

Children's Emergent Leadership and Relational Thinking in Collaborative Learning

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Abstract: Children's emergent leadership is an important but often ignored component of peer-led collaborative learning. Existing research suggests that emergent leadership develops when children are given the autonomy and space to regulate group dynamics on their own, which often assists the group to achieve better outcomes within the collaborative activities. However, it is less known whether the emergence of child leadership also promotes deeper and more connected reasoning *during* collaborative learning. This current study, by coding emergent leadership and relational thinking from two sets of small group discussions (25 in total), revealed that over time, children exhibited more leadership and relational thinking in the second collaborative discussion than their first one. In addition, *intellectual leadership* moves, rather than *organizational leadership* moves, were positively related to generation of relational thinking. We discuss the implications of the study to help children, particularly minority children from underserved communities, to developing leadership and relational thinking through participating in intellectually stimulating collaborative discussions.

Keywords: child leadership, relational thinking, collaborative learning, development, Collaborative Reasoning

Introduction

Understanding how to support productive social interactions in collaborative learning has become more important, as research shows that without productive peer interactions, even groups with good ideas could fail (Barron, 2003). Besides individual self-regulation, Järvelä and Hadwin (2013) pointed out co-regulation and social regulation among group members plays a key role for collaborative learning to succeed. Socially-shared regulation refers to the regulatory strategies that a group utilizes, to coordinate their collective thinking, actions, and emotions, that help the group achieve its goals. Social regulation can be examined from different angles, and emergent leadership is one of them (Miller, Sun, Wu, & Anderson, 2013).

Emergent child leadership is defined as a reciprocal social process during which some children coordinate, enhance, or guide the behavior of other children (Miller, Sun, Wu, & Anderson, 2013). It is an important but often ignored component of successful collaborative learning groups. Though limited, research that examined children's emergent leadership in both face-to-face and computer supported learning environments has confirmed the benefits of emergent leadership on the productiveness of collaboration (e.g. Yamaguchi, 2004; Cassell, Huffaker, Tversky, & Ferriman, 2006). A microgenetic study of children's emergent leadership, led by Li and her colleagues (2007), found five commonly occurring leadership moves in children's discussion groups: argument development, topic control, turn management, planning and organizing, and acknowledgement. Based on Li et al.'s study, Mercier (2014) coded children's emergent leadership into intellectual and organizational categories, and found that individual children tended to primarily use one type of leadership move instead of both.

Previous research on the impact of children's emergent leadership has primarily focused on how leadership helps the group to achieve better outcomes. For example, research shows that more effective leadership moves helps groups produce better solutions to problems (Mercier et al., 2014; Sun, Anderson, Perry, & Lin, in press), and also promotes group members' positive feelings towards collaboration (Sun et al., in press). However, there has been limited research examining the impact of leadership on the process of collaboration. We know little about whether emergent leadership produces a higher quality of reasoning during collaboration, such as relational thinking.

Relational thinking, as stated by Holyoak (2012), refers to the individual ability to form coherent schemas through conceptualizing, generating, and manipulating relations between different concepts. Such ability to recognize relations through surface and deep levels often sets the foundation for deep learning to occur, such as the transference of knowledge and skills, and conceptual change. Previous research that examines relational thinking in the classroom shows that teacher scaffolding influences children's use of relational

thinking. Lin et al. (2015a) found that when teachers use prompts based on relational thinking, versus lower level prompts such as requesting facts or definitions, students in turn generate more relational thinking. Research has also confirmed that peer relationships, such as individual social status and group level social support, play an important role in students' increased use of relational thinking (Lin et al, 2015b). Besides this emerging inquiry on relational thinking in collaborative learning, it is uncertain whether emergent leadership, a reciprocal social process and dynamic form of peer interactions and group regulation, could also influence children's development in relational thinking. This study therefore aims to fill in the research gap, by exploring the relationship between emergent leadership and relational thinking in Collaborative Reasoning discussions.

