

Models for collaborative information exchange over networks



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The Past Decade



- Tremendous investment made in infrastructure over the past two decades to allow flow of information from computer to computer
- Organizations such as NIH realizing that this capability is not being fully used

Defining Collaboration



This discussion focuses on high-level collaborations between individuals with diverse ideas and information capital.



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Automated Collaborative Tools

- Tools developed in industry to manage collaborative relationships.
- Have a long history and demonstrated use
- However, these tools are often designed or fitted to a narrow collaborative task
 - Development of software code
 - Testing of a set of compounds
 - Design documents for a new system



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Commonly Sited Challenges

- Lack of tools with needed features
 - Information exchange platforms lack features necessary for scientists.
- Lack of integrated tools
 - Tools not brought together in an integrated platform.
- Fear of network security
 - The assumption that over the network collaboration increases exposure.
- Platform mismatches
 - The scientific community in particular has diverse computing tools.



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Specific Challenges In Science



- Very diverse group of individuals with specialized backgrounds
- The creative process does not lend itself to as much automation as in industrial processes
- An organic process



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Defining our terms

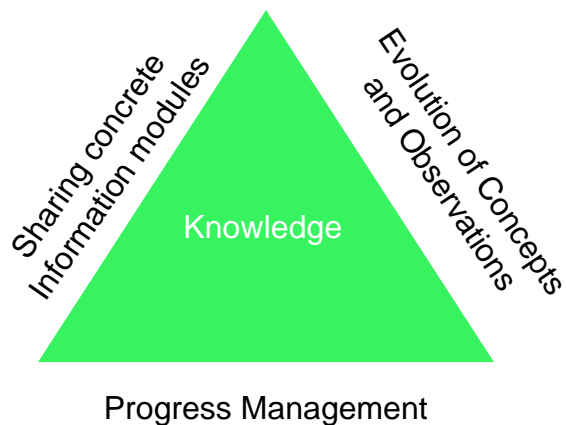


- Information Modules: key pieces such as data, news, ideas, direct observations
- Meeting: A process during which individuals have to synchronize either in location, or locations (teleconferencing).

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Aspects of Collaboration



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Current Paradigm

- Subgroups are defined based on geographic location
- Subgroups share information modules in regular (e.g weekly) meetings.
- Discussion and evolution of information occurs at the water cooler or at the meetings
- Progress management is only “visible” to the higher level individuals and is assessed during the meetings by having key members give presentations.



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Sharing Information Modules



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Importance

- Individuals with specific expertise contribute information modules (data, ideas, observations, news) to the collaborative process
- This is a key process in which all information is brought together in one place.



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The Web

- The world wide web originates in one of the largest collaborative projects of human kind: experimental particle physics (CERN)
- Hundreds of scientist work to define experiments and build instruments, collect data and analyze it.
- The whole process can easily take more than a decade for a single experiment!
- The web was designed **specifically** to address this problem



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The Web Continued

- The web requires knowledge of how to design websites: a task trivial for particle physicists working over decades but a hassle for everyone else.
- Web-design is not compatible with fast paced data generation and analysis time scales often found in biologic sciences.
- Access is hard to regulate and IP protections difficult to define



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Current Paradigm

- The web was originally designed to facilitate this.
- However, because individuals don't want to risk putting raw ideas or data for the world to see, websites are not really used for this purpose
- If technologically savvy, discussion groups are often used (with a discussion thread and a files section)
 - Yahoo groups are an example of such implementation
- If not, information is exchanged during a meeting.



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Current Tools For Information Exchange

- E-mail
- Groups
- File-Sharing Software
- Group Enabled Electronic Scientific Software
- Sharepoint
- Lotus Notes
- Groove Networks



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Directions of Improvement

- Direct and easy access
 - Elimination of the middle-man: from the direct data recording to the collaborative platform
- World-wide access across platforms and devices
 - Operating systems and hardware
 - PDA's, Cell Phones

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E-nnovate's Approach

- Direct entry information and upload capable
- Data and text coexist in one environment
- Organized under topics, experiments and entries.
- Levels of collaborative access controlled by author.
- Information delivered using .html. Tested under multiple very diverse platforms.



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Information Evolution



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Significance

- Information collected in its raw form is not generally the outcome of the study
- The difficult part is in fact in turning massive amounts of information into valuable insights, manuscripts, designs, etc..
- Often the most time-consuming of steps



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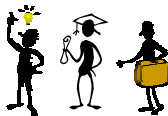
Collaborative Groups



Collaborate Group



Subgroups



Individuals



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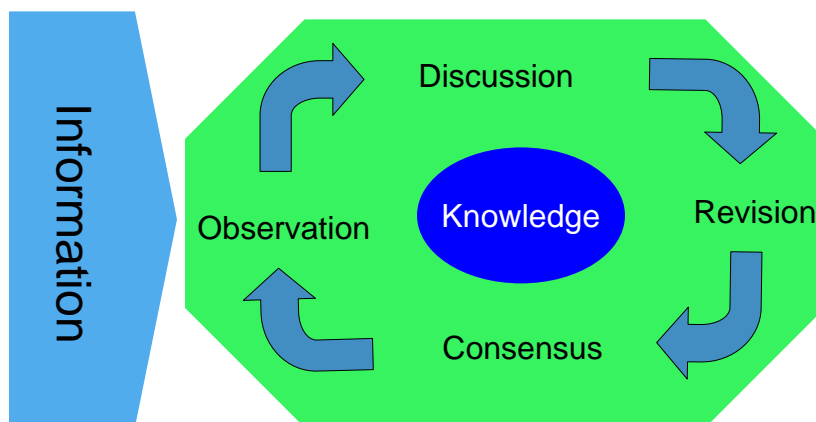
Current Paradigm

