CATALYST:
Metrics for Large-Scale Deliberation

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Who is CATALYST?

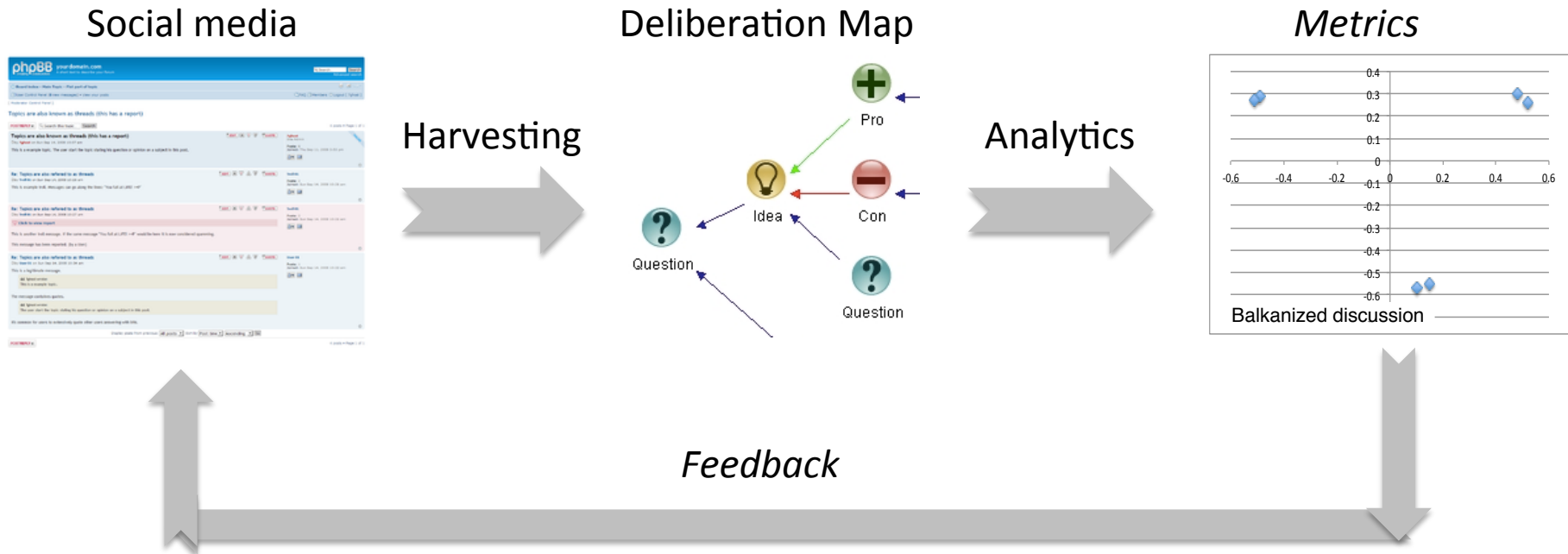