Full length article

Fostering and scaffolding student engagement in productive classroom discourse: Teachers' practice changes and reflections in light of teacher professional development

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A R T I C L E   I N F O

A B S T R A C T

The present study investigated the extent to which two teacher professional development (TPD) programmes on classroom discourse, which differed systematically in their options for professional learning, would support teachers in changing their teaching routines regarding the levels of 1) *teacher questions*, 2) *student answers* and 3) *teacher feedback*. An initial comparison revealed that the video-based programme Dialogic Video Cycle (DVC) supported teachers in making significant changes regarding the level of feedback. Concerning the levels of teacher questions and student answers, no significant changes could be found between the first programme and the second programme: the Advanced Traditional Programme. To further understand the DVC's role as a professional teacher learning opportunity and to acknowledge classrooms as individual contexts for the implementation of new knowledge, the individual practice changes of DVC participants were analysed. The results showed a rather heterogeneous picture at the level of teachers' questions, which supports the heterogeneous changes in students' answers. Individual changes in teachers' level of feedback were more homogeneous. The results are backed by excerpts of the qualitative discussions from the DVC workshops and teacher reflections. These data illustrate the role of video as a cultural tool for mediating the interactions between classroom and workshop contexts.

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1. State of the art regarding classroom discourse

Classroom discourse is a predominant interaction pattern in many science and math classrooms (Hiebert et al., 2003; Mercer & Dawes, 2014; Seidel & Prenzel, 2006). In this context, several studies report tight communication structures, in which teachers ask narrow, focused questions and students can provide only short answers (Hugener et al., 2009; Pauli, Reusser, & Grob, 2007). In this interaction pattern, students are rarely provided with learning opportunities that facilitate the acquisition of knowledge and deep understanding (Alexander, 2005). Therefore, the need to learn more about the elements that make classroom discourse a meaningful learning opportunity and train teachers in implementing such purposeful elements in their teaching has seemingly increased (Wells & Arauz, 2006). From a research perspective, it is relevant to empirically examine how teachers realise their gained knowledge regarding productive classroom discourse in their practice. In this context, an understanding of classrooms as individual contexts in which teachers implement their gained knowledge is critical (Buczynski & Hansen, 2010; Vescio, Ross, & Alyson, 2008).

Herein, we therefore investigated elements of teacher–student interaction (i.e., teacher questions, student answers and teacher feedback) following teachers' participation in a newly developed video-based teacher professional development (TPD) programme

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on productive classroom discourse, called the Dialogic Video Cycle (DVC). As a first step, we examined the following research question: (a) To what extent does the DVC, as a newly designed, video-based TPD programme support teachers in changing their discourse behaviour compared to an advanced traditional programme? Classes that used the DVC served as the intervention group (IG), classes that used the traditional programme as the control group (CG). In so doing, we contribute to the highly relevant field of research on TPD effectiveness, which seeks further knowledge on how different TPD programmes provide teachers with opportunities for professional learning (Borko, 2004; Fishman, Marx, Best, & Tal, 2003; Osborne, Simon, Christodoulou, Howell-Richardson, & Richardson, 2013). Since such research thus far tends to refer to the interaction pattern of Initiation, Response and Evaluation/Feedback (I–R–F) (Mehan, 1979; Mercer & Dawes, 2014), we follow this rationale and explore the levels of (1) teacher questions, (2) student responses and (3) teacher feedback by comparing the IG and CG. As a second step, to acknowledge classrooms as individual settings for teachers' knowledge implementation and to further understand how the DVC affected individual teachers' practice (van den Bergh, Ros, & Beijaard, 2015), we investigated the following research question: (b) How did IG teachers' individual practice develop in relation to components (1)–(3)? As a third step, (c) these results are backed in an exploratory manner through illustrative findings from video-based discussions in the TPD workshops of the DVC programme. Finally, (d) we present excerpts from video interviews in which teachers reflected on the role of the DVC as an opportunity for professional learning. With this additional source of information, we aim to understand teachers' professional needs (Mansour, Heba, Alshamrani, & Aldahmash, 2014) and the role they attribute to video as a cultural tool mediating the interaction between classroom and workshop contexts (van Es, Tunney, Goldsmith, & Seago, 2014).

