

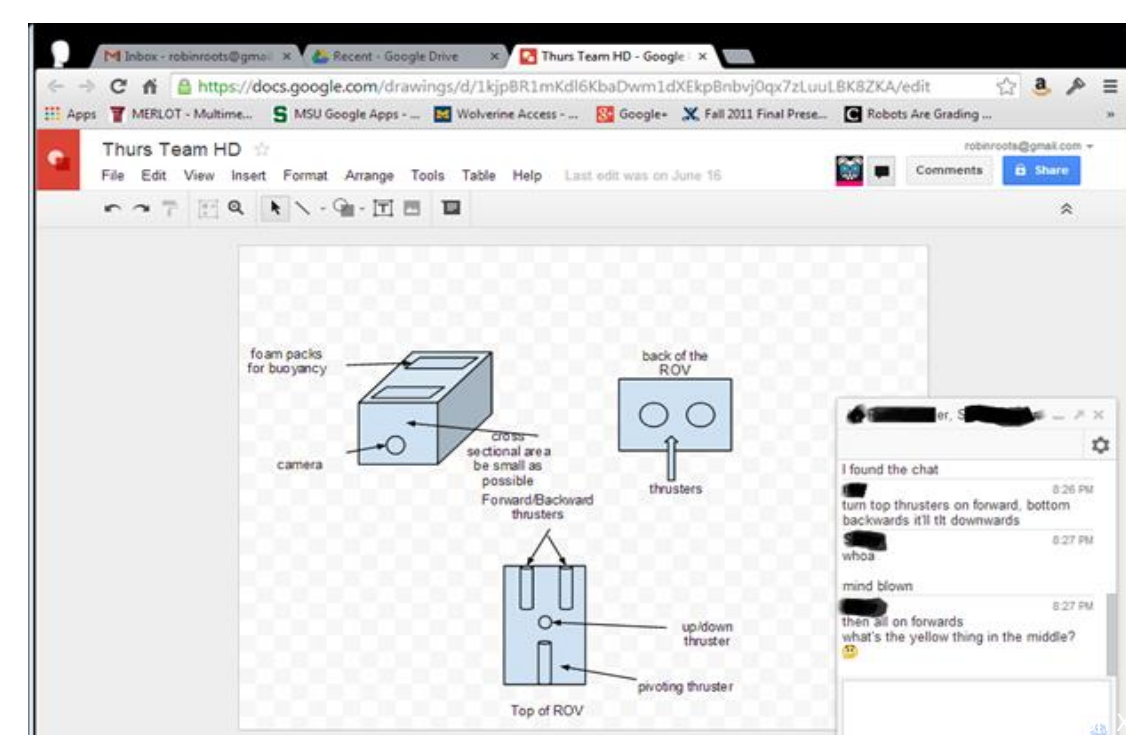
What do students talk about, and how, during team design negotiations held via synchronous chat and face-to-face?

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First year “Introduction to Engineering” (ENGR 100):
Team-based, problem-based design and communication course

Teams of 4-5 students assigned to meet via synchronous chat (held in Google Docs) or face-to-face (f2f) (audio-recorded) for single 45-minute initial design conversation.

Synchronous chat condition **Face-to-face (f2f) condition**



n = 158 students on 37 teams



n = 73 students on 17 teams

The conversations studied are both “authentic” (part of the actual process in the course) and “high stakes” (the idea negotiated at this meeting affects student grades and workload in remainder of course).

The co-instructor/researcher was salient in the conversations (as a lurker in synchronous chat groups and as a microphone in face-to-face groups).

Content analysis: Transcripts unitized and coded for what was discussed and how

WHAT
 (Obj. of discussion):

- Design itself
- Problem space
- Other, related
- Other, not related

Interrater reliability

15% of sample coded by 2 raters

Kappa, WHAT = 0.913
 Kappa, HOW = 0.924

HOW
 (Rhetorical function):

- Info seeking
- Info providing (no rationale)
- Info providing (with rationale)
- Topic directing
- Agreeing (no rationale)
- Agreeing (with rationale)
- Disagreeing (no rationale)
- Disagreeing (with rationale)
- Politeness
- Other

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(Thank you!)

Two goals of the communication in team-based, problem-based learning, from the education literature: **DISAGREEMENT** and **EXPLICATION**

Disagreement: Teams with moderate levels of disagreement produce more creative solutions, earn better scores on projects (Cress & Kimmerle, 2008).

Explication of rationales: Students learn from framing things to explain to peers, leads to better information retention (Fischer & Mandl, 2005; Jorczak, 2011; Schellens et al., 2005).

Student willingness to engage in these pro-group behaviors is affected by communication medium, from communication literature

High *social presence*, such as in a face-to-face group, **inhibits student willingness to disagree with peers** (Lowry et al., 2006; Roberts et al., 2006; Yoo & Alavi, 2001).

