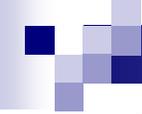


# Large-Scale Collaboration for Ill-Structured Problems

Drs. John Kruse, Joel Helquist, Mark Adkins



# Outline

- Background
- Network-centric operations
- Control spectrum
- Collaborative bottlenecks
- New group support system model

# Background

- Success on battlefield:
  - More dependent on broad, integrated efforts
  - Sense-making in a complex, dynamic environment
- Collaborative tools available:
  - Generally analogous extensions of manual collaboration
  - Susceptible to scalability issues

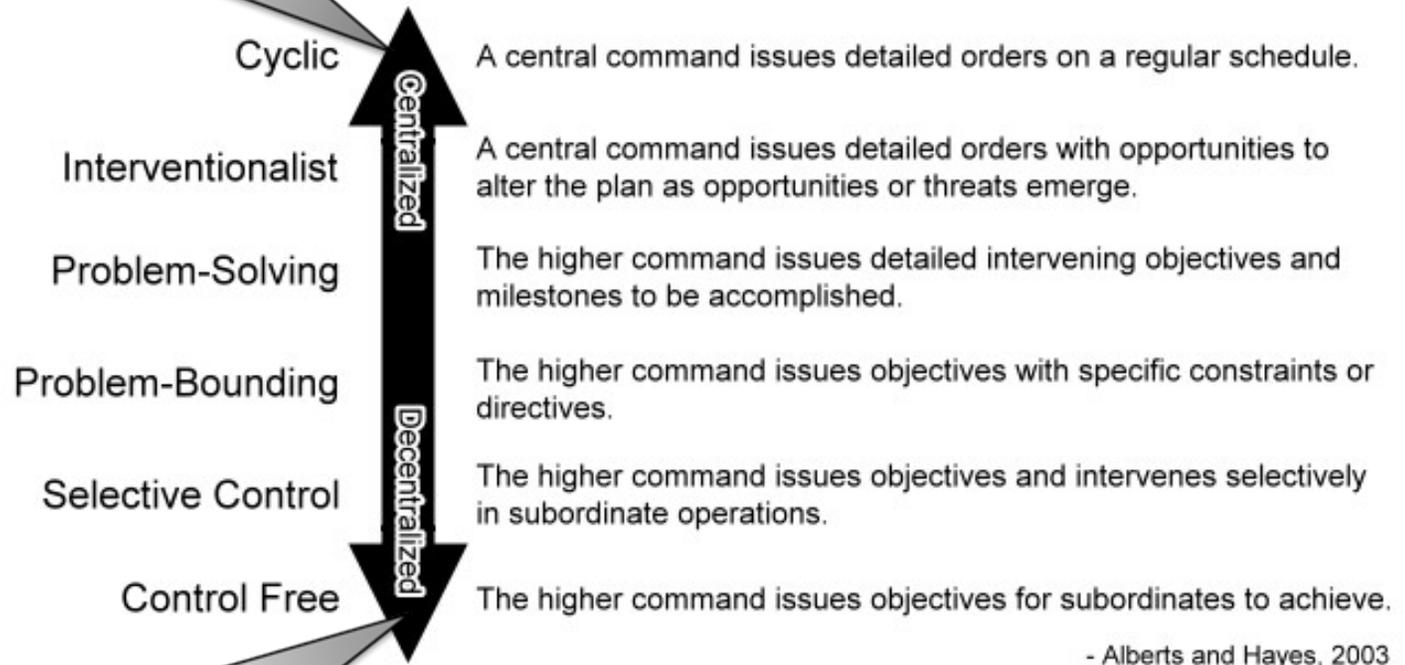
# Network-centric Operations (NCO)

- High quality and timely information
- People act independently and interdependently
- Decentralized approach that can produce efficiencies over a hierarchical, centralized organization
- NCO Benefits
  - Self-synchronization:
    - Commander's intent + rules of engagement + plans/orders + superior local knowledge
  - Agility
    - Command can rapidly adapt to meet contingencies

