

The Challenge

The Internet enables unprecedented opportunities for large scale *knowledge sharing* via "social computing" platforms (e.g. email, newsgroups, chat, forums, blogs, wikis, podcasts, etc.)



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



- ◆ Idea synergy
- ◆ The long tail
- ◆ Many eyes
- ◆ Wisdom of the crowds
- ◆ Many hands
- ◆ Quality competition

Supporting Large-Scale Deliberation: The MIT Deliberatorium

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Outline

- ◆ Limitations of current technologies
- ◆ Our approach: the Deliberatorium
- ◆ Evaluation results
- ◆ Future Directions

The Center for Collective Intelligence

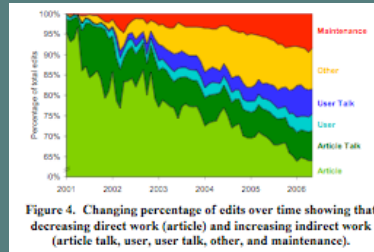
- ◆ Founded as Center for Coordination Science in 1995, re-focused on Collective Intelligence in 2006
 - ◆ Creating new examples of collective intelligence
 - ◆ The Climate Collaboratorium
 - > *The Deliberatorium*
 - > Open-Access Climate Models
 - ◆ Prediction Markets
 - ◆ Studying collective intelligence in today's organizations
 - ◆ Distributed Collaboration (surveys)
 - ◆ Sensible Organizations (badges)
 - ◆ Developing theories of collective intelligence
 - ◆ The Handbook of Collective Intelligence
 - ◆ Measuring Collective Intelligence

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"
- and thus are prone to the same limitations as other collaboration-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.

What's Wrong with Current Collaboration Tools?

Most tools (e.g. forums, blogs, email, IM) organize interactions by *time*

Discussions typically meander unsystematically producing **scattered content & haphazard coverage**

Discussions tend to **balkanize**, creating "echo chambers"

Soapbox effect: "flame wars" mean "**small voices**" get drowned out



Incomplete and often flawed content

Hard to make sure your voice is heard

Hard to find the good stuff amongst all the noise



Flawed Argumentation

In current collaboration tools, there is no inherent bias towards well-founded argumentation

prejudices

Logical fallacies

attacks

rumors biases

lies

Uninformed opinions

An Example

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



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**

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

Every point can only appear **once** and is attached to the point it **logically** refers to



This discussion, in argument map form, becomes:

plus rating
aggregation

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! ★★

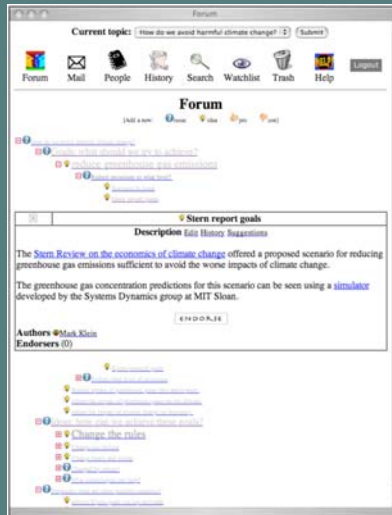
☐ **no**

- 👍 it fosters complacency, distracting from more important measures ★
- 👍 it's too easy to cheat; may not always decrease carbon emissions ★★★★★

plus ratings



The MIT Deliberatorium



Integrates argumentation 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/social translucence to incent quality contributions and focus attention

Benefits of Argument Mapping

- ❑ **No scattering**: all content on a given topic is co-located
- ❑ **Better coverage**: easier to find gaps that need to be filled
- ❑ **No redundancy**: each unique point can only be made **once**
- ❑ **Bias towards well-founded arguments**: the system makes the arguments for/against ideas – or the lack thereof – **visible**



