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AUTHOR Penick, John E.
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ABSTRACT

This paper discusses five specific features of an emerging teacher education model. They include: (1) developing a rationale for teaching science; (2) providing sufficient time for personal change; (3) developing self-analysis skills concerning teaching and learning behaviors; (4) analyzing classroom climate; and (5) modeling teaching behaviors expected in the new science teachers. Each feature is elaborated in detail. (CW)

# BUILDING A RESEARCH-BASED MODEL SCIENCE TEACHER EDUCATION PROGRAM

John E. Penick

Science Education Center
University of Iowa

# Building a Research-Based Model Science Teacher Education Program

John E. Penick
Science Education Center
University of Iowa

After reviewing the history of science teacher education for the new Handbook of Research in Teacher Education, some specific features of an emerging model are advanced. The five major ones include:

1) Developing a Rationale for Teaching Science
2) Teacher Education Across Four Semesters: Providing sufficient time for personal change
3) Developing Self-Analysis Skills Concerning Teaching and Learning Behaviors
4) Analyzing Classroom Climate
5) Modeling Teaching Behaviors Expected in the New Science Teachers

Some elaboration for each of these features of a new model may be desirable. Following is such an elaboration:

1. A teacher education must develop teachers with a rationale, a research-based rationale; one predicated on current knowledge of effective teaching and learning. A teacher with a rationale has a clear and consistent view of teaching and learning where student goals, teacher behaviors, student capabilities, and evaluation are all considered. Such a teacher is able to self-evaluate their teaching performance by comparing it to the model implied in the rationale. And, a teacher with a rationale will probably not find it so easy to lose sight of the forward thinking and enthusiastic goals they possessed as beginning teachers.

2. While there are some "born teachers," most of us need to systematically change our classroom behaviors if we are to provide an optimal learning environment. Such behavioral change is difficult and requires consistent practice

across time. In the traditional model of one semester of education courses on campus followed by a semester of student teaching, the student teaching semester has most of the impact.

If the student teaching setting is an ideal one, this may work. But, in most instances, the cooperating school and teacher will not be absolute or even extraordinary models of teaching practice. As a result, teacher educators must establish models, provide opportunities for practice and feedback, and take the extensive time necessary to actually change behaviors. Change takes time but such behavior change is necessary if teachers become all they can be. We feel 3 semesters plus student teaching to be a minimum.

3. Teachers who rely on others for an evaluation of their teaching are captives of their own inabilities. And, receiving feedback only a few times each year may well result in changes only a few times each year.

On the other hand, a true professional evaluates continually, comparing actual with desired conditions. Self-analysis skills are not innate but are developed as any other skill, through practice. First, teachers learn to observe discrete behaviors. Then, they practice individual behaviors until they have a full repertoire of both initiating and responding behaviors. Now, in conjunction with a rationale, the teacher is prepared to compare and model behaviors as needed.

4. Classroom climate includes the teacher and teaching behavior, the students and their actions, and the physical setting. Since classroom climate has a distinct effect on students, teachers need to analyze this as well.

As before, analysis begins with observation and awareness, skills developed in teachers through training and practice. Learning which aspects are critical derives from knowledge of the literature on effective teaching as well as personal experience. Once again, the teaching rationale should provide the ideal

classroom climate described.

5. "Teachers teach as they have been taught." Although common words in education, they seem to be little heeded. University classes are usually the worst possible examples of teaching appropriate for K-12 students. We also know that students imitate their teachers in more specific ways.

So, teacher educators must use the behaviors they wish their prospective teachers to use and must use them consistently. Doing so provides preservice teachers with a concrete example of both the behavior in actions and a feeling of what it is like to be subjected to the behavior. At the same time, such modeling indicates the teacher educator has a rationale as well as the skill to exhibit the desired behaviors. A teacher educator with a rationale who does not model desired behaviors must either be incompetent or a hypocrite.