# Command & Control Spectrum

Industrial Age approach with  
Lean communication channels

## C2 Approach Spectrum

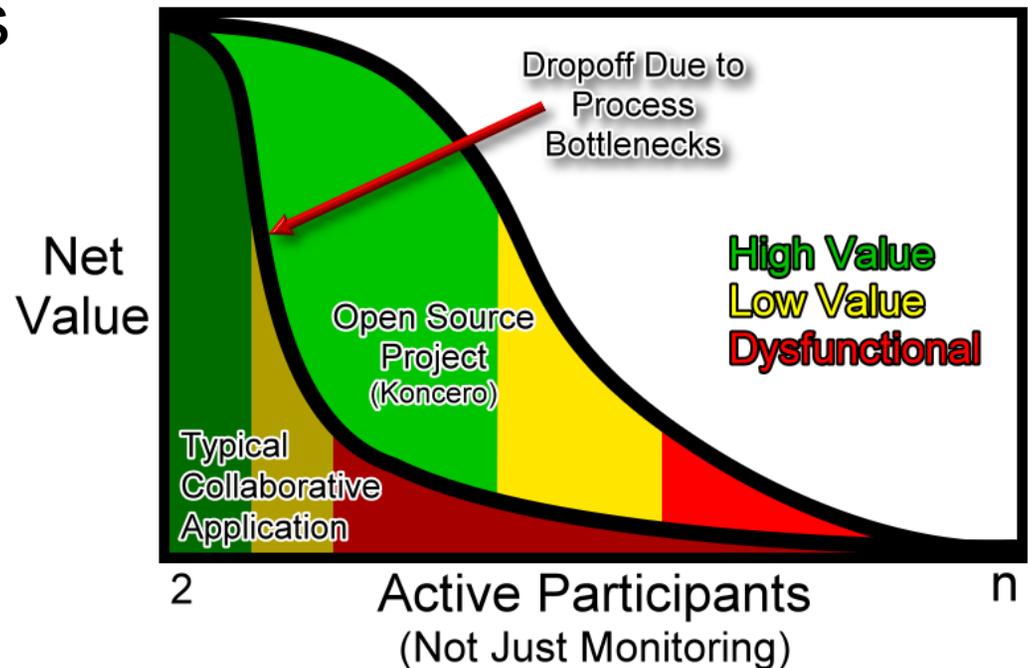


- Alberts and Hayes, 2003

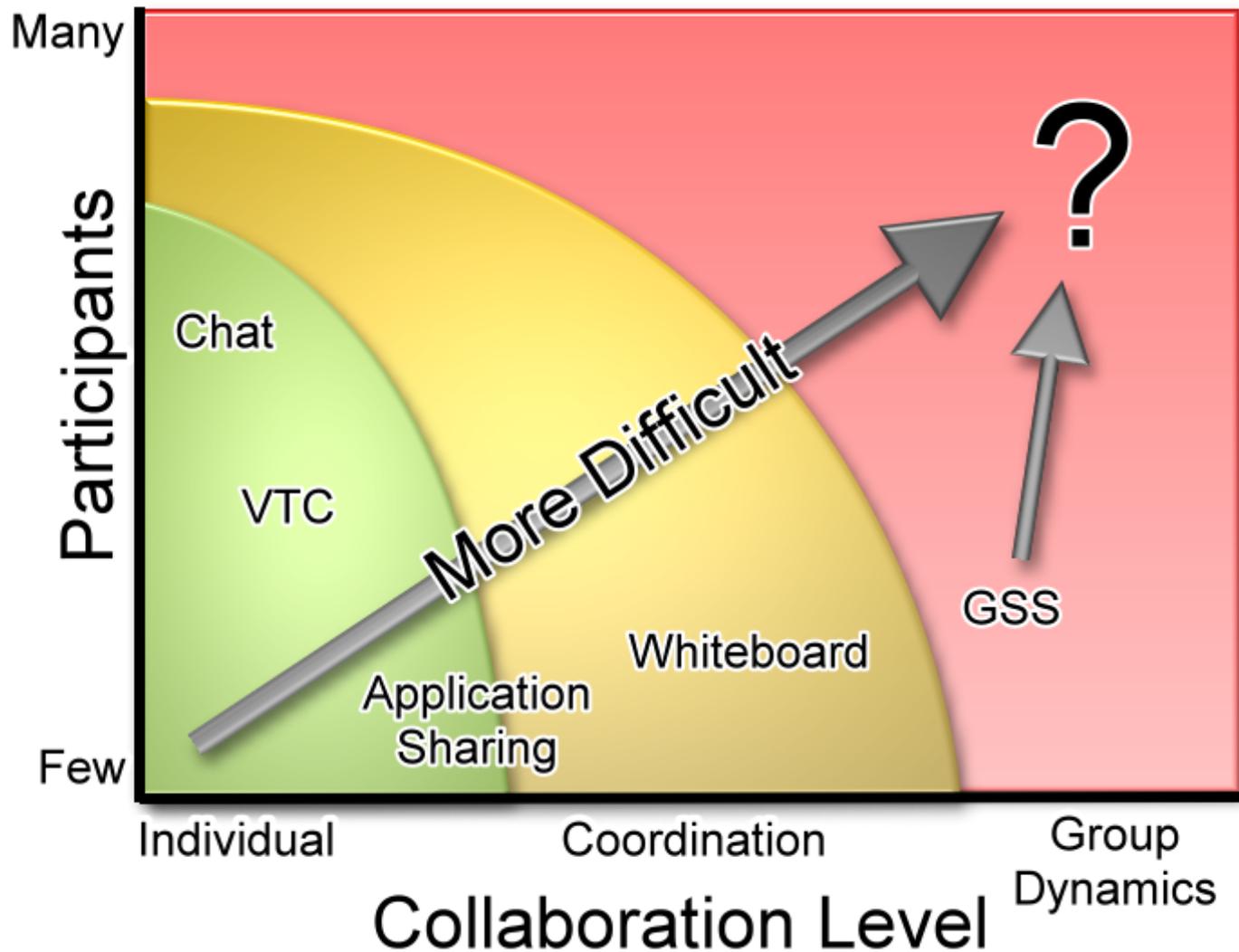
Variety of sensors and complicated  
communication channels

# Collaborative Bottlenecks

- Current collaborative processes are limited
  1. Facilitator bottleneck - Cost, availability, quality & cognitive bandwidth
  2. Serial workflow - Many collaborative processes do not allow parallel participation
- These drawbacks cause process bottlenecks that further limit
  - Synchronicity
  - Proximity
  - Flexibility
  - Scalability



