Personally-Seeded Discussions to Scaffold Online Argumentation

Douglas B. Clark
College of Education, C&I, Arizona State University, Tempe, Arizona, 85287-0911
Tel: (480) 491-7921, Fax: (413) 832-6347
Email: dbc@asu.edu

Personally-seeded discussions support learning and collaboration through an activity structure that elicits, shares, and contrasts students' own ideas to engage them in the discourse of science argumentation and inquiry. The context for this study is an online thermal equilibrium inquiry lab for eighth grade students. The students use a special interface to build principles to describe the data they collect in the lab portion of the project. These principles become the seed comments for the online discussion. The software sorts the students into discussion groups with students who have built different principles so that each discussion group represents multiple perspectives. Students then follow a set of guidelines to critique each other's principles. This paper explores the efficacy of this approach in supporting argumentation structure using a coding scheme developed by Osborne, Erduran, and Simon (2002). The Toulmin-based hierarchy rates arguments according to level of structural sophistication in terms of first order elements including Claims, Grounds, and Rebuttals.

The personally-seeded discussion system analyzed in this study was piloted in an online inquiry project. Students begin the inquiry project by making predictions about the temperature of everyday objects around them in the classroom. Students then use thermal probes to investigate the temperature of these objects and construct principles to describe the patterns encountered. This first portion of the project attempts to cue students' conflicting ideas, including students' sense that objects are different temperatures because "they feel that way" and students' sense that objects in the room should be the temperature of the room because "what would make them be a different temperature?" In the second portion of the project, the project places students in electronic discussion groups with students who have constructed different principles explaining the data.

Category Of Contribution	Number of Comments	Mean Episode Depth	Claims (Define Episode)	Opposing Claims	Opposing Claims w/ Grounds	Rebuttals	Rebuttals w/ Grounds	Support	Support w/ Grounds	Support (Clarification)	Support (Change Position)	Queries	Emotional Appeals	Off Task Remarks
All Episodes (Total)	412		120	24	2	25	72	49	25	16	8	32	23	40
All Episodes (Mean)	3.43	2.74	1	0.2	0.02	0.21	0.6	0.41	0.21	0.13	0.07	0.27	0.19	0.33
Non-Oppositional Episodes (Total)	137		58	0	0	0	0	36	16	1	2	6	7	17
Non-Oppositional Episodes (Mean)	2.36	2.24	1	0	0	0	0	0.62	0.28	0.02	0.03	0.1	0.12	0.29
Oppositional Episodes (Total)	275		62	24	2	25	72	13	9	15	6	26	16	23
Oppositional Episodes (Mean)	4.44	3.21	1	0.39	0.03	0.4	1.16	0.21	0.15	0.24	0.1	0.42	0.26	0.37
Oppositional Episodes Rated 1 (Total)	25		9	11	0	0	0	0	0	1	0	3	2	2
Oppositional Episodes Rated 1 (Mean)	2.76	2.56	1	1.22	0	0	0	0	0	0.11	0	0.33	0.22	0.22
Oppositional Episodes Rated 2 (Total)	0		0	0	0	0	0	0	0	0	0	0	0	0
Oppositional Episodes Rated 2 (Mean)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oppositional Episodes Rated 3 (Total)	30		12	0	0	13	1	1	1	2	0	2	0	0
Oppositional Episodes Rated 3 (Mean)	2.5	2.42	1	0	0	1.08	0.08	0.08	0.08	0.17	0	0.17	0	0
Oppositional Episodes Rated 4 (Total)	98		26	8	0	2	26	4	5	6	4	15	5	4
Oppositional Episodes Rated 4 (Mean)	3.77	3.12	1	0.31	0	0.08	1	0.15	0.19	0.23	0.15	0.58	0.19	0.15
Oppositional Episodes Rated 5 (Total)	122		15	5	2	10	45	8	3	6	2	6	9	17
Oppositional Episodes Rated 5 (Mean)	8.13	4.4	1	0.33	0.13	0.67	3	0.53	0.2	0.4	0.13	0.4	0.6	1.13

Osborne et al. cited a baseline of 2% of typical classroom discourse involving argumentation. In comparison to this 2% baseline, personally-seeded discussions scaffold significantly higher levels of argumentation with minimal teacher training. Osborne et al.'s findings suggest that altering teacher practice is more critical than student training in terms of changing quality of argumentation in the classroom. In their study, the important variable was the teacher's experience with the interventions. Importing curricular change into the classroom might be more easily accomplished with technology. An interesting future question focuses on the degree to which extended interaction with personally-seeded discussions might change teacher or student argumentation behavior in the classroom when outside of the online scaffolds. What would be the impact over time of participating in these online discussions? Will students internalize any of these improved argumentation strategies and use them unprompted in classroom settings? (Download more about this work at: http://courses.ed.asu.edu/clark/)