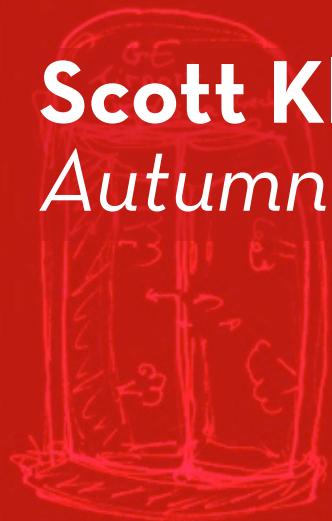


# Collaboration on the Web

# Scott Klemmer

## *Autumn 2009*



# Collaboration: What succeeds today?

- Collocation for tightly coupled work
  - because you get common ground and rapid rich interaction for free
- Remote work that is loosely coupled
  - because it doesn't require high interaction
  - use video and other high bandwidth to overcome loss of common ground
  - travel often

# Distance Work will Only Increase

- 67% of companies anticipate increased reliance on virtual teams
  - 80% for companies with 10,000+ employees
- 35% of respondents rated difficulty of management as top challenge for virtual teams
- 92% said trust is critical for virtual teams

• Survey by Institute for Corporate Productivity

# What has changed in practice?

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- Fundamentally very little
  - Distance work is still less efficient & effective than collocated work
  - The basic problems haven't changed
- Changes
  - Demand has increased
  - Some tools have gotten better



# Geographic dispersion & software development

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- Software outsourcing is increasingly common
- But software development takes longer when performed by geographically distributed teams
  - Compare software development efficiency, when all developers are at one location or distributed across sites
  - Two different software development organizations
  - Time to complete an “MR” (Modification Request)

|                                     | Team type   |               |       |
|-------------------------------------|-------------|---------------|-------|
| Study                               | Single site | Multiple site | Ratio |
| Herbsleb                            | 5.0         | 12.7          | 2.5   |
| Espinosa                            | 48.2        | 97.2          | 2.0   |
| Days from start to completion of MR |             |               |       |



# Cummings & Kiesler (2005; 2007) Study of Large NSF Projects

- Two studies of the outcomes of large NSF funding initiatives
  - 71 Knowledge & Distributed Intelligence projects 1998/99
  - 491 Information Technology Research Projects, 2001-2003
- PIs complete questionnaires describing
  - Collaboration composition
  - Coordination techniques used
  - Scientific & educational success

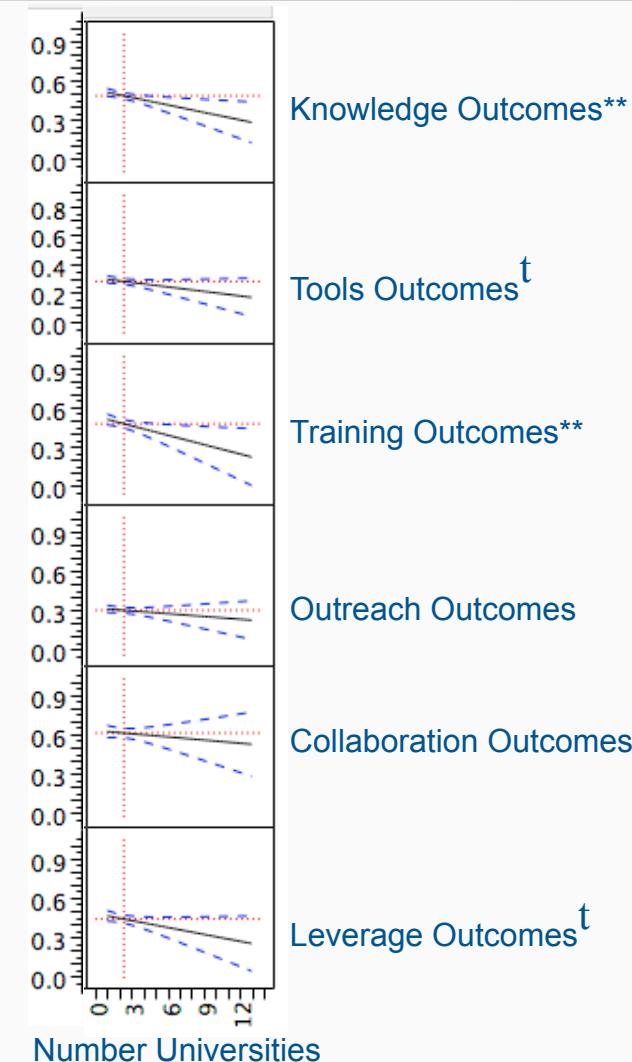


Cummings, J. N., & Kiesler, S. (2005). Collaborative research across disciplinary and organizational boundaries. *Social Studies of Science*, 35(5), 703.