Better, more complete content

Small voices can be heard

Easier to find the good stuff

The Role of Authors

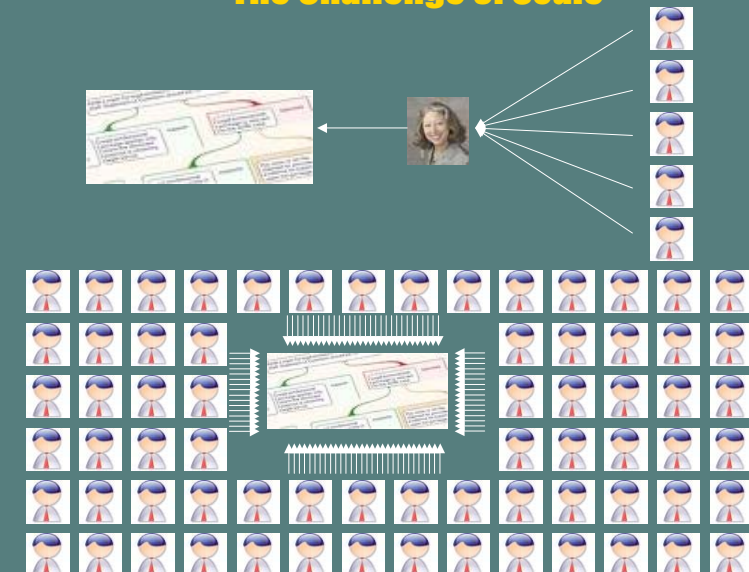
Unbundle – break your thoughts into points that each contain just one issue, idea, or argument.

Locate – search the argument map to see where your point(s) belong, and whether they are already present.

Enter – If it's a new point, attach a new post to the issue, idea or argument it logically refers to. Otherwise, refine the existing post.

The **live-and-let-live** rule: If you disagree with someone, add a “con” argument or a competing idea, but do not edit their posts to undercut them. You should only edit a post if your goal is to **strengthen** it.

The Challenge of Scale



The Surprising Power of Social Computing

- ◆ When communities *exceed critical mass*, users become motivated to contribute *massively*, so they can
 - Become a hero
 - Find their tribe
- ◆ Can we exploit this to incent users to contribute to deliberation maps?

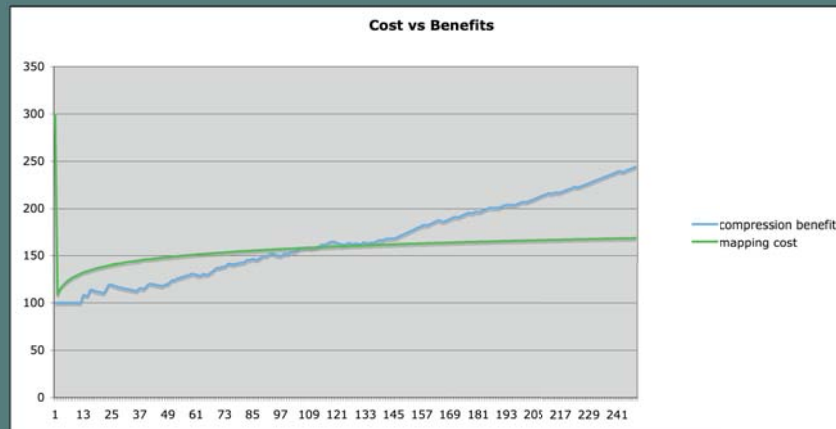
The Role of Moderators

Check pending posts to check whether they are well-structured to maximize value to community - *a coaching role*

Certify well-structured posts: only certified posts can be viewed by outside community -> key incentive

Remove clearly inappropriate (e.g. abusive or spam) content but otherwise remain strictly **content-neutral**

Many communities (debaters, lawyers, scientists, philosophers, librarians) have the requisite skills