Lowered *synchronicity*, such as in synchronous chat, **allows time to formulate ideas**, may result in more explicit provision of engineering rationales (Gunawardena et al., 2001).

In this study, which compared communication in groups meeting via synchronous chat and face-to-face:

Groups meeting **f2f had lower levels of expressed disagreement**. It is likely that the amount of disagreement was not different between the groups, but that students f2f did not feel free to express it.

Groups meeting via **synchronous chat were more likely to provide explicit rationales**, but the way they did so (often providing a link in the chat) is likely less pedagogically useful.

Disagreement: Proportions of the two disagreement rhetorical codes were summed by team. A T-test shows a significant difference in the two communication modalities:

Table 1. Disagreement significantly more likely to be expressed in the chat condition.

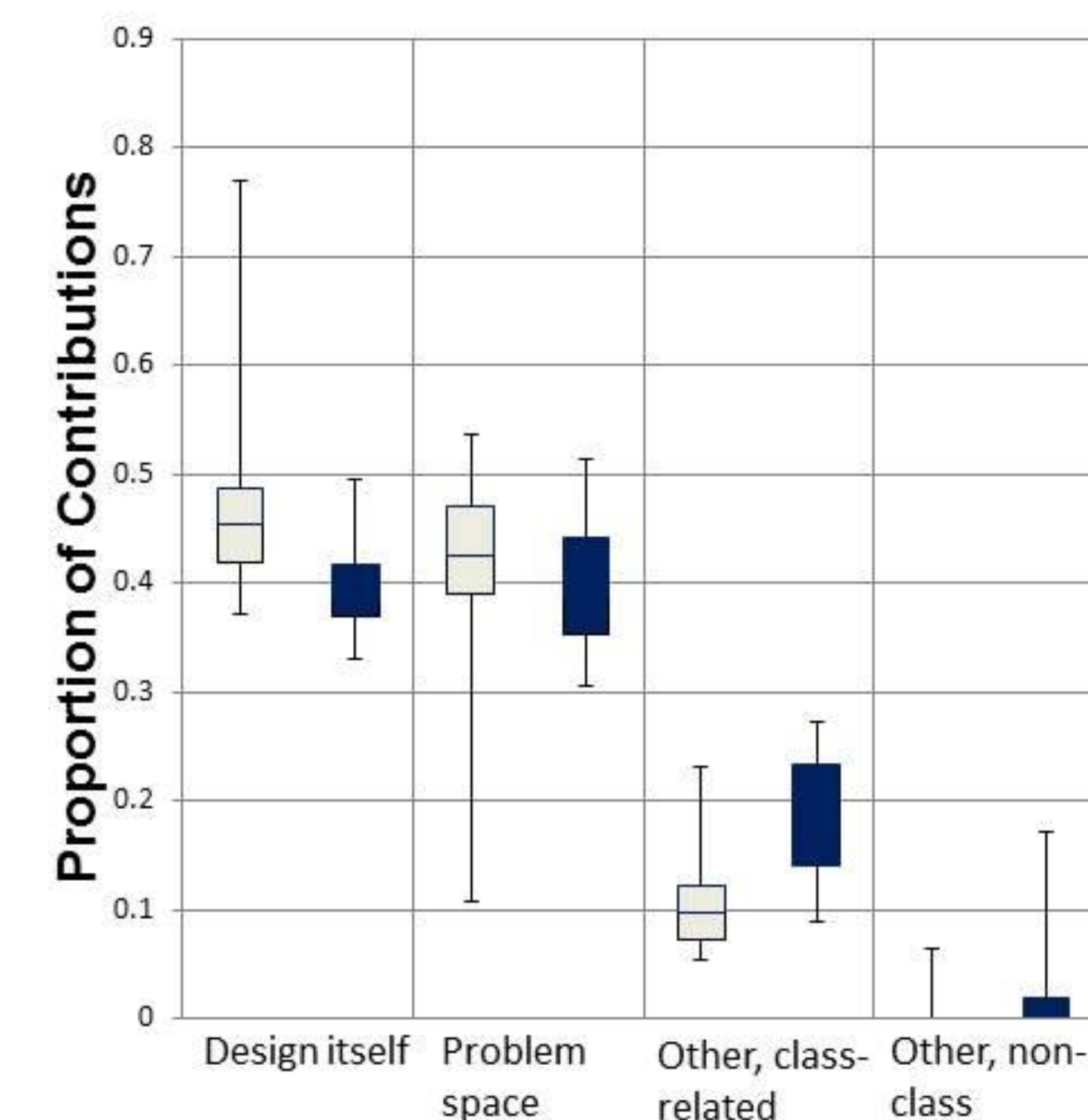
	Chat	F2F	t(51.6)	p
Mean (SD)				
Disagreement	.064(0.0034)	0.039(0.017)	3.57	<0.001

Rationale: For each team, codes “with rationale” were summed and divided by sum of all codes that could conceivably include rationale (all “with rationale” AND all “no rationale” codes). A T-test shows a significant difference in the two communication modalities:

Table 2. Explicit rationales significantly more likely to be expressed in the chat condition.

