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What Teachers Saying About

Mentoring

by Scott Schomer and Michael Dias

Have you ever spoken to your colleagues about those initial experiences in becoming a teacher? Many of us participated in a student teaching program as we completed our degree program, while others took alternate routes to the classroom. Whatever path led us to our students, as we reflect on those initial weeks of our teaching work, we realize just how far we've come in this complex and rewarding vocation. If you were one of the lucky ones, a wise and caring mentor teacher supported your initial teaching efforts. In our educational vernacular, the term "mentor" usually refers to an experienced teacher who guides a newly hired teacher in their school. The mentor title honors the teaching expertise and nurturing qualities of the experienced teacher. Our use of the mentor term embraces these qualities, but directs the mentor role to the pre-service stage of the learning-to-teach process. Given the inevitable influx of new teachers to Georgia schools, and the ever-present challenge of delivering high quality science instruction, we would like the k-12 readers of TGST to consider their vital role in mentoring new teachers. In this article we will summarize what we have learned from interviewing six of our science teaching colleagues, each of whom have mentored pre-service teachers with the hope that patterns and assertions generated here will inform your mentoring work.

As teachers recount their student teaching experience, sentiments range from the fond to the disdainful. Some may remember being "thrown to the wolves" and not seeing their mentor until the end of the twelve weeks, while others may have experienced a nurturing period of growth amid collaborative support. Both of us completed a rather traditional "student teaching" experience in the late 1980s. At that time, teacher education was steeped in the process-product research that pushed to align teacher behaviors with optimal student learning. We both observed the emphasis shift some ten years later as constructivism influenced teacher education. As science educators well into our careers, we have enjoyed opportunities to participate as mentors to pre-service science teachers as part of a program that we believe has considerable merit. In fact, so many of our colleagues at a particular suburban high school have served as mentors to aspiring teachers that we decided to conduct an initial study to explore their experiences and strategies as mentors and consider how we might improve the situation for everyone involved.

In the traditional model for teacher preparation a student working towards their Baccalaureate Degree is paired with a mentor in the public school system to take part in a 12-week field experience. Usually, the student observes for a few weeks and then gradually assumes the total teaching responsibilities of the mentor teacher.

The science education program of focus in this paper is a marked departure from the traditional model. This program known as TEEMS (Teacher Education Environments in Mathematics and Science) is a Masters-level initial teacher preparation program for students holding degrees in engineering, mathematics, or science. TEEMS originated in 1994 at Georgia State University (GSU) (http://www.gsu.edu/~mstjrh/teems.html) . Students are admitted to the program in the spring of each year, and then progress through a four-term course of study, which includes professional education and science content courses, as well as teaching experiences at the middle and high school. TEEMS graduates earn a Master of Arts in Education degree and a license to teach secondary science, grades 7-12.

A key element of the TEEMS program is the cohort group. The continuity of maintaining a cadre of students throughout the program is intended to facilitate the collaboration and ongoing dialogue among participants, as they become teachers. In the TEEMS high school teaching internship, several interns are placed at a common school site. This allows each TEEMS intern the opportunity to observe and interact with a variety of mentor teachers and peer pre-service teachers from GSU. In TEEMS, the mentor and intern have the freedom to negotiate the transition of control as the intern assumes increased teaching responsibility. The assumption of teaching responsibilities by the intern is based on the continual comfort and growth of the intern rather than a date on the calendar. The collaborative relationship between the mentor and intern encourages a "team" approach to teaching rather than a "watch me teach, then teach as I teach" scenario.

The constructivist foundation to the TEEMS program, more than anything else, accounts for its distinctive qualities. Constructivism has been described as an epistemology, a cognitive position, and a pedagogical orientation (Noddings, 1995). The core commitment of a constructivist view of education is that knowledge is not transmitted directly from one knower to another, but is actively built by the learner (Driver, Asoko, Leach, Mortimer, & Scott, 1994). The emphasis that constructivists place on active participation by the learner, together with the recognition of the social nature of learning has wide appeal. A constructivist, in basic terms, would be someone who realizes that students "construct" their knowledge based on several things. First students already possess some knowledge when they arrive in the classes we teach. Providing experiences and conversations that help students refine and enhance their science knowledge is at the heart of what a teacher does when guided by the constructivist referent. Constructivism implies that teaching is more than telling. It implies that we teachers should try to understand students' conceptions of the subject matter and direct these toward richer, more enhanced constructions of knowledge, building on prior knowledge as much as possible. It's a matter of meshing new and old to produce a "current understanding" of the world. Because constructivist teachers are aware of this process, they design educative experiences that add to, but also challenge, build upon, and refine prior knowledge.