Cummings, J., & Kiesler, S. (2007). Coordination and success in multidisciplinary scientific collaborations. *Social Studies of Science*.

# Research Model & Consistent Findings

- Multi-university projects were less successful than single-university projects
- More successful projects used a variety of specific coordination mechanisms
- Multi-university projects used fewer coordination mechanisms than single-university projects
- Reduced use of coordination mechanisms mediated the relationship between # of university and performance



# Collocation supports awareness & increased frequency of communication

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- Visual information supports information pick-up without explicit communication →
  - Common ground
  - Trust
  - Opportunities for communication
  - Identification of appropriate times for communication
- Examples of walking down corridor



# Live video to support informal interaction

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- Early systems for distributed work tried to leverage affordances of the visual channel
  - Video Window
  - Montage



# Change the metaphor

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Goal should be to support the ***functions*** of collocation and not the ***form***



# Challenges

- Unobtrusive Accessibility  
Features that support group processes are used relatively infrequently, requiring unobtrusive accessibility and integration with more heavily used features.

# Track Changes

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at facer possim assum.

Samantha Smith, 4/8/04 11:22 AM:  
Inserted

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tincidunt ut laboret dolore

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Samantha Smith 4/8/04 11:08 AM  
Deleted: consectetur



Samantha Smith 4/8/04 11:14 AM  
Formatted: Font:Bold



3

# Lower tech solutions: Text based, manual awareness displays

 **hardillb**

listening to roo's presentation <http://>  
half a minute ago from web

working from home about 5 hours a day

@kellypuffs: aye, up norf about 15 minutes ago from web

up north about 16 hours ago from web

Listening to the Radio 1 Establishment

windering if anybody is going to turn on the web

getting older 01:14 AM October 03, 2007

suffering from insomnia 12:21 AM October 03, 2007

Back from the gym to find that dinner is cold. September 30, 2007 from web

Trying to write a c lib for audioStreaming and publish it. 12:44 AM September 30, 2007

**WTF!**

 **Stimpdawg**

off to work now.....  
1 minute ago from web

off to work now..... hope it's not too long

what the hell... usb controller bar

wondering if Ivan made it safely...

great... can't find my glasses 11 minutes ago from web

going to hop in the shower..... 28 minutes ago from web

laptop is slow.. I'm going to look at it again

jeez why can't Hotmail Popper be faster

ok maybe it's just the slow internet

the internet hates me 39 minutes ago from web

I should really defrag my computer

for once I'm up early... I have a headache

oh no.. stomach is hurting.. sigh

ahhh hotmail is so slow about 1 hour ago from web

 **jyunderwood**

going to watch Stars vs Bruins tonight at 7:30 p.m.  
4 minutes ago from web

being audited at work. boo. about 21 hours ago from web

deciding... Tomorrow: Physics exam or Stars vs Avalanche... Tricky. 06:46 PM October 02, 2007 from web

listening to "Exodus Honey" by Honeycut. You should too. Really. 05:57 PM October 01, 2007 from web

