Innovation in Action Article

An Innovation in the Evaluation of Teacher Professional Development Serving Reform in Science

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The authors describe an innovative perspective for the evaluation of professional development programming in science. This perspective focused on a self-critical analysis of the reflective practices developed and used among program participants. This approach ties program quality directly to issues impacting the implementation of curriculum reform in the science classroom. An illustrative case of this innovation in action is presented.

Introduction

This article describes an innovative perspective and associated methods for the evaluation of professional development efforts (PDE) in science. It demonstrates this innovation in action by presenting a case of an evaluation of a local professional development effort. This case provides an example of the richness of information that this perspective derives when science teacher educators apply it to the evaluation of professional development programming. Rich evaluative information is essential for informing science teacher educators whose efforts often involve work focusing on helping inservice and preservice teachers learn through the vehicle of a professional development program.

Teacher Learning Essential to Reform

Agencies advocating science curriculum reform (e.g., American Association for the Advancement of Science, 1993; National Research Council, 1996) call for teachers of science to work toward a complex and interdependent set of goals. These goals focus on the following four principles:

1. Teaching and learning science is an active, “mindful” process that requires the application of higher order thinking and reasoning skills among teachers and students;
2. Science learning is robust when students conduct classroom-based inquiry;
3. Teachers should focus on helping all students develop a deep understanding of science concepts and principles; and
4. Focusing on science literacy implies helping students understand the nature of science, its history, and its philosophy.

A recent international assessment of science education, the U.S. report on the curriculum analysis component of the Third International Mathematics and Science Study (TIMMS; Schmidt, McKnight, & Raizen, 1997), found that teachers usually enact a science curriculum that looks very different from these goals. In general, children all too often receive science instruction that views science as a body of facts, supported by a “rhetoric of conclusions” (phrase coined by Schwab, 1964), and reinforced through lecture and isolated science skills training (Van Driel, Biejaard, & Verloop, 2001). Such an enacted curriculum inadequately prepares students for the future (Millar & Osborne, 1998).

Although the exact role that teachers play in curriculum reform is a matter of debate, closing the gap between contemporary curriculum goals and the current state of science instruction requires professional development for teachers of science (Van Driel et al., 2001). Such efforts almost invariably focus on teacher learning (Ball & Cohen, 1999) and attempt to introduce some form of curricular change (Anderson & Mitchener, 1994); yet, teachers view inservice “training” as having little effect on their learning (Smylie, 1989). Historically, professional development efforts have largely been ineffective in producing reform-based classroom change (Guskey, 1986). Having said this, efforts focusing on teacher learning remain a viable option for promoting curricular change because teachers ignore policy-based changes in the absence of a learning component (Cohen & Ball, 1990; Wilson & Corbett, 1990). With these ideas in mind, teachers need high-quality professional development that moves beyond the “teacher-training” programs of the past. Supovitz and Turner (2000) argued that facilitators of high-quality professional development efforts engage participating teachers by taking the following forms of action:

1. model inquiry forms of teaching by immersing participants in inquiry, questioning, and experimentation;
2. involve participants in intensive and sustained development;
3. engage participants in concrete teaching tasks that are based on teachers’ experiences with students;
4. focus participants on improving subject-matter knowledge and content skills;
5. ground participants in a common set of professional development standards and help teachers see how to connect their work with students to performance standards; and
6. help participants connect with other aspects of school change.

The Innovation

Building on the previous work of Supovitz and Turner (2000), a “forms-of-action” approach to professional development necessitates a paradigm change for