New STEM Faculty Support: Why Aren't We Providing It?

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As everyone knows, skilled professionals routinely receive training before being certified to practice independently. Electricians, machinists and chefs get preliminary instruction and then serve for months or years as apprentices. Accountants, psychologists and physicists and physicians spend years earning degrees in their fields, and the physicians spend additional years in supervised internships and residencies. It would be unthinkable to allow people to practice a skilled profession without first being trained for it, especially if their mistakes could cause harm to others. . . unless, that is, they are college professors.

The standard preparation for a faculty career is taking undergraduate and graduate courses in one's discipline and completing a research project on a topic someone else has defined, and then perhaps sitting through a half-day or one-day new faculty orientation that covers such things as health and retirement benefits and the importance of laboratory safety. The unstated assumption is that the main activities in a professor's job—designing and teaching courses, creating research projects and getting them funded, recruiting and advising graduate students, publishing scholarly papers and books, dealing with the innumerable crises that regularly occur in teaching and research, and balancing the demands of work and personal life—either require no training or are trivial to learn by trial-and-error.

That assumption is wrong. High-quality research and high-quality teaching each involve many complex skills, and while trial-and-error learning has some merits, it is not efficient. Robert Boice (1992) studied many new faculty members and found that roughly 95 percent of them took four to five years to meet or exceed their institutions' standards for teaching quality and research productivity. A learning curve that long is costly to universities and colleges, which may invest as much as a million dollars in each new faculty member they hire, and those who pay the penalties for errors in teaching are not the ones making them. Boice also found, however, that the remaining 5 percent of the new faculty members he studied—the ones he called quick starters—needed only one to two years to learn their craft, and the things they did that their more numerous colleagues failed to do could be identified and taught. In other words, a good support program for new faculty members can cut three years off their usual learning curve.

Such programs are rare, but they exist. For example, a program to prepare new and future STEM faculty members for academic careers has been in place at North Carolina State University for over a decade (Brent et al., 2006). Elements of the program include the following:

- *A four-day orientation workshop for new STEM faculty members.* The workshop addresses the three questions uppermost in most new faculty members' minds: (1) How do I start and build a successful research program? (2) How do I teach effectively? (3) How do I juggle the time demands of research, teaching, and service and still manage to have a satisfying personal life? It is presented by some of the best STEM researchers and teachers on campus with concluding presentations by the Deans of the two participating colleges (Engineering, and Physical and Mathematical Sciences) and two of their department heads. In an assessment conducted several years ago, workshop participants gave significantly higher ratings than nonparticipants to their academic career introductions and outperformed the nonparticipants in both research productivity and teaching evaluations in their first three years.
- *A half-day workshop for department heads and senior faculty members on mentoring and supporting new faculty*. The workshop addresses Boice's quick starter strategies and surveys things department heads can do to help their new faculty members get their careers on a fast track to tenure and promotion. It goes on to introduce several alternative mentorship models, suggests ways to make mentoring programs effective and sustainable, and offers guidance on helping new faculty members deal with crises that commonly occur in research, teaching, and achieving a healthy work-life balance.
- *A one-day workshop called "Introduction to Faculty Careers" for graduate students and postdoctoral fellows*. The workshop offers tips for applying and competing successfully for faculty positions, starting a research program, and beginning to teach.

Brent *et al.* (2006) describe the support program elements in detail, and Brent and Felder (2012) give assessment data for the new faculty orientation workshop.

Felder *et al.* (2011) offer the following suggestions for making STEM instructional development programs effective, basing their recommendations on cognitive science, adult learning motivation theory, and the experiences of successful instructional developers:

1. *Use program facilitators with expertise in both STEM disciplines and general pedagogy, and provide STEM-related applications of all recommended instructional methods.* Programs without STEM-specific examples given by people who lack the disciplinary content knowledge to provide such examples are unlikely to have much impact on most STEM faculty members. Some facilitators can provide both pedagogical and disciplinary expertise, but more often teams of presenters are needed to do it.
2. *Target workshop contents to the needs, interests, and levels of the participants*. For new faculty members, emphasize basic instructional issues and strategies, approaches to starting and building a successful research program, and time and crisis management. Save presentations on learning theories and advanced teaching approaches like problem-based learning for faculty at later stages of their careers.
3. *Provide choices rather than mandates regarding adoption of new teaching methods, and advise a gradual approach to making changes*. Don't make pronouncements like "You can only be an effective teacher if you use active learning!" or imply in any other way that the teaching methods the participants have been using (such as lecturing) are wrong. The idea is not for them to stop using those methods, but to gradually add new ones. Also, caution them against setting out to adopt every workshop recommendation starting on Day 1 of their next course. Rather, invite them to select and try two or three recommended techniques; give each one a fair try (rather than trying something once and giving up if it doesn't work immediately), keep using the ones that work well and modify or drop any that do not, and add another one or two in the next course.

4. *Provide opportunities for participants to think of how they might apply recommended methods in their own courses*. For example, after you introduce learning objectives, have the participants write several—including at least one at a high cognitive level—for a course they teach; or in a session on active learning, have them think of one or two possible activities that address their learning objectives. Then have them briefly discuss their ideas in groups of two or three and get feedback. Such exercises substantially increase the likelihood that they will actually try the recommended methods once they are back in their classrooms.

There are of course costs associated with new faculty support programs. For a program to be sustainable, facilitators and mentors must be compensated financially or through release from teaching and service responsibilities, notebooks with copies of presented material and supplementary reprints and reference lists must be prepared, and participants should be fed. Program costs are insignificant, however, when measured against typical STEM college budgets, and if they include research training, they can be fully paid for by just one major grant being funded that would not have been if the PI had not participated. In short, there is every reason to provide support programs to new STEM faculty members and no good reason not to. Nevertheless, most universities and colleges don't provide them. Does yours? If not, why not?

References

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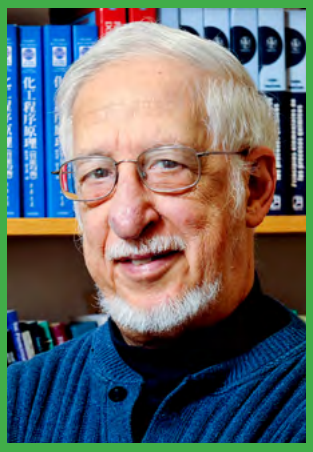

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