



GUEST COMMENTARY

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The Heart of Effective Biology Teaching

What is at the core, the very heart, of teaching biology?

When you ask teachers what gives them the most pride (as one of us did informally at a recent NABT conference), more often than not they describe a special relationship with individual students. That is, they rarely mention how successfully they conveyed the intricacies of the mitochondria or the nitrogen cycle. Sometimes, it's about guiding students to a higher level of awareness and appreciation – typically about connecting to a personal or social issue. Or just personal growth. Scores on the AP, PISA, or other standardized exam? Alas, not among the Top 10 Achievements identified by biology teachers.

By comparison, when students talk in retrospect about what they valued most in their biology course, inevitably they refer to their teacher, not the content. Imagine that. The most memorable dimension of education was the people, not the biology. Not the science. Not the concepts. But the interpersonal dimension.

These primary values may seem ironic given our self-professed commitment to teaching difficult concepts and our oft-voiced concerns about covering the prescribed curriculum in the time available. The values and the aims of education seem to differ sharply. How do we resolve this tension?

We wish to endorse the values expressed by teacher and student alike. Namely, we want to articulate and advocate a “culture of trust” as a primary feature of any classroom. Business leaders talk about building a culture of trust among employees, in a work setting. As *Inc.* magazine columnist Marissa Levin advises, “A culture of trust yields higher engagement, happier employees, greater productivity, and higher profits.” That is not education. But perhaps it should be? Higher engagement. Happier students. Greater learning. That sounds OK to us.

Ironically, perhaps, fostering trust or happiness does not seem a focus for research in science education, nor for professional development. Yet an openness toward the dynamic of teaching, including accommodating a diversity of student values and behavior, is the starting point of every classroom interaction. Teacher education and research should explicitly acknowledge that social and communication skills and open-minded, receptive attitudes are not just desirable, but also fundamental to *teaching*.

A culture of trust is not a concept (like mitosis or predator–prey cycles) to convey through lecture. It is a social environment to create and nurture. It is expressed through patterns of behavior, habits, and teachers' beliefs and values. Foremost, it involves caring, empathy, and respect. We believe that most teachers exhibit these traits. At the same time, institutional contexts seem to limit their ability to express or openly discuss how these principles may be integral to effective education.

What can we do to change the culture of schools? A first step is to reflect collectively on our own beliefs about the goals of biology education

and the teacher's role. We need to share our personal experiences and discuss them openly. Our joint understanding of the learning environment will shape our didactic posture and guide our behavior.

Further, a culture of trust involves sharing authority and acknowledging some level of student autonomy – and responsibility. It means forsaking the teacher's apparent privilege of being the sole authority or expert. Many teachers, we suspect, fear losing control of the classroom. They may feel vulnerable. But “control” is only needed where the students and teacher(s) are not in harmony or working closely together toward shared goals. We encourage our peers to have confidence in themselves and their ability to earn authority and respect through their personal interactions, rather than through institutional hierarchy.

At the very least, teachers should reflect on what motivates their students to come to school. How many sought out a biology class as fulfilling a vital life need? School-age learners are primarily focused on *relationships*. That, we contend, is where every biology class needs to begin: developing and sustaining a fruitful mutual relationship. (If in doubt, ask students what they value.) They typically report that they respond well to teachers who are good listeners, who care about student problems (inside and outside of school), who are empathetic and fair, who can explain things clearly and individually, who teach creatively, and who inspire.

In our view, a culture of trust is not just an ideal on its own. It is a requirement for effective education. Students may successfully perform the tasks of the classroom, but they do not genuinely learn unless they regard the teacher as someone to learn from. The caring relationship is a conduit for effective listening and exchange of information (free of implicit institutional fear, that is). Disaffected students fail to really learn. They tune out. They turn off. They shut down.

Accordingly, one of the first tasks of the teacher is to establish this personal relationship with each student from the first day of school. Regard each student as a whole individual, not just an anonymous someone sitting at the desk. Time devoted to making personal connections is not a mere courtesy. It is a deep investment in *learning*.

Ultimately, for educators to succeed, they need strong personal relationships with students. That includes a strong sense of giving (not trying to earn) respect. It is about spirit, not the subtleties of pedagogical technique. Accordingly, the core of biology teaching is, we claim, the heart.

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DOI: <https://doi.org/10.1525/abt.2019.81.8.1>