

Learning in Collaborative Electronic Discussion vs. Classroom Discussion in Science

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Introduction

Can electronic discourse improve scientific discussion among 8th grade students? Classroom discussion can privilege teachers, stifle debate, and silence women. Electronic discussion tools can have several advantages over face-to-face classroom discussion. In this study, electronic discussion and classroom discussion are contrasted, and the role of comment attribute and authority participation is explored.

The Multimedia Forum Kiosk (MFK) is an electronic discussion tool used to research alternative formats for discussion (Hoadley & Hsi, 1993). Two graphical representations of discourse are provided in MFK called the *Opinion Area* and the *Discussion Area* (see URL: <http://obelisk.berkeley.edu/kiosk/kiosk.html>). Students may browse position statements of other participants in the Opinion Area, or add to an on-going argument in the Discussion Area. The Discussion Area displays discourse as argument trees where all comments are labeled by semantic category. Pilot data suggests that electronic discussion increases student participation, allows students to reflect on a comment before reading another one, and encourages students to link their contributions to existing comments.

Method

Six class periods with a total of 165 students used MFK during an 18-week physical science curriculum as part of the Computers as Learning Partner project (Linn, 1992). Every four weeks, a new topic from the curriculum was posted on MFK and discussed by 11 groups of 15 students each.

The MFK software ran on a pair of Macintosh computers at the side of the classroom; students took turns using the software during breaks between classes, after school, or during free time in class. No time was specifically devoted to using the system other than an in-class demonstration the first time the system was introduced to the classroom.

Equal numbers of boys and girls were randomly assigned into one of three MFK discussion conditions for each topic: anonymous, attributed, or attributed plus authority participation. For the anonymous condition, all participants were assigned unique cartoon identities. For the attributed condition, students' names and photos were displayed, but comments made by researchers or teachers were anonymous. In the authority-participation condition, all comments were attributed to named photos, and the classroom teachers and researchers were prominently identified as science authorities. In the authority-participation condition, an authority entered

an opinion in the Opinion Area, as well as participated in the discussion, while the authorities made few comments in the attributed condition. An electronic log recorded all comments and time-stamped all writing and reading interactions. Eight video and field observations of class discussion led by the classroom teacher served as comparison to MFK discussion.

Results

Using MFK, three electronic discussion formats are contrasted: all comments are anonymous, all comments are attributed, and comments are attributed plus authority participation (e.g. the classroom teacher). In all three formats, 78% of the students contributed compared to only 15.3% participation in class discussion. Boys also interrupted more than girls and raised their hands more frequently. In comparison, gender participation in electronic discussion was equitable ($t = .53, p = .59$). Girls participated *more* than boys in electronic discussion, and less in classroom discussion compared to boys.

Analyses of comment content indicated all electronic discussions were characterized by high levels of scientific conceptual content, elaborations, and question-asking. While there were no significant differences in quality between electronic discussion formats, the quality of elaborations declined with authority participation.

In summary, electronic discourse can improve science discussion by making discussion more accessible to girls, while improving quality with anonymity and less authority participation. As evidence by their ability to generate multiple scientific conceptions as a group and elaborate their ideas, electronic discussion in MFK supports productive discussions in science.

References

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- Hoadley, C. M., & Hsi, S. (1993). *A multimedia interface for knowledge building and collaborative learning*. Paper presented at the International Computer Human Interaction Conference (InterCHI) '93., Amsterdam, The Netherlands