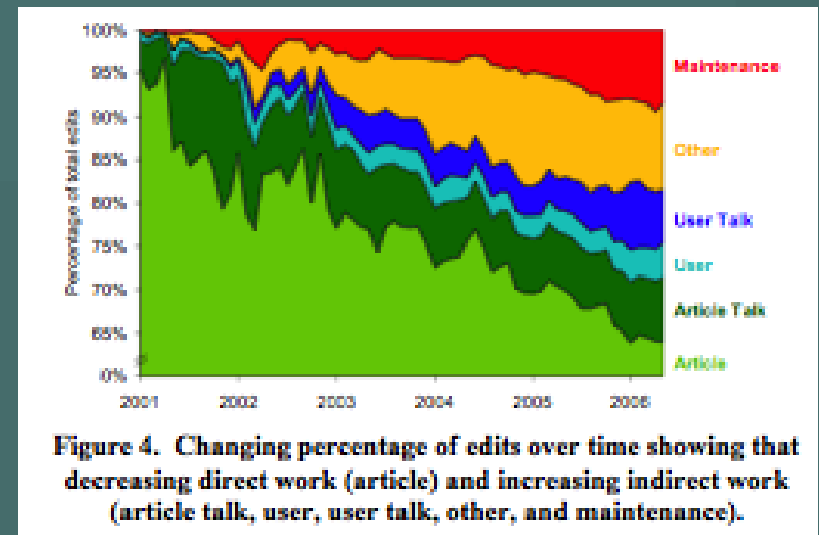
In the end, most of the ideas came **from the analysis team itself**

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



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:

[new topic](#) [postreply](#) [Planeta Forum Forum Index -> Climate](#) All times are GMT - 6 Hours
Goto page [Previous](#) [1](#), [2](#)

Page 2 of 2

Jump to:

You **cannot** post new topics in this forum
You **cannot** reply to topics in this forum
You **cannot** edit your posts in this forum
You **cannot** delete your posts in this forum
You **cannot** vote in polls in this forum

[Are You Ready For Help?](#) [Forum](#)
Find Individualized Eating Disorder Treatment Updated Tech Market Reports at Dice Search
Options-You're Not Alone. News, Advice & Jobs Today.


Powered by phpBB © 2001, 2005 phpBB Group

<http://forum.planeta.com/viewtopic.php?t=451&postdays=0&postorder=asc&start=15&id=573bb6830065e621c487cd3de4cae2e> Page 6 of 6

This discussion, in argument map form, becomes:

☐  Is Carbon Emission Offsetting a good idea?


☐  yes

 carbon offsets do reduce greenhouse gas emissions (if not fraudulent)

 it is getting easier and easier to find good carbon offsets

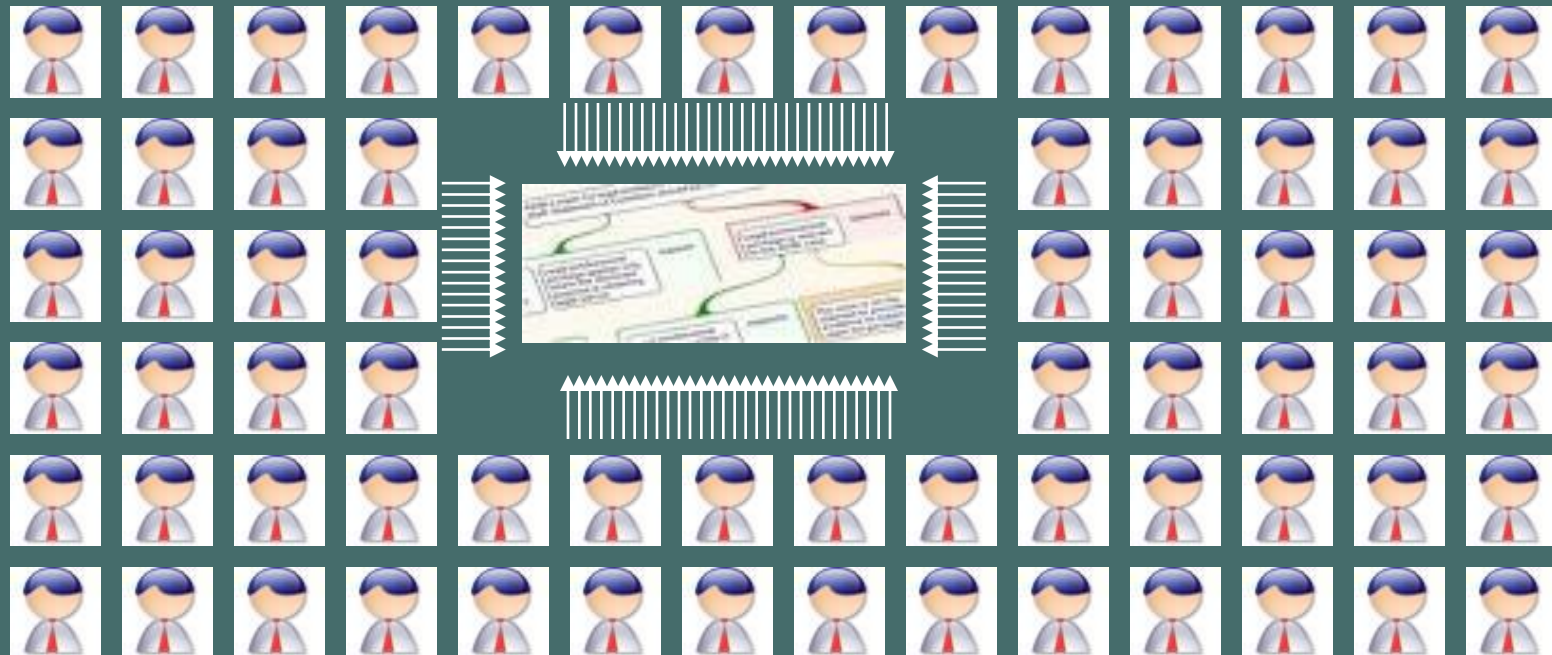
 Many major meetings are using them!

☐  no

 it fosters complacency, distracting from more important measures

 it's too easy to cheat; may not always decrease carbon emissions

The Challenge of Scale



The MIT Deliberatorium

Integrates argument theory with large-scale social computing

Climate change solutions

Deliberation About Topics People My Profile Help Logout

Climate change solutions

- Deliberation Map
 - interviews
 - What should our goals be?
 - What actions can achieve these goals?
 - change what consumers demand
 - reduce the energy intensity of services
 - most have a positive ROI
 - more efficient energy distribution
 - more efficient communications
 - more efficient homes
 - a lot of room for improvement
 - make homes more efficient how?
 - Install better insulation
 - substantial
 - more efficient desalination
 - more efficient buildings
 - more efficient appliances
 - more efficient transportation
 - reduce the GHG intensity of electricity
 - reduce the GHG intensity of transportation
 - reduce how much GHG is emitted
 - reduce the strength of the greenhouse effect
 - reduce the impact of climate change
 - How can we ensure these actions are effective?
 - What should our overall plan be?
 - Trashcan

E-3MAORN-356

CERTIFIED

substantial impact

Article Edit Comments History

Of the \$1,900 per year an average household spends on utility bills, half pays for heating and cooling. Depending on where you live, replacing your old heating and cooling equipment with ENERGY STAR qualified equipment and properly sealing your ducts can cut your energy use (and therefore your

Go to "http://localhost:8000/ci/ci-outline?show"

- 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

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.