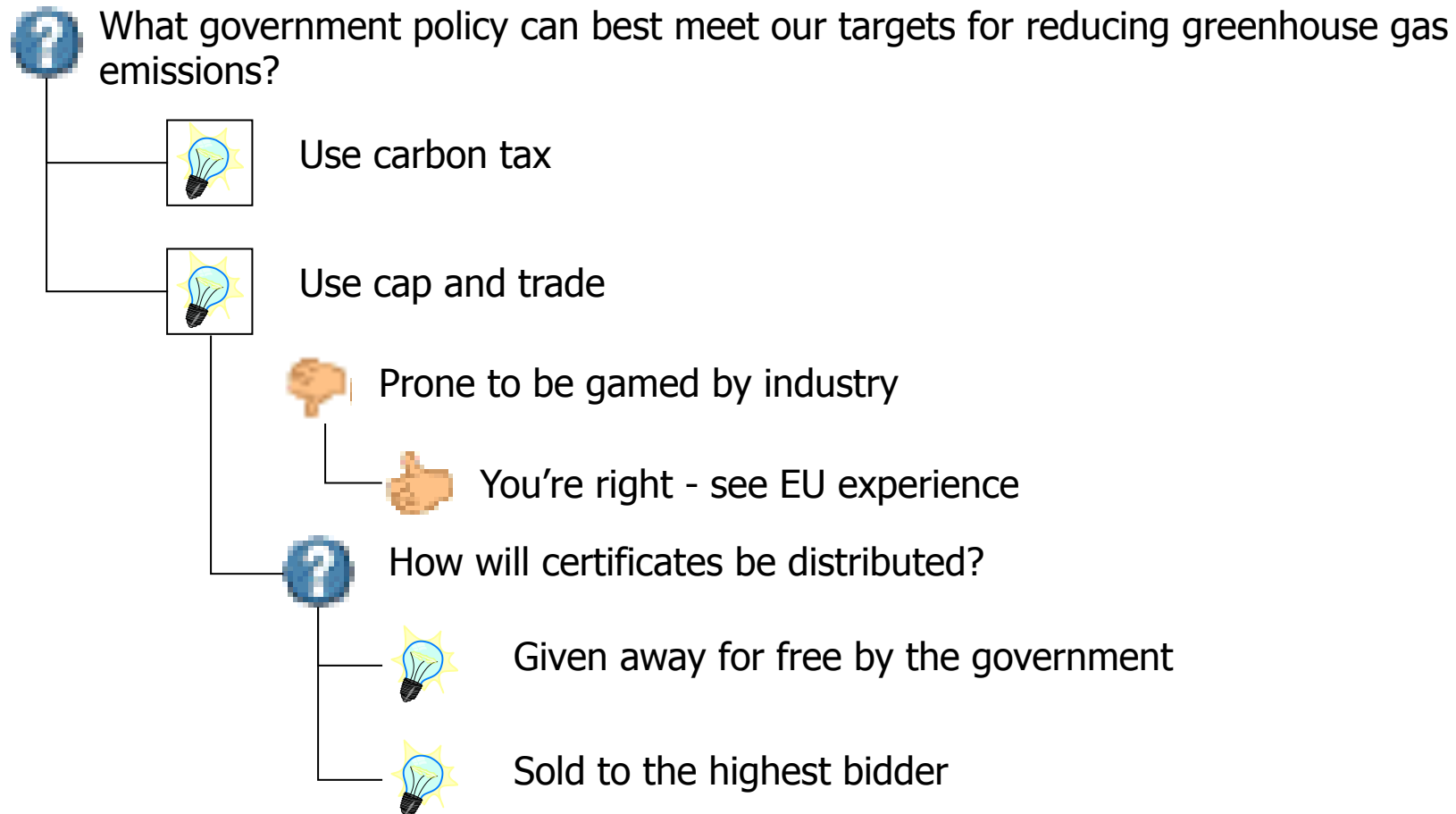| Research Partners	Community Partners
Developing open source collective intelligence technologies	Providing real world test cases

