Doctoring Doctoral Education

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Vexation

After thinking about *situation recognition*, I realized that a significant aspect of my current situation, as is likely the case for a number of Crossroads participants, involves working with graduate students. As I began to work through my vexation I set my sights on the science education doctoral program at my institution. We have a large doctoral program housed in a large college of education. Certainly there are advantages associated with the size and scope of our program, but there are notable disadvantages as well. Although a large program may have its unique issues, I suspect some of the issues we face are common to programs of all sizes. In particular, I find myself wrestling with questions regarding the purpose of our program, as well as how to structure a program in a way that is flexible enough to meet the diverse interests of our students yet provides enough structure so that students become well-versed in issues facing the field of science education.

As mentioned, there are benefits associated with being part of a large college of education. The most noteworthy benefit, in my mind, is that faculty and students have access to a wide variety of scholars and a wide variety of perspectives. The challenge that parallels this advantage, however, is that doctoral preparation is distributed across a variety of departments and an even wider variety of faculty. From a student's perspective, I wonder if the experience lacks cohesiveness in terms of seeing how all the pieces come together. I also wonder how well this arrangement works in terms of orienting students to foundational conversations in science education. Faculty members associated with a particular program area should help students see cohesiveness and understand key concerns, but even this can be challenging because developing a shared vision among faculty is not a trivial task. At best, witnessing faculty with diverse interests negotiate the same working space may model for students how to converse with others. At worst, I wonder if students become accustomed to seeing faculty represent various factions. In the spirit of preparing students, faculty ought to have honest conversations about what we hope to accomplish in graduate programs. What role should coursework serve? What kinds of research experiences are appropriate and/or necessary for graduate students, especially those who aspire to pursue research-oriented careers? What kinds of qualifying exams (or other ways of demonstrating competence) reflect the ideas we hope to instill in our students? Ultimately, what does it take to ensure that a student is competitive for—and prepared for—his or her dream job?

As is likely the case with other programs, we have a variety of students in our program—current and former teachers, people transitioning from science to science education, full time and part time students, etc. Students cite a number of reasons for pursuing a graduate degree. Some intend to become faculty members at institutions of higher education and will be responsible for teacher education and educational research. Others intend to remain in classroom positions, while others intend to work at the district or state level. In short, our doctoral program, like many programs around the country, is responsible for preparing people for a variety of responsibilities associated with education positions. In the spirit of reflective practice, it is important to consider the strengths and weaknesses of our program in terms of preparing students to meet the demands they will face. Beyond the particularities of our program, it is interesting to consider broader questions about the nature of doctoral education and the training of educational researchers. How can a science education doctoral program be structured to (a) ensure that students are well versed in practical and theoretical conversations in science education and (b) model ways to contribute to important conversations taking place in the field?

I know the questions above are ones I need to answer for myself. But as I work through revising this paper I realize I would really like to hear how my program faculty—and perhaps even the department faculty—would respond to them. (The science education program is in the Department of Mathematics and Science Education.) I would also be interested to hear how other programs approach these questions.

An issue related to graduate education is how to get students associated with research in ways that all parties benefit from the arrangement. Within the field of science education, there are many people who have been successful at building research programs that (a) focus on interesting questions and (b) bring together faculty and students in productive and sustainable ways. I am impressed by people who have been able to build the kind of research infrastructure that supports a steady stream of work. I am also impressed by people who are able to build productive research groups. One advantage of a research group is that a group can accomplish much more work than an individual researcher. Additionally, research groups can serve as a training ground for doctoral students. Ok, I'll admit it—I'm enamored with people who have been able to build successful research groups. I can easily see benefits associated with having students associate with research groups. Are there potential downsides to such research groups? If so, how do you compensate for these downsides?

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Venture

The comments in my vexation allude to my venture. It would be wonderful if someone would hand me a productive research infrastructure, but we all know that that is not a plausible reality. I also realize I have to start on smaller scale. As a beginning point, I am interested in building a research group for myself and the doctoral students with whom I work. One reason for this venture is to sustain my own work activities in a manner that is consistent with the expectations of my institution. Another reason is that I believe this activity has benefits for doctoral students, particularly in terms of getting involved with research activities and learning about the expectations associated with these activities (e.g., dealing with comments from reviewers, responding to editors, etc.). There are many science educators who have successfully established and sustained research groups. I admire what they have been able to accomplish, especially now that I have a greater appreciation for the infrastructure needed to support research groups. In my mind, establishing a research group requires a fair amount of work on the part of the lead researcher, but also involves buy in from faculty and students in the program. Thus, working on this venture means working along at least two fronts.

As I mentioned earlier, one of the issues associated with having a large doctoral program is that responsibility for preparing students is distributed across departments and faculty. Given this situation I think the science education faculty should consider whether or not students should be expected to enroll in core science education courses, and, if so, what such courses should look like. This is where having a common vision would be helpful. I would be interested in learning about whether or not other doctoral programs have core science education courses, as well as how the content of these courses is negotiated among faculty. I would also be interested in hearing whether or not people believe core courses contribute to the effective preparation of doctoral students. I would also be interested in hearing about what people think would be important conversations to include in core courses, as well as what students should be asked to do to demonstrate that they understand the dimensions of these conversations.

A second point seems to be getting students on board with the purposes and goals of a research program. Students often enter doctoral programs with ideas about the kinds of research they would like to pursue, and their ideas may be more or less informed by existing research (which may or may not be a problem). Asking students to participate in a research program may mean that they are being asked to focus on an area that does not interest them. However, part of educating doctoral students includes enculturating them into important conversations in science education. In terms of my role in this venture, I believe there are some steps I can take within our doctoral program. Obviously, I can find ways to include doctoral students in research activities and try to support their understandings of the issues and ways to address these issues. Additionally, I can encourage students to participate in conferences and to begin to build their own networks. There are also steps I can take to facilitate their network building (e.g., starting a research group with my doctoral students, inviting other scholars to share their work with us, etc.). The more challenging aspect of this venture seems to be changing the culture of our science education program, although this aspect is important for making sustainable changes. I do not yet have answers about how to instigate these kinds of changes.