Technology-Supported Dialog as a Bridge to Developing Individual Argumentive Thinking and Writing

Deanna Kuhn, Teachers College, Columbia University, dk100@columbia.edu
Wendy Goh, Teachers College, Columbia University, adrwendy@gmail.com

Abstract: We describe the rationale, implementation, and outcomes of a multi-year program featuring electronic dialog as a tool in developing both discourse skills and individual argumentive thinking and writing in middle-school students. Its theoretical roots lie in the sociocultural tradition, in particular Vygotsky's view that the inter-mental with practice becomes interiorized and transformed into the intra-mental. We report on the gains observed among successive cohorts, relative to close comparison groups who engaged in non-dialogic whole-class discussion. Gains are seen both in dialogic argumentation and in individual written argument, specifically with respect to counterargument and the use of evidence.

Keywords: argumentation, technology, discourse, dialog, writing, reasoning, middle school

Introduction

The last decade has seen a notable expansion of attention to argument skills as an educational objective, reinforced by the US Common Core Standards emphasis on non-fiction writing and reading, and, within science, by the US Next Generation Science Standards emphasis on scientific practices, in particular argumentation. Neither set of standards, however, specifies how mastery of argument skills is best achieved. We describe a multi-year program featuring electronic dialog as a tool in developing argumentive thinking and writing in middle-school students. The program rests on the view that core intellectual skills such as argumentation must be developed in a context of rich content but are sufficiently important to warrant dedicated attention, rather than being subordinated entirely to subject matter content goals, where they risk neglect.

Rationale

We regard dialogic argumentation as a productive vehicle for developing both individual and dialogic argumentive competencies on several grounds. One is the close connection between an individual argument as a product and dialogic argumentation as a process (Billig, 1987). Another is the developmental origins of dialogic argumentation in everyday talk. A third is the ability of dialogic argumentation to provide the "missing interlocutor" (Graff, 2003) that often leaves students' expository writing devoid of purpose.

Our approach is consistent with the sociocultural tradition of Vygotsky in taking the everyday social practice of dialog as a starting point and pathway for individual development: The inter-mental with practice becomes interiorized and transformed into the intra-mental. A dialogic approach argumentation has ancient origins with Socrates and Plato. We draw on the contemporary philosophical work of Walton (1989), who identifies two goals of argumentation: to secure commitments from the opponent that can be used to support one's own argument and to undermine the opponent's position by identifying and challenging its weaknesses.

Skill development requires sustained, dense practice in rich environments that require those skills and values. It requires both a supportive community and the strengthening of individual skills and understanding, and hence is not quickly achieved (Kuhn et al., 2013). In contrast to approaches emphasizing explicit instruction as the key tool in developing critical thinking and writing, our approach is experiential in its pedagogical emphasis and microgenetic with regard to research methodology. By observing students engaged in technology-supported guided practice, we believe we seek to gain insight into what develops and how.

Overview of method

Our initial work documented that young adolescents engaged in argumentation concentrate on exposition of their own claims, essentially ignoring the opponent's position. Thus, the initial goals of our program are to encourage attention to the other's position and to enhance ability and disposition to address it, the objective being to weaken it, or in other words, to engage in counterargumentation. Our focus then shifts to use of evidence to strengthen and weaken claims. By securing answers to their own self-generated questions on the topic, students contribute to a set of evidence that plays an increasing role in their argumentation. Students ask questions so as to create a need for the information they acquire. They see how such information could be useful in achieving their discourse objectives, and then we assist them in securing it.

The recurring sequence of activities and their objectives are summarized in Table 1. The cognitive goals are not strictly sequential in order and rather are visited and revisited multiple times with new and gradually more complex ideas and topics. The core activity is one in which students use chat software to conduct electronic dialogs on a social issue (Fig. 1). They begin with topics close to their own experience, e.g., Should a misbehaving student be expelled or given a second chance, and gradually move on to topics of wider scope, e.g., Should organ sales be allowed. See Kuhn et al. (2016) for further details.