What are CATALYST's Goals?

⬡ **Develop effective, easily integrable open-source tools for harnessing collective intelligence to solve complex societal challenges**

⬡ **Evaluate/refine by engaging European citizens in large-scale deliberations**
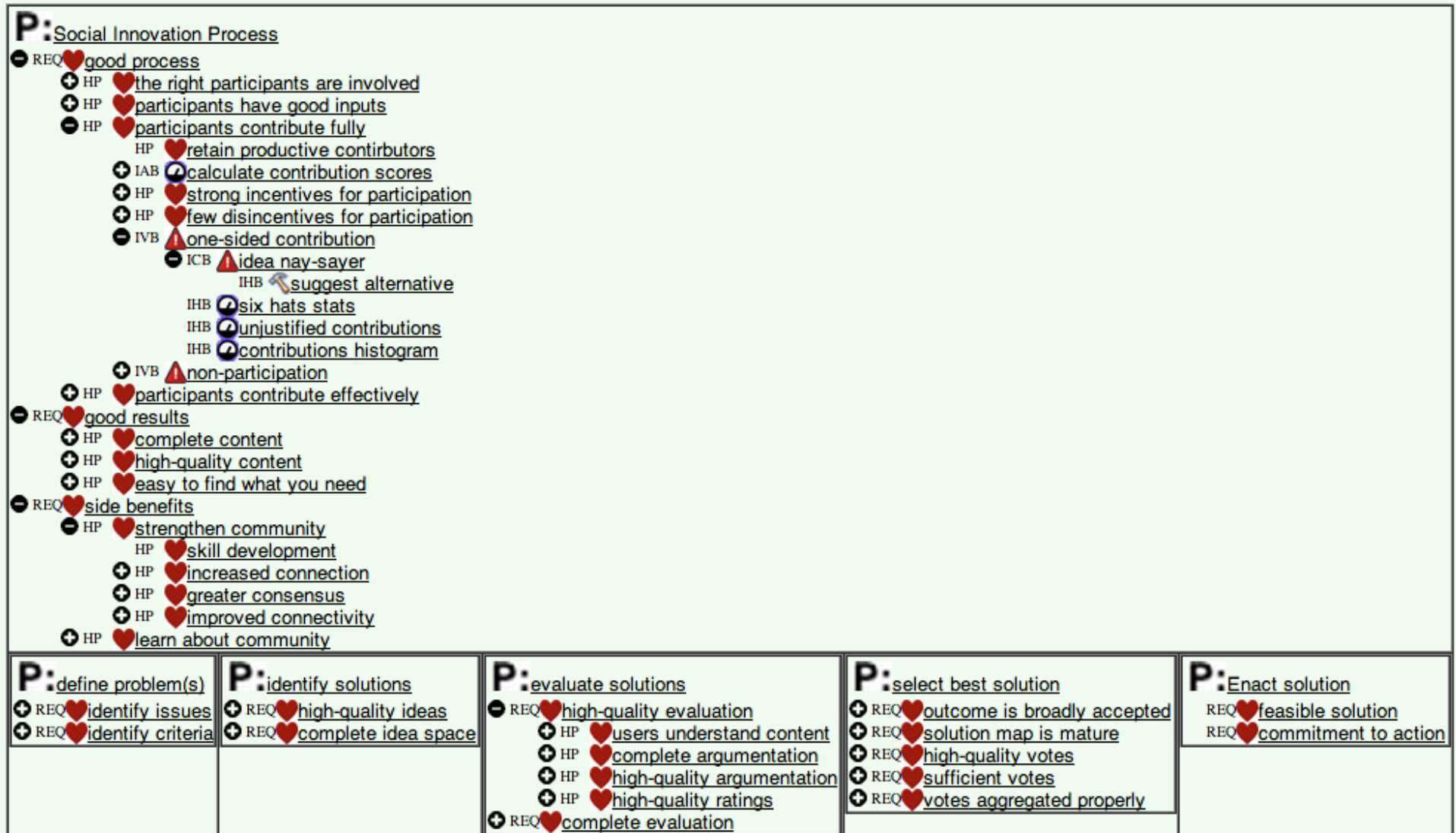
The CATALYST Approach

Social media → Harvesting → Deliberation Map → Analytics → *Metrics*

Pro

Idea   Con

Question

Question

Balkanized discussion

Feedback

Author: Where can I do the most good?
Manager: What deliberation problems do I need to address?
Customer: What content is high-quality and complete?

Deliberation Maps

? 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

CATALYST Progress

◆ A free open-source web service that deliberation platforms can call to calculate metrics on their maps