For mentors, constructivism provides a framework for guiding new

teachers through the various strategies one might use to help students learn. Some strategies that could be used include collaborative activities, demonstrations, interactive lectures, experiments, projects, etcetera. The key to these and any other strategy is that each student must be mentally involved and should strive for deeper understanding beyond what is already known. A constructivist mentoring approach allows new teachers to develop their own picture of what teaching is, to recognize their own successes and failures and then grow from those experiences. Constructivist mentoring does not allow novice teachers to naively follow unsound teaching practices any more than constructivist science teaching allows students to hold to misconceptions. The constructivist referent directs us to mediate a learning process toward the best construction of meaning. For learning science, this is what works in terms of empirical evidence. For learning to teach science, this is what works in terms of affective and cognitive objectives. In both teaching roles, there is a shift away from a transmission of knowledge to a more learner-focused process of making sense of phenomena.

With these notions in mind, we were please to find six of our science teaching colleagues who were willing to recount their experiences as TEEMS mentors. We initiated reflection through a focus group session that could be described as a guided discussion of salient aspects of their work in mentoring the novice science teachers. This discussion guided a semi-structured one-on-one interview conducted with each of the six mentor teachers. All interviews were tape recorded and transcribed, then analyzed inductively for identification of patterns of similarity in the data. As we coded and categorized the interview data, a few common themes emerged regarding the work of these mentors.

One interesting pattern evident in the mentor's experience was labeled a "reciprocity of learning". It is expected that the novice teacher should learn from her/his mentor. However, we found that most mentors expressed that their teaching had been enhanced by their involvement with new teachers. Some representative quotes are provided from three mentors. Rhonda, a physical science teacher explained, "I think it improves my teaching, because every time I get [an intern] it never fails that by the time they've left, they've left me with something I haven't had before." Jane, a biology teacher, said that mentoring taught her to "be a little more flexible and try to incorporate more creative ideas into how [the students] could use the information." Hank, a chemistry teacher, appreciated how his work as a mentor allowed him to be "exposed to new stuff that I don't always have time to see...new ideas in terms of educational methods."

Mentors picked up a few novel lesson plan modifications, reflected on some aspect of their teaching philosophy, and some credited their intern with exposing them to some of the newest instructional technologies and learning theories. The enthusiasm of the TEEMS teacher was often cited as an encouragement to the mentor teacher as well. So one of the benefits of mentoring was not just the education of the intern, but also a measure of professional development and learning among the mentor teachers.

Mentoring techniques that promote reflection formed another strong pattern evident in the interview data. Although it was not a part of our questioning, interview data showed that every mentor used an array of reflective techniques to help their intern work through issues and grow beyond their current level of understanding. Some examples of questions stated were "What did you see happening in class today?" "Did kids look involved or interested?" "Why was that activity successful?" "How would you improve that lesson?" "What's your reason for teaching this material with group work; would a lecture accomplish the same task/goal?" Many of the mentors used these types of questions to get at what the intern was thinking and to help them see the strengths and weaknesses of what they were doing.

The elements of "constructivism" and "learning by inquiry" in these reflective questions are hard to miss. We facilitate the learning-to-teach process by helping new teachers think about instructional decisions and how they impact students. Whether working with a new science teacher or one of our science students, the most basic inquiry question of all is the hallmark of making meaning from experience. As a science teacher helping a student interpret an observation, you might start by asking, "What do you think?" Similarly, as a mentor helping a new teacher to make sense of classroom events, you might start by asking the same question: "What do you think?"

Why is this important for k-12 science educators? We believe that the principles of inquiry and constructivism have much to offer in directing our science teaching efforts *as well as* the professional development of new teachers. Just as there is a body of scientific knowledge that we want students to learn, there is a substantive knowledge base of "what works" in teaching. The TPAI checklist of optimal teaching behaviors was of some merit to us as we progressed through our own new teacher induction back in the late 1980s, but how much better we feel it would have been, had we been under the guidance of a mentor who knew specifics of best-practice and provided an environment in which we could experiment with various pedagogies and move toward a vision "best-practice" congruent with educational theory and our own beliefs. We encourage you to consider how the essential components of constructivism and inquiry teaching might inform your opportunities to mentor new teachers.

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