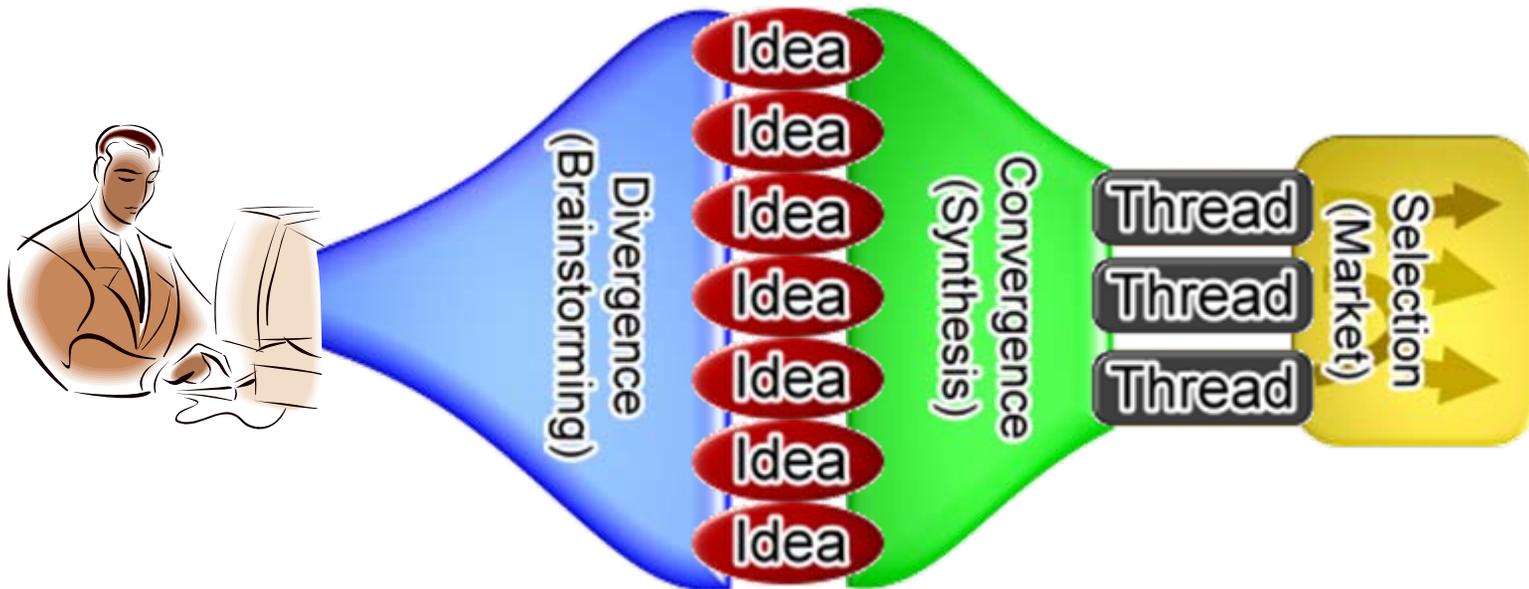
# Collaboration Level



# Patterns of Collaboration

- 6 patterns of collaboration
  - Generate
  - Reduce
  - Clarify
  - Organize
  - Evaluate
  - Build consensus
- Significant literature regarding generate (brainstorming)
- Dearth of research regarding other activities

