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Quality of educational dialogue and association with students' academic performance

Heli Muhonen^{*}, Eija Pakarinen, Anna-Maija Poikkeus, Marja-Kristiina Lerkkanen, Helena Rasku-Puttonen

Department of Teacher Education, University of Jyväskylä, P.O. Box 35, 40014 Jyväskylä, Finland

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ABSTRACT

The study used a mixed-methods approach to examine the associations between the quality of educational dialogue and students' academic performance and to analyse what kinds of dialogic teaching patterns of different levels of quality can be identified in classroom lessons. A total of 158 Grade 6 lessons were video-recorded, and the quality of the educational dialogue was assessed using the Classroom Assessment Scoring System-Secondary (CLASS-S) observational instrument. Multilevel modelling indicated that the quality of educational dialogue was positively associated with students' academic performance (grades) in language arts and physics/chemistry. Qualitative analysis was subsequently used to examine the quality of the patterns of dialogic teaching in language arts and physics/chemistry lessons ($n = 11$). The analysis revealed that teacher-initiated patterns were predominant in both subjects and that physics/chemistry lessons were more typically characterised by high-quality educational dialogue than language arts lessons.

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1. Introduction

As the nature and intent of teaching are seen less as a transmission of information and more as guidance and support for students' self-regulated learning and shared knowledge building (Wells & Arauz, 2006), it has been acknowledged that the quality of learning and its outcomes rely on learning activities and students' involvement in exploratory action (e.g. Bransford, Brown, & Cocking, 2000; Vermunt & Verloop, 1999). Through their organisation of activities and classroom time, teachers create and shape the dynamics of interactive opportunities, but the quality of the interaction between teachers and students as well as that of educational dialogue are most critical for the construction of knowledge and learning in classrooms (Alexander, 2006). The relevance of the quality of educational dialogue for the development of students' deep understanding has been documented in science, in particular, but it also applies to other curriculum subjects (e.g. Alexander, 2000; Howe, 2010; Mercer & Littleton, 2007;

Mortimer & Scott, 2003; Nystrand, 1997).

Although there is increasing documentation of the use and benefits of promoting exploratory talk among students in small-group discussions both in primary and secondary education (e.g. Dawes, Mercer, & Wegerif, 2000; Howe et al., 2007) as well as in higher education (e.g. Kaartinen & Kumpulainen, 2002), research evidence of learning gains relating to the quality of whole-class dialogue, as observed in authentic classroom situations, remains scarce. There is a need for more research on the benefits and learning outcomes of different types of educational dialogues (Howe, 2017; see Howe & Abedin, 2013 for a meta-analysis). Observations and video-recordings of authentic classroom discussions provide valuable data for examining students' learning and conceptual changes, but engaging in an analysis of this kind of data is also demanding and requires rigorous and systematic approaches (Mercer & Howe, 2012). Consequently, the aim of our study was to utilise a mixed-methods approach to examine the association between the quality of educational dialogue in whole-class lessons and students' academic performance (grades) in Grade 6 as well as the quality of teacher-initiated and student-initiated dialogic teaching patterns in different subjects.

^{*} Corresponding author.

E-mail addresses: heli.j.muhonen@jyu.fi (H. Muhonen), eija.k.pakarinen@jyu.fi (E. Pakarinen), poikkeus@jyu.fi (A.-M. Poikkeus), marja-kristiina.lerkkanen@jyu.fi (M.-K. Lerkkanen), helena.rasku-puttonen@jyu.fi (H. Rasku-Puttonen).

1.1. The sociocultural approach to learning and scaffolding

The conceptual basis of the present study draws from the sociocultural approach to learning and the Vygotskian view (1978) of the fundamental role of language in children's learning and development. According to the sociocultural theory, language can be defined both as a cultural tool for sharing and developing knowledge and as a psychological tool for analysing the content and processes of individual thoughts (Vygotsky, 1978); it is through language that individuals learn via interaction and build collective understanding. Although Vygotsky focused on adult-child interactions in general, sociocultural approaches to learning have been increasingly applied to teacher-student and peer interactions and to theoretical accounts of educational dialogue in the classroom.

Scaffolding is a term that is widely used to describe the process by which a teacher or more experienced peer supports a child's learning through interaction (Wood, Bruner, & Ross, 1976). Van de Pol, Volman, and Beishuizen (2010) suggest that scaffolding consists of three main features: 1) *contingency* (tailored, responsive and adjusted support); 2) *fading* (gradual withdrawal of the support over time) and 3) *transfer of responsibility* (the teacher eventually transfers the responsibility of performing the task to the student). Ideally (and what is meant by scaffolding in this study), the process of scaffolding is interwoven in educational dialogue whereby the teacher supports students' participation, meaning making and independent thinking, for example, through open questions, inquiry and feedback and encourages them to explain their thinking (Gillies, 2013; Rogoff, 2008; Rojas-Drummond, Torreblanca, Pedraza, Vélez, & Guzmán, 2013). Muhonen, Rasku-Puttonen, Pakarinen, Poikkeus, and Lerkkanen (2016) identified patterns of teacher- and student-initiated dialogic teaching with different qualities of teacher scaffolding and initiation of the dialogue. Two of the patterns presented moderate quality, with relatively unitary forms of scaffolding for students' participation, and shared understanding, e.g. mostly closed questions that did not invite students' active sharing and elaboration of their thoughts. In addition, the level of the questions and teachers' comments was mostly on an abstract level, not closely tied with the students' experiences and everyday lives. The two other patterns presented more versatile and rich scaffolding of students' participation and shared understanding, e.g. authentic open-ended questions, summaries of the main concepts, invitations for students to explain their opinions and justify them and the use of inquiry-stimulating vocabulary.

