Chapter 34
Analyzing Classrooms with Video and Structured Observation:
A Model of Software Development for 21st Century Teaching Evaluation

Basiyr D. Rodney
Webster University, USA

David Devraj Kumar
Florida Atlantic University, USA

Andrew Binder
Florida Atlantic University, USA

ABSTRACT

This chapter discusses the conceptualization and development of a methodological tool for conducting classroom research and teacher evaluations with application to the analysis of the Trends in International Mathematics and Science Study (TIMSS) classroom data. The development process involved the creation of a structured video observation system (called the Synchronized Video Observation System, SIVOS) built on top of a database application. The concept applies the integration of an on-screen video frame containing classroom-teaching episodes alongside a structured teaching evaluation rubric. The conceptualization and development of such an application leverages rapid application development techniques. The application is of significance because it allows for the fine-grained and iterative analysis of classroom teaching episodes. It leverages the storing, searching, and retrieval capacity of a database application to code video segments with a structured observation tool. The tool offers an opportunity to enhance the fairness, accuracy, and transparency of teacher evaluations. The approach values low-inference, low-learning curve design. It allows for data to be quickly and easily analyzed. With such tools, teachers, researchers, and administrators have the ability to examine teaching behaviors for continuous improvement.

DOI: 10.4018/978-1-4666-6046-5.ch034

INTRODUCTION

There remains a high level of interest in utilizing video-based technologies to explore and understand effective teaching practice (Pickering & Walsh, 2011; TDOE, 2012; Xiong, 2013). The rapid growth in trans-national economic, technological and other types of cooperation brought on by the process of globalization has contributed to the need for ongoing classroom observation research (Biesta, 2004; Segedin, & Levin, B. (2012). Similarly research and theorizing on instruction have been important areas of disciplinary inquiry in the field of instructional system design (Carr-Chellman, 2011). The aim has been to improve classroom instruction (Reiser, 2001). This has been ongoing primarily since the work of Gagne, Bloom and other instructional theorists during World War II (Reiser, 2001).

Recognizing patterns of teaching behavior is essential to supporting teachers as they move toward developing pedagogical knowledge. This interest belies the need for robust and refined software tools that focus on accurate and reliable teacher improvement. If teaching practices are to change in order to meet the demands of the digital-age learner, teachers ought to become more proactive and systematic at looking at their teaching (Snell, 2011; Xiong, 2013). In support of this need, this chapter deals with the development and research involving the Synchronized Instructional Video Observation System (SIVOS) to investigate classroom interactions in authentic classroom settings.

SIVOS (Rodney, Kumar, & Binder, 2008) provides a unique approach to finely analyzing classroom interactions. The SIVOS originated from an attempt to computerize the "Elementary Science Instruction Observation Instrument" (Kumar & Hofwolt, 1992) for students in an undergraduate science methods course at Florida Atlantic University (Rodney, 2006). The instrument was designed to bring into focus pre-recorded classroom academic interactions alongside a structured observation system both within the same interface. The dual interface allowed for interactions such as guidance, modeling and other variables related to first principles to be coded against each video segment under analysis. This approach allowed for a more refined analysis of first principles in the classroom setting.

FOUNDATIONAL PRINCIPLES OF CLASSROOM OBSERVATION

First Principles of Instruction as propounded by instructional theorists are model and research-based instructional practices as well as anticipated learner behaviors that lead to learning regardless of program or methodology (Merrill, 2002, 2012). The goal of implementing instruction based on foundational principles (Rodney, 2006) has become an important design construct in recent years (Merrill, 2012, 2002; Gardner, 2011). These principles reflect basic methods of instruction (Reigeluth, 1999), powerful principles (Yelon, 1996) or learning components (van Merrienboer, 1997). These foundational principles have been arrived at after over fifty years of research and theorizing in the area of instructional systems design (ISD). To engender further empirical validation, each aspect of first principles remains open to observation and testing in authentic instructional contexts.

The Synchronized Instructional Video Observation System (SIVOS) custom made for the study contains 28 variables each relating to one of the five main categories designated for foundational principles (Table 1). The five main categories are that that the lesson is problem centered, the teacher engages the student in the activation of prior knowledge, the teacher demonstrated the new information that is to be learned, the teacher provides for practice during the lesson, and the teacher demonstrates new knowledge and provides for students to make real world connections.