SciCafe2.0

A participative method for crowdsoucing and extracting collective intelligence

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Summary

- Brief introduction about:
  - Collective intelligence
  - Human scales
  - Nonverbal communication, feedback and context perception
  - Participatory leadership
  - Peer instruction
  - Science cafés
- SciCafe2.0
- Let’s try

Collective intelligence

Some definitions

By analogy with individual intelligence, we define a group's collective intelligence (c) as the general ability of the group to perform a wide variety of tasks[1].

Collective intelligence is defined very broadly as *groups of individuals doing things collectively that seem intelligent* [2].

Since collective intelligence is the result of an interactive group, it is important to favour everyone's expression but avoid prevarications

This is particularly difficult when experts' contributions are needed (e.g., in technical questions): their influence can easily driven the group towards a preferred direction.

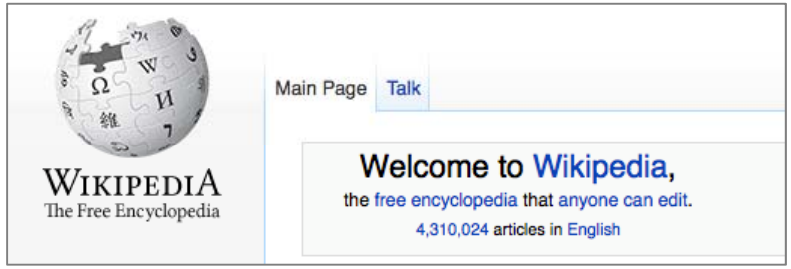
[1] Anita W Woolley, Christopher F Chabris, Alexander Pentland, Nada Hashmi and Wmalone Thomas. 2010. Evidence for a collective intelligence factor in the performance of human groups., Science 330:686–8
[2] Thomas W. Malone, Robert Laubacher, and Chrysanthos Dellarocas
MIT,Working Paper No. 2009-001 H**arnessing Crowds: Mapping the Genome of Collective Intelligence,**

Collective awareness and social applications

Over the past decade, the rise of the Internet has enabled the emergence of surprising new forms of collective intelligence.

Google, for instance, takes the judgments made by millions of people as they create links to Web pages and harnesses that collective knowledge of the entire Internet to produce amazingly intelligent answers to the questions we type into the Google search bar.

In Wikipedia, thousands of contributors from across the world have collectively created the world's largest encyclopedia, with articles of remarkably high quality.



Collective awareness and social applications

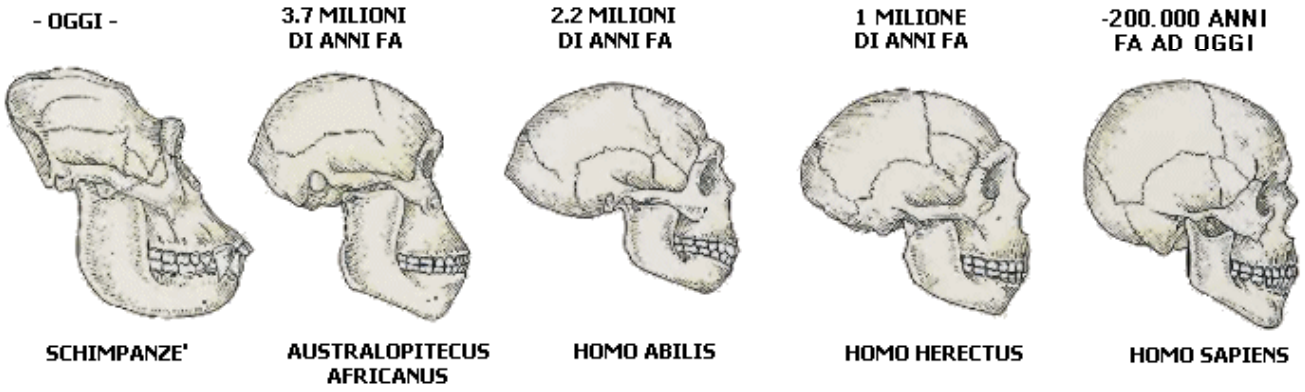
Other examples are “social” utilities for saving environmental resources, water, energy, inducing better behaviours, administer common goods

In other words: how to manage common good avoid the “tragedy of commons” (i.e., inducing cooperation when selfishness leads to ruin)

Human scales

The Internet allows global interactions, but there is not a simple path to e-democracy and crowdsourcing

We have to consider the “human scales” that are hard-wired in our brain by evolution



Human scales

$\simeq 5$ 

The smallest unit is the chat one: two to four/five people. Everybody interacts in such a group. This is where new ideas are born.