2. Theoretical background

2.1. Productive classroom discourse: teachers' provided learning opportunities to foster and scaffold student engagement

Teachers provide students with learning opportunities that they can ideally use to achieve maximum success regarding the construction of knowledge and learning outcomes (Klieme & Rakoczy, 2008). Since classroom discourse is the predominant learning setting in most classrooms, we therefore ask how classroom discourse can become a learning opportunity that fosters and scaffolds students' verbal engagement and, in so doing, becomes "productive".

Previous research has shown that the quality of the I–R–F conversation pattern is crucial and can be created in either a more-learning-supportive manner or a less-learning-supportive manner, thereby creating either a "productive" or a "non-productive" learning environment, respectively (Emanuelsson & Sahlström, 2008; Kovolainen & Kumpulainen, 2005; Mercer, 2008). "Productive" means that students are invited to participate in a conversation that facilitates the process of "thinking together" and elaborations on ideas (Mercer, Wegerif, & Dawes, 1999; Rojas-Drummond, Perez, Velez, Gomez, & Mendoza, 2003). In such a productive context, rather than simply transferring knowledge to their students, teachers facilitate students' ideas (Waldrip, Prain, & Sellings, 2013). Supporting teachers in becoming such facilitators has been attempted in such projects as, for example, "Accountable talk" (Michaels & O'Conner, 2012), which provides "talk moves" as tools for teachers to encourage open and elaborative student communication.

Herein, we present another newly developed video-based TPD programme, the DVC (Gröschner, Seidel, Kiemer, & Pehmer, 2014), and explore its effects on classroom practice with regard to I, R and F.

2.1.1. Initiation: level of teacher questions

One important tool in creating a "productive" conversation is teacher questions. These are relevant to increase participation, to evaluate student answers and to gain class control (Koufetta-Menicou & Scaife, 2000). Questioning is often used to initiate conversations, and its quality with regard to students' learning is profound because it promotes the level of students' answers (Chin, 2006). There is a consensus among studies on teacher questioning that a "productive question" challenges students to think profoundly, inspires their learning processes and encourages them to use reasoning skills (Alexander, 2005; Lee & Kinzie, 2012; Wragg & Brown, 2001). Additionally, an effective teacher question should foster elaborative student responses which should include explanations of the students' thoughts and encourage students to develop their ways of expressing ideas, rather than only their abilities to memorise facts and give correct keywords (van Zee, Iwasyk, Kurose, Simpson, & Wild, 2001). Oliveira (2010) states that questions that allow students to give only one correct keyword lend support to students' expectations that, in case of failure, the teacher will ultimately provide them with the correct answer anyway. Oliveira (2010), therefore, emphasises the importance of questions being *open-ended*, with multiple answer possibilities; *challenging*, to trigger students' further exploration; and *connecting*, to include students' prior knowledge. Thus, the quality of a question has an important function in classroom discourse, influencing how students become activated and engaged in the conversation (Walshaw & Anthony, 2008). Consequently, the exploration of teacher questions as instructional tools for teachers seems to be essential in gaining a better understanding of students' knowledge construction through classroom discourse (Chin, 2006). Thus, in this study, the cognitive level of teacher questions, in terms of their ability to foster students' elaborations and with regard to the state of the art on research in the field of questioning, is examined.

2.1.2. Response: level of student answers

Following the essence of the I–R–F pattern, the chapter of initiation—which is, most often, a teacher question concerning a certain cognitive demand—is followed by a student's response. Educational researchers agree that knowledge is co-constructed by a community of learners (Mercer & Littleton, 2007; Osborne et al., 2013; Wells & Arauz, 2006), meaning that students should be verbally engaged in classroom discourse, where they can explore and justify ideas (Molinari & Mameli, 2013). In their review on effective