Table 1: Summary of curriculum activities and associated cognitive goals

Curriculum Activity	**Cognitive Goal**
Generating reasons	Reasons underlie opinions. Different reasons exist for the same opinion.
Elaborating reasons	Good reasons support opinions.
Evaluating reasons	Some reasons are better than others.
Developing reasons into an argument	Reasons connect to one another and are building blocks of argument.
Examining and evaluating opponents' reasons	Opponents have reasons too.
Generating counterarguments to others' reasons	Reasons can be countered.
Generating rebuttals to others' counterarguments	Counters to reasons can be rebutted.
Supporting [and weakening] arguments with evidence	Evidence can strengthen claims. It can also weaken claims.
Contemplating mixed evidence	The same evidence can be used to support or weaken different claims. The same claim can be supported or weakened by different pieces of evidence
Conducting and evaluating two-sided arguments	Opposing positions must be weighed in a framework of alternatives and evidence.
Constructing a [written or oral] individual argument	An individual argument can be constructed from a dialogic argument.

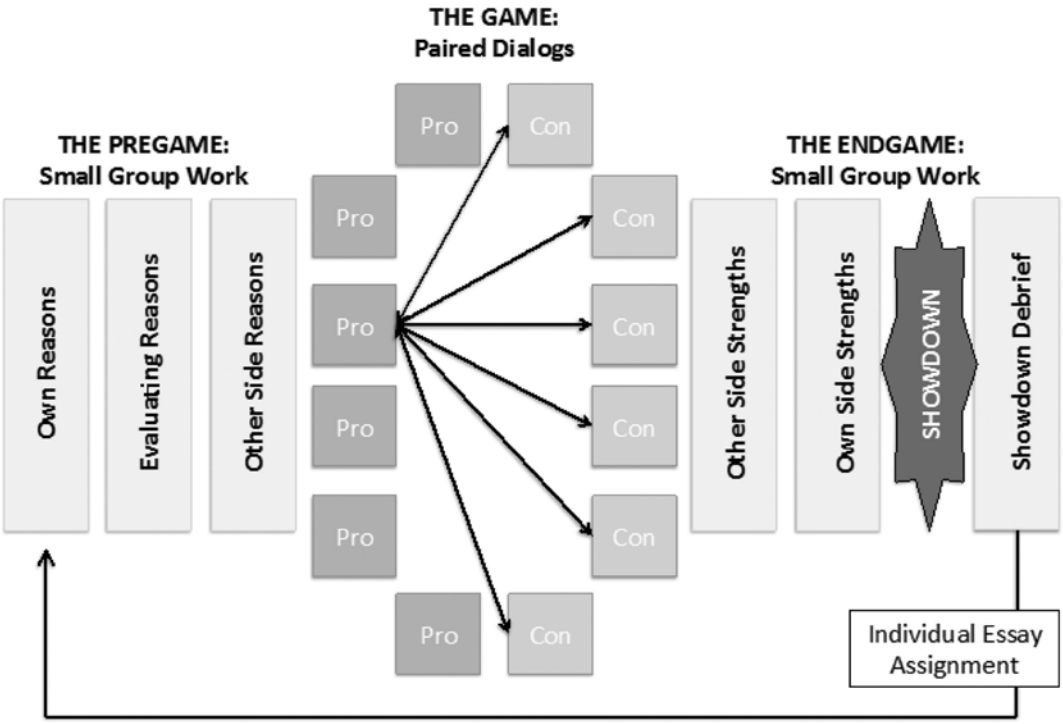

Figure 1. Topic workflow from pregame to final essay (from Kuhn et al., 2013).

