

## The Courage to Be Experimental: How One Faculty Learning Community Influenced Faculty Teaching Careers, Understanding of How Students Learn, and Assessment.

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*This article describes a learning community for early-career faculty in the sciences aimed at course redesign and active-learning. Through findings from surveys, interviews, and observations, program outcomes regarding faculty teaching skills and confidence, understanding of how students learn, and use of assessment are explored. Finally, the article examines some of the structural characteristics that made this program successful.*

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Of all the faculty development models that have been initiated in the last thirty years, the faculty learning community seems to be one of the most intense and successful. While the term, "faculty learning community" is new, such programs have existed since the mid-1970s (Cox, 2001). The Lilly Teaching Fellows is but one example (Austin, 1992; List, 1997) of this model. Milton Cox (2001) defines a faculty learning community as a "cross-disciplinary faculty group of 8 to 14 members engaged in a year-long program with a curriculum about enhancing teaching and learning with frequent seminars and activities that provide learning, development, and community building (p. 71)."

Whether the program is cohort-focused (addressing issues of a particular group such as junior faculty) or issue-focused (such as emphasizing cooperative learning), there is evidence that faculty learning communities produce substantial learning for their members (Austin, 1992; Cox, 2001; List, 1997). The overall format for these programs differs somewhat

but usually includes bi-weekly seminars on teaching and learning issues, independent self-designed teaching projects, and financial support or course-release time for participation. However, by far the main curriculum or resource employed in these programs are the meetings between colleagues. According to Fulton and Licklider (1998), "faculty, like their students, learn by reading, experiencing, reflecting and collaborating with others" (p. 55). Weick (1995) observes that meetings are sense-makers (p. 143) that can have a powerful influence on beliefs and on personal learning. Likewise, Harper (1996) observes that when contexts are created "where conversations can take place that enable college teachers to critically reflect on their assumptions, share their thinking and concerns with peers, and focus on themselves as teachers/learners," (p. 252) individuals can be transformed by the learning that takes place.

What follows is a brief history of one faculty learning community, research questions and methodology that guided analysis of this program, key find-

ings, and discussion of how change occurred so that findings might be used to improve existing faculty development programs or initiate new ones.

*STEMTEC Faculty Fellowships in Science and Mathematics Teaching Program: History and Context.* The 2002 Faculty Fellows program engaged 16 faculty members from seven partner colleges in Western Massachusetts in a faculty learning community aimed at increasing teaching effectiveness in college math, science, and engineering courses. Modeled after the Lilly Teaching Fellows program, fellows received a \$5,000 stipend to support their involvement in this year-long program which had a blend of cohort-focus (early-career faculty in the sciences) and issue focus (active learning and course redesign).

The program had two major components—bi-weekly dinner seminars and a course redesign project. During both the spring and fall (2002) semesters, the Faculty Fellows Program held 16 dinner seminars (2.5 hours each) which included formal and informal discussions of: teaching goals; active learning; informal and formal cooperative learning; alternatives to traditional tests; instructional technology; critical, higher order, and expert thinking; syllabus construction; interactive techniques for large classes; formative assessment; and individual reports from fellows on their course redesign efforts. During each session there were a mix of mini-lectures by the program coordinators, videos modeling teaching techniques, exercises where faculty fellows tried out active learning methods themselves, and unstructured discussions among faculty fellows about their own teaching and attempts at reform. Fellows were all given a copy of Handbook on Teaching Undergraduate Science Courses: A Survival Training Manual (Uno, 2002), and were assigned readings from the handbook related to each week's topic. Each fellow also designed a plan to integrate active learning methods into a course or courses that they were teaching or would teach in the near future. These projects were year-long and a progress report was handed in mid-year for feedback from coordinators and a final portfolio assessing the redesign was handed in at the conclusion of the program.

A major goal of the Faculty Fellows program was to enhance faculty members' familiarity with and likelihood of using active-learning methods in science, mathematics, and engineering courses and to facilitate the redesign of courses to include active-learning

methods. However, equally as important, if not more so, were the goals of providing support for early career faculty to strengthen their ability as teachers and investment in and commitment to teaching, developing faculty understanding of assessment and how students learn, and providing opportunities for teaching development. This article assesses the degree to which the program was effective in achieving this second group of goals. Thus the research questions that guided this study over one year were:

- Did the program impact any of the following aspects of faculty members' teaching careers (a) teaching skills & self confidence, (b) commitment to teaching & satisfaction with teaching, (c) philosophy of teaching, or (d) degree of being "pedagogically self-conscious?" If so, how?
- Did participation in the program increase or enhance faculty understanding of how students learn? If so, how?
- Did participation in the program increase faculty understanding of and/or likelihood of using assessment techniques in their classrooms? If so, how?