The **live-and-let-live** rule: only edit a post to **strengthen** it

Moderators

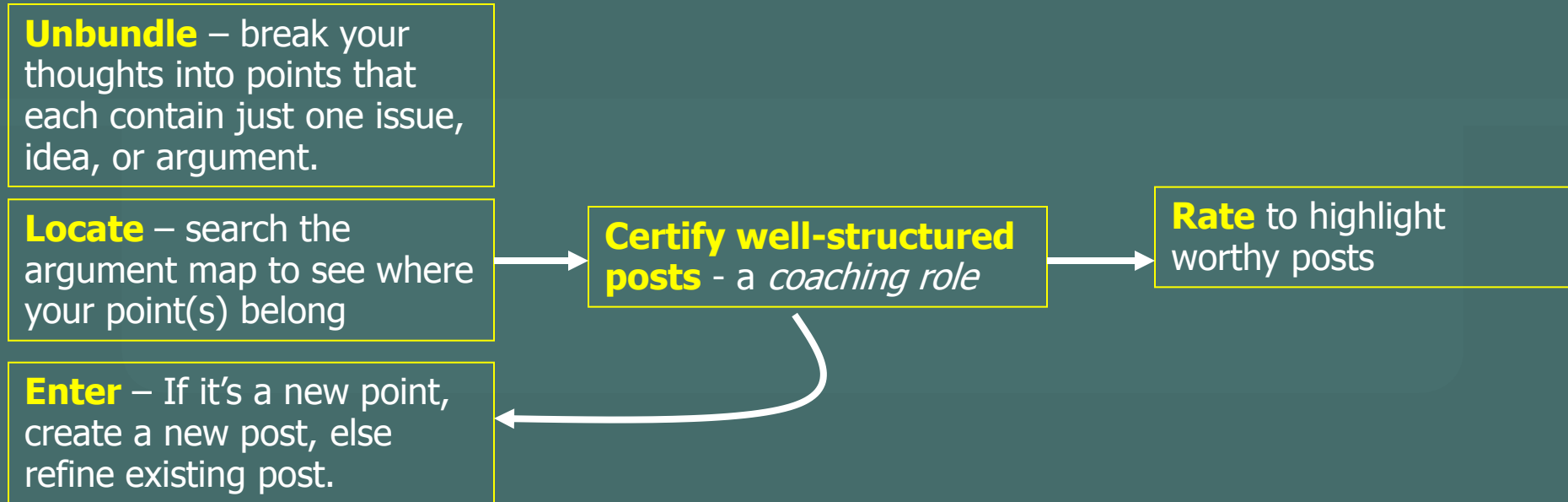
Certify well-structured posts - a *coaching* role

The **honest broker** rule: remain strictly **content-neutral**

Readers

Rate to highlight worthy posts

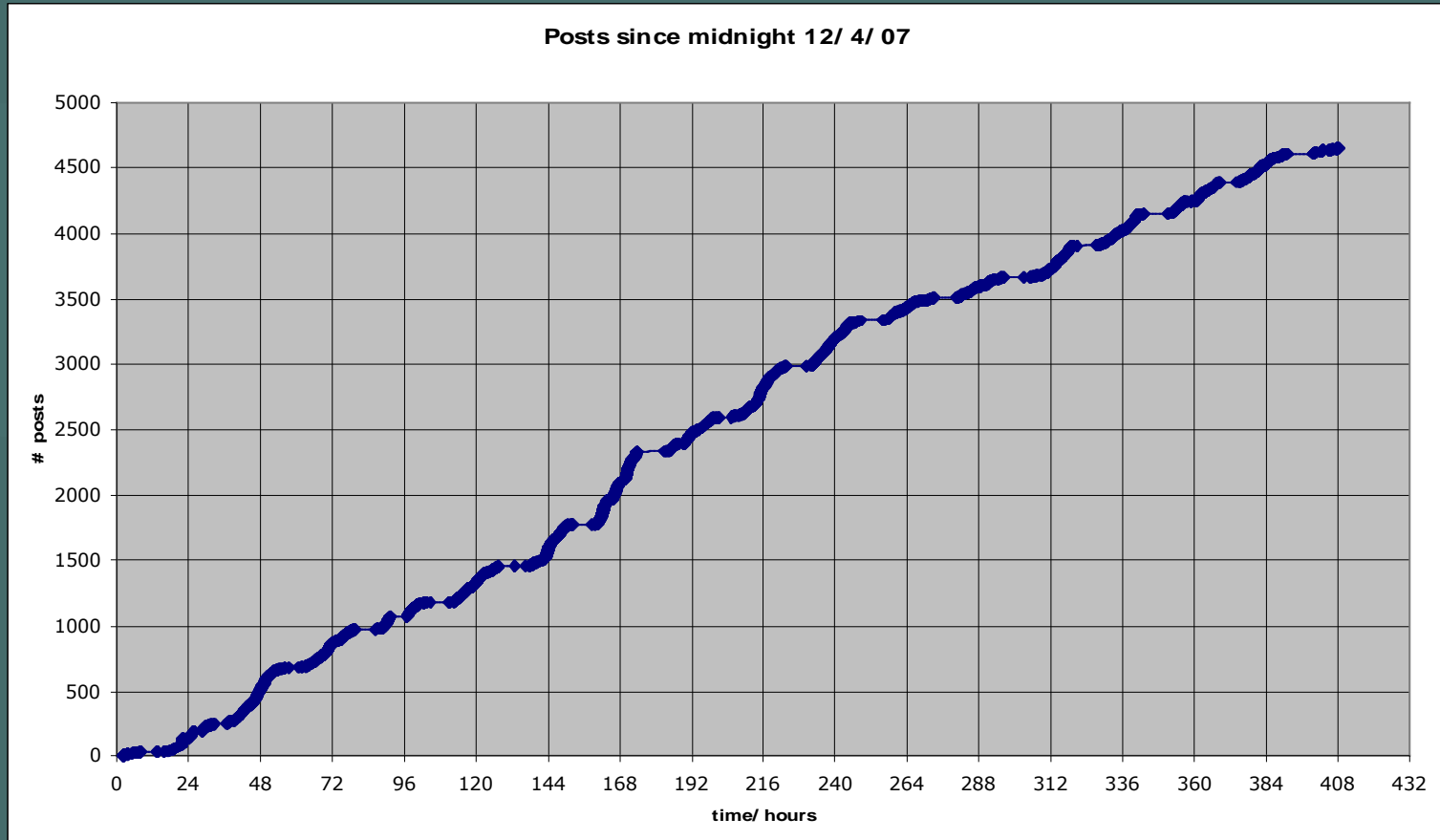
Only **certified posts** can be viewed by readers