Discourse is electronic to facilitate reflection on it. Students work in same-side pairs to promote externalization of and reflection on their thinking, with each pair conducting electronic dialogs with a series of opposing-side pairs. Over 13 class sessions devoted to a single topic, same-side team work precedes and follows

the dialogs. The sequence culminates in a whole-class "Showdown" debate, debrief, and individual position essays (Fig. 1). The major way we support students' thinking is by externalizing it, making it more visible. Doing so increases awareness of their own and others' thinking, a first step in enabling them to reflect on it, and, in so doing, to enrich it. The visible transcript of the dialog allows students to review and reflect on what has been said. This feature stands in striking contrast to face-to-face dialog, where the spoken word disappears once it is uttered, challenging memory capacities.

Because the pair must agree in advance on what to communicate to the opposing pair, participation in reasoned discourse is doubled (both verbal within the same-side pair and electronic between opposing pairs) and encourages metacognitive planning and reflection (since the pair must reflect on the opponents' statements and debate what to say in return). Other activities based on the dialogs function as additional tools of reflection. For example, students are asked to identify the major arguments and their counterarguments and rebuttals, as well as relevant evidence. These summaries remain available as resources during preparation for the final Showdown and the Showdown itself, as well as the adult-led debrief analysis that follows.

That activities center around peer interchange, rather than whole-class, teacher-directed talk, promotes students becoming accountable to one another, as members of a community with evolving group norms. Students are constantly on call and cannot assume the passive role of audience. These evolving norms must be constructed within the group and gain acceptance by its members, with risk of criticism for violating them. Claims must have reasons and reasons must stand to the challenge of arguments and evidence that can weaken them. Shared understandings evolve regarding acceptable counterarguments and what counts as evidence.

Results

Our assessment of outcomes is based on 12 middle-school classes who participated twice weekly for two to three years. Comparison classrooms participated in a parallel twice-weekly class taught by school faculty. This class was equivalent in time and work investment but followed a more traditional whole-class format, plus writing assignments, but without the pair dialogs, electronic discourse, or structured debates of our curriculum. Initial and final assessments of these classes as well allowed for close comparison.

At annual assessments a pair who held opposing views on the assessment topic (capital punishment, which was not part of the curriculum) conducted a dialog in writing. These were divided into idea units and each classified according to whether it "countered" the opponent's immediately preceding statement in either of two ways —as a counter-alternative, i.e., one that opposes the statement by proposing an alternative argument, or as the stronger counter-critique (or direct counter) that opposes the statement and directly critiques it.

Proportions of dialog statements classified as counterarguments rose with each yearly assessment among the participating group but not the comparison group (Crowell & Kuhn, 2014). (See Figures 2 and 3.) As shown, it is mainly the simpler counter-alternative arguments that become more prevalent during the first year, while counter-critiques do not rise until the second year. Least overall gain appears during the third year. Yet, when these gains are broken down by initial skill level, the one third of the experimental group that showed least skill at the initial assessment continue to improve during the third year, indicating the program continues to be of benefit to them. Indeed, even this initially least able group reached a proportion of direct counterargument of almost 50%, almost equal to that of their peers who began with more initial skill. These findings are important in establishing not only that the curriculum works but does so very well for low-ability students.

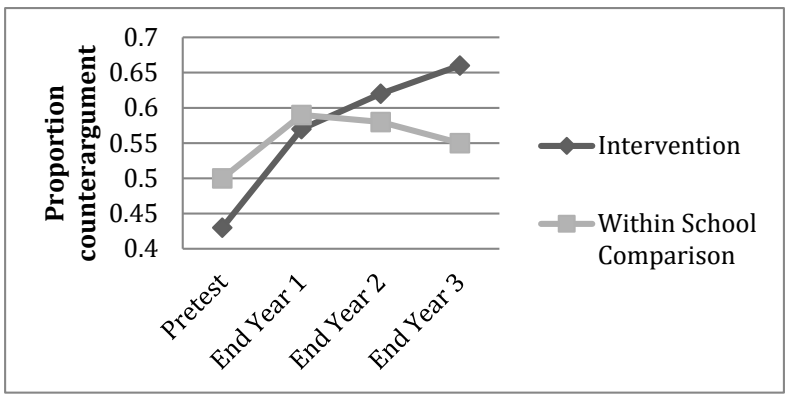

Figure 2. Mean proportion counterargument use by group and time (from Crowell & Kuhn, 2014).