# Collaboration Workflow



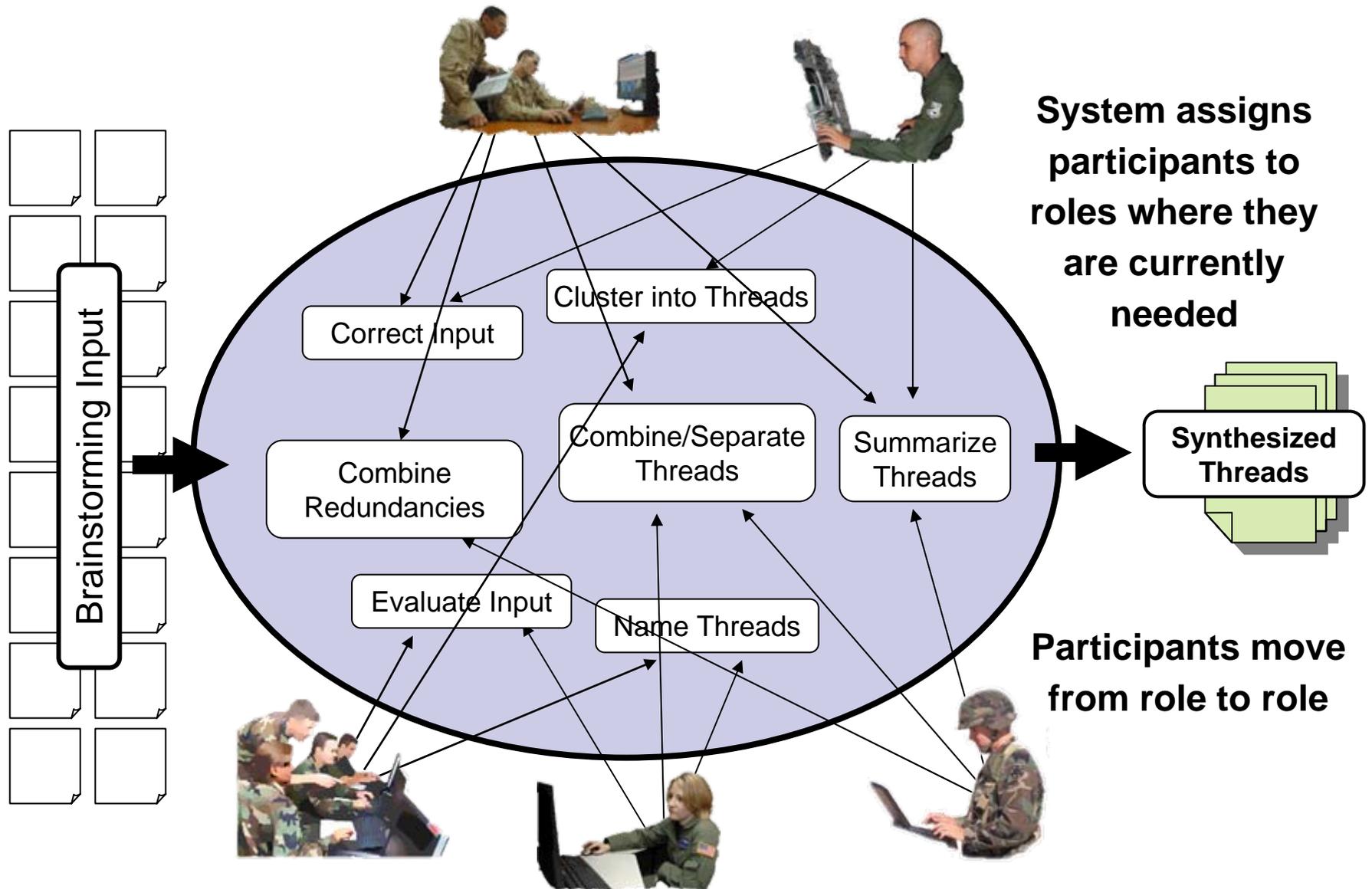
# Convergence Bottleneck

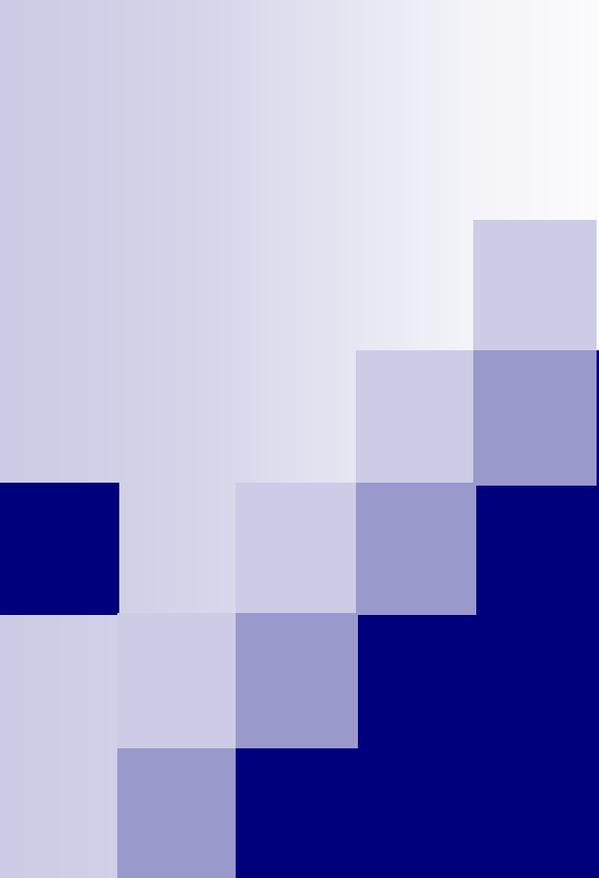
- Difficult to do in a group setting
  - Must balance multiple ideas and opinions
- Often requires the use of an expert facilitator
  - Discuss themes and guide group
- Work becomes serial in nature and less collaborative
  - Lose anonymity
- Constraints on synchronicity and proximity