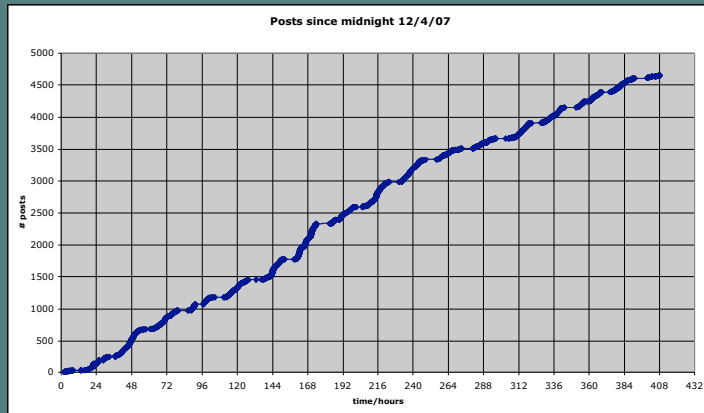
The cost/benefit of argument mapping *increases* with community size => "hero" incentive increases with scale

Lack of redundancy means that each point in a map garners *more attention* => "tribe" incentive increases with scale

The Role of the Entire Community

Rate - rate posts to help highlight important issues, promising ideas, and compelling arguments. This moderates attention allocation, and encourages high-quality deliberation.

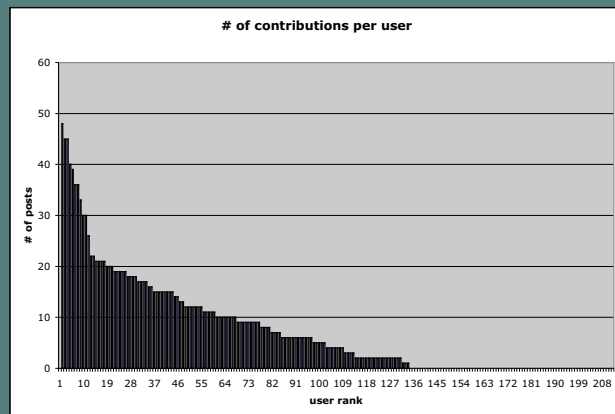
Collective Intelligence Doesn't Sleep



~3000 posts (~1900 certified) plus ~2000 comments

Field Evaluations

Power Law Participation

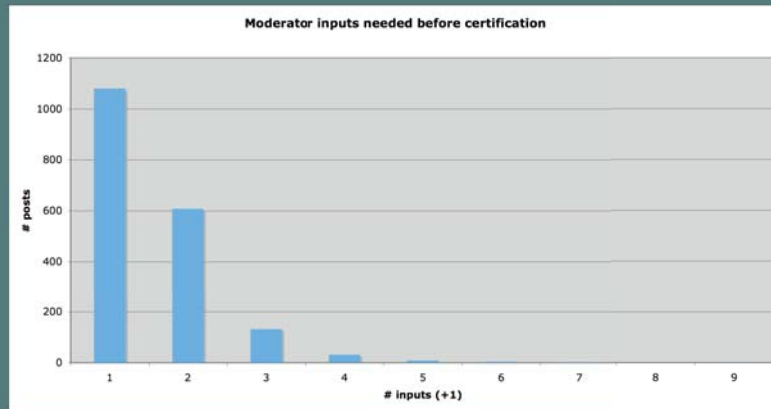


but with a thick middle - scale doesn't discourage authors as much?

Naples Evaluation

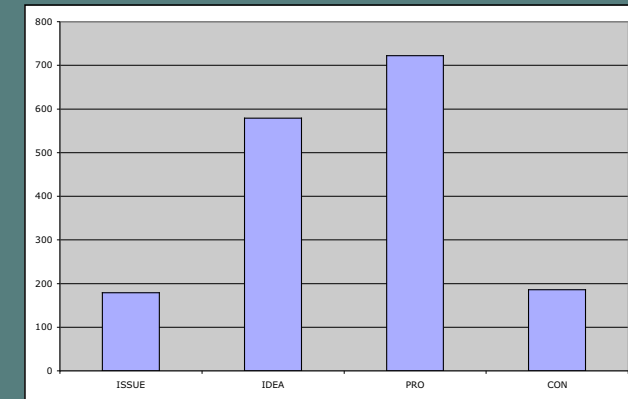
- ♦ 3 weeks
- ♦ 200 masters-level IT students @ University of Naples
- ♦ Closed (single-user) authoring
- ♦ Topic: what use should our country make of bio-fuels?

