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## Synergistic Relationships: Why Effective Teaching is Complex

Michael P. Clough, Editor

The crucial role of teachers in creating powerful learning environments has been a consistent feature of editorials and articles appearing in *ISTJ* under my editorship. Research makes clear that what teachers do significantly impacts their students' achievement, interest in a field of study, and attitude toward schooling in general. The cognitive and affective climate of classrooms is influenced by the learning and behavioral expectations set by teachers, the activities and instructional strategies they choose, the behaviors they exhibit when interacting with students, and many other important teacher decisions.

My previous two editorials have addressed two very important teacher behaviors – questioning and wait-time. I noted the importance of asking and scaffolding thought-provoking questions, but that questions must be accompanied by appropriate wait-time to create highly interactive and engaging learning experiences. However, even these teacher behaviors may not encourage the extensive interaction between teacher and students that is so important for learning.

For example, several years ago my student teacher and I were discussing a particular lesson he had taught to my high school biology students. The discussion turned to the behaviors he exhibited during the lesson, beginning with the kinds of questions he asked. After agreeing with his assessment that he had asked thought provoking questions that were within students' ability to answer, I then asked him about his wait-time. His answer was intriguing in what it conveyed about the complexity of teaching and the ease in which education research may wrongly be dismissed. He said, "I used extensive wait-time – wait-time doesn't work!" My response was to ask how else we might account for students' reluctance to answer his questions. After some time, the issue of his non-verbal behavior was raised. In reviewing the videotape of his teaching, he observed that his non-verbal behavior communicated an uninviting climate that overshadowed his use of thought-provoking questions and extensive wait-time.

From a students' perspective, answering a teacher's questions, particularly in front of peers, can be an intimidating experience. Promoting an intellectually safe environment requires, in part, exhibiting a number of non-verbal behaviors alongside appropriate questions and wait-time. Body language communicates how open a teacher is to student responses. Teachers who genuinely want student interaction will appropriately incorporate encouraging and expectant non-verbal behaviors such as smiling, appropriate eye-contact, movement around the room and among students, leaning forward when students are speaking, raising eyebrows to show interest, inviting hand-gestures (Bavelas, *et al.*, 1995; Roth, 2001), equality of physical status, and wait-time I and II.

However, even more is required for promoting and maintaining student interaction. Carefully listening to students and sensitively responding to what they say is imperative for creating an intellectually safe environment that encourages students to bare their thinking. Rather than immediately evaluating students' responses, teachers should encourage interaction by acknowledging students' ideas, writing students' ideas on the board, using students' ideas as a focus for further instruction, asking students to elaborate, and asking for the implications of proposed ideas. None of this means that all students' answers are accepted as correct. Instead, by using students' ideas for further thinking and discussion, the focus of the discussion moves from a sole concern for right answers to reasoning and justification for ideas (correct or incorrect).

Implemented together, effective questioning, encouraging non-verbal behaviors, appropriate wait-time I and II, listening attentively, and responding in a manner that further engages students are the central core of effective teaching. The importance of these behaviors is that they are the essential “tools” teachers *always* have at their disposal for understanding students' thinking, promoting students' understanding of content, and advancing all the goals we have for students. Moreover, attention to these teacher behaviors emphasizes that teaching is, above all else, an activity centered on human interaction. It rightfully places the teacher together with students as the focus of education and education reform.

But even if a teacher's behavioral interaction pattern reflects all the above, student discussion may be muted for any of the following reasons:

- the science content chosen is not developmentally appropriate
- the task is not meaningful
- needed experiences were not previously available for students to draw from
- helpful concrete materials are not available during the discussion
- the materials/equipment confused students (Olson & Clough, 2001)

What all this means is that practical suggestions from education research, when implemented in isolation, often result in effects that are either muted or non-existent (Clough & Kauffman, 1999, p. 532.).

Synergy refers to combined or co-operative action. The power of what we know about teaching and learning is in the synergistic relationship of multiple teacher behaviors, teaching strategies, and other pedagogical decisions. When the isolated teacher behaviors and teaching practices above are implemented in concert, the total effect is greater than the sum of those individual teacher behaviors and practices. Unfortunately, intended outcomes may be diminished or not occur at all if any crucial decision is made or implemented poorly.

The manner in which multiple teacher decisions coalesce to create the classroom environment illustrates the intricate nature of effective teaching, and it explains why implementing isolated research-based education practices so often fail to improve learning. For example, the positive effects of the well-supported learning cycle approach can easily be negated by myriad variables including, but not limited to, the selection of developmentally inappropriate content, materials that hinder desired learning, and/or teacher behaviors that do not encourage students to express their ideas and make the desired connections. The strength of education research resides in the synergy resulting from the integration of disparate research findings into a unifying system. This is why effective teaching is so very complex and why teachers should and always will be central in efforts to improve teaching and learning.

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