◆ A growing library of metrics, defined based on systematic analysis of deliberation needs and challenges
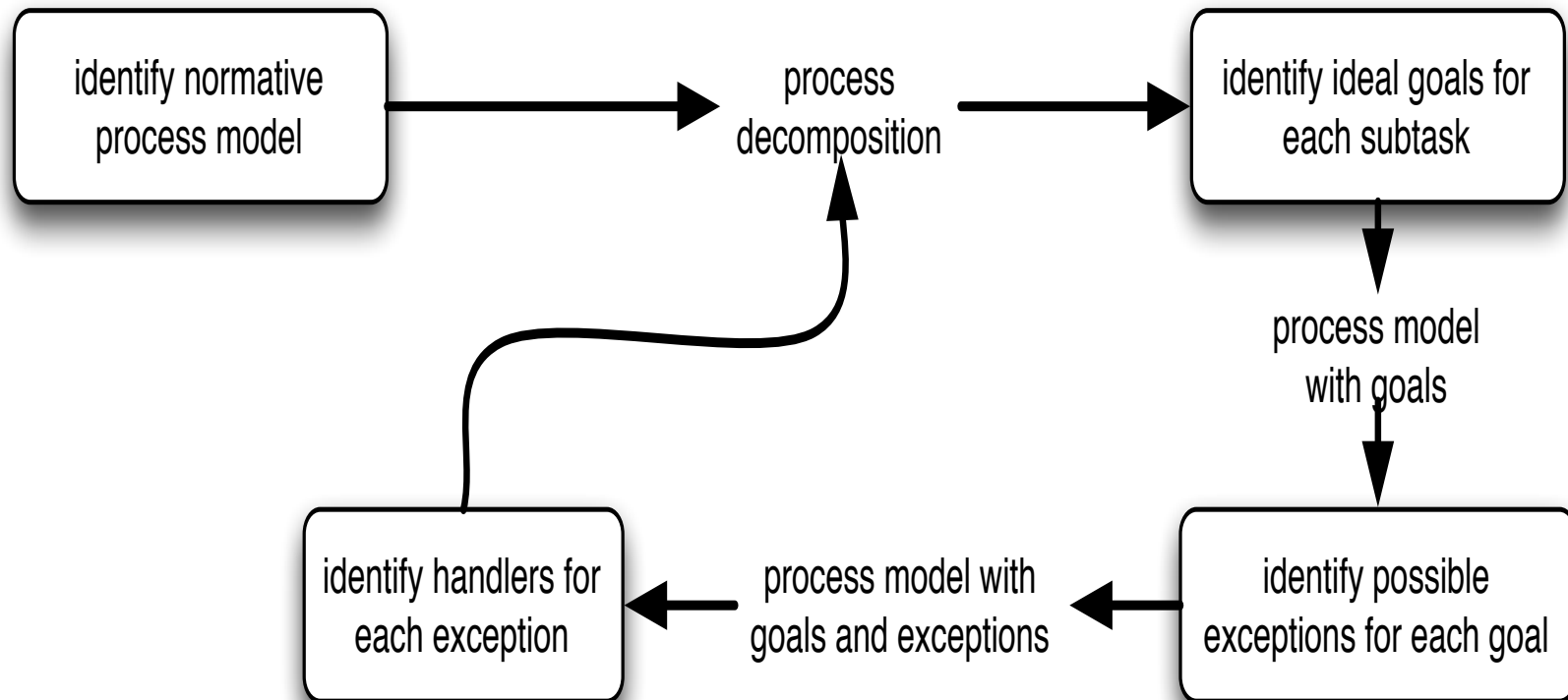
◆ Exploits additional semantics of deliberation maps to create metrics of unprecedented power

Normative Social Innovation Model

P: Social Innovation Process
- REQ ♥ good process
  - HP ♥ the right participants are involved
  - HP ♥ participants have good inputs
  - HP ♥ participants contribute fully
    - HP ♥ retain productive contirbutors
    - IAB ⊘ calculate contribution scores
    - HP ♥ strong incentives for participation
    - HP ♥ few disincentives for participation
    - IVB ⚠ one-sided contribution
      - ICB ⚠ idea nay-sayer
        - IHB ⛏ suggest alternative
      - IHB ⊘ six hats stats
      - IHB ⊘ unjustified contributions
      - IHB ⊘ contributions histogram
    - IVB ⚠ non-participation
  - HP ♥ participants contribute effectively
- REQ ♥ good results
  - HP ♥ complete content
  - HP ♥ high-quality content
  - HP ♥ easy to find what you need
- REQ ♥ side benefits
  - HP ♥ strengthen community
    - HP ♥ skill development
  - HP ♥ increased connection
  - HP ♥ greater consensus
  - HP ♥ improved connectivity
  - HP ♥ learn about community

P: define problem(s)
- REQ ♥ identify issues
- REQ ♥ identify criteria

P: identify solutions
- REQ ♥ high-quality ideas
- REQ ♥ complete idea space

P: evaluate solutions
- REQ ♥ high-quality evaluation
  - HP ♥ users understand content
  - HP ♥ complete argumentation
  - HP ♥ high-quality argumentation
  - HP ♥ high-quality ratings
- REQ ♥ complete evaluation

P: select best solution
- REQ ♥ outcome is broadly accepted
- REQ ♥ solution map is mature
- REQ ♥ high-quality votes
- REQ ♥ sufficient votes
- REQ ♥ votes aggregated properly

P: Enact solution
- REQ ♥ feasible solution
- REQ ♥ commitment to action

Identifying Metrics:
process-goal-exception analysis

Implementing Metrics

- Data mining (dimensionality reduction , hierarchical clustering ...)

