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On Teaching Graduate Students How to Be Independent Lifelong Learners

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Recently, I participated in a national panel discussion on developing competencies for the various levels of training (master's, doctorate, post-doctoral) for health services research. Given the multidisciplinary nature of this field, the graduate program directors acknowledged that the list of desired competencies for doctoral students could morph into a list so vast that it would not be achievable within the time limitations of most doctoral programs. I noted that one of my goals for students is to teach them how to be independent, lifelong learners. I rationalized that if we achieved this goal our graduates would have the skills to continually expand their methodological sophistication as new challenges in their research programs appeared. There was much agreement with this concept around the table that day, but during informal meetings after the panel session, it became clear that more sharing about what it means to nurture lifelong learners is warranted. Further conversations regarding various approaches to mentoring students to embrace this philosophy and providing experience and skills to practice this approach are in order.

What is an independent lifelong learner? I believe a lifelong learner is a person who has the passion and courage to consider options beyond their personal "toolbox" filled with knowledge, techniques, and methods they've mastered in their education programs, as well as work and life experiences. A lifelong learner is also someone who not only has the desire to continuously broaden their scope, as well as deepen their understanding of knowledge. Having the passion to learn without direction or guidance can often leave a student spinning in circles. Thus, independent lifelong learners must also have the skills to take their passion to learn one step further and bravely march down a new path of inquiry and discovery, and to do so confidently.

How then do we as graduate trainers provide such training? Within my department, faculty implement different strategies to achieve this goal including serving as role models. I attempt to implement the following formal opportunities which include 1) fostering a community of learning; 2) providing opportunities for teaching as a vehicle for providing

graduate students perspective on their learning style and others; and 3) teaching students how to ask good questions. I've summarized strategies and thoughts for each area below.

Community of learning

I believe that we do not learn optimally in a vacuum. As such, I strive to foster a sense of community among students. Ideally, a community of learning would acknowledge that all members of the community (faculty, students, and research collaborators) are at different phases of their understanding of concepts within a discipline. Setting a tone for a community of learning begins with creating a non-threatening learning atmosphere. I begin this process by enforcing the notion that one learns more when they acknowledge (out loud) what they do not understand. Students must feel completely comfortable stopping me at any point throughout the lecture to ask questions. With this approach, there is a shift in the classroom from one directional pouring of information onto students to a learning conversation. Shifting to a bi-directional approach in the classroom, I assume shared responsibility with students for our mutual learning. The realization that saying "Great question! I don't know – but I will find out." contributes to the process of learning is liberating for professors at any level in their career.

It is common to have upper level graduate students sit in on parts of my classes again. Why? Not because it is mandated or I haven't done my job well, but rather students have learned to self-regulate, identify areas for more growth, and appropriate venues to attain deeper understanding. I'm thrilled when this occurs for several reasons. First, the advanced graduate students are fabulous models of lifelong learning behavior for the first and second year students. The advanced students have transitioned to the point where they are reflective practitioners who have learned to self-assess their attainment of competencies and have sought out opportunities for understanding knowledge at a deeper level. By participating in this way, the newer students in the program quickly realize that it is the norm to continuously learn and think about the concepts presented in class and that it is not my expectation that they will achieve complete understanding during the first exposure to the concepts. Second, the sophistication of the advanced student's questions is exciting. It becomes rapidly clear to all in the room that with each concept there are different depths of understanding. Questions regarding the subtleties of the approach often clarify confusion for the students newly introduced to the concepts. Third, the advanced students through their active participation in the learning conversations often become recognized as another source for the first/second year students to continue the dialogue. Students often share space, socialize, and simply see each other more often than I see them. Expanding the circle of folks with whom these discussions occur contributes to building a community of learners. If we train students to view every interaction with people as a potential moment for teaching and learning, we further set the stage for lifelong learning.

Appreciate that competition among students threatens everyone's learning. If a competitive environment in a doctoral program is permitted, the concept of fostering a community of learning cannot be fully realized. Competition breeds insecurity. If students are

insecure, they hide what they don't know rather than be transparent. In the absence of transparency, faculty cannot effectively fulfill their life's mission.

See one, do one, teach one

In our graduate programs, doctoral students are required to complete the Sheridan Level I teaching certificate and to serve as a teaching assistant for one semester. Because courses in their specific discipline are few and departmental needs for students to TA courses with broader public health scope, doctoral students often do not have the ability to practice teaching graduate level material specific to their own research and methodological interests. To address this issue, faculty expands opportunities for this method of learning in courses, as well as journal club.

One level of learning occurs through reading about a technique (or method). A deeper level of understanding occurs when you actually apply the technique or use the method. I encourage students to delve even deeper to attain a new level of understanding of material through the art of teaching. In the context of advanced courses in methodology, I have given as a major assignment (final exam, etc) an exercise called "see one, do one, teach one". Briefly, I work with students to select a topic tailored to their interests, level of understanding, and cumulative life experiences. The goal in the selection process is to identify a new technique, method, or understanding of a methodological area. To give the students a start in the right direction, I provide each with one or two articles from the literature from which to begin the immersion process. In each case, I identify an area which I know they have studied and applied some of their learning in an application – but there is much more to learn. Students are expected to design a teaching module – objectives, reading assignment (and rationale for selection), handouts and lecture material, and problem set development. The topics selected are extremely focused to make the assignment doable in a reasonable amount of time. I encouraged the students while working on the assignment, to reflect on lectures/seminars/classes and problem sets that they found particularly helpful, as well as those that were not conducive to learning. For example, methods without applications or examples from the literature can be difficult for students to place in context. Likewise, formulas without examples to demonstrate their application, interpretation, etc. seem more challenging than the presentation of formulas with such teaching aids. Part of the objective of the assignment is for students to pay attention to how they learn. I want them to appreciate that learning is a process and an important aid in their own learning is sharing their knowledge with others.