## Method

Because the research questions were both quantitative (e.g. whether or not fellows' teaching skills were increased) as well as qualitative (e.g. how and why teaching skills were affected), several methods were employed over the faculty fellows year.

Three surveys were developed and given to fellows to complete. Fowler's (1993) work on survey methods guided survey design. A survey was completed by fellows before the program began, at midpoint, and at its conclusion. The three survey instruments were designed by the author and reviewed by an expert in survey design to establish validity and reliability. From this review, the survey was revised and confirmed. The first survey had 15 questions, most of which were likert-scale questions and asked fellows to rate specific areas of their own professional development, knowledge of student learning, and assessment. About half of the survey questions had multiple items per question. The second and third surveys repeated questions from the first survey in order to assess change in fellows over time. While there was a 100% response rate on the first survey (16 participants), 12 (80%) of the midpoint survey were

received, and 13 (87%) of the final survey (when the total number of participants had dropped to 15). In the second semester, one of the fellows was unable to participate, thus concluding the program with 15 participants. Survey data was analyzed using basic descriptive statistics.

Several qualitative methods were also employed to understand how and why changes were occurring in faculty teaching careers, understanding of student learning, and assessment. Guided by experts in participant observation (Glesne, 1999), I attended, observed, and took notes at six dinner meetings (three in the fall and three in the spring). Two research assistants assisted me in interviewing 12 of the Faculty Fellows at the conclusion of the program using a semi-structured, open-ended question protocol I developed. The interview protocol included six questions on fellows' experiences in the seminar meetings and with their own course redesign with special attention to how the experiences did or did not facilitate professional development and understanding of student learning and assessment. Interviews ranged from 30 to 45 minutes. I also facilitated a focus group of all fellows absent program coordinators at the program's midpoint and again at the conclusion where similar questions were asked.

Application materials, final course redesign portfolios, and communication from the fellows' listserv were also reviewed to provide context for interviews and survey data collected using methods appropriate for document analysis (Whitt, 1992).

The interviews, focus group sessions, and observation notes were transcribed. I analyzed these transcripts for themes that related to program goals as well as unexpected or divergent themes. I began data analysis by reading and rereading transcripts and then coding them according to categories that emerged from the data; coding reduced the data and facilitated drawing conclusions from patterns (Miles & Huberman, 1994).

## Findings

### *Impact of Program on Teaching Careers*

*Commitment to and Satisfaction with Teaching:* There was only a small increase (in survey responses) in the category of commitment to teaching (from 88% to 92% to 92.3%), but this is likely due to the high initial rating participants gave their own com-

mitment and the fact that the program recruits faculty who have an established commitment to teaching. When asked to check the statement that best characterized their satisfaction with their work as teachers at the beginning of the program, 2 (15%) said they were very satisfied, 10 (77%) somewhat satisfied, 1 (8%) somewhat unsatisfied, and none very unsatisfied. When asked the same question again at midpoint, 4 (33%) said very satisfied, 8 (67%) said somewhat satisfied and none said somewhat unsatisfied or very unsatisfied. Final survey responses included 5 fellows reporting (38.5%) very satisfied, 6 (46.2%) somewhat satisfied, and 1 (7.7%) somewhat unsatisfied. Looking across the three surveys, one sees more fellows noted that they were very satisfied after completing the program. However, this was a group where the majority was either somewhat or very satisfied at the beginning and likewise at the end, but perhaps for different reasons. For example, during the focus groups a faculty member said, "it was great to be part of a community where everyone cares about teaching." Faculty in community colleges mentioned some frustration that their attempts at reform were not appreciated by students. One faculty member said, "the obstacles to success may be too great to be overcome by enhanced methodology, but I am satisfied that I have been able to achieve a more active learning environment and that students seem generally satisfied with my methods." In other words, she continued to be discouraged in the problems many faculty face but was satisfied that she was trying more effectively to overcome these barriers and had the support of a community of colleagues trying to do the same.