- Belief propagation (e.g. Bayesian)

- Network topology analysis

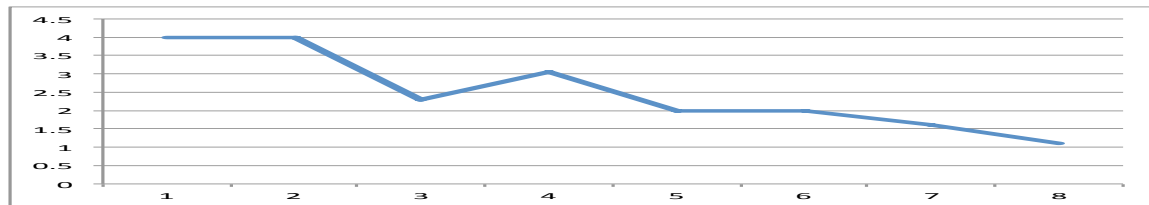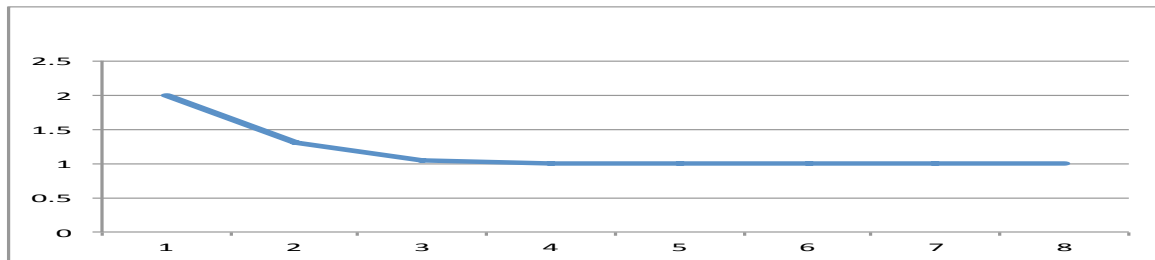- Statistical analysis

- Graph-based query languages (e.g. SPARQL)

Maturity Metric:
Network analysis
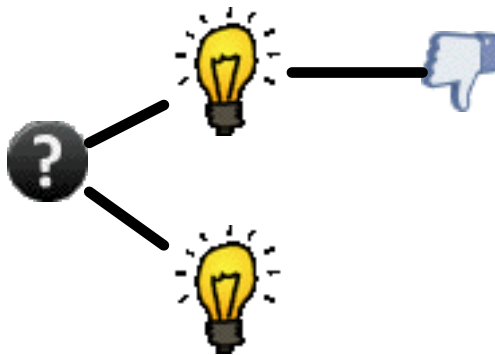
versus
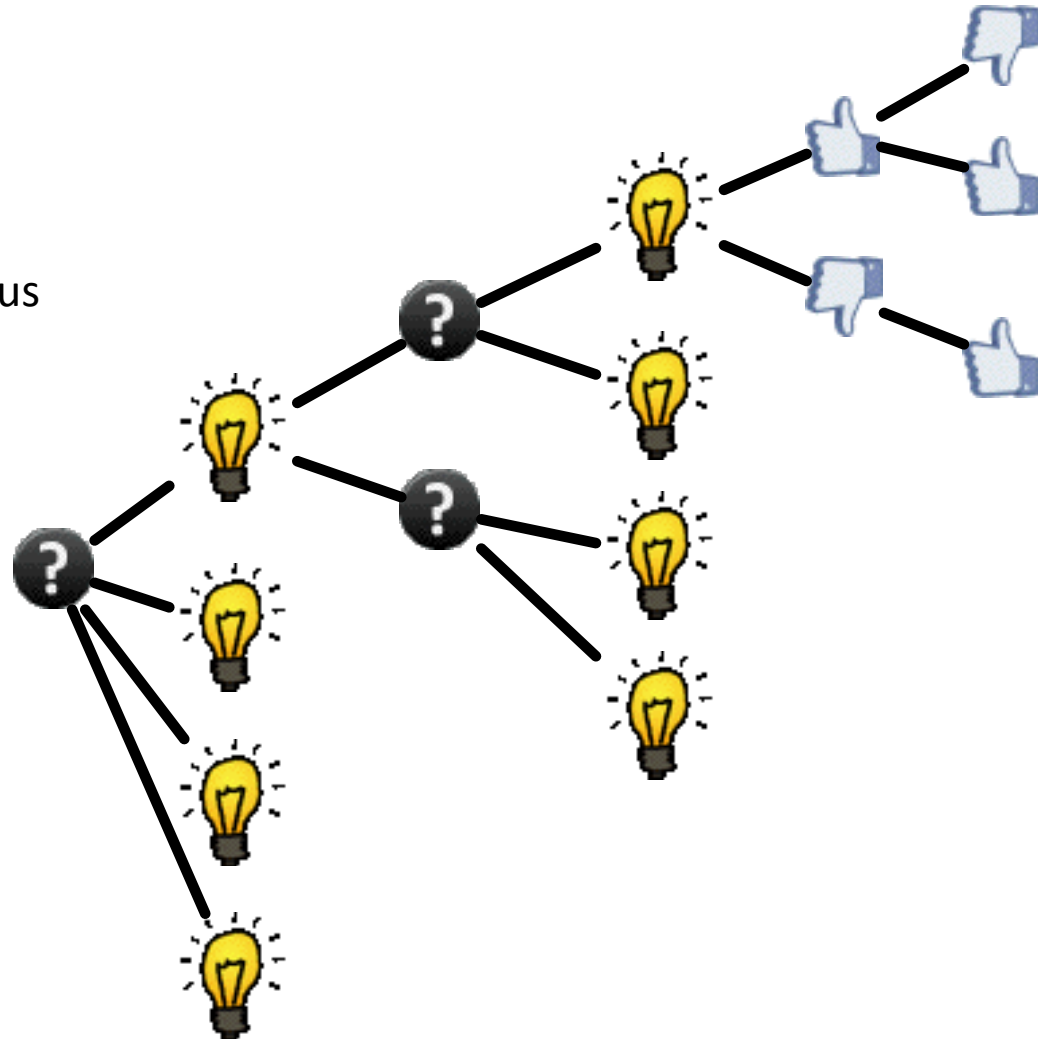
Groupthink Metric:
Gini coefficient