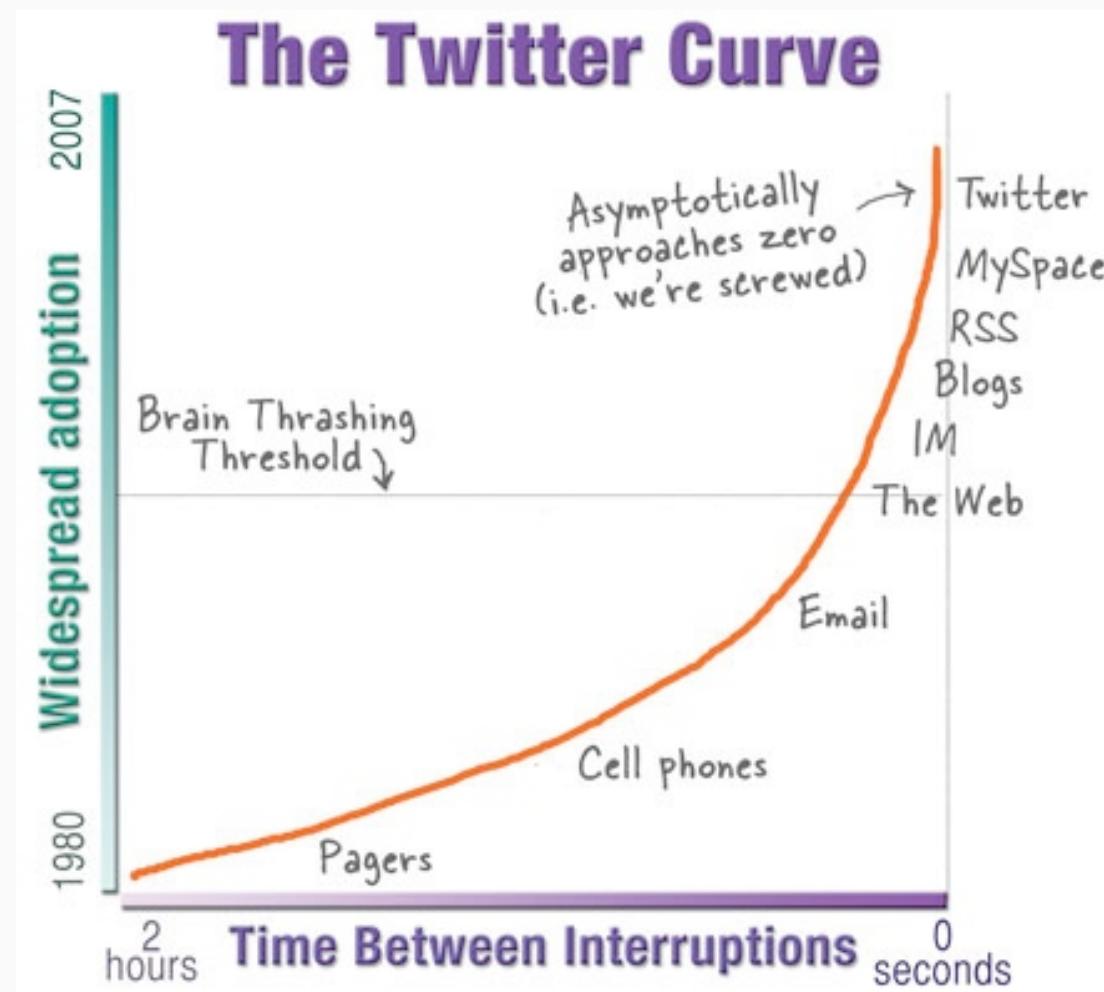
in need of a light trim. 09:41 AM October 01, 2007 from web

trying to focus long enough on studying to say I actually did some. 06:49 PM September 30, 2007 from web

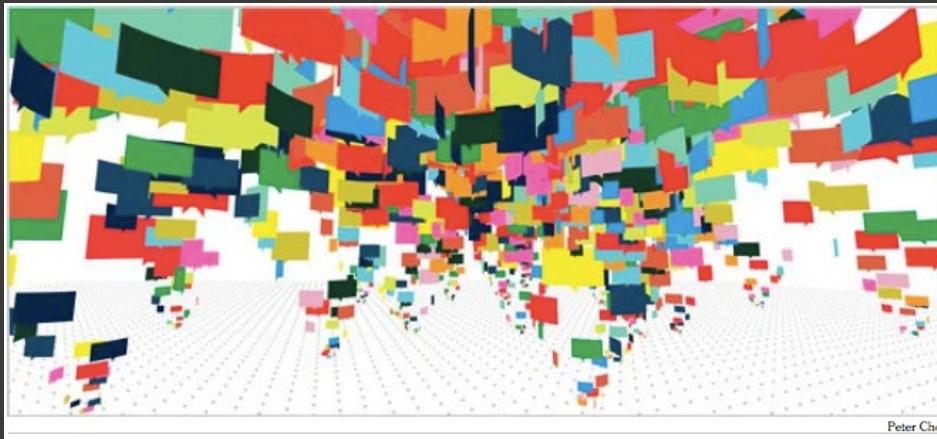
new glasses today, yay. 10:32 AM September 21, 2007 from web

crawling under my desk and hiding from all the crazy customers at work. 11:44 AM September 21, 2007 from web

