

Sustaining Interdisciplinary Projects in Green Engineering: Teaching to Support Distributed Work

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This material is based upon work supported by the National Science Foundation under Grant Nos. 0619263, 0633537, and 0648439. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

Sustainable design involves bringing everyone to the table



But what happens when the table is only a metaphor?



Co-located Work

- Collaborators work in close physical proximity
 - “Project rooms” to cubicles/office in same area
- Characterized by extensive informal interactions and high relational space



<http://www.firstshowing.net/2007/11/06/watchmen-war-room-photos/>

Co-located work facilitates collaboration

In general

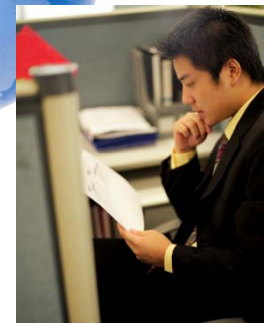
- Rapid feedback
- Personal information (i.e. collaborators know one another)
- Shared local context
- Informal “hall” time before and after meetings
- Implicit cues (access to information about what’s happening around the edges of the project, context)
- Spatiality of reference (physical location of both collaborators and objects such as papers, drawings, models)

In meetings

- Individual control (anyone present can change the focus easily)
- Coreference (the ability to establish shared points of reference)
- Nuanced information (collaborators can subtly indicate shades of meaning via gesture or expression)
- Multiple channels (e.g. voice, gesture, tone, body language)

Distributed Work

- Collaborators are physically separated from one another
 - 30 meters to half a world
- Characterized by limited interactions and low relational space



Distributed work inhibits collaboration*

*particularly in low-structure environments

In general

- Delayed feedback
- Lack of interpersonal information (i.e. collaborators don't know one another)
- No shared local context
- No pre/post meetings
- No information about what's happening around the edges of the project
- No spatiality of reference

In meetings

- Leader control (anyone present can change the focus easily)
- Explicit references required
- No access to nuances
- Single/dual channels

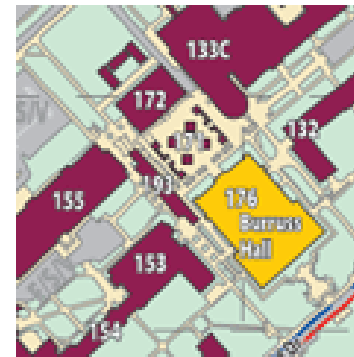
Disciplinary design teams are more likely to be co-located

- Shared course schedule
- Shared student lounge
- Shared buildings
- Shared departmental history
- High interpersonal knowledge (smaller departments)



Interdisciplinary teams are more likely to be distributed

- Case study: Interdisciplinary design teams in a year-long green engineering course
 - 2 teams
 - MSE, BSE, ISE, Business, CEE
- Different schedules
- Different buildings
- Different histories
- Low interpersonal knowledge



	Mon	Tues	Wed	Thurs	Fri
Morning		ME Design Team Mtgs.		ME Design Team Mtgs.	
Afternoon	Arch & IDS Studio	ISE Capstone	Arch & IDS Studio	ISE Capstone	Arch & IDS Studio
Evening		ME Design Team Mtgs.		ME Design Team Mtgs.	

Teaching transferable practices for distributed work

- “Teaming”
- Interdisciplinary communication
 - How to “think with” non-engineers
- Distributed collaboration
 - Create shared workspace
 - Create meeting times
 - Teach strategies for using virtual tools
 - Teach communication strategies to build relational space

Communicating in distributed environments*

- 1. Acknowledgement of Contribution** - Exchanges containing explicit acknowledgements of contributions made by other members of the group.
- 2. Desire to Contribute** - Expressions indicating a desire to contribute to the endeavor and/or willingness to address questions or general statements about collaborating.
- 3. Recognition of Benefits** - Exchanges that recognize there are benefits to be derived by collaborating and by investing oneself in the endeavor.
- 4. Relational Motivation** - Expressions of desire to work together or friendly chatty statements.

*Forthcoming: McNair, Paretto, and Davitt (2010). Towards a Pedagogy of Relational Space and Trust: Analyzing Distributed Collaboration Using Discourse and Speech Act Analysis. *IEEE Transactions on Professional Communication*.