Collaborative Reasoning (CR) is a free-flowing, peer-managed approach to discussion intended to stimulate critical reading and thinking and to be personally engaging (Anderson, Chinn, Waggoner, & Nguyen, 1998). Children read stories about controversial issues that cover ethical or practical dilemmas or child-friendly public policy or scientific issues. They take positions on a Big Question raised by a story and present reasons and evidence for and against these positions, with the goal of collaboratively coming up with the best answer to the Big Question. In a CR discussion, teachers are encouraged to step back and reduce their talk, making more room for students to decide when to speak and what to say. Students independently manage the flow of the discussions for the majority of the time, and teachers occasionally provide scaffolding when it is necessary.

Methods

Participants

128 fifth-grade children from six classrooms with a predominant population of African American students from Midwest America participated in this study. Depending on the school, between 79% and 99% of the participating students were registered for free or reduced-priced lunch.

Procedure

During the intervention, the participant classrooms learned a six-week curriculum about wolf reintroduction and management in collaborative group work. The curriculum includes three packets: ecosystem, economy, and public policy. Each packet comprised of readings specific to the topic, and an activity booklet that contained various activities and problems that reinforced and expanded the concepts presented in the readings. Students role played as officials in the Wolf Management Agency while learning the curriculum, and had to make an informed decision on a Big Question about whether or not they should give permission to hire professional hunters to kill a pack of wolves that posed a threat to a fictional town.

The study employed a jigsaw design. Teachers helped split the class into three or four heterogeneous groups, where each group held an initial Collaborative Reasoning discussion based on their naïve opinions about the Big Question (BQ 1). About one third of the groups were videotaped. Groups were then assigned one of the three topics (ecosystem, economy, or public policy) to become experts on by learning the information booklet and completing the activities together. After finishing their expert topic, children were shuffled into new groups to hold a second Collaborative Reasoning discussion about the same Big Question, but with their informed perspectives (BQ 2). All of the second discussions were videotaped. Detailed descriptions of the study can be found in Ma et al. (2016).

Data sources and analyses

The current dataset includes full transcripts of the six groups' first Collaborative Reasoning discussions (BQ 1), and systematically sampled 6-minute episodes from all of the 19 new groups' second Collaborative Reasoning discussion (BQ 2). In sum there are 25 discussions.

Coding for children's relational thinking

Children's relational thinking was examined turn by turn throughout the 25 discussion transcripts using the coding scheme created in Lin et al. (2015), which included two major categories of 1) logical or causal, and 2) analogical or hypothetical relational thinking. Logical or causal keywords and key phrases included *because*, *if*, *so* and *so that*, where statements were based upon conclusions. Analogical or hypothetical relational markers included keywords and key phrases such as *what if*, *if you were*, *is like*, *just like*, *the same as* and *so as*, where inferences were made by relating material to hypothetical scenarios. After speaking turns that included these keywords and phrases were identified, statements were checked in the context to determine if they truly served as one of the two relational thinking functions. About 20% of the relational coding was checked by a different researcher, and the intercoder agreement percentage was 98% (Cohen's Kappa = .90).

Coding for emergent leadership

Children's leadership moves were initially identified using the coding scheme created by Li and colleagues (2007), which primarily included five categories of *argument development*, *topic control*, *turn management*, *planning and organizing*, and *acknowledgement*. Due to the infrequency of *acknowledgement* ($n=1$), we dropped it from the coding results, and kept the rest of the four leadership moves. In the second step of coding, we applied the categorization developed by Mercier, Higgins, & de Costa (2014), and combined *argument development* and *topic control* into *intellectual leadership*, and *topic control* and *turn management* into *organizational leadership*. About 10% of the leadership coding was checked by a second coder, and the intercoder percentage of agreement was 88% (cohen's kappa = .76).

Findings

Overall, there were 2,592 turns from the 25 transcripts, of which 473 (18.25%) speaking turns contained relational thinking, and 207 (7.99%) showed the use of at least one type of leadership move. To adjust for the variance in the length of the discussion transcripts, numbers of leadership moves and relational thinking coded within each transcript were standardized by dividing the total speaking turns of that transcript.

As shown in Figure 1a and Figure 1b, children used more leadership moves, and generated more relational thinking, in the second Big Question discussion compared to the first one. In both discussions, *intellectual leadership* moves were positively related to relational thinking ($r_{BQ1} = .16$, $r_{BQ2} = .43$). This trend can be seen in the following example where student A made a leadership bid of argument development for student B, who compared dogs and wild wolves to support his argument that wolves should be killed.