Major Evaluations

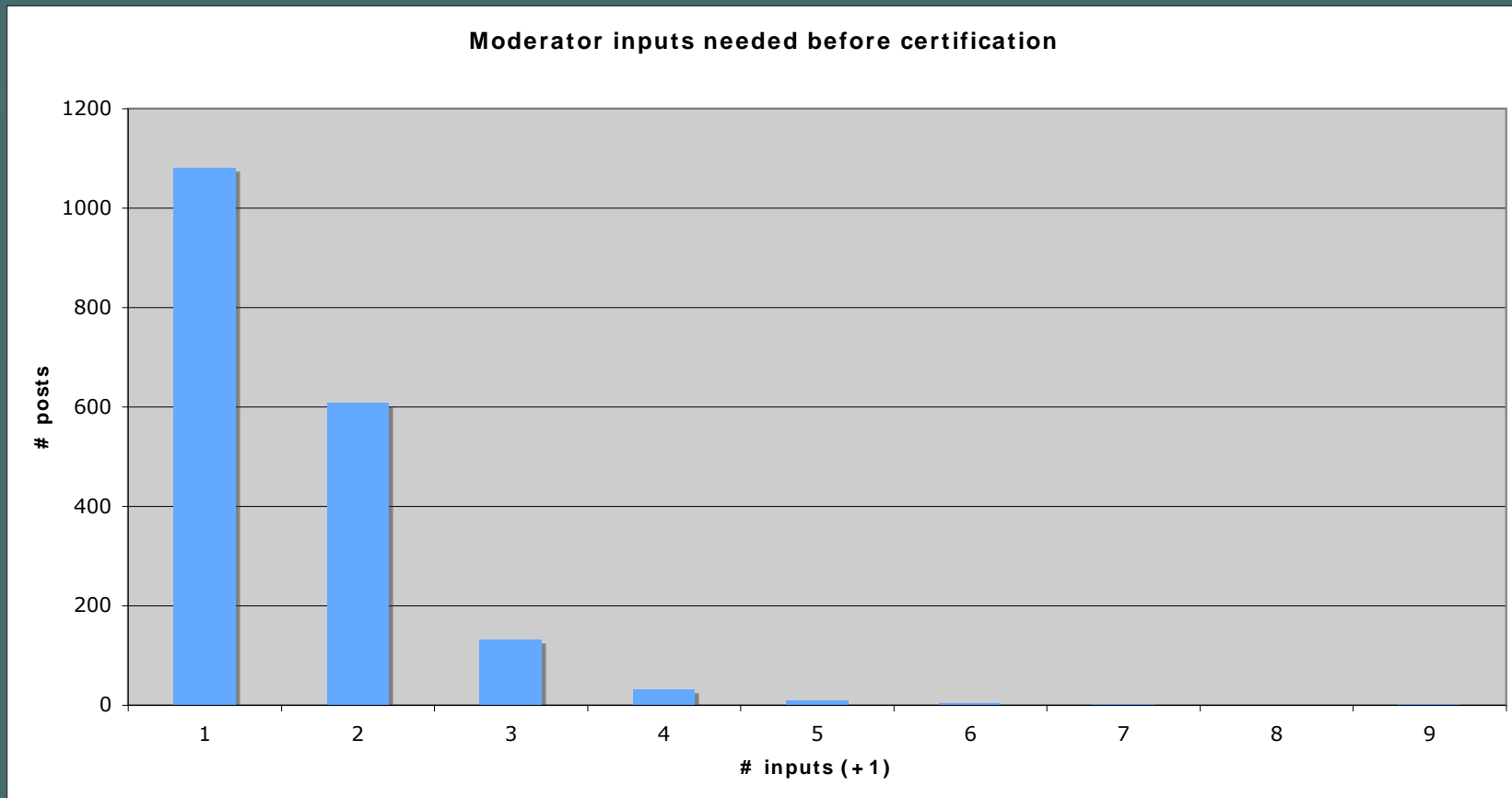
- ◆ University of Naples (Italy)
 - ◆ 3 weeks, 200 authors. bio-fuels
- ◆ University of Zurich (Switzerland)
 - ◆ 4 weeks, 300 authors, split across wiki, forum, and deliberatorium, bio-fuels
- ◆ BLM (USA)
 - ◆ 40 users, 10 agencies, water use
- ◆ Intel (USA)
 - ◆ 70 users, 2/3rds from outside, computing 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

Deliberation Map

- ☐ **?** How to reduce the barriers to the spread of biocidal products ...
 - ⊕  reducing the impact on the environment and health ...
 - ⊕  through appropriate subsidies from the state aprte
 - ⊕  increase the availability of local raw materials ...
 - ⊕  By introducing appropriate sanctions
 - ⊕  reducing conflicts and local self-interest
 - ⊕  Weakening of the opposition of the multinationals ...
 - ⊕  reducing the "competition for land" and increasing ...
- ☐ **?** What future for biofuels in Italy?
 - ⊕  The future of green energy committee is already in Italy ...
 - ⊕ **?** How to enhance the production of bi ...
 - ⊕ **?** How can Italy 'supplies and use ...
 - ⊕ **?** To what extent and how the production of biochar ...
 - ⊕ **?** To what extent will spread in Italy 'use ...
- ⊕ **?** what effects the development of biofuels try ...

Challenges Moving Forward

- Attention mediation
 - Seeing the forest for the trees

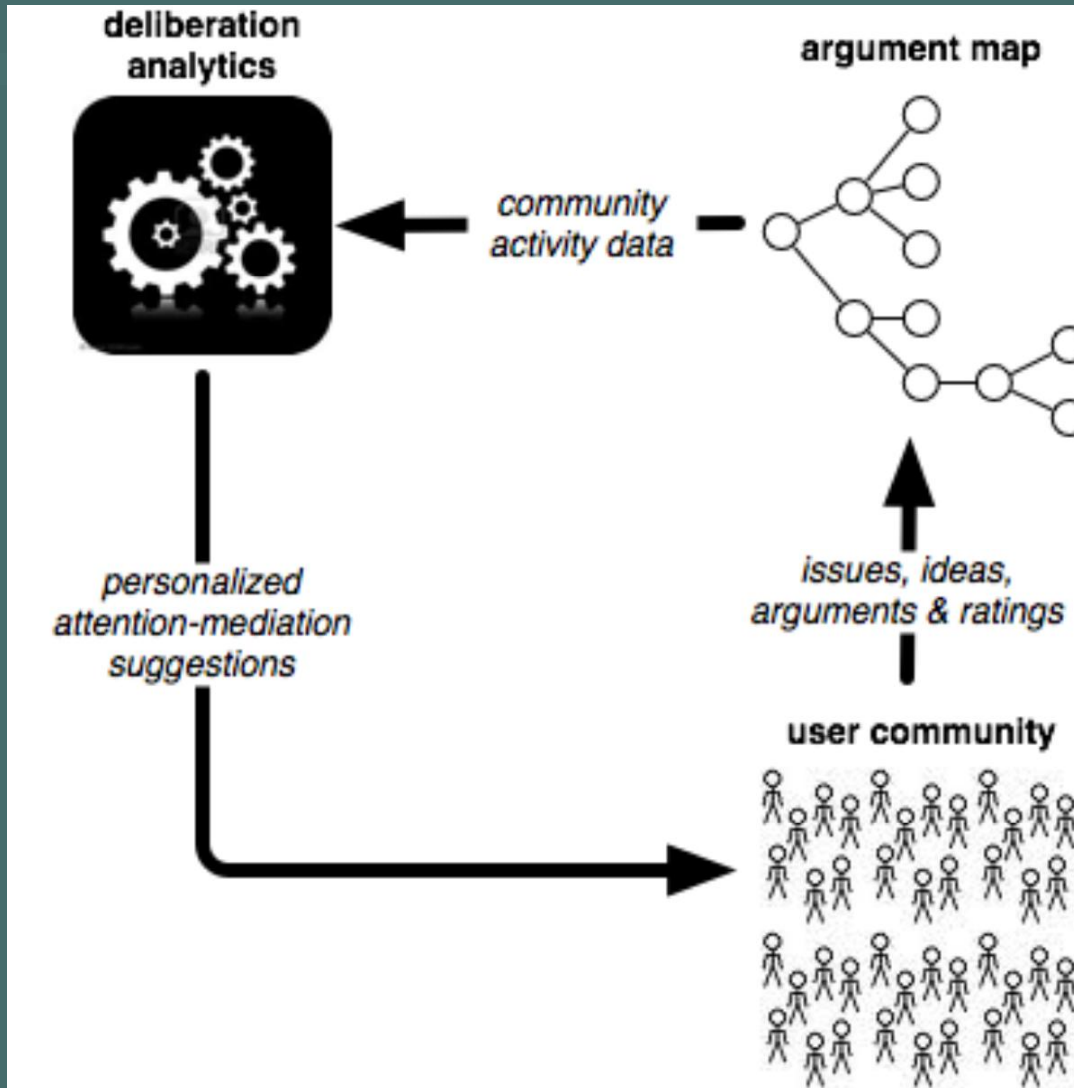
- Crowdsourcing
 - Harnessing the crowd to radically reduce authoring and moderation costs