# Raises its own problems



# NYTimes on Social Software



- This is the paradox of ambient awareness. Each little update – each individual bit of social information – is insignificant on its own, even supremely mundane. But taken together, over time, the little snippets coalesce into a surprisingly sophisticated portrait of your friends' and family members' lives, like thousands of dots making a pointillist painting.
- “Brave New World of Digital Intimacy” by Clive Thompson

# Some fundamental shifts are occurring in practice

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- Highly distributed work groups have been successful by not striving for the collocation ideal
  - Wikipedia,
    - > 500,000 successful articles
    - Each written by 10s - 1000s of editors & large time periods
    - Coordination via the malleable & revertible artifact
    - Coordination thru text linked to the artifact
  - Open source software
    - Highly distributed teams
    - Task decomposition
    - Database driven production, with formalization to reduce the need for direct interpersonal communication
- Maybe the comparison with collocated work is fundamentally misleading



## About this project

These are some of the real ballots that have been challenged in the U.S. Senate race. Evaluate each one based on the voter's intent.

- Under Minnesota law a ballot must be counted if it is possible to determine intent - even if the voter failed to follow instructions. [Learn more](#).
- Ballots are not counted if two candidates are marked (with no attempt to strike one of them) or if there's any mark on the ballot that would identify the voter.

As you vote, the results change to reflect your decisions — projected as if you had voted on every challenged ballot. We've built in a margin of error (+/-), so the more ballots you evaluate, the more precise the numbers get. [Learn more](#).

[Close](#)

## The Ballot Challenge [Log in](#) to vote on 6700 ballots

|                        | Resolved challenges |         |              | Remaining challenges | Projected vote totals * |           |                |       |
|------------------------|---------------------|---------|--------------|----------------------|-------------------------|-----------|----------------|-------|
|                        | Coleman             | Franken | Other/no one |                      | Coleman                 | Franken   | Margin         | Error |
| Current recount totals | 0                   | 0       | 0            | 5,421                | 1,212,317               | 1,212,629 | Franken by 312 |       |
| Your choices           | 0                   | 0       | 0            | 5,421                |                         |           |                |       |
| Everyone               | 2980                | 3246    | 510          | 0                    | 1,211,915               | 1,211,993 | Franken by 78  |       |

[Ask your friends to take the StarTribune.com Ballot Challenge](#)

 Can't see the issue? Click to see the full-size ballot and reason for the challenge.

|   |  |
|---|--|
| <input type="checkbox"/> BOB BARR AND WAYNE A. ROOT<br>Libertarian        | and fish, game, and wildlife to preserve our arts and cultural support our parks and trails; a enhance, and restore our lake streams, and groundwater by sales and use tax rate beginn 2009, by three-eighths of one taxable sales until the year 20 |
| <input type="checkbox"/> CHUCK BALDWIN AND DARRELL CASTLE<br>Constitution |  |
| <input type="checkbox"/> write-in, if any                                 |  |
| <b>UNITED STATES SENATOR<br/>VOTE FOR ONE</b>                             | <input type="checkbox"/> YES<br><input checked="" type="checkbox"/> NO   |
| DFAN RARKLEY  |  |

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### SENATE RECOUNT

Complete Star Tribune coverage of the Senate recount, including the latest on missing ballots, the ballot challenges and rejected absentee ballots.

**You must be logged in to vote**

Please visit our member center to [log in](#) or [create an account](#)

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INTUIT INC. (US) https://qtwu1.turbotaxonline.intuit.com/secure/ttonline.htm?uid=105050955.0&csrc=3468337910&prodid=1

Fidelity Investments

TurboTax Deluxe

Federal Refund \$200 CA Tax Due \$218

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Wages & Income Deductions & Credits Other Tax Situations

### Retirement Distributions

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- IRA and pension distributions (Form 1099-R) [More Info](#)

[What paperwork do I need?](#)

Did you have any retirement income in 2008?

[Back](#) Yes No

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# Wisdom of the Crowds (Surowiecki)

- Aggregate groups of people can be really smart / effective...
  - At predicting the future (prediction markets)
  - At solving tough problems (InnoCentive)
  - At causing / creating change
  - At collecting / filtering info (Digg, Delicious)
  - At democratizing production (crowdsourcing)