*Teaching skills, self confidence, courage, and inspiration:* The Faculty Fellows program was also found to increase teaching skills, enhance self-confidence, and provide courage and inspiration for innovative teaching. Table 1 outlines survey responses regarding teaching skills and careers. When high and good ratings were combined, fellows' ratings on their skills as a teacher went from 80% in January to 100% in May to 100% in December and self confidence as a teacher from 56% to 82% to 92.3% during the same period. One faculty member summarized the benefits of the program being described here when he said, "this program gave me techniques for things I was gravitating towards anyway. But now I know how to do it." As suggested in this quote, having a greater repertoire of teaching skills and techniques would be

useless without the self-confidence and courage to use them. Indeed, fellows felt that listening to each other talk about what they tried and what worked or didn't work gave them "the courage to be experimental." Fellows felt strongly about this aspect of the program. One faculty member said:

One of the aspects of the program that was significant to me was the courage to be experimental in the classroom. This courage came from seeing so many people out there trying and discussing their success and discussing their failures. It made it feel like, 'Wow, I can go into the classroom and do whatever I want; if I blow it, I blow it.' I'll go back the next day and try something different. That has opened me up to many positive experiences in the classroom.

Faculty members agreed that the group maintained a "real culture of experimentation is okay." One faculty member said at the program's conclusion, "I am much more willing to go out on a limb than I was before." And another observed, "Having this group to come talk to gave me a lot of courage to go do things. [The group provided] inspiration to take more risks." This inspiration and courage to be ex-

perimental seemed to come from fellows hearing the strategies others had tried and admitting teaching efforts that were less than perfect. One faculty member said:

Innovation in the classroom requires both a prior understanding of pedagogy and the courage to face periodic public disaster. I had neither when I started with STEMTEC. However, after the formal presentations we received during the first semester I learned enough about pedagogy to formulate a strategy for my class. In addition, our frequent opportunities to discuss disaster showed me that disaster is not a mark of a bad teacher but of someone who is pushing to improve. So, armed with just enough knowledge and courage to be dangerous, I dove into teaching.

Learning of the benefits of active-learning strategies from experts and feeling more comfortable about making mistakes made fellows feel more confident about attempting reform. As one faculty member explained: "I always had a fear of letting go of control. When I tried it [active-learning methods], I was stunned at how well they responded."

And another faculty member said, "I gained

confidence that I can innovate in the classroom without risking whatever it was that I thought I would have been risking before my STEM experience."

*Becoming "Pedagogically Self Conscious":* At the beginning of a dinner session in the second semester, the coordinator asked how everyone was, and one faculty member said, "I didn't want to teach this week, so I gave the students a question to discuss," followed by laughter from the group. The Faculty Fellows program helped faculty become, as one Lilly fellow observed in a previous study, more "pedagogically self-conscious" (List, 1997, p. 208). Fellows said that sometimes this was good, other times difficult. One faculty member in the focus group said (and others agreed): "I was more miserable with my teaching this semester because I was taking it apart. Like, okay, I am going to do this boring thing again. That isn't very creative." Another faculty member reflected that "it [active learning] is a lot of work, while slapping a lecture together is much easier." Another faculty member reflected, "I feel like the course in particular and my teaching in general are going to continue changing." Faculty reflected on their own thinking, their teaching process, students' learning and the interaction. Faculty reported that the process of talking about and writing about their teaching made them question and revise their goals and think consciously of new ways to make classes more interactive. The importance of this kind of learning is underscored by one fellow's comment: "The price paid for understanding that students did not get a particular concept is that you must take the time to revisit the concept until the majority understand. Taking the extra time, though obviously the right thing to do, is very difficult when there is a very large body of work remaining in the course. Self discipline is key to overcoming the desire to push ahead." Fellows were more aware of what they were doing, why they were doing it, and more curious about the outcomes of their teaching then when the program began.

*Philosophy of Teaching:* Many early-career faculty resist declaring that they have a "philosophy of teaching" because they think it sounds presumptuous, when in fact they have much to learn. However, when high and good ratings were combined in survey data, 19% of fellows rated their philosophy of teaching high or good at the beginning of the program, 75% at the program's midpoint and 100% at the program's conclusion. The conversations among faculty in this learning community helped fellows to recognize that

they had a philosophy of teaching, even if it wasn't formally written down.