- 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

deliberation engine

- ♥ develop stronger community among participants
- ♥ develop small-world connectivity structure

identify goals

- ♥ identify all relevant goals
- ♥ get input from all relevant perspectives

identify possible decisions

- ♥ full coverage of idea space
- ♥ diverse range of idea contributors
- ♥ contributors are incented to contribute ideas
- ♥ benefits of contributing ideas are high
- ♥ cost of contributing ideas is low
- ♥ contributors allocate their efforts to gap areas
- ♥ easy to identify gaps
- ♥ high-quality ideas

place in deliberation map

evaluate decisions wrt goals

- ♥ complete evaluation
- ♥ high-quality evaluation
- ♥ back up evaluations with solid arguments
- ♥ arguments are well-founded
- ♥ arguments are complete
- ♥ contributors are incented to contribute arguments
- ♥ easy to identify missing arguments

community rates arguments to separate wheat from chaff



metric: show propagated support values



place in argument tree



select the best decision

- ♥ Individual select solutions rationally
- ♥ based on mature deliberation
- ♥ based on complete evaluation
- ♥ based on fully enumerated idea space
- ♥ consensus-based
- ♥ fair outcome
- ♥ fair decision procedure
- ♥ input from all stakeholders
- ♥ rational (pareto-optimal) outcome

Goals -> Exceptions -> Handlers

P: *Deliberation Process*

☐ *has-part* **P:** evaluate solutions

☐ *requires* ♥ complete evaluation

☐ *has-part* ♥ includes all relevant arguments

☐ *raises* ▲ incomplete argumentation

☐ *is-handled-by* **P:** detect: few/no arguments on idea

☐ *is-handled-by* **P:** detect: inconsistent propagated vs actual ratings

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

Using standard techniques ...

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

(over 120 metrics so far)

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*
- ◆ *Marco Cioffi, Bain & Company*
- ◆ *Ali Gurkan, Ecole Centrale Paris*
- ◆ *Jérôme Gayerie, Airbus Toulouse*
- ◆ *Beaudry Koch, Bureau of Land Management*
- ◆ *Luca Iandoli, University of Naples*
- ◆ *Hajo Reijers, Eindhoven University*
- ◆ *Carlo Savoretti, DIIGA Polytechnic University of Marche*
- ◆ *Paolo Spada, Harvard*
- ◆ *Catherine Spence, Intel*
- ◆ *Maggie Wang, Hong Kong University*