$\simeq 15$ 

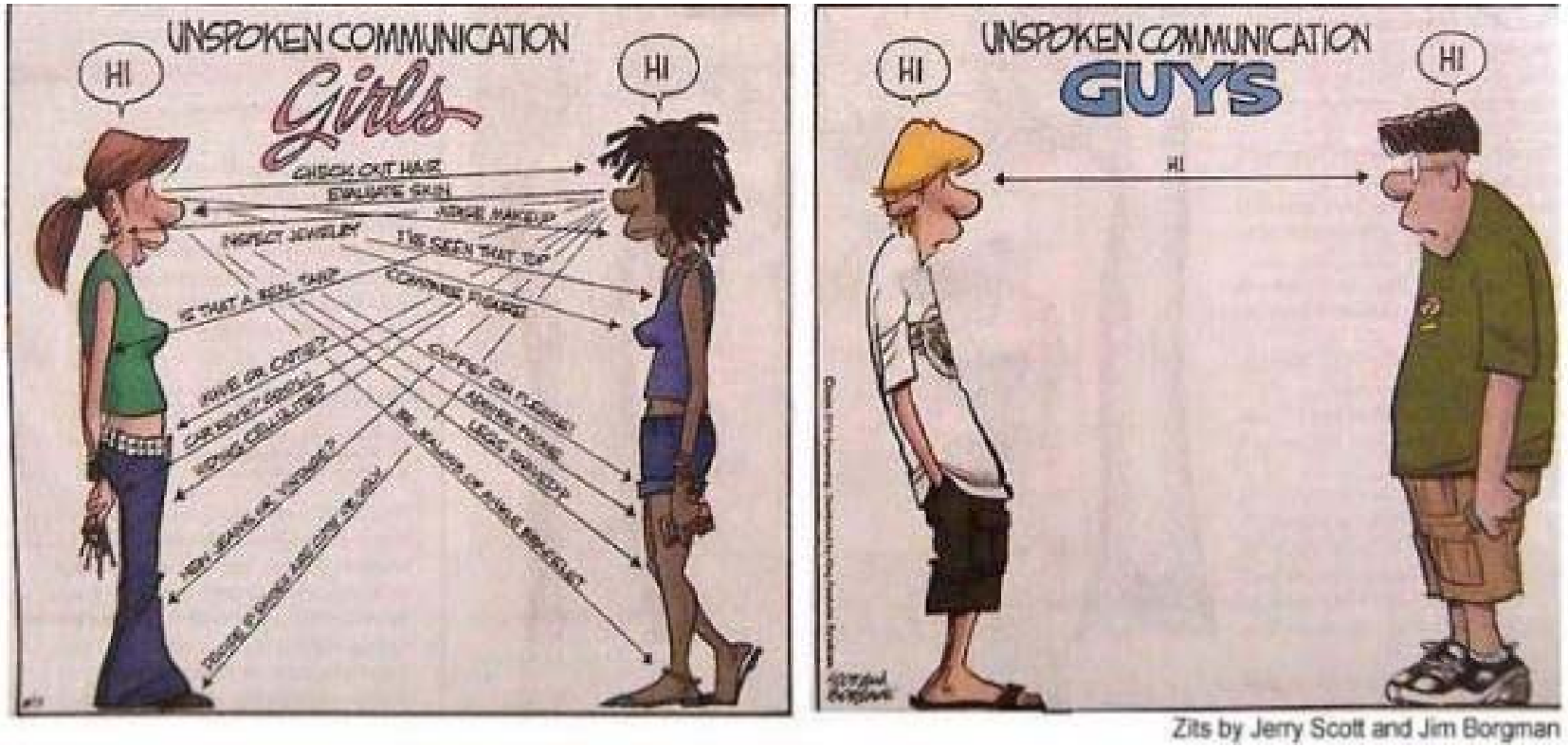
The following size is the small group: five to twelve, fifteen people. This is the typical action unit (in work and military organizations, for instance). The small group is quite dynamic: it oscillates among several configurations (all listening or attacking one, fractioned in many chat units, etc.). This is where new ideas are tested