Most Posts Were Well-Mapped from the Start



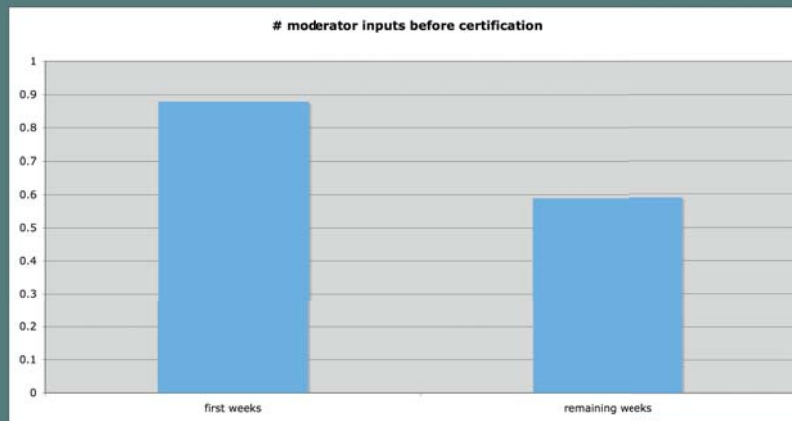
60% required no changes before certification

Ideas and Pros Dominate



Students reluctant to criticize peers?

Users Improved Over Time



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

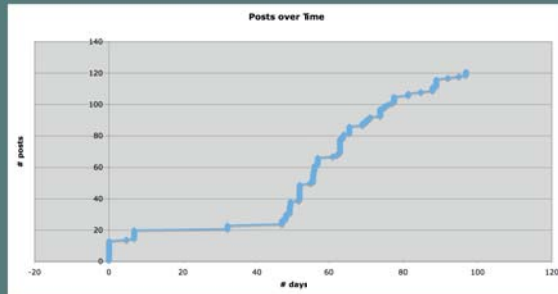
Lively Debate

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

About 70% of arguments addressed posts by other authors

Moderate Scale

- ♦ 73 author accounts: 51 from outside Intel
- ♦ 64 certified posts: 40 from outside Intel
- ♦ 25 ratings

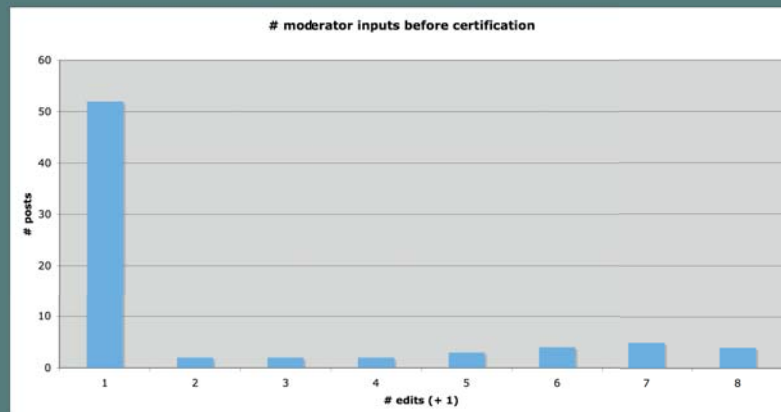


neither extrinsic
incentives nor
critical mass

Qualitative Observations

- ♦ **Efficacy**: a large non-expert community was able to comprehensively cover a complex contentious topic in just a few days with no top-down coordination
- ♦ **Structure**: few out-of topic posts, “quite” well-organized, low redundancy
- ♦ **Moderation**: It was difficult for 2-3 moderators to keep up with 200 active authors - probably need 5% of users
- ♦ **Idiosyncratic incentives?** Motivated by grades, rather than intrinsic or outcome-related incentives

