Chapter 13

Teaching Routines to Enhance Collaboration Using Classroom Network Technology

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ABSTRACT

This chapter presents an argument for the use of teaching routines (pedagogical patterns) to engage students in collaborative learning activities using the Group Scribbles classroom network technology. Teaching routines are a resource for structuring student opportunities to learn within lessons. They address known challenges associated with making the most of classroom network technology by scaffolding teacher enactment, enabling contingent teaching, and providing an anchor for expanding practice. In this chapter, the authors articulate the theoretical and empirical basis for using teaching routines to support diagnostic interactive formative assessment of student learning. The authors describe the goals and features of routines, types of collaboration instantiated in the routines, technological aspects of Group Scribbles, teachers’ perceived utility of the routines, and anticipated implementation challenges of the routines within lessons designed for middle school Earth science.

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INTRODUCTION

Classroom network technologies enable unique forms of participation in classrooms in which elements of online learning are integrated fully into face-to-face instruction. This class of technologies includes student response systems (“clickers”), networked graphing calculators, and tools that enable participatory simulations. With these technologies, students can work online in private and group spaces while simultaneously participating in classroom activities. These technologies have been the focus of much research in recent years (see, Penuel, Roschelle, & Abrahamson, 2005, for a review), though explicit attention to how teachers can use them well has not been widely studied.

To make the most of classroom network technologies, teachers need support for the design and enactment of classroom teaching strategies to use in conjunction with them. Our candidate for the form that support should take is what we call a teaching routine. Teaching routines are recurring patterned sequences of interaction that teachers and students jointly enact to organize opportunities for student learning in classrooms. Routines are familiar features of classrooms, and remarkably stable and recognizable across large timescales and distances; they form part of the very “grammar of schooling” (Tyack & Cuban, 1995). Many routines are enacted principally through classroom discourse, as when teachers pose students a question whose answer is known to the students, students respond, and the teacher evaluates the response (Mehan, 1979). Classroom formats for organizing student participation in class, such as recitation, small group discussion, and whole-class discussion are ubiquitous and differ little in structure from subject to subject (Nystrand, Wu, & Gamoran, 2003).

This chapter provides an overview of the challenges to using classroom network technology that routines are intended to address, presents examples of routines developed for a new classroom network technology called Group Scribbles, shows how routines have been embedded in lessons designed for middle school Earth teachers, and describes professional development for teachers in using routines. The chapter also presents evidence about how teachers perceive the potential of routines and challenges they anticipate in using them.

BACKGROUND

Technology can transform how teachers organize learning opportunities for students in the classroom. Technology readily facilitates re-use of learning processes (Koper, 2003; Schroeder & Spannagel, 2005; Zumbach, Muhlenbrock, Jansen, Reimann, & Hoppe, 2002), by providing a record of interaction that can be used as a guide for enacting processes again so that they can become routine sequences of interaction. In addition, with the aid of certain forms of classroom network technology, learners can participate anonymously, in ways that may facilitate their willingness to ask for help when they do not understand something (Davis, 2003). With this technology, students can engage in participatory simulations and acts of collective representation that help them master difficult subject matter, from complex adaptive systems in biology to functions in algebra (Hegedus & Kaput, 2004; Stroup, Ares, & Hurford, 2005; Wilensky & Stroup, 2000).

Collaborative Scripts and Design Patterns

The introduction of technology either to change the medium of learning (e.g., from face-to-face to online learning) or to augment face-to-face interaction may necessitate the development of new teaching routines and transformation of existing routines to make the most of new affordances of technology (Penuel, 2008; Roschelle, Knudsen, & Hegedus, in press). Designers of educational technologies have been aware of the need, potential, and limitations of designing sequences of

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