- Discussion often occur on a geographically local level.
- Meetings are required to go through the process of information evolution
- Getting lots of people with busy schedules in one place is VERY difficult.
- At best a discussion board is used to facilitate this



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Information Evolution Process



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Current Tools



- Meetings at multiple levels (live, teleconferencing or online conferencing)
- E-mails
- Groups and discussion boards
- Instant Messaging

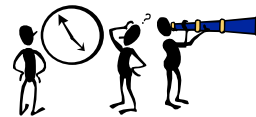
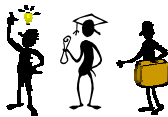


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Collaborative Groups



Collaborate Group



Individuals



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Improvements

- Able to add value at all steps of information evolution.
 - Information must be “present” at the process to merge observation and discussion
 - Discussion can occur by individuals commenting
 - Conclusions can be produced and revised
 - A final consensus can be recorded and displayed
- Reduce need synchronized presence of individuals



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E-nnovate's Approach

- Information modules (entries) have associated discussions that can take place (comments)
 - Thus observation and discussion can co-occur
- Revisions and conclusions can be developed and discussed as new entries.
- Once consensus is reached, a document can be made permanent by electronic signature.



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Progress Management



Importance

- Allows organizations to plan actions
- Allows for efficient reactions (such as collecting more data)
- If properly implemented, can make each member understand and appreciate the significance of their contribution.

Current Paradigm

- One Person (The PI or project manager) evaluates progress at meetings
- Often done via presentations by key members: makes it difficult to assess shorter term progress.
- A lot of problems by one part of the group are “hidden” from the other part.
- Lower level members assessment of their contribution often based on “impressions” from quick discussions with upper level members.



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Tools For Progress Management



- Multi-Level Meetings
- Project management software
 - Often incompatible with the way science is done.
 - Too rigid and more of a planning rather than an assessment tool



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Integrated Paradigm

- Higher level members setting the general abstract structure of the work to be done
- Higher level members can track direct day-to-day progress in information collection and integration
- All members can see how their specific piece is evolving with respect to the rest of the project



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E-nnovate's approach

- Multiple tiers of organization with defined access
 - Can give different members different levels of access
- New approaches to scientific information visualization.
- Search and viewing abilities allow members to view the project from different perspectives and form their impression of progress
- Access logs (if enabled) give information about level of interest/participation



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Other Challenges



Integrated Tools



- Few tools exist for integration of these concepts
- Sharepoint
- Groove networks
- Lotus Notes
- Wiki
- Instant Messaging
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Security Over Network

- One concern is always protection of ideas over the network
- Networks now have many security features but critics will always point that it is not 100% secure
- In reality, no practical 100% secure way of communicating with people
- Think of how many people can overhear your conversations, go through your cabinets, see you lab notebooks or listen into a phone conversation.
- Fed by fears of hackers: Hacking into a secure server is more difficult than tapping a phone line.



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Platform Compatibility

- **Very** important to science
- Most labs use multiple computer platforms.
- Large multi-national scientific collaborations involve many different platforms
- Best solution is to use platform independent carriers such as the web



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Summary of current state



- Data and information shared using multiple channels
- Information evolution is fragmented. Only unifying point is often physical meeting, often involving the highest level members.
- Because of above processes, progress is hard to observe and is known only to a few.



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Summary of Current Direction of Progress

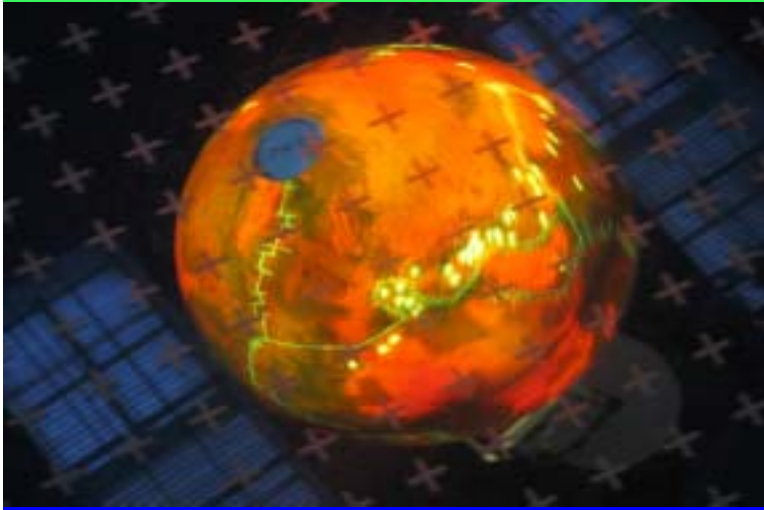


- Ease of information exchange
- Facilitate each step of information evolution.
- Increasing awareness of progress by members
- Merging the collaborative process into one platform.



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Future Vision




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E-nnovate's Vision



- The Scientific Studio
- Increase speed and quality of complex scientific collaboration
- From data gathering to the final intellectual product (Manuscript, Design, Conclusion)
- We offer scientific information and collaboration tools for individuals and enterprises
- Management Consulting


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For more information



- Let us know how we can help your design a collaborative environment for your needs!
- Info@e-nnovate.com