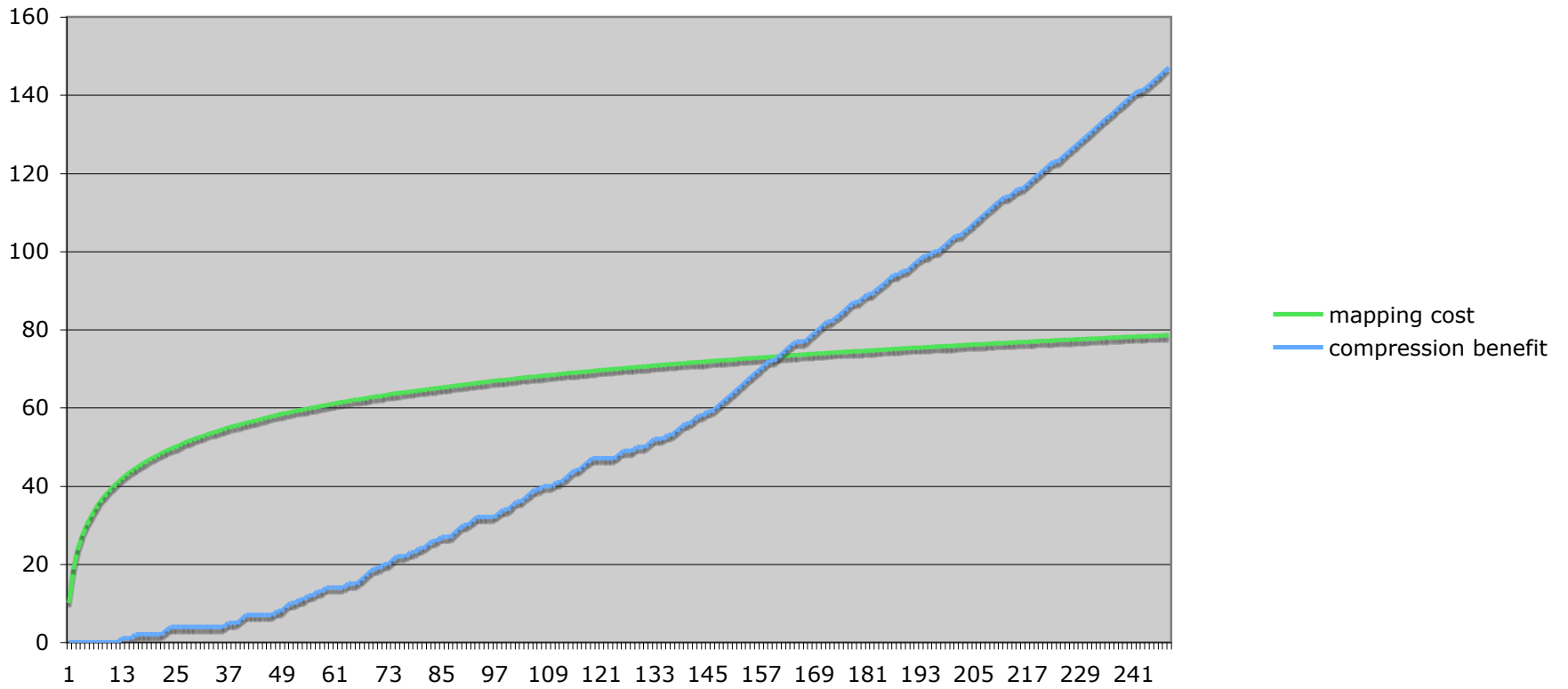
◆ *Funding*

- ◆ *National Science Foundation*
- ◆ *Intel*

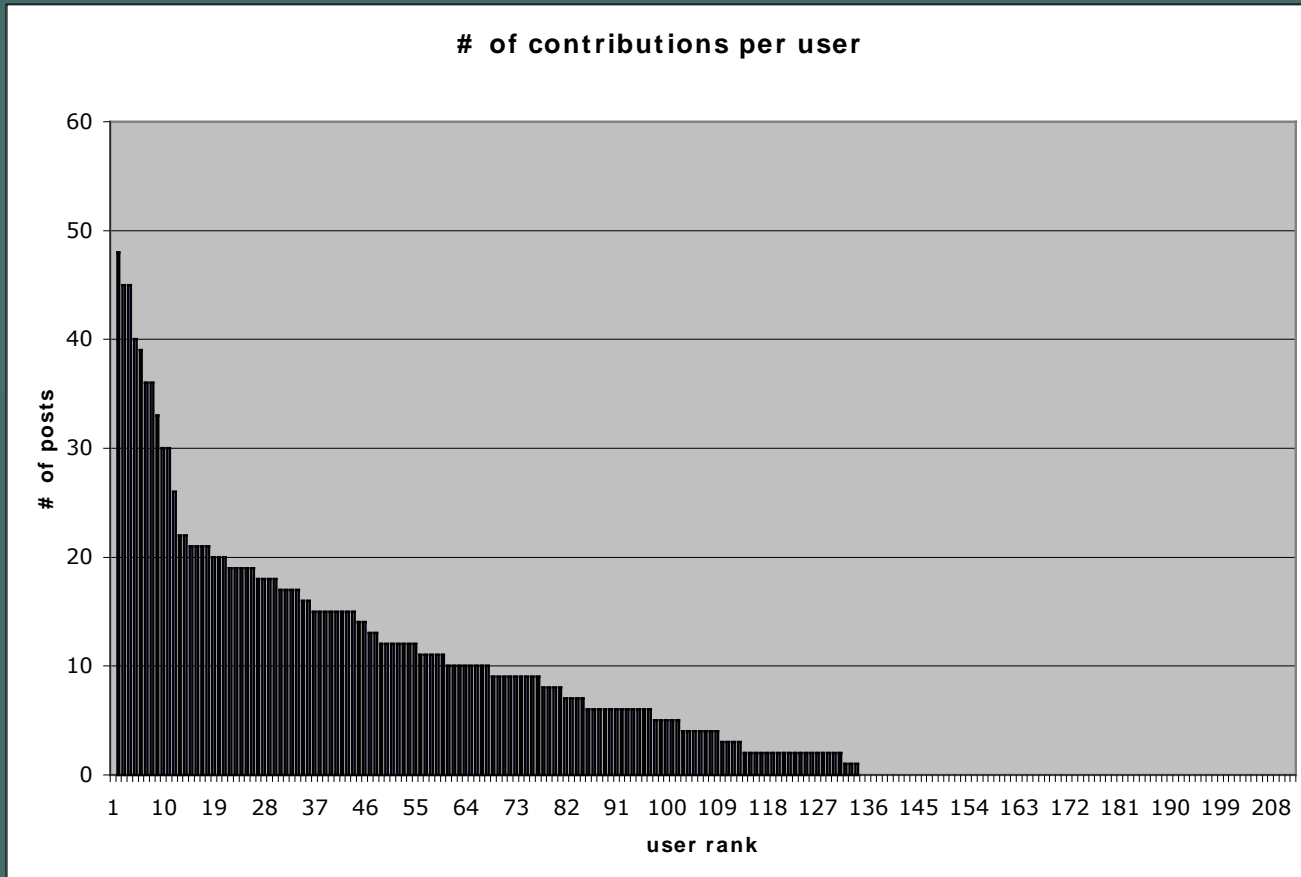
Incentives

a cost/benefits analysis

Cost vs Benefits



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?

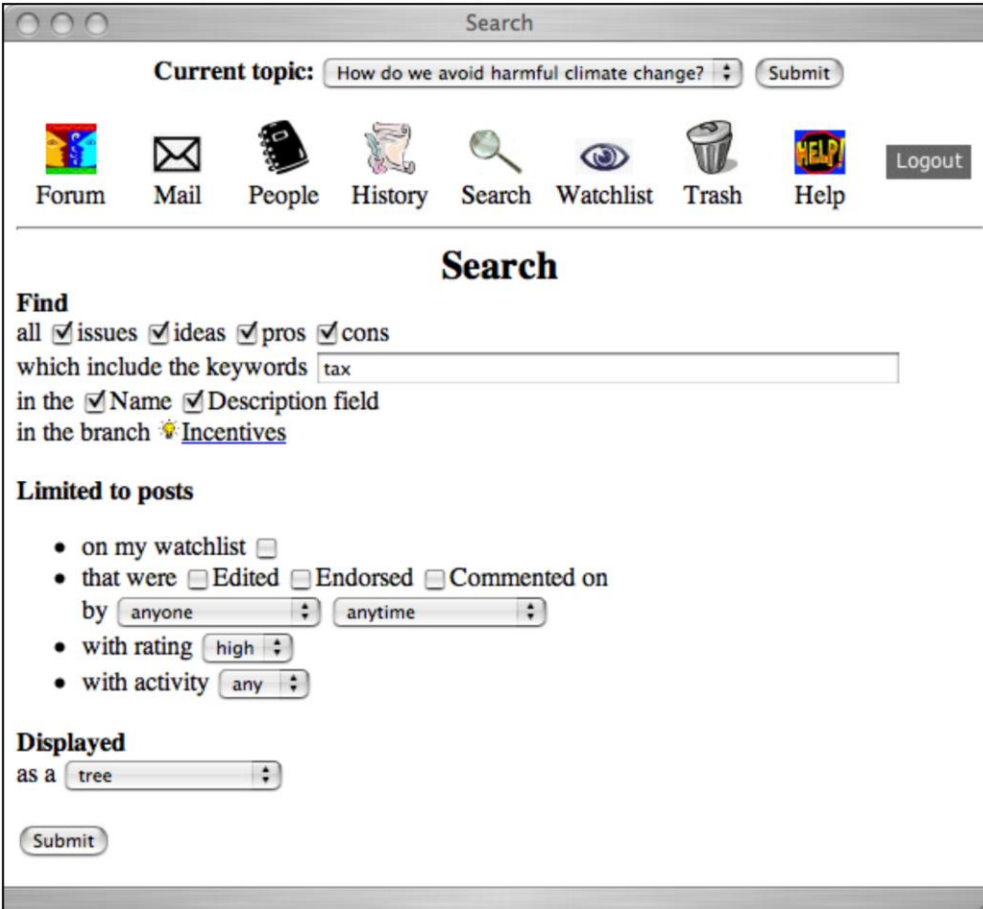
- ◆ Wiki “anyone can edit anything” model
 - ◆ Ensures diverse perspectives and self-healing content
 - ◆ Amateurs can over-write experts -> motivation issue
 - ◆ Muddies credit assignment for reputation tracking
 - ◆ Controversial topics lead to edit wars
- ◆ Forum “one author many commentors” model
 - ◆ 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



The screenshot shows a web browser window titled "Search". At the top, there is a "Current topic:" dropdown menu with the text "How do we avoid harmful climate change?" and a "Submit" button. Below this is a navigation bar with icons and labels for "Forum", "Mail", "People", "History", "Search", "Watchlist", "Trash", "Help", and a "Logout" button. The main content area is titled "Search" and contains several sections:

- Find**: A section with checkboxes for "all", "issues", "ideas", "pros", and "cons". Below this is a text input field containing "tax" and the text "which include the keywords".
- in the**: A section with checkboxes for "Name" and "Description field".
- in the branch**: A section with a star icon and the text "Incentives".
- Limited to posts**: A section with several options:
 - on my watchlist
 - that were Edited Endorsed Commented on
 - by
 - with rating
 - with activity
- Displayed**: A section with the text "as a" and a dropdown menu showing "tree".