# Participant-driven Collaboration

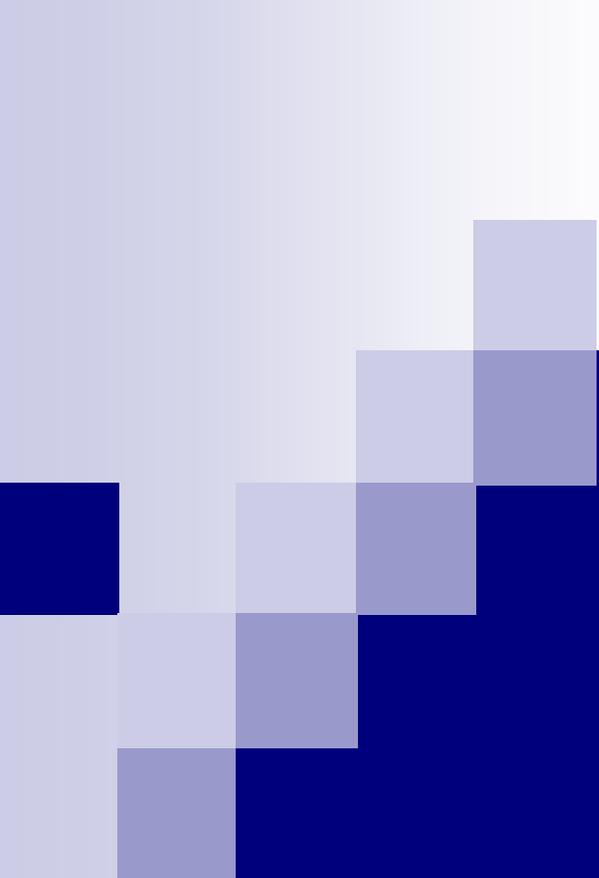
- Decompose convergence into discrete roles (modules)
- Each role is independent but required to move the group toward collaboration
- Participants iterate through various roles
  - Parallel
  - Autonomous

# Participant-driven Collaboration





# Discussion



Backup

# Project Goals

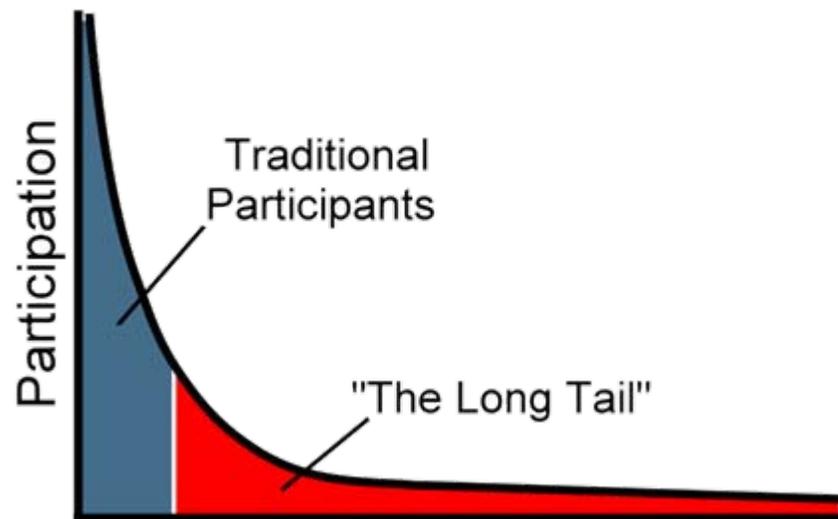
- What are we trying to do?
  - Develop a browser-based, open source Group Support System (GSS)
    - Aid practitioners and researchers
    - Support a full range of collaboration
      - Traditional GSS, thinkLets, PD-GSS, etc.
  - Modify current GSS workflows to create more dynamic, agile collaborative processes
    - Participant-driven GSS (PD-GSS)

