Chapter 18

Micro-Case Videos:
A Proposal for Purposeful Video Design to Enhance Prospective Teachers' Noticing of Student Thinking

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ABSTRACT

Teachers' professional noticing of student thinking is a complex and challenging issue as being parallel with the complexity of students' ideas. Prospective teachers do not naturally notice details of student thinking in an unedited classroom video due to complexity and limitations of classroom context. This chapter identifies micro-case videos as a particular alternative to promote prospective teachers' noticing abilities by enabling them to directly attend and interpret students' thinking and strategies. In addition to the definition and characteristics of micro-case videos, this chapter articulates the production of micro-case videos used to support prospective teachers' professional noticing abilities. A micro-case video includes a collection of selected-edited events concerning a learner's thinking on content-related tasks or problem situations in a non-classroom learning environment. Incorporating micro-case videos in video-based professional development environment promotes a detailed and focused examination of student thinking.

INTRODUCTION

Student thinking is one particular significant focus of teacher education since teachers' understanding and use of student ideas have been identified as crucial elements to increase student learning (e.g., Fennema et al., 1996) and effectiveness of instruction (e.g., Anthony, Hunter & Hunter, 2015; National Council of Teachers of Mathematics [NCTM], 2014). According to Stockero, Rupnow and Pasceo (2017), "it is worth considering whether noticing skills can be developed at the beginning of a teacher education program, however, because noticing student ideas is a key component of teaching expertise and foundational to student-centered instruction" (p. 385).

School-based field experiences in a teacher education program are one appropriate context for supporting noticing skills since they provide an opportunity for real time observation and interaction with students. However, there are some arguments about field experiences (e.g., Santagata, Zannoni & Stigler, 2007). For instance, prospective teachers are generally prone to concentrate on superficial or irrelevant features of classroom environment such as students talking each other, the sound of their voice, and the gestures in the absence of necessary guidance on how to conduct observations (Fuller & Manning, 1973). Furthermore, field experience can expose prospective teachers to a limited instructional strategies and student groups in isolation (Little, 1993) with little time and the lack of access to their colleagues' work (Sherin, 2004). Under this limitation, they may see and adopt limited numbers of strategies to teach a concept without thinking alternative ones. In video-based interventions, researchers generally use classroom videos that involve information about various dimensions of classrooms such as the students, the teacher, management, climate, pedagogy and mathematical thinking (e.g., Sherin, Jacobs, & Philipp, 2011; van Es & Sherin, 2008). Thus, prospective teachers encounter a multi-dimensional structure of classroom videos. However, prospective teachers do not naturally attend to student ideas in a classroom video (Jacobs et al., 2010). Instead, they commonly focus on other aspects of classroom such as management (Star & Strickland, 2008) and teacher's actions (Santagata et al., 2007). Fortunately, the skill of noticing of student thinking can be learned in structured settings embedded in teacher preparation programs (Sherin & van Es, 2005; Stockero et al., 2017). In structured settings, the productivity of video discussions is influenced by the quality of the segments in the video content (Sherin et al., 2009). Prospective teachers have great difficulties in learning to notice classroom interactions in a raw classroom video and noteworthy events may remain unnoticed in the analysis of full-length classroom videos (However, prospective teachers have great difficulties in learning to notice classroom interactions in a raw classroom video and noteworthy events may remain unnoticed in the analysis of full-length classroom videos (Peterson & Leatham, 2009; Stockero, 2008; Stockero & Van Zoest, 2013; Stockero et al., 2017; Superfine, Li, Bragelman, & Fisher, 2015). For this reason, it cannot be appropriate to present a raw video without making certain editing and research aim before they are shared with the viewers (Seago et al., 2018, Ulusoy & Çakıroğlu, 2018) in terms of providing productive learning environment. Kang and van Es (2018) think that identifying the right video is challenging because what is "right" largely depends on situations and preservice teachers (p. 7).

In recent years, researchers have begun to articulate the production and selection of video cases in teacher education contexts (Kang & van Es, 2018; Seago, 2004; Seago et al., 2018; Sherin et al., 2009; Stürmer & Seidel, 2017). They commonly make their arguments about the selection of videos based on classroom videos. Researchers generally produced video cases by cutting the events in which a student or students solve problem on the board in the classroom to support prospective teachers' noticing of student thinking. However, in a classroom environment, a student's thinking on a particular concept depends on many factors such as the teacher's questions, teaching environment, students' characteristic features, or time limitation. For this reason, some details related to a student's mathematical thinking may be missed in the classroom.

Limitations of classroom videos reveal the necessity of production and use of specially-designed educational videos that directly focus on students' thinking. Accordingly, as a strong proposal in the current study, producing and using *micro-case videos* can be utilized an alternative effective approach to promote prospective teachers' professional noticing abilities. *Micro-case video* is defined as a collection of significant events related to an individual's thinking process on particular concepts or problem situations (Ulusoy, 2016; Ulusoy & Çakıroğlu, 2018). In that process, the learner works on structured

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