I received positive feedback on this learning exercise. Yet, the exercise was extremely difficult to maintain as it was incredibly labor intensive for me to tailor the topics and individually mentor the students through the process. I also found it difficult to provide immediate opportunities for students to refine and deliver their teaching module in a timely fashion and meet the other course objectives. As a result, I turned to two other courses I typically teach to identify time within each for students to run "mini-lectures". I realized that in the context of the applied papers and projects students worked on for class, often students learned a method or concept beyond the scope of the course objectives, but of interest to all. If

so, I encouraged students to share their experience by giving a 15 minute teaching module complete with handout, example of computer code if necessary, and tips. Their classmates may not be ready to fully absorb what is taught at that moment but several things occur. First, exposure to the concepts plants the seeds for future growth. Second, the student who immersed themselves in the topic gains a greater level of mastery by organizing their thoughts for teaching and facilitating the active discussion stimulated by the presentation. Lastly, the student then becomes “the expert” on the topic for the learning community. In addition to the mini-teaching modules, students in dissertation phase become expert in the methodological issues that stimulate new directions for research. If this occurs and there is sufficient overlap with course objectives, I will work with the student to develop, refine, and deliver modules on their area of expertise. I believe this approach is rewarding for the advanced graduate student to hone their skills and deepen their knowledge of their research through their teaching. It is rewarding for the first/second year students to learn from a colleague, to see where they will be in a very short time, and to have access to a greater number of facilitators of knowledge. Further, I am rewarded as I stand back in awe as the students continue to spread their wings and apply the technique to teach self, and then teach others.

Teaching students how to ask good questions

A few months ago, I was having lunch with a group of students at a well-established, well-regarded graduate program. I was extremely curious about the process through which students learned how to define their dissertation scope. How did they learn to ask good questions? Having trained at Brown and being on the faculty my entire career, I wanted to learn more about this particular component of training at other leading programs. I was actually taken aback to learn that the norm at this well-regarded program was that faculty and research collaborators doled out topics as suited the particular projects at the moment. I recognize that this approach would probably be more cost-efficient and easier for trainer and student alike. Yet, I believe that this component is critical in developing the independent lifelong learner.

From the first day in the program, the students are encouraged to look within to understand more about themselves and what their research passions are. Throughout their graduate experience students are expected to actively participate by asking questions in class, in journal club, at seminars, etc. In many classes, students expand their portfolio by defining questions for projects and papers. It is customary for students to present their work at national and international meetings. Exposure to different trains of thought provide additional stimulus for learning. Before the meeting, students are encouraged to flip through the meeting materials and circle what is of interest to them. During the meeting, students are advised to pay careful attention to which sessions (of concurrent sessions of interest) they actually attended. What sessions were most engaging? What questions piqued their intellectual curiosity the most? This approach acknowledges that the “good” questions are ones that keep you thinking in the shower, at two in the morning, during traffic jams, or you keep thinking about while you sleep.

Despite early interventions in the craft of asking questions, the critical phase remains the post comprehensive exam period. In our program, this phase of training typically takes 9-12 months during which students define three related research questions that each provides innovation to their discipline. The end result becomes three peer-reviewed papers. At the onset, I encourage students to think about their ultimate next step post-graduation. In what setting do they want to serve? Industry? Government? University? What methods would they like to refine? What topics excite them? Essentially, I encourage them to view the dissertation as the ultimate opportunity for self-exploration and discovery. Each student approaches this phase uniquely, but common to all is the reflective practice students bring to the process. Students meet regularly with various faculty members, students who've completed the process, and former graduates. With each defining step, they immerse themselves into the literature to understand the complexities of the substantive area, as well as the methods applied. Considering the strong foundations of their coursework, these test the limits of their learning by stretching their imaginations in surprising ways. Appreciate that this phase remains a challenging, soul searching, and life defining exercise for students. They must ultimately set their course. As a result of the process, students find questions everywhere and are encouraged to keep a notebook of questions to research after their dissertation is complete. How does the transformation occur? I believe this is so because the questions that define the scope of their dissertation work have come from within, are consistent with their goals and values, and set the stage for their lifelong learning. How satisfying to participate in this process!

How does a graduate trainer know if they have achieved their goal of facilitating the development of an independent lifelong learner? It is pretty clear. You have done your job as graduate trainer well when your role in the student's learning experience is unnecessary and the only thing left to do is to step aside and watch your graduate soar. Are the methods described above useful in assisting in the development of independent lifelong learners? I believe so. Are there more methods, techniques, and strategies others employ to assist our students? Of this, I am positive and I am anxious to participate in the exchange of ideas.