1.2. Educational dialogue and dialogic teaching

There is no clear consensus on the definition of educational dialogue, as it can be seen to occur between the teacher and students, or between students, and an emphasis can be placed on the exchanges and involvement of the participants in the dialogue or on the teacher's orchestration of the resources and scaffolds that contribute to dialogue. There is considerable variation in the terms used to refer to forms of educational dialogue, such as dialogical pedagogy (Skidmore, 2006), dialogic teaching (Alexander, 2006), dialogic inquiry (Wells, 1999), dialogic instruction (Nystrand, 1997), exploratory talk (Mercer & Dawes, 2008), accountable talk (Wolf, Crosson, & Resnick, 2006) and collaborative reasoning (Rheznitskaya et al., 2001). Wegerif's work (2007) proposes the idea of a 'dialogic space' within which teachers and students can negotiate, explore and confront different ideas in an open and constructive environment. Because the present study focuses on whole-class dialogue between the teacher and students, we see teachers as playing a vital facilitating role in educational dialogue. Consequently, in this study, we construe educational dialogue as

reciprocal interaction in the classroom, in which both the teacher and students are present, exploring different ideas and views in an attempt to build shared understanding in accordance with Alexander's (2000, 2006) criteria for dialogic teaching.

The concept of dialogic teaching, according to Alexander (2000, 2006), describes five principles of interaction that harness the power of talk to stimulate and develop students' thinking, learning and understanding and also extends interaction between students. Classroom interaction can be considered dialogic when it meets the criteria of being: 1) collective (participants, here teacher and students, address learning tasks together); 2) reciprocal (participants listen to each other, share ideas and consider alternative viewpoints); 3) supportive (students articulate their ideas freely without fear of embarrassment, and they help each other to achieve shared understanding); 4) cumulative (participants build on their own and each other's ideas and link them to coherent lines of thinking and enquiry) and 5) purposeful (the teacher plans and steers discussion with specific learning goals in mind). Two additional features have been suggested by Lefstein (2006) to complement the existing criteria for dialogic teaching. According to Lefstein, dialogue should also be: 6) meaningful (the teacher and students bring their own views to the discussion of a topic of mutual interest) and 7) critical (the teacher and students identify different points and explore questions related to them). Alexander (2013) suggests that by acknowledging and utilising the educational functions of talk (for thinking, learning, communicating, democratic engagement, teaching and assessing) in dialogic interactions, teachers can facilitate the development of students' cognitive and communication skills. Despite the important role of teachers as facilitators of educational dialogue, it is important to acknowledge the educational student-to-student dialogue that can be observed in dialogic classroom (Alexander 2008).

A number of studies have linked the quality of dialogue to how students learn. Nystrand (1997) proposes the following aspects as reflecting the quality of a teacher's dialogic instruction: 1) the use of authentic questions, 2) the incorporation of students' responses into subsequent questions and 3) allowing students' responses to modify the topic of discourse. Although it is the teacher who predominantly initiates and manages classroom dialogue (Wells, 2009), also students can provide turns that initiate sequences that the teacher or other students contribute to with their responses (Lemke, 1990; Nassaji & Wells, 2000). For younger students it can be difficult to engage in sustained discussion of a certain topic and they easily go off on side-tracks (Wells, 2009). Even these side-tracks can, however, turn into meaningful educational dialogues if the teacher sensitively responds to students' initiatives and ideas and scaffolds the shared knowledge-building process. Cazden (2001) suggests that it is only by allowing more time for students' answers and elaborations that the teacher can create a more dialogic atmosphere and classroom dynamic where students respond to and build on each other's comments. Muhonen et al. (2016) defined the quality of dialogue through differences in a teacher's scaffolding strategies and initiation of the dialogue. In student-initiated dialogues the student asks a question or presents an idea, which the teacher extends to whole class discussion or allows space for students' independent discussion, and the focus of the discussion is on the ideas that rise from students' interests. In teacher-initiated dialogues, teacher's involvement and questioning is typically planned a priori, and the teacher uses a wide variety of scaffolding strategies. Patterns showing different qualities of dialogue and turn-taking have also been documented by, e.g. Chin (2006), and Rasku-Puttonen, Lerkkanen, Poikkeus, and Siekkinen (2012).

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