Groundedness Metric:
belief propagation

👍 hurts nature
  👍 Disturb wildlife habitats
  👍 Injury or death to birds and bats
    👎 newer wind farm technology has cut down on bird kills
  👎 wind farms are far less damaging than coal and oil powerplants
    👍 they don't cause climate change
    👍 they don't pollute the air and water

Balkanization Metric:
dimensionality reduction

Balkanized discussion

Unbalkanized discussion
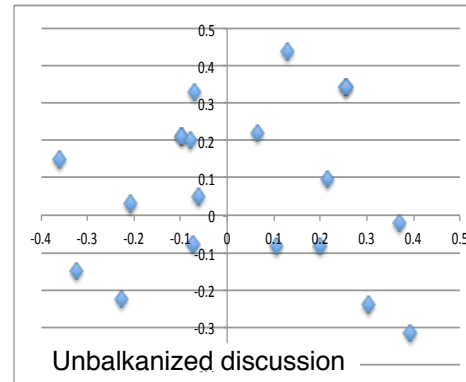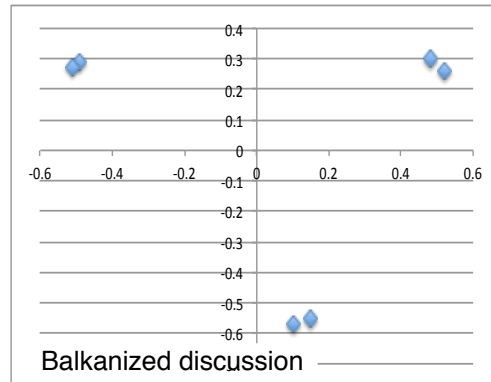
Apply dimensionality reduction to idea and argument ratings => "bias space"

- each point represents a user
- each axis represents a "bias" (i.e. post sets with correlated ratings).

Balkanization = distinct clusters in bias space

Metrics Server:
http & JSON

{ "metric" : "user_biases",
  "user"   : **userID**,
  "root"   : **postID** }

{
    "metric" : "user_biases",
    "user"   : **userID**,
    "data" : [[**postID, numlist**]*]
}

Harnessing the Collective Intelligence of the Research Community

http://deliberatorium.mit.edu/brainstorm-signup