

(How) can distance collaboration succeed?

Teams are increasingly distributed

- 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

“If, as it is said to be not unlikely in the near future, the principle of sight is applied to the telephone as well as that of sound, earth will be in truth a paradise, and distance will lose its enchantment by being abolished altogether.”
— Arthur Mee, 1898



Can teams work when people are remote?

- What if 1 person is remote?
- How about a work at home day?
- What about when everybody is distributed?
- Does the technology used matter?
- How about the organizational practices?
- What things should we expect will succeed or fail?

Example: Distributed software teams take longer than comparable collocated teams

- 362 project
- 4 companies
- 15 countries
- 5 continents

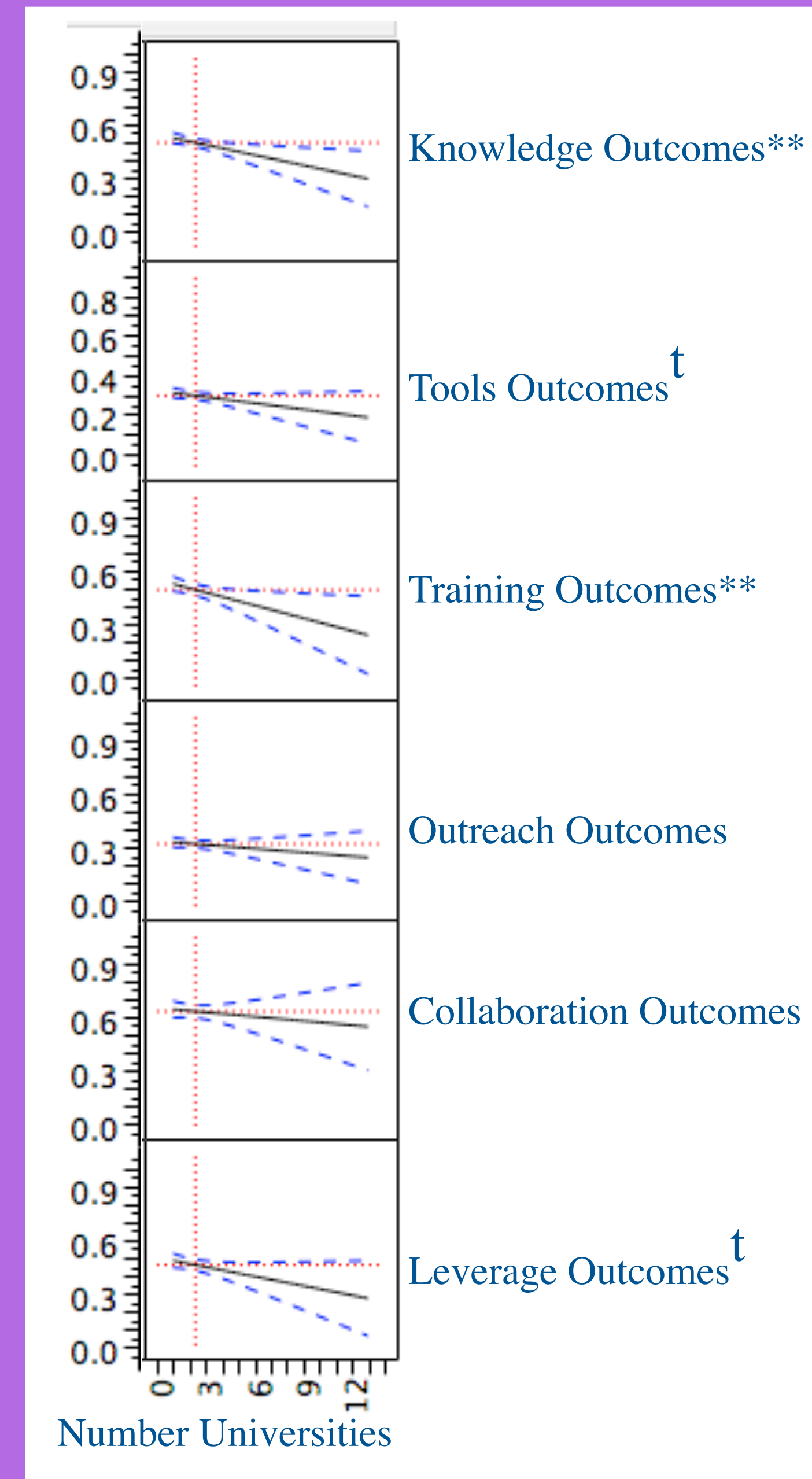
Variables	Productivity	Quality	Profit
Physical Separation	↑	↓	↑
Number of Sites	↑	↓	↓
Personnel Imbalance	↑	↓	↑
Experience Spread	↓	↑	↑

Example 2: 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

Research Model & Consistent Findings

- Multi-university projects 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

- 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

Some fundamental shifts are occurring in practice

- 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

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

Sources of Failure

- **Common Ground:** knowledge that people have in common and know that they have in common
- **Coupling:** how complex the work interdependencies are
- **Time zone** and
- **Cultural separation**