At the bottom of the search area is a "Submit" button.

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

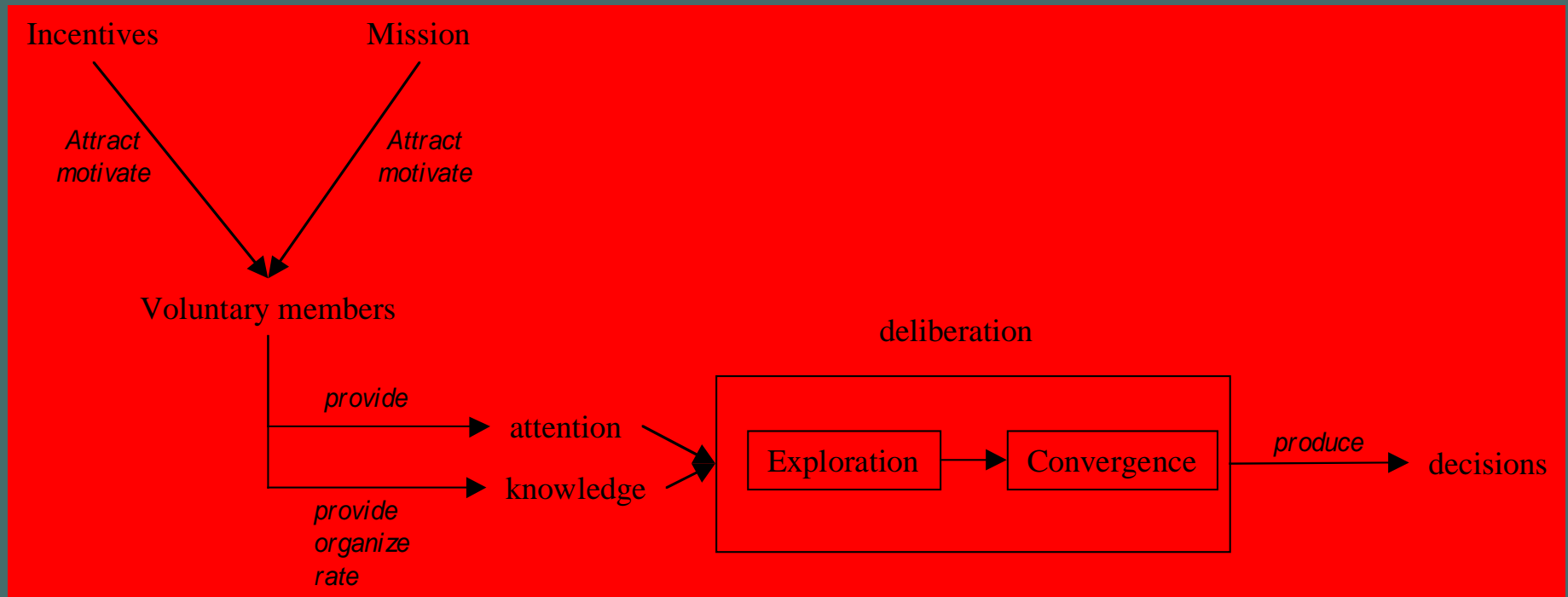
Technical: Trade-off between scalability and structure, defining suitable formats for on-line arguments, Argument evaluation and scoring (quality & impact), Robustness to attacks and unfair ratings, ...