$\simeq 150$ 

The Dumbar number (150), corresponding to the typical neolitic village size. This is the largest unit in which individuals are still recognizable

The crowd. People feel the crowd as an individual, powerful and intimidating subject.

Nonverbal communication, feedback and context perception



Zits by Jerry Scott and Jim Borgman

Nonverbal communication, feedback and context perception

- Humans rely a lot on nonverbal communication, which is often absent (or limited) in Internet communications.
- We are also sensible to the context (the environment, the attitude of people, way of speaking and dressing) that influence the propensity in participating and contributing with innovative ideas
- Finally, we rely on feedbacks (eye contact, for instance) for exstablishing the context: in many cases (e.g. FaceBook) one is not aware of the surrounding public and/or of the persistence of his/her message

Participatory leadership

Several techniques have been developed to induce/force people in forming the most profitable groups and establishing the right context (in real life). Examples are:

- **Circle practice**: avoid hierarchic positions. The speaker can move to the center, and there is a moderator. Limited to small assemblies.
- **World café**: break the audience is chat groups and have people cycle among them. Small number of participants.
- **Open space**: Break the audience in parallel sessions, that can be organized by everyone and announced on an agenda (wall). The results are posted on a wall. Adapt to large audiences

Peer instruction

Eric Mazur is a well known physicist at Harvard University who is also a leader in science education. In the early '90s he developed an instructional approach to teaching called peer instruction. In 1997, he published a book on the subject called Peer Instruction: A User's Manual.

"I thought I was a good teacher until I discovered my students were just memorizing information rather than learning to understand the material," says Mazur. "Who was to blame? The students? The material?" In the presentation from 2009 [4]entitled "Confessions of a Converted Lecturer," Mazur explains how he came to the conclusion that "It was my teaching that caused students to fail!"

[4] http://www.youtube.com/watch?v=WwslBPj8GgI

Peer instruction

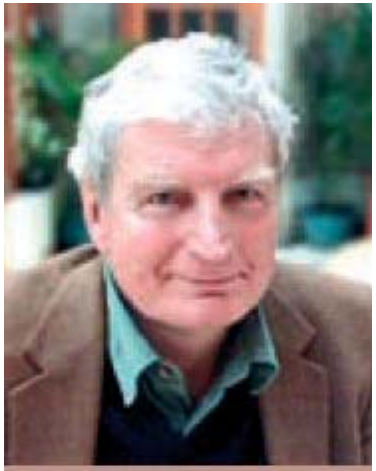
- During a lecture, the only one that can say “aha!” (revelation) is the teacher. Students are too busy following the flux of information.
- Listeners to lectures are like tv watchers: they cannot control the flux of information (not even stop it for thinking) so their brain switch to “record” modality.
- The best way of learning is by teaching.
- Students are the best teachers because they are so “fresh of ignorance” that they can still understand the difficulties of their colleagues. Teachers are so expert of the matters that are unable to catch them.

Peer instruction

Dr. Mazur's approach:

- Have lectures administered before classroom (e.g., by Internet).
- Ask conceptual questions and let students answer individually.
- Let them discuss the answers in groups (to be rotated) until convergence towards a common accepted answer
- (In another phase) Present students a complex problem and let them discover what they need to deal with it (working in chat or small units).
- Let people in a group score themselves (weighting scores with correlation: a dissident that evaluates him/herself differently from others receives a bad score).

Science cafés



"It is as interesting to look at science from the outside (via history, philosophy, politics, or whatever) as it is to understand it from the inside."