# Project Roadmap

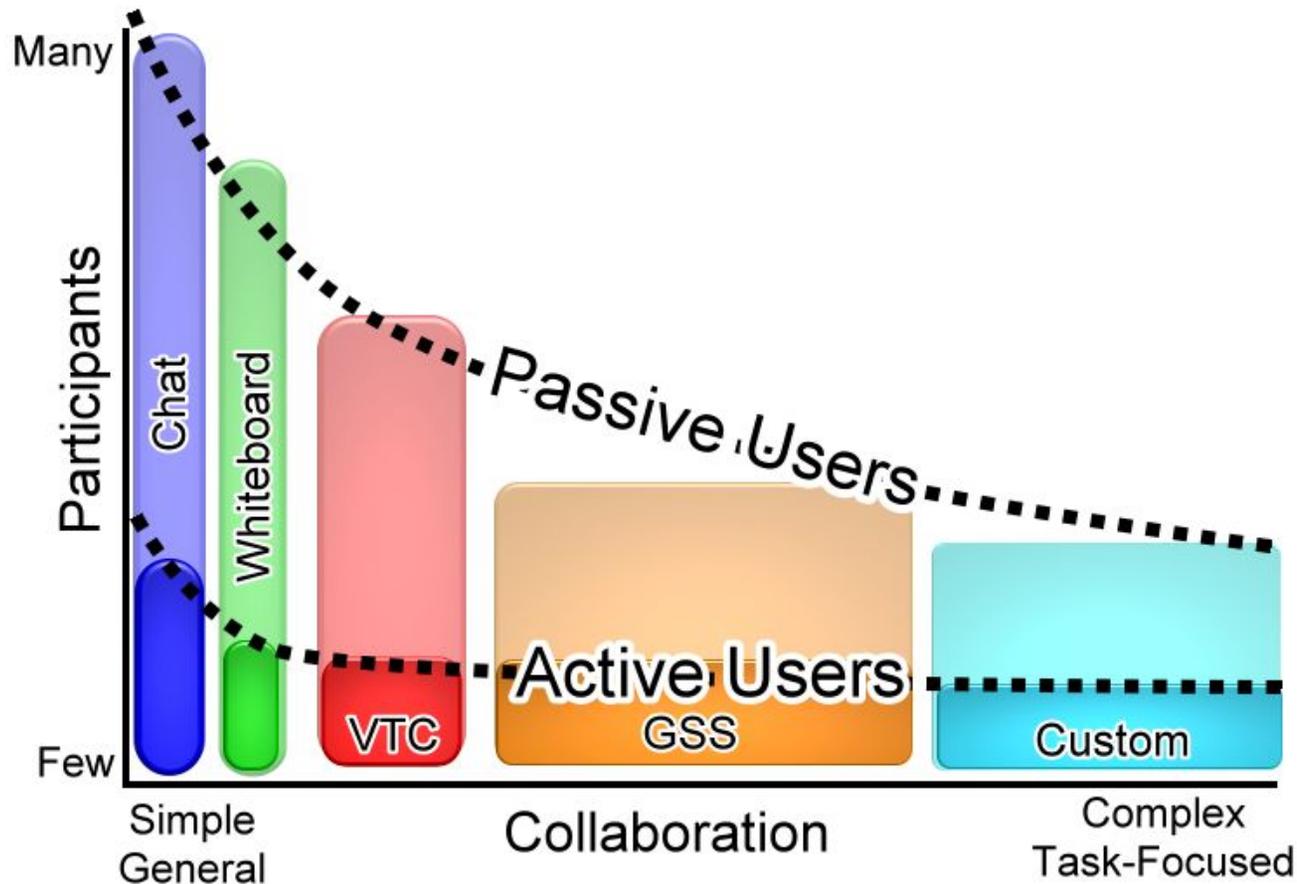
- What is new with our approach?
  - First – Build light, free and robust collaboration system
  - Second - Speed collaborative processes by replacing cumbersome, serial processes with full parallel participation
  - Third - Lessen, and in some cases remove, the requirement for the slow and expensive human facilitator
  - Fourth - Significantly increase agility by easing development of new activities

# The Long Tail

- Much of our expertise is untapped
  - Commitment – I can give 15 minutes, not 2 hours
  - Inconvenience – Distributed and asynchronous
- The network allows us to engage a greater number of participants
- The Long Tail - Derive value from the *marginal contribution of the least interested participant* – Clay Shirky
- Examples
  - “Crowd sourcing”
  - Wikipedia
  - Slashdot, Digg