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

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

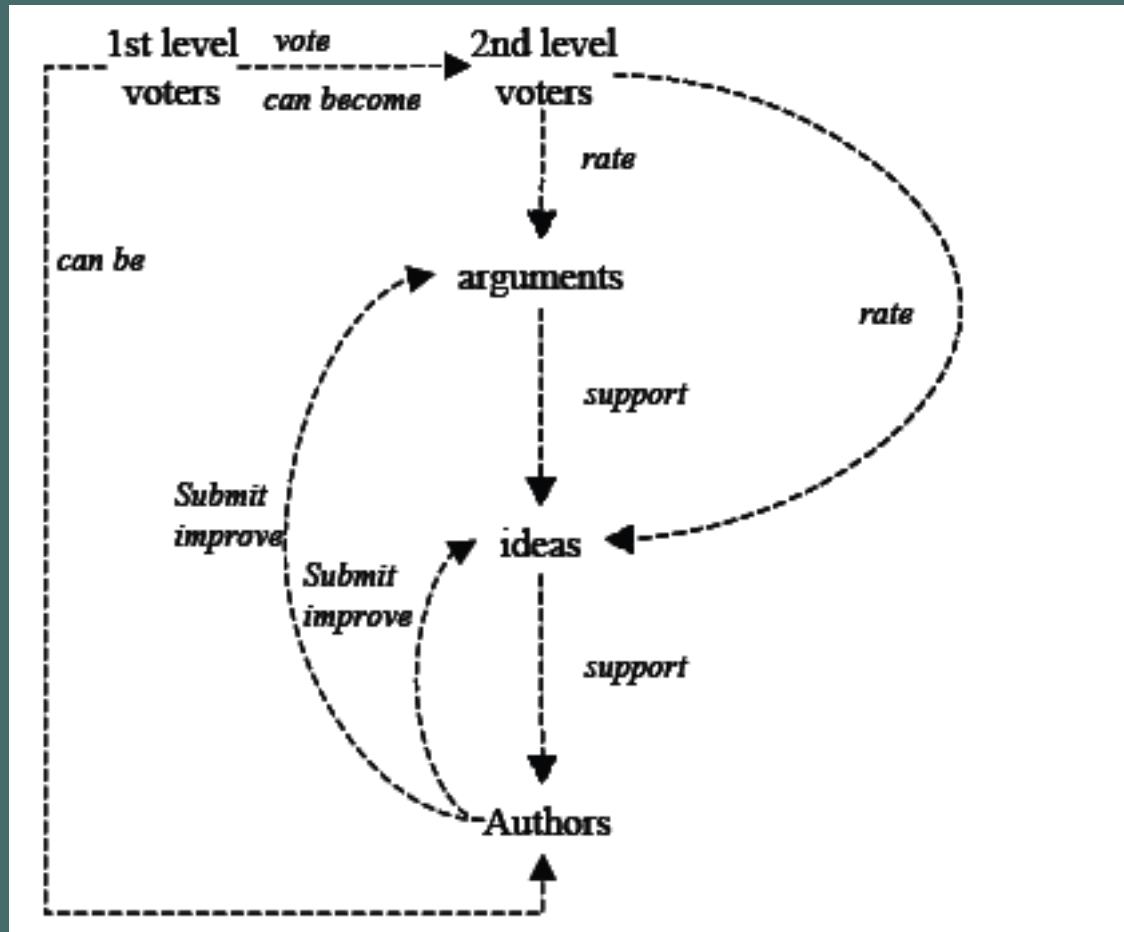
Design the argumentation community

On-line community as a virtual organization



Design the argumentation community

The on-line argumentation process in a proxy democracy scenario

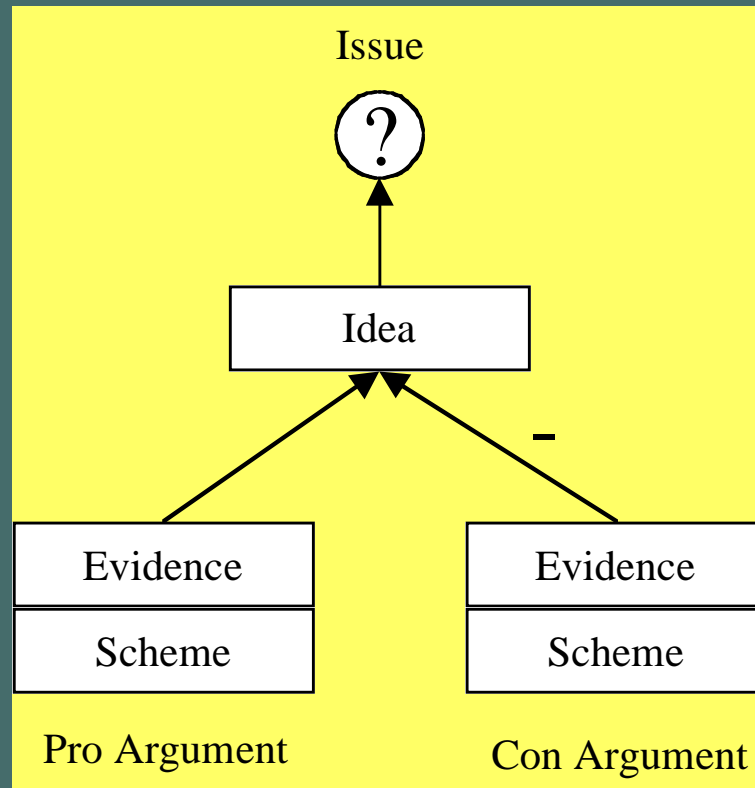


The design of the knowledge format

IBIS
Concklin, 2003

Argument Scheme
Walton, 2006

Ground+warrant
Toulmin, 1959



Scale-Enabled Incentives

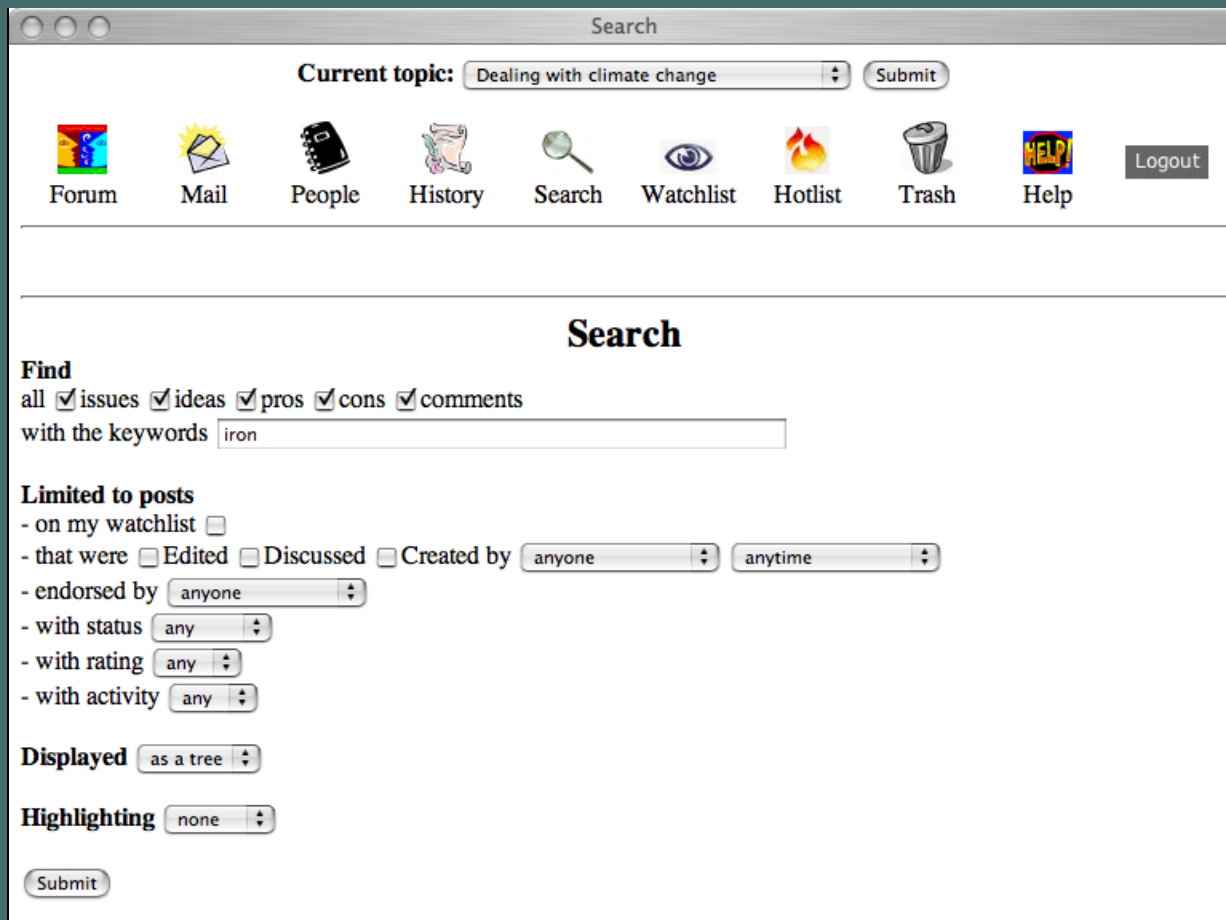
- ◆ Finding your tribe
- ◆ Having an impact (becoming a hero)
- ◆ Reputation
- ◆ Networking
- ◆ Profit
- ◆ Self-definition
- ◆ Entertainment
- ◆ Self-development

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:



The screenshot shows a web browser window titled "Search". At the top, there is a "Current topic:" dropdown menu set to "Dealing with climate change" and a "Submit" button. Below this is a navigation bar with icons and labels for "Forum", "Mail", "People", "History", "Search", "Watchlist", "Hotlist", "Trash", "Help", and a "Logout" button. The main content area is titled "Search" and contains the following search criteria:

- Find**
 - all issues ideas pros cons comments
 - with the keywords
- Limited to posts**
 - on my watchlist
 - that were Edited Discussed Created by
 - endorsed by
 - with status
 - with rating
 - with activity
- Displayed**
- Highlighting**

A "Submit" button is located at the bottom left of the search criteria section.

A Scenario

... and finds a relevant match

The screenshot shows a web browser window titled "Query Matches {3}". At the top, there is a search bar with the text "Current topic: Dealing with climate change" and a "Submit" button. Below the search bar is a navigation menu with icons and labels for "Forum", "Mail", "People", "History", "Search", "Watchlist", "Hotlist", "Trash", and "Help", along with a "Logout" button. The main content area is titled "Query Matches {3}" and displays a hierarchical list of search results. The results are organized into a tree structure starting with "Dealing with climate change", followed by "How should we respond to climate change?", "Ideas: what actions could achieve these goals?", "Change what?", "reduce how much GHG is released to the atmosphere", "GHG capture/sequestration", "CO2 sequestration", "sequester CO2 how?", "increase carbon-capturing biota", "increase biota how?", and finally "iron fertilization of ocean" which is highlighted with a red oval. Below this, a snippet of text is visible: "A company call Planktos, located in California, ha ...".

Query Matches {3}

Current topic: Dealing with climate change Submit

Forum Mail People History Search Watchlist Hotlist Trash Help Logout

Query Matches {3}

- Dealing with climate change
 - How should we respond to climate change?
 - Ideas: what actions could achieve these goals?
 - Change what?
 - reduce how much GHG is released to the atmosphere
 - GHG capture/sequestration
 - CO2 sequestration
 - sequester CO2 how?
 - increase carbon-capturing biota
 - increase biota how?
 - iron fertilization of ocean ★

A company call Planktos, located in California, ha ...

A Scenario

... she clicks on the article

The screenshot shows a web browser window with the URL `http://10.0.1.4:8000/ci/show-post?E-LYQEI4-4+Description+E-LYQEI4-4`. The page features a navigation bar with a "Current topic:" dropdown menu set to "Dealing with climate change" and a "Select" button. Below this is a row of icons for "Forum", "Mail", "People", "History", "Search", "Watchlist", "Hotlist", "Trash", and "Help", along with a "Logout" button. The main content area displays the article title "iron fertilization of ocean" with a star and a checkmark icon. Below the title is a menu with options: "Description", "Edit", "History", "Discussion", "Authors", "Endorsements", "Selections", and "Context". The article text reads: "We can implement iron fertilization of our oceans to create artificial algae blooms that will sequester carbon dioxide." At the bottom of the article is a button that says "un ❤️ this".

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



The screenshot shows a web browser window with the URL `http://10.0.1.4:8000/ci/show-post?E=LYQEI4-4+Discussion+E=TRWRI4-3`. The page features a navigation bar with icons for Forum, Mail, People, History, Search, Watchlist, Hotlist, Trash, Help, and a Logout button. The current topic is "Dealing with climate change". The main content area displays a forum post titled "iron fertilization of ocean" with a star icon. The post has a tabbed interface with "Discussion" selected. The discussion content includes a link to a company called Planktos, a comment stating "this sounds like a terrible idea!", and a detailed paragraph about dead zones in the Gulf of Mexico caused by fertilizer runoff from the Midwest. The post is attributed to Mark Klein, dated 8/24/2007.

Current topic: Dealing with climate change

Forum Mail People History Search Watchlist Hotlist Trash Help Logout

iron fertilization of ocean

Description Edit History **Discussion** Authors Endorsements Selections Context

iron fertilization of ocean

A company call Planktos, located in California, ha ...

this sounds like a terrible idea!

algae blooms create "dead zones"!

Researchers say more intensive farming of more land in the Midwestern U.S. -- in part a result of the push for more corn production for ethanol -- could contribute to growth in the "dead zone" in the Gulf of Mexico. The zone is created when fertilizer and other runoff find their way down the Mississippi River and into the gulf, encouraging algae to grow. The algae's decay process sucks up all the available oxygen, leaving little for other species such as fish. In 2006, the dead zone was 6,662 square miles.

See [BBC News, 18 Jul 2007](#).

Also see [Gristmill: Gulf Dead Zone: Bigger than ever](#)

Posted by Mark Klein 8/24/2007 at 9:16:57 pm, viewed 1 times, with 0 hearts

this reply

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

The screenshot shows a web browser window titled "Forum". At the top, there is a search bar with the text "Current topic: Dealing with climate change" and a "Select" button. Below the search bar is a navigation menu with icons and labels for "Forum", "Mail", "People", "History", "Search", "Watchlist", "Hotlist", "Trash", "Help", and a "Logout" button. The main content area displays a topic tree for "Dealing with climate change". The tree starts with a question mark icon and the text "Dealing with climate change". It branches into several sub-topics, each with a question mark icon: "How should we respond to climate change?", "Ideas: what actions could achieve these goals?", "Change what?", "reduce how much GHG is released to the atmosphere", "GHG capture/sequestration", "CO2 sequestration", "sequester CO2 how?", "inject into geological formations", "the greenhouse gases may leak back into atmosphere eventually", "increase carbon-capturing biota", "increase biota how?", "ocean fertilization", "causes ocean 'dead zones'", "iron fertilization of ocean", "giant ocean-based pipes", "plant trees", "reduces temperatures due to shade and reflectivity", "helps retain moisture and prevent desertification", "reduces soil erosion", "no-till farming", and "protect earth's remaining vegetation".

Forum

Current topic: Dealing with climate change Select

Forum Mail People History Search Watchlist Hotlist Trash Help Logout

Forum

issue idea pro con

? Dealing with climate change

? How should we respond to climate change?

? Ideas: what actions could achieve these goals?

? Change what?

reduce how much GHG is released to the atmosphere

GHG capture/sequestration

CO2 sequestration

sequester CO2 how?

inject into geological formations

the greenhouse gases may leak back into atmosphere eventually

increase carbon-capturing biota

increase biota how?

ocean fertilization

causes ocean "dead zones"

iron fertilization of ocean

giant ocean-based pipes

plant trees

reduces temperatures due to shade and reflectivity

helps retain moisture and prevent desertification

reduces soil erosion

no-till farming

protect earth's remaining vegetation

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.

The screenshot shows a web browser window with the URL `http://10.0.1.6:8000/ci/show-post?E-4JY1J4-2+Votes+#E-4JY1J4-2`. The page features a navigation bar with icons for Forum, Mail, People, History, Search, Watchlist, Hotlist, Trash, and Help, along with a Logout button. The current topic is "Dealing with climate change". Below the navigation bar, there is an "edit this" button and the issue title "ISSUE: ?increase biota how?". A table with four columns: Description, Discussion, Votes, and History, is displayed. The "Votes" column shows the results of the poll. The poll question is "How should we increase the amount of living things ('biota') that naturally sequester greenhouse gases such as carbon dioxide?".

| Description | Discussion | Votes | History |
|--------------------------------------|-------------------------------------|-------|---------|
| ocean fertilization | <input type="checkbox"/> | 0% | |
| plant trees | <input checked="" type="checkbox"/> | 31% | |
| no-till farming | <input checked="" type="checkbox"/> | 23% | |
| protect earth's remaining vegetation | <input checked="" type="checkbox"/> | 45% | |

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.

The screenshot shows a web browser window with the address bar containing a URL fragment: MIT Climate Center. The page features a navigation bar with icons for Forum, Mail, People, History, Search, Watchlist, Hotlist, Trash, and Help, along with a Logout button. The current topic is set to "Dealing with climate change". Below the navigation bar, the MIT Climate Center logo is displayed. A text box provides information about the center: "The MIT Climate Center, founded in 1991, engages in research and education activities related to climate change policy and technology. See [our web site](#) for details on what we do." The user's profile information is shown, including their role as "AUTHOR", email address "climate@mit.edu", and current topic "Dealing with climate change". A list of contributions is displayed, each with a question mark icon and a star rating:

- how many allowances should be given to each company?☆☆
- allowances should be given away for free☆☆
- how should allowances be allocated?☆☆
- how should limits be segmented?☆☆
- allocate allowances based on historical emissions by company☆☆
- change electric utility charge rules to incent investment in energy efficiency☆☆
- allow purchases from uncapped sectors?☆☆
- allowances should be auctioned☆☆
- cap & trade☆☆

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.