Duncan Dallas

The Science cafès were invented in the 90s by Duncan Dallas, a journalist who worked in popular science on television.
He was tired of this mode non-participatory and wanted (to use his words) bring science out of the "chair" and inside the life.
[6]

[6]Dallas, D.. "The café scientifique". Nature, 399, 120. doi: 10.1038/20118 (1999)

Science cafés

Science cafes were born as a reaction against popularization of science: one-way stream of information, hierarchical disposition (experts leading the discussion), intimidating location (conferences, tv..)

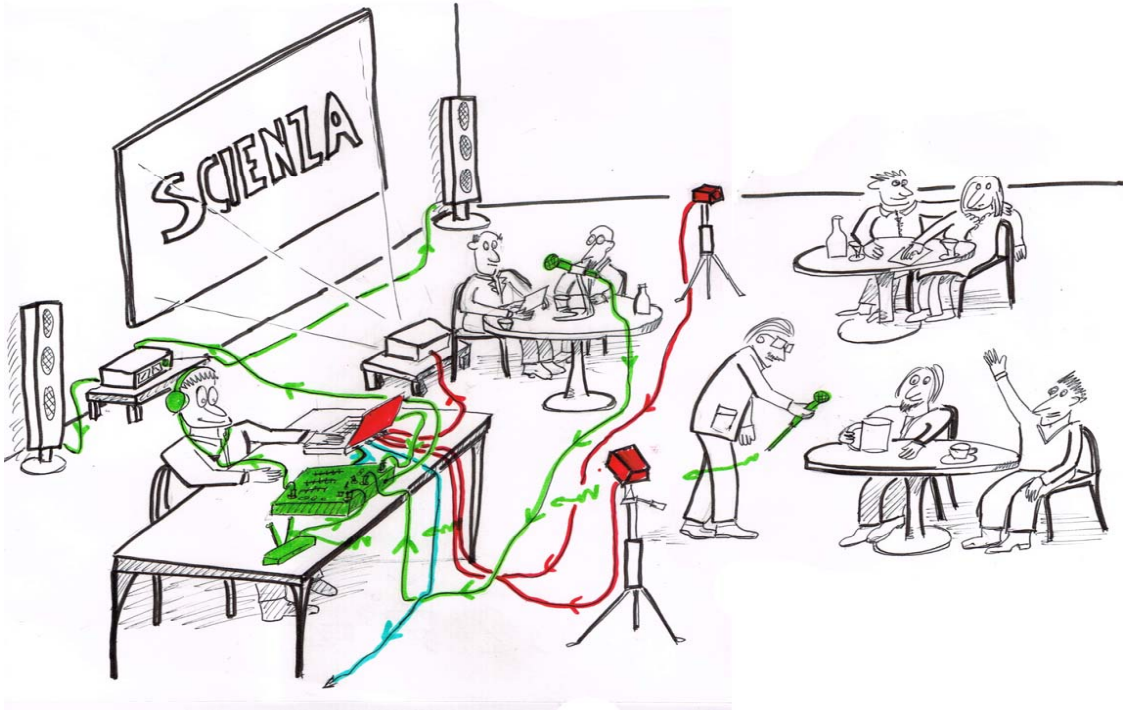
The ingredients of a Science Café are:

- In a place where normal people are at home: a pub, a café, a public place.
- Experts should present themselves and the topic of discussion in a quick way (15 minutes)
- The discussion is driven by questions from the attendees.
- There is a moderator

Science cafés

There are several “scenarios” of science cafes, explored also during the SciCafe EU project:

- Internet streaming with distant participation of public (by chat) and/or of experts (skype/google hangout)
- Completely virtual science cafes



Science cafés

- With or without slides, audiovisual support, direction, audio and video support, with literary reading, theatrical support, on the radio, etc.
- With longer presentation in case of a complex topic
- With question collected by sms during the exposition and grouped by the moderator (ideal for long presentations)

SciCafe2.0

SciCafe2.0 is a Coordination Action for the Collective Awareness Platforms UE call.

The idea is that of exploiting the knowledge and the “best practices” accumulated in the science cafés experience for promoting crowdsourcing and collective intelligence, in an Internet scenario (mixed with real-life encounters).

The goals are:

- Knowledge base (database) of scenarios, experts, stakeholders and users
- Portable interface
- Crowdsourcing observatory for experiments, promotion, support

Knowledge base

The goal is that of organizing the knowledge so to reduce the cost (mainly time) of organization.