Student A: Why don't you give us-or a good reason why they should [kill the wolves.]

Student B: Because they're dangerous wild animals. They're not-they're not (dogs) like-to the point where you could like take care of them. Mmmmm. You could take care of them, but not like one of your own like a (a parrot) or something."

Organizational leadership moves, however, negatively correlated with relational thinking ($r_{BQ1} = -.12$, $r_{BQ2} = -.53$). This is perhaps due to the nature of organizational leadership, where a majority of attempts were to take control of or change the direction of the conversation. Organizational moves were also found to lead to simple yes and no answers, rather than lengthy explanations, thus may not promote or even inhibit relational thinking. This can be seen in the following example, where student C tried to summarize the group's decisions by asking group members to restate their positions. Though such leading gesture helped everyone to see each other's standing, the flow of the discussions was also interrupted.

Student C: Yeah but she didn't say all that. Alright who thinks yes? (Several students raise their hands.) And no? (Two students raise their hands.)

Student D: Sort of...

Student E: How about you [pointing to student F]

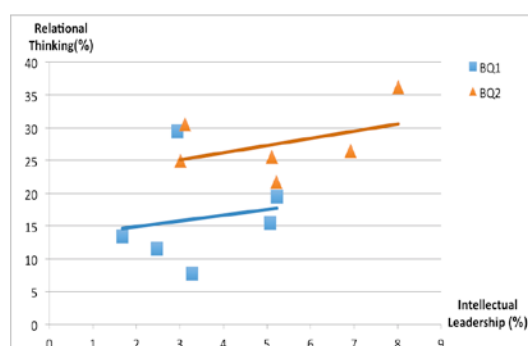


Figure 1a. Correlation between *Intellectual Leadership* and Relational Thinking in BQ 1 and BQ 2.

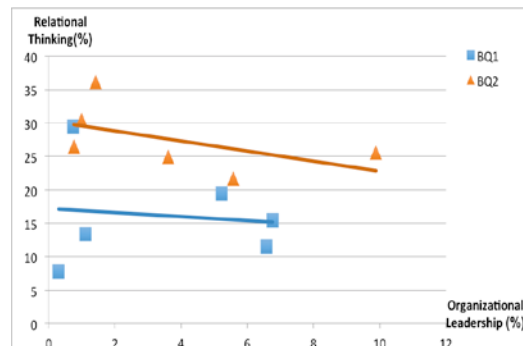


Figure 1b. Correlation between *Organizational Leadership* and Relational Thinking in BQ 1 and BQ 2.

The initial results can be interpreted that over time, children developed emergent leadership skills and an ability in using relational thinking. In classes where *intellectual leadership* moves emerged, children were also more likely to use relational thinking that contains hypothetical, analogical, and causal reasoning. However, in classes where there were many *organizational leadership* moves, children's likelihood of using relational thinking decreased. The initial findings are intriguing, and in order to understand why these two types of

leadership moves had completely opposite relationships with relational thinking, we are currently under closer examination of features of these two different types of leadership moves. In order to take advantage of the temporal information reserved from the transcripts of the collaborative learning process, we will conduct sequential analysis in the next step to further explore the immediate and delayed impact of *intellectual* and *organizational leadership* moves on children's relational thinking. We expect to answer questions such as: If a child requests his or her peers to provide clarification of their thinking, will this immediately trigger relational thinking from the rest of the group? Does conversation and relational thinking stall following *organizational leadership* moves?

Conclusions and implications

Findings from this current research speaks directly to the intertwining nature of children's social and cognitive development during collaborative learning. Children's emergent leadership, including organizational and intellectual leadership, was closely related to their relational thinking. Additionally, the participants in this current study were primarily minority children from under-served communities with a high poverty rate. Children from such communities often lack the opportunities to work on challenging activities collaboratively. The study shows that Collaborative Reasoning and group work can be an alternative instructional method to provide intellectually stimulating environments where students naturally develop essential skills such as deep learning and leadership. Findings from this study, though representing a face-to-face collaborative learning activity, may also have implications for computer supported collaborative discussions. The initial findings indicate that to help students further develop relational thinking, tools that help students to plan and organize group dynamics at appropriate timing could be particularly beneficial.

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