Project markers

- Outline
  - Part 1
    - Project markers (Bangerter & Clark)
  - Part 2
    - Apply project markers to the approach briefing. Model representational work.
  - Part 3
    - Apply project markers to collaborative learning. Developing a metric to measure depth in collaborative learning.

PART 1
Navigating Joint Projects with Dialogue
Adrian Bangerter and Herbert H. Clark

The problem

- Words used in dialogues are not only signals of...
  - listener feedback
  - turn-taking devices
  [A Simplest Systematics for the Organization of Turn Taking for Conversation by Sacks, Schegloff, Jefferson]

Think of words or sentences in dialogues as a way for participants to mark transitions in joint projects and navigate through them.

These words are part of a "system of contrasts" specialized to navigate through joint projects.

Hierarchical structure of joint activity

Open A-Project 1. Ed and John agree to move two benches.
Open B-Project 1.1. Ed and John agree to move bench 1 first.
C-Project 1.1.1. Ed agrees to take the left end, and John the right end.
C-Project 1.1.2. Ed and John lift the bench together.
C-Project 1.1.3. Ed and John put down the bench together.
Close B-Project 1.1. Ed and John agree that they have finished moving bench 1.
Open B-Project 1.2. Ed and John agree to move bench 2 next.
C-Project 1.2.1. Ed agrees to take the left end, and John the right end.
C-Project 1.2.2. Ed and John lift the bench together.
C-Project 1.2.3. Ed and John put down the bench together.
Close B-Project 1.2. Ed and John agree that they have finished moving bench 2.
Close A-Project 1. Ed and John agree that they have finished moving the two benches.
Open A-Project 2. Ed and John agree to go have a beer together.

The hierarchy we navigate through

- Vertical transitions
- Horizontal transitions

Joint projects

- Requires coordination/project navigation
  - Use dialogue to communicate and establish/update common ground.
  [Grounding in communication by Clark, Brennan]
  [Joint activities by Clark]

- Dialogue emerges from joint activities
  - That project markers are used to navigate
  - Evidence?

- Signals (project markers)
  - Part of a system of contrast
Project markers

- Two types of transitions
  - Vertical transitions (enter/exit a project)
    - Many techniques (repairs, clarifications, digression)
    - Okay, all right
  - Horizontal transitions (continue with project)
    - uh-huh, m-hmh, yeah (yes, yep)

Signalling vertical transitions

Amy: Uh, but I like, uh Reggie Roby.
Bob: Roby, who does he play for?
Amy: He, Miami.
Bob: Okay.
Amy: Uh, at times I like Kevin Butler on the Bears.

Signalling horizontal transitions

Amy: …in public places. There is one state that does that, by the way.
Bob: Really? What is that?
Amy: I want to say Oklahoma, I saw something the other night about it.
Bob: Oh.
Amy: They don’t do them real often.
Bob: Yeah.
Amy: Which is obviously the death penalty.
Bob: Yeah.

PART 2

Using dialogue to measure representational work of pilots during an approach briefing

Johann Larusson, Vidar Tulinus, Richard Alterman
Presented at the 15th annual meeting of the Society for Text and Discourse

Measuring representational work

- The claim of DCOG is that cognitive behaviour is mediated by the representational system.
  - (Hutchins 1995ab, Hutchins & Klausen, 1996)
- How do we model representational work of pilots during an approach briefing?
  - By structure and depth of conversational interaction among participants with respect to different representational tasks.
    - (Clark & Bangerter, 2003)
- Model “mapping” between the representation of the approach chart and representational state of cockpit.

Approach briefing

- Routine collaborative task mediated by a checklist.
  - Task Structure
    - Jointly step through items on the checklist.
    - For each item, identify representational state of some artifact in cockpit.
Representational System

- Distributed cognition (DCOG)
  - Formed by the representational media available:
    - Internal, external, private, shared
  - Utility of the system depends on
    - Matching recurrent tasks of the community.

Model the representational work

- How much of the interactive work is spent coordinating between representations?
  - Count and analyse vertical and horizontal transitions in the dialogue.
  - Example of a vertical transition

  P: Taylormade map number 11-1... Reykjavik Iceland, localizer DME runway 13.
  C: Check

  P: Okay... we expect radar vectors into... onto the localizer and we will start at twelve hundred feet at six DME and start to descend at five DME down to three hundred feet... normal speed.
  C: Okay, normal speed.
  P: Yeah... speed will be... one hundred and four and... we add ten so it will be about one hundred and fourteen for our approach speed and reference speed will be about one or four at threshold.
  C: Okay

Example dialogue

P: Okay... I got a map from the VFR of... Doctor Scarits.
C: Okay
P: Taylormade map number 11-1... Reykjavik Iceland, localizer DME runway 13.
C: Okay
P: Okay... we expect radar vectors into... onto the localizer and we will start at twelve hundred feet at six DME and start to descend at five DME down to three hundred feet... normal speed.
C: Okay, normal speed.
P: Yeah... speed will be... one hundred and four and... we add ten so it will be about one hundred and fourteen for our approach speed and reference speed will be about one or four at threshold.
C: Okay

Project markers (taxonomy)

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Taxonomy for measuring representational work

- Representational activities
  - Approach chart/checklist
  - Cockpit controls
  - Mapping between cockpit controls and approach chart
- Other activities

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Taxonomy applied to approach briefing

- Example of an approach briefing session

Confiming a representational state

- The conversational interaction reflects the bulk of the pilots’ collaborative task.
- Markers used during representational task:
  - Outnumber all other uses of markers
  - The bulk of the markers used during the representational task were vertical markers that were used to align two different representations.
  - Vertical markers used to confirm that the state of the cockpit matches the representational requirements of the checklist.
  - Horizontal markers used to step through the checklist which is the “plan” for the approach briefing task.

PART 3
Collaborative Learning;
Collaborative Depth

Svetlana Taneva, Richard Alterman,
Timothy J. Hickey
Collaborative depth

- Successful cases of collaborative learning depend on collaborators working closely.
- What constitutes closeness? Can we measure closeness?
  - $A$ projects mark the surface of the task
  - $B$ and $C$ projects are below the surface
- Collaborative depth reflects both the frequency, and the degree to which, group members collaborate beneath the surface.

Results – Collaborative learning

- Time spent chatting is not enough
- Frequency of chat is not enough
- More frequent coding on the same code segment is not enough
- Collaborating students can be working closely, talking, interacting a lot, without having meaningful interactions.
  - Meaningful interaction depends on depth
- Depth lies at the intersection of joint focus, joint problem space and structure of activity.