

Constraints and affordances for the implementation of dialogic argumentation in science classrooms

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Despite research demonstrating the efficacy of dialogic argumentation in supporting student learning, and although this practice is advanced in local and global reform documents, we continue to find evidence that implementation rarely occurs in classrooms, where teacher-centered instruction predominates. But what is it that makes teacher-centered pedagogy seem like a fundamental feature of schools, while dialogic argumentation has been relatively ignored? An answer to this question can have a lasting impact in the field of science education as it can advance dialogic argumentation from theory and policy to practice "on the ground". To answer it, this research draws on insights and concepts from the new institutional theory, which describes how organizations (e.g., schools) develop practices and norms based not on efficiency, but on social legitimacy. This legitimacy is bestowed onto organizations through compliance to macro-level ideas about how they ought and should act, defined as institutional logics. Guided by this notion, I argue that an examination into how institutional logics inform instruction in schools should precede - and inform - attempts for implementation "on the ground", where it actually matters.

Accordingly, the first study that comprises this research takes place inside schools and is concerned with the identification of macro-level institutional logics that teachers invoke to imbue their work with sources of legitimacy, and with the ways in which these logics inform micro-level teacher-student classroom interactions. Based on an inductive analysis of observations, teacher interviews, and documents, three macro-level institutional logics emerged which give rise to practices that run counter to dialogic argumentation: (a) accountability, (b) tracking, and (c) the profession. At the micro-level, classroom observations show that instruction that is shaped by these logics is narrowed to mostly direct instruction of terminology and facts, and is stratified into various status levels according to classroom tracking. I argue that teachers may resist dialogic argumentation primarily because it violates the fundamental rules, norms, and practices that grant them individual and organizational legitimacy. To advance its implementation "on the ground", I conclude, dialogic argumentation may need to be more convergent with the institutional logics that structure teachers' work.

A following study aims to utilize an extracurricular environment, in which teachers can experiment with dialogic argumentation without threats to legitimacy, to find ways to carry this pedagogy more consistently with the elements deemed valuable inside schools. This study focuses on socioscientific argumentation which can give rise to unproductive argumentation and engender classroom interactions that diverge from reliance on objective science knowledge toward subjective claims, thus conflicting with how quality learning is traditionally defined. Enactments of teacher-led and peer-led socioscientific argumentation were examined using two qualitative analytical frameworks related to the content and form of the students' arguments. The findings show that in teacher-led argumentation, students relied on science knowledge more prominently when teachers followed up students' responses with interrogative questioning. In peer-led argumentation, talk tended to collapse into confrontational disagreement or uncritical agreement, obscuring instances in which students relied on science knowledge. In the pursuit to advance dialogic argumentation, these findings grant an instrumental significance to teachers' use of productive talk moves, but also suggest that teachers may be constrained in their knowledge regarding the management of dialogic activities.

Aiming for a lasting impact in the field of science education, the findings from the two studies are integrated to offer an institutionally informed teachers' professional development (TPD). This TPD account for the perceived legitimacy of dialogic argumentation, for the knowledge and competency needed from teachers to carry dialogic activities in productive ways, and for the interactional mechanisms that can mediate instruction in science classrooms away from teacher-centeredness. As such TPD aims not to collide, but to converge with the institutional conditions in schools, it holds the potential to advance the implementation of dialogic argumentation "on the ground" in sustainable and substantive ways.