- Scenarios (best practices, howtos, cost/performances)
- Topics (for instance, UE projects, national projects, research groups)
- Experts (abilities, disponibility, experiences, topics)
- Users (interests)
- Stakeholders (projects, research centers, universities, public administrations)
- Events

Crowdsourcing observatory

- Promotion
- Organization of events
- Laboratories (researchers and PhD students)
- Population of databases
- Elaboration of howtos and scenarios

Web interface

The idea is that of assembling a mash-up of tools for remote (and live) participation.

- A streaming channel for following the discussion (e.g. Google hangout)
- Several tabs for different environments:
  - The official channel for asking questions/comments (by chat)
  - Instant pools/votations/feedbacks
  - A series of chat rooms (the café tables)
  - The wall of knowledge (where ideas and questions can be graphically arranged in a conceptual map and commented).

Let’s try

We have no time for setting up a standard real science café, but we can try some experiments.

The speakers have already presented their arguments. Now they are our experts.

It is time to pass to discussion.

I have collected questions during the workshop by various ways:

-email

-sms

-twitter channel

Now I show you some questions and you can start with the answers

General questions stimulated by the workshop

- How can we maintain diversity and plasticity while collectively converging to a desired behaviour?
- How can we recognise and accommodate individual failure in a collective system?
- Does nature evolve globally through collaboration or does natural suppression caused by the success of competing entities cause global equilibrium rather than optimality?
- Do biological, financial or political systems care about global improvement?
- There is a cost to adaptation - how to balance this cost against the potential benefit ?
- The role of human heuristics in human-computer interactions. Can we design it using simple optimization or should we consider the typical human "dimensions"?
- Evolutionary collective systems: Does game theory applies?
- I do not know anything about CAPS but I'm curious: you can explain in a few words what are they in a no scientific language? Can you do some examples?
- In Cloud Computing very interesting aspects to discuss are privacy and trust. Will be the same for CAPs?
- We have seen “classical frameworks for adaptation and several bio-ispired approaches for achiering adaptivity.It is possible to “merge” these different ways so to have a unified, more complete framework?

Specific questions

Vivek Nallur

- clonal colonies - what is the equivalent of a query in a sensor network? are there multiple queries? Is adaptation to context not to query?

- clonal colonies sense the environment so is it possible to create a structure on the basis of the available network resources in a variable environment?

Rupert Regier

- What about the different timescales wich characterize the systems you described? And how Entopy could consider such a factor?

- EntropyAdaptability is usually constraint to adaptation to likely changes in circumstances but entropy is a macroscopic notion that appears not to take account of likely changes so: Are there any examples where a system S has greater entropy than a system S' but S' is more adaptable? (I'm trying to work out if there is an assumption that the "utility" of all micro states is the same and whether that is at all damaging.)

- Does "open innovation" in a company increase its entropy?

- Is there a golden ration of entropy vs stability wich is essential for good collaboration?

Unanswered questions

- What is a useful example of a socially inclusive CAS? (*Stuart Anderson*)
- Why is it sometimes impossible to predict a CAS' future behavior?
- What preconditions are necessary to predict a CAS' future behavior?
- What properties destruct any possibility to predict a CAS' future behavior? e.g. lead to chaos? (*Rupert Reiger*)

Specific questions

Andrea Guazzini

- How is privacy and trust interrelated?
- In terms of Privacy we might worry about a "disclosing event" this might arise from a complex interaction of data from amy different sources - what is the perspective on this kind of disclosure? SHould privacy be less schematic/structural and more related to content?
- How important is truthfulness in a CAPS?

Stuart Andersoon

- How much is important to develop a common knowledge between humans and machines in order to reach the human-machine coexistence in Groups?
- What about the interplay between diversity at the human and the device level?

Specific questions

Hyondong Oh

- How complex are Gene Regulatory Networks - how many genes - how many links?
- How do GRNs relate to inter cellular communication?
- Is the simulation of GRNs computationally costly?

Mirco Tribastone

Do you thik about case studies?

Emma Hart