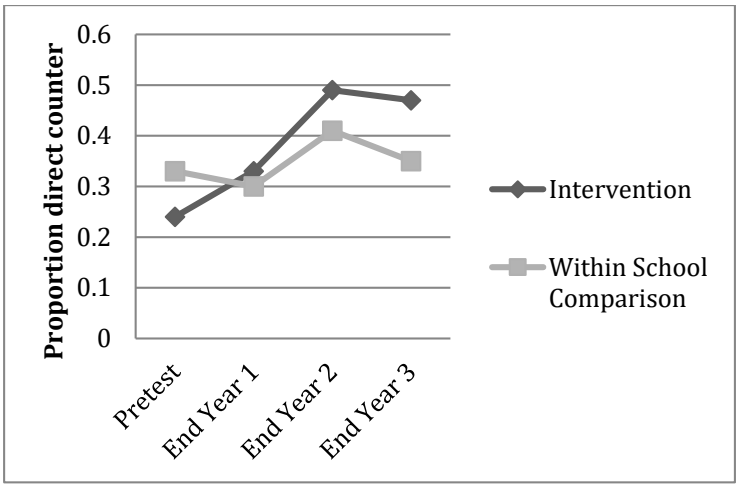

Figure 3. Mean proportion counter-critique use by group and time (from Crowell & Kuhn, 2014).

We also saw gains in students' evaluation of arguments and in their construction of hypothetical two-sided dialogic arguments (Kuhn et al., 2013), and the outcome measure of greatest interest to educators, students' individual argumentive essays. We administered at each assessment point a writing assignment on a topic not part of the curriculum. We kept the topic constant over time, to be able to more precisely gauge students' gains. Like the dialogic assessments, this assessment was also administered to the comparison classes.

At the pretest one third of both groups wrote essays that addressed both sides of the issue (whether teachers should receive experience-based or equal pay). At the end of year 1, two thirds of the experimental group did so, with no significant change in the comparison group, and at the end of year 2 this percentage rose to 79%, again with no improvement in the comparison group (Kuhn & Crowell, 2011). Further development toward an integrative stance (that includes negatives of preferred position or positives of opposing position) did not occur until year 3 and only in the experimental group.

Conclusion

Argument as core curriculum requires not only new approaches but a vision and commitment on the part of educators, especially when competing, more traditional objectives infringe on it. Our findings support the view that its place as core curriculum is productive and thus justified. The group norms regarding intellectual discourse that we observe evolve during our curriculum are at first confined to this special context, but hopefully in time become familiar enough that students begin to recognize these standards as a powerful and valued mode of discourse observable far beyond their classrooms, one that they are capable of participating in fully, as citizens and in all their individual pursuits.

References

Billig, M. (1987). *Arguing and thinking: A rhetorical approach to social psychology.* Cambridge: Cambridge University Press.

Crowell, A., & Kuhn, D. (2014). Developing dialogic argumentation skills: A 3-year intervention study. *Journal of Cognition and Development,* 15, 363-381,

Graff, G. (2003). *Clueless in academe: How schooling obscures the life of the mind.* New Haven: Yale University Press.

Kuhn, D. (1991). *The skills of argument.* Cambridge: Cambridge University Press.

Kuhn, D., & Crowell, A. (2011). Dialogic argumentation as a vehicle for developing young adolescents' thinking. *Psychological Science, 22*, 545-552

Kuhn, D., Hemberger, L., & Khait, V. (2016). *Argue with me: Argument as a path to developing students' thinking and writing.* New York: Routledge.

Kuhn, D., Zillmer, N., Crowell, A., & Zavala, J. (2013). Developing norms of argumentation: Metacognitive, epistemological, and social dimensions of developing argumentive competence. *Cognition & Instruction, 31,* 456-496.

Walton, D. N. (1989). Dialogue theory for critical thinking. *Argumentation, 3,* 169-184.