Fellows were asked in focus groups and in individual interviews whether their philosophy of teaching changed throughout the program, whether conversations in the program caused them to question any of their former teaching practice, and whether they did anything less often because of the program. All of the fellows strongly agreed that they lectured much less often because of the program and felt "guilty" if they did not have any active-learning in a class session now. One fellow explained his thinking before and after the program: "I used to think that's [active-learning exercises] not my job. Through this program I became more comfortable that this is a fine way to teach—to the point where even when parents were visiting I did it." Another faculty member said the program helped him to think differently about the whole purpose of their classes. "It helped me to appreciate how different things are now from when I was a student. [The program] helped me to ask 'How can I help them to stop memorizing and learn how to learn things?'"

While many of the shifts described above were subtle, a few of the fellows said their philosophy had changed significantly, as illustrated by one fellow's comment: "I was initially a little bit of a skeptic and came out of the program a more or less complete convert to the approaches advocated by the programs' organizers. My approach to teaching has been changed pretty drastically, and I did not really expect that to happen going in."

### *Impact of the Program on Participant's Understanding of How Students Learn*

In survey data, 47% of fellows rated their own understanding of how students learn high or good at the program's beginning compared to 83.5% at midpoint and 76.9% at the program's conclusion. In terms of how this increased understanding occurred it seemed to be a blend of conversation with colleagues, theoretical frameworks presented by coordinators, and individual teaching projects. For example, the coordinators of the program outlined the paradigm shift discussed by Barr and Tagg (1995) of changing teaching from a process of delivering information to helping people learn, which they explained takes more expertise. This framework seemed to be helpful to fellows throughout the year as they considered their

**Table 1. Professional Development**

How would you rate your own professional development in each of the following areas?

	High			Good			Okay			Poor		
	Jan	May	Dec	Jan	May	Dec	Jan	May	Dec	Jan	May	Dec
Skills as a teacher	0%	33%	38.5%	80%	67%	61.5%	20%	0%	0%	0%	0%	0%
Understanding of how students learn	0	16.5	15.4	47	67	61.5	47	16.5	23.1	6	0	0
Commitment to teaching	69	75	84.6	19	17	7.7	12	8	7.7	0	0	0
Philosophy of teaching	0	17	46.2	19	58	53.8	75	25	0	6	0	0
Design of courses	0	18	7.7	50	64	69.2	44	18	23.1	6	0	0
Self-confidence as a teacher	6	27	30.8	50	55	61.5	38	18	7.7	6	0	0

\*Percentages based on the total number of people that responded to the question. Response rates were as follows: January 100% (N=16 of 16 participants); May 80% (N=12 of 15 participants); December 87% (N= 13 of 15 participants).

own methods for helping students learn.

However, just as much learning occurred through conversations between fellows. During one of the first dinner seminars, the fellows were asked to reflect on something they learned as a result of being involved in an active-learning activity. Fellows seemed genuinely engaged and reflected on what they learned, how they learned it, and what it felt like to learn it. Afterward, one faculty member asked, "If I get involved in active learning, how do I know this is the most effective or efficient way to learn something?" Another faculty member commented that what we are learning must be meaningful to us in order to stick in our minds. Another posed the question: "It is easy to teach motivated students, but how do you get students to be motivated when they don't start out that way? Can you motivate students by being enthusiastic?" This questioning and thinking out loud enhanced fellows' understanding of the complexity of the learning process.

During a fall dinner session, I observed one fellow interviewing another concerning their syllabus. This exercise worked extremely well in helping each participant become clearer about the overt and shadow learning goals they had for students. Discussions of the student clientele and teaching methods followed. As one faculty member explained the active learning she planned for this class, the other suggested she might consider integrating her methods into her syllabus, so students who are used to being lectured would have a sense of what she was doing and why. Back in the large group, a fellow commented that he often does not tell students where they are going so they can figure it out on their own. Another commented that some students don't react well to

being kept in the dark. A discussion followed about the differences between how undergraduate and graduate students learn, how courses must be designed differently as a result, and the interaction between content and higher learning goals.

As fellows articulated to each other what they were doing in their course redesign projects