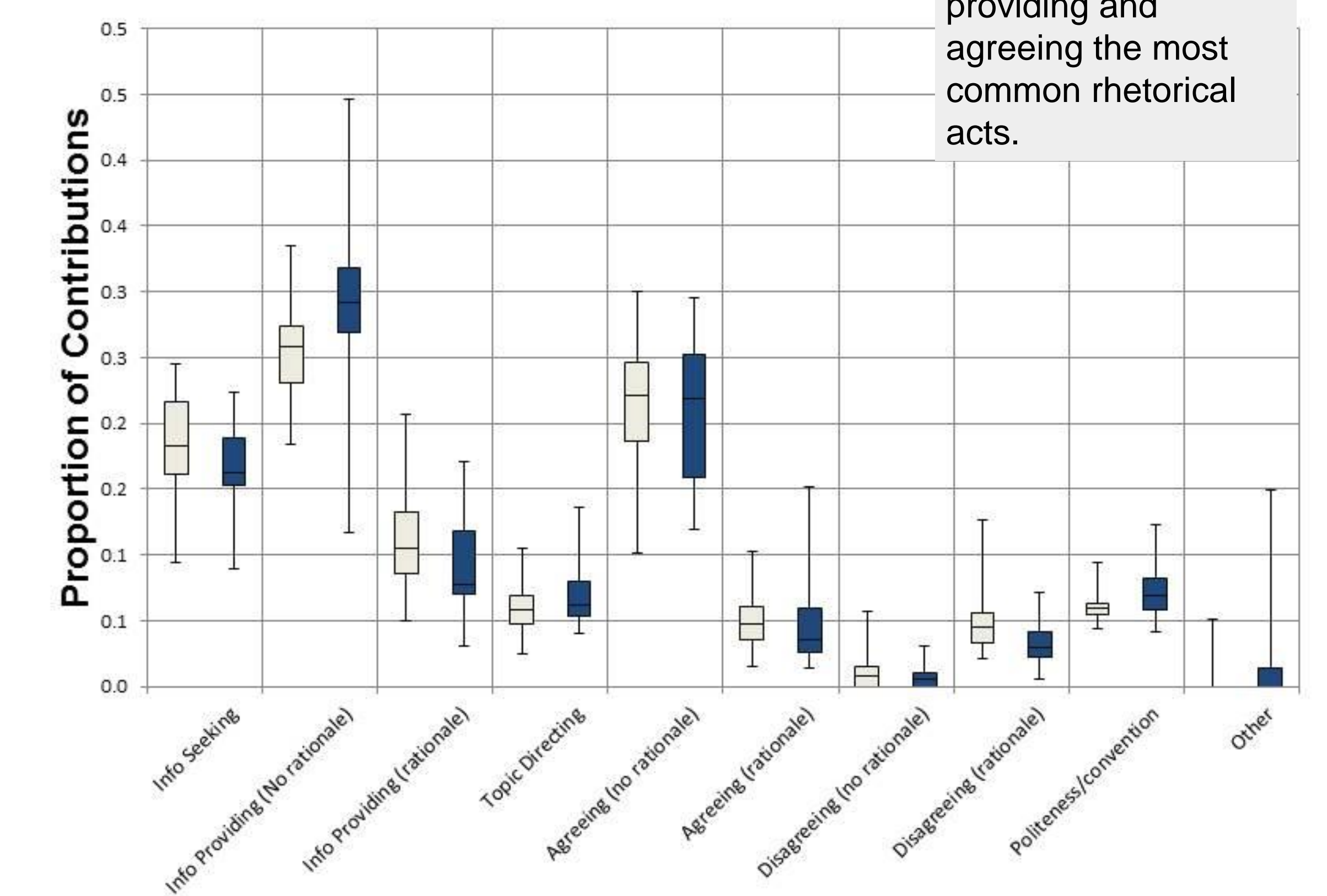
	Chat	F2F	t(52)	p
Mean (SD) rationale Provision	0.305(0.070)	0.251(0.063)	2.70	0.009

What they talk about:



Students **primarily talk about the design project and problem space**. Conversations about the problem space often took the form of restating project expectations for unprepared teammates rather than actual brainstorming/design negotiation.

How they talk about it:



Conversations in the two mediums were **remarkably similar**, with information-providing and agreeing the most common rhetorical acts.

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