

Building a Cell Model: An Embedded Study Examining Accountable Talk in 9th Graders' Group Discussions

Iris Howley, Gregory Dyke, Rohit Kumar, Carolyn Rosé



Introduction

- Our goal is to increase density of Accountable Talk in teacher-led discussions in classrooms.
- This microstudy takes place within a larger study, but here we focus on a computer enrichment activity that examines various ways to provide Accountable Talk training to students, with the help of a computer agent.
- With our agents, we hope to get Accountable Talk into the classroom even before the teachers have been fully trained.

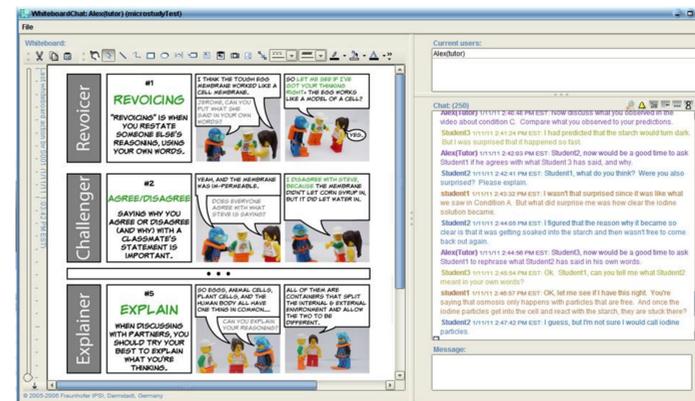
Study Procedure

Around 30 9th grade students in BSCS Biology, sitting in one computer lab. Students work through an online chat room in groups of 3.

1. **Instruction:** Students read about diffusion and receive training on Accountable Talk
2. **Instruction:** Setup of two simulated cells
3. **Online Group Discussion:** Discuss predictions about the lab activity in the video, and record their predictions
4. **Videos 2&4:** Observe conditions A, B, and C
5. **Online Group Discussion:** Discuss how the results were different from predictions
6. **Wrap Up:** Complete a reading discussing semi-permeable membranes
7. **Post-quiz:** Students complete a lab-related quiz

Materials

- Macro-level Pretest (baseline data for the yearlong study)
- Lab-Specific Posttest
- Cell Membrane Lab Booklet (contains background info for the lab, instructions for the activity, an Accountable Talk comic, and a datasheet)
- *The Accountable-Talkers* Lego Figure Comic (explains the Accountable Talk moves, using an example from a class activity)
- ConcertChat Whiteboard Software (chat window + group whiteboard)



- Collection of videos exemplifying the cell model lab activity



Experimental Design

What form of scaffolding is most effective in supporting student discussion roles?

As student groups discuss the lab activity, each student is assigned an Accountable Talk role:

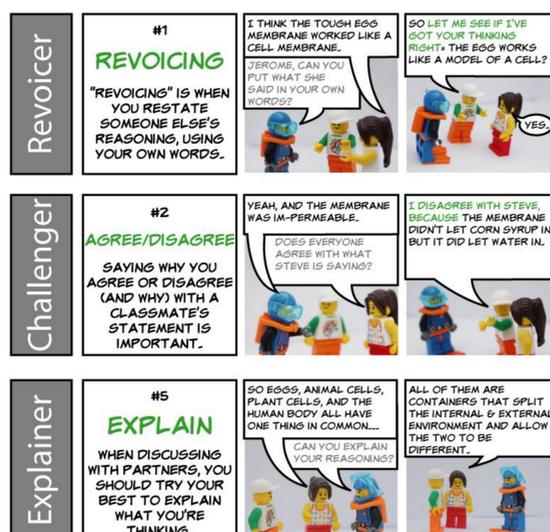
- **Revoicer:** Responsible for looking for revoicing opportunities
- **Challenger:** Checks agreement or challenges a claim
- **Explainer:** Looks for opportunities to push for more explanation

Students are guided in their roles by an automated dialogue agent that offers three levels of support:

- **No Support:** Students are just assigned roles
- **Direct Agent:** Agent does accountable talk moves
- **Indirect Prompting:** Agent reminds students to do their role

Accountable Talk

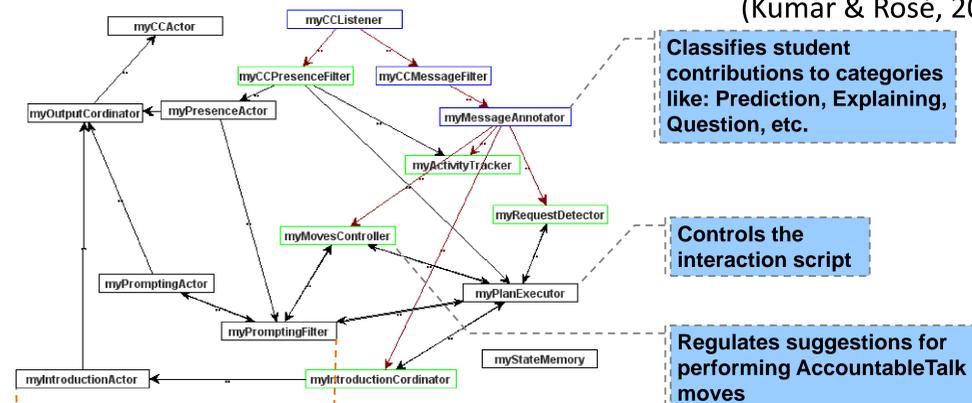
As part of the student group discussion, students are assigned specific Accountable Talk roles, a sampling of which are explained by a comic, to the right.



Implementation Details:

Automated Conversational Tutor built using the Basilica architecture Agent (Tutor) is modeled as a network of behavioral components

(Kumar & Rosé, 2009)



Interactive Behaviors:

- **Introductions & Role Assignment**
- **Instructional Prompts**
- Encouraging students to perform Accountable talk moves

Suggesting Accountable Talk moves is controlled by rules based on:

- Classification of student turns: Prediction / Explanation
 - Prediction favors Challenger move
 - Explanation favors Explainer move
- Current step in the script
 - No Revoicer move during a Prediction step
 - No Challenger move during a Discussion step
- Number of move suggestions performed in the current step (max: 5)
- Time since last suggestion (min: 80 seconds)
- Condition: Direct/Indirect
 - Constraint satisfaction based selection of Performer & Mediator