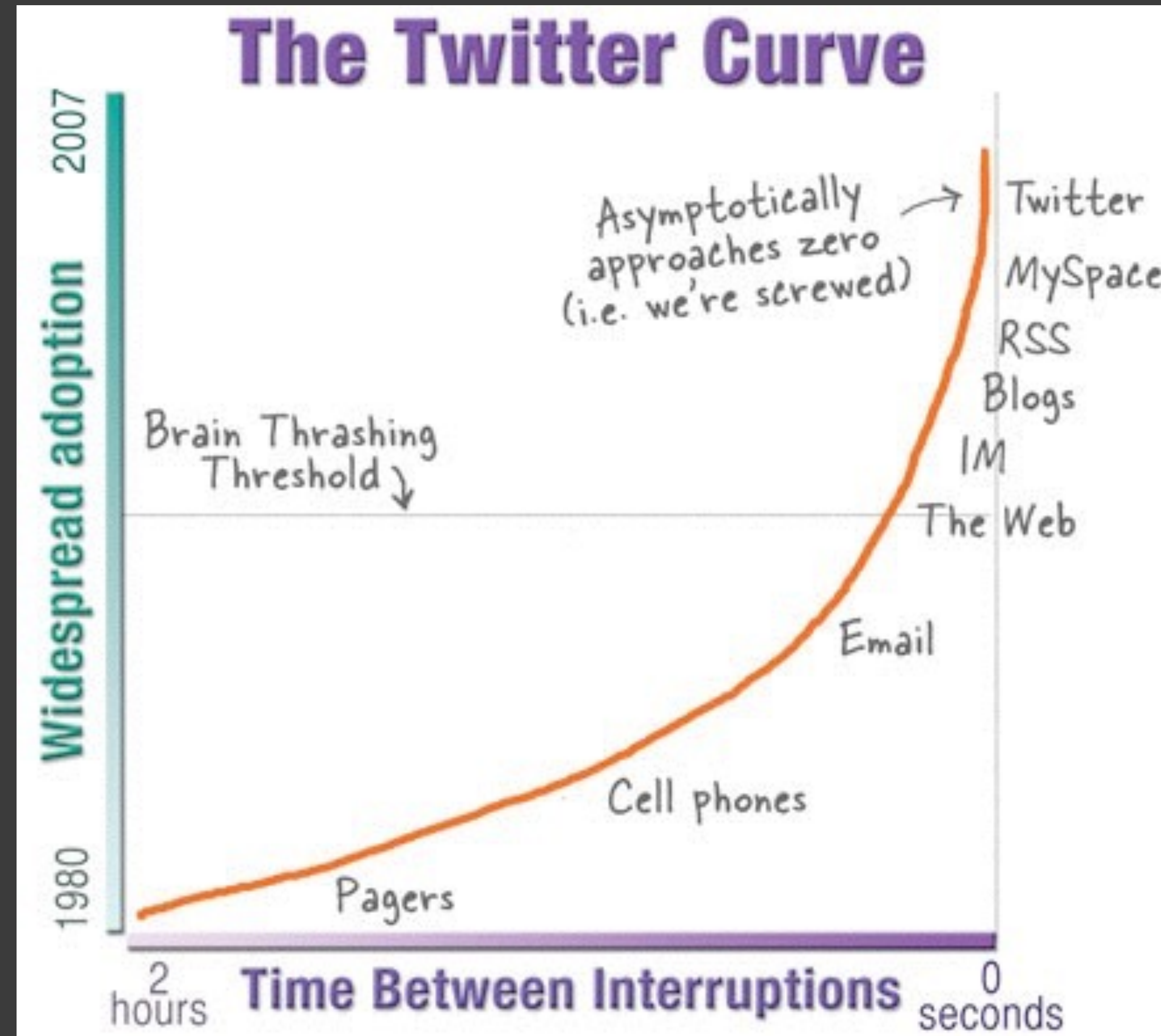
Social Translucence

We have discussed two dimensions of social translucence. First, a system that makes social information visible enables participants to be both aware of what is happening, and to be held accountable for their actions as a consequence of public knowledge of that awareness. Second, people also have a sophisticated understanding of the physics that underlie the visibility of their social interactions. The fact that physical space is translucent (and not transparent) to socially salient information is an important resource for structuring interactions. Neither of these dimensions of social translucence is a given in the digital domain.

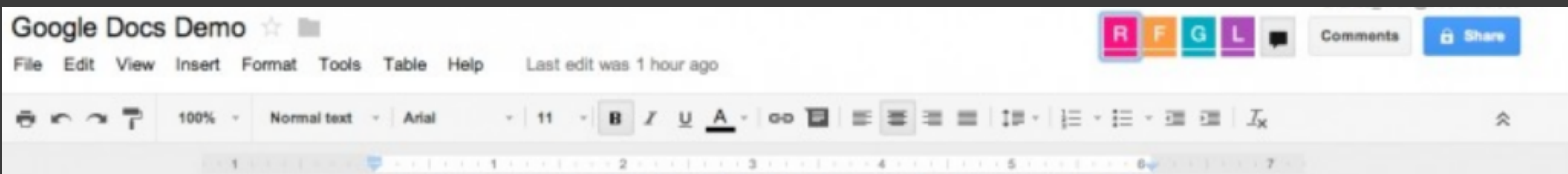
This is the paradox of ambient awareness. Each little update – each individual bit of social information – is insignificant on its own, even supremely mundane. But taken together, over time, the little snippets coalesce into a surprisingly sophisticated portrait of your friends' and family members' lives,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

"Brave New World of Digital Intimacy" by Clive Thompson, NY Times

Raises its own problems



Abstract Social Cues



Beyond Being There

Hollan, Jim, and Scott Stornetta. "Beyond being there." ACM, 1992.

Change the Metaphor

- Support the *functions* of collocation
- Not the form

What's beyond Skype?

Eye to the future: Telepresence Robots