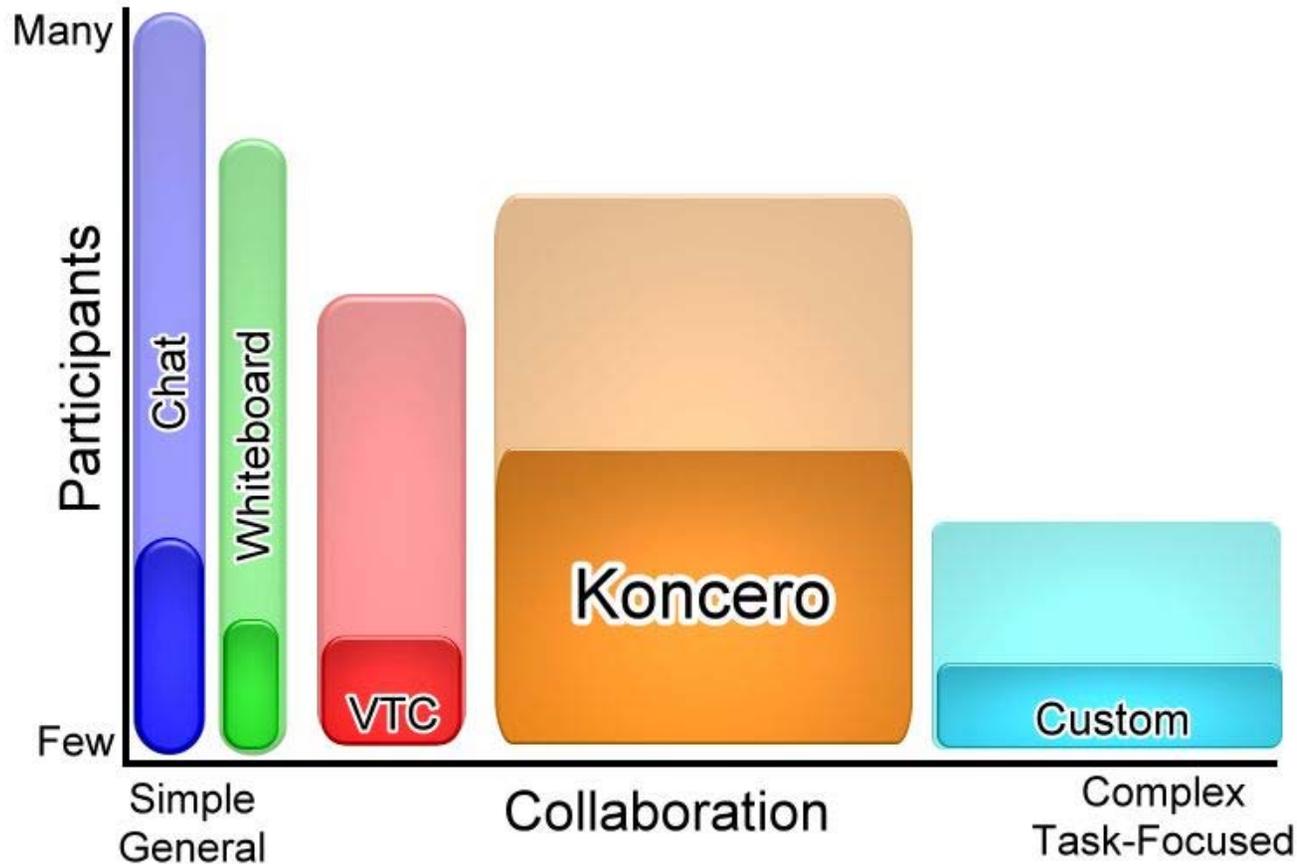


# Collaboration Participation



Typically, as collaboration grows more complex, participation decreases

# Koncero Participation Goals



A major goal of Koncero is to increase participation, especially active participation

# Roles

- Evaluate input
  - Provide rating of brainstorming ideas
- Correct input
  - Improve completeness & coherence of ideas
- Combine redundancies
  - Consolidate ideas

# Roles (cont)

- Cluster ideas into threads
  - Identify threads or themes
- Name and rename threads
  - Develop label for threads
- Summarize threads
  - Develop concise textual summarization