Most Posts Well-Mapped from Start



70% required no moderator inputs to get certified

A small number of “problem posts”

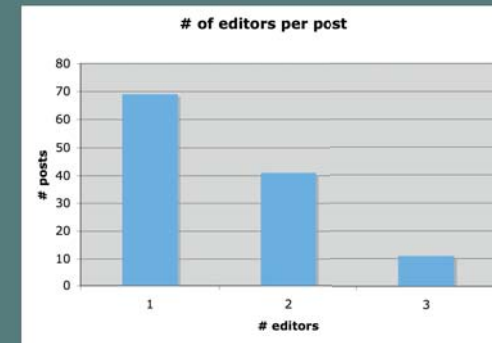
Intel Evaluation

- ♦ 4 weeks, 73 authors
- ♦ Open authoring
- ♦ Topic: opportunities and risks of open computing

Other Evaluations

- ◆ University of Zurich - 4 weeks, 300 authors, split equally across wiki, forum, and deliberation conditions, on same topic - analysis in progress
- ◆ BLM - 40 users, 10 agencies, 300 posts
- ◆ HMC - 1000's of posts, small centralized author corps, 100's of readers, move towards user-generated content

Many Multi-Authored Posts



Allows many hands/eyes effects

Contributions

- ◆ Novel integration of argumentation & social computing
 - ◆ promises qualitatively better deliberations, at scale
- ◆ Good results from evaluations to date
 - ◆ Heavily used - with right incentives
 - ◆ Quick learning curve
 - ◆ Remarkably complete and well-organized output *with 100's of authors and with no one in charge*

Qualitative Observations

A compact, substantive and well-organized map

A cheap way to get usable outside input

Topic: balancing productivity and security with open computing

- What kinds of open computing approaches can increase productivity?
 - Discussion forums
 - Manage access at the database and let the analyst choose the tools
 - Leads to better data dictionary and data models...
 - Analyst Flexibility - Speedy Recommendations/Decisions
 - Other standard reports
 - Results in smarter analysis
 - We need to wait for programmers to create a new report
- Web forums
 - Lead to create a lot of repetition and 'noise'
 - Quick way to get lots of input
- Prediction markets
 - Prediction markets work well only with a limited, well-defined set of options
- Wikis
 - Wikis are diffusing also in companies
 - Allows us to quickly gather broadly-based consensus on a subject
- What are the security risks of open computing?
 - Too many trees can also obstruct to see the forest
 - Competitive Intelligence
 - Use of aggregate data to identify individuals
 - Leak of meta-data
 - Risk of bookmarking information
 - Loss of Intellectual Property
 - Increased risk of system compromise
 - Destabilization of the computing environment
 - Instability of new tools
 - Increased risk of social engineering
 - Loss of Personal Information
- What are the risks of closed computing?
 - Risk of missing out on good ideas
 - Risk of duplication of effort
 - Hard to find data in a timely manner
- Exclusion is non-inclusive
- How can IT address the security risks associated with open computing?
 - Industry-based standards work
 - When should we provide open vs customized data access tools?
 - Always provide open tools
 - What should IT do in terms of creating and enforcing rules and standards to ensure a secure environment?
 - Include policy statement re use of RSS and Bookmark services
 - Authority Rating System

Ongoing Work

- **Scale:** content visualization, high-precision search
- **Links with Social Media:** “dispute finder”
- **Metrics:** maturity, polarization, bias, completeness ...
- **Self-sustaining:** integrated e-training, author templates ...
- **Applications:** to “real-world” *conversations that matter* : corporate, government, scientific, educational ...

The Deliberatorium aims to enable more **creative**, **systematic**, and **well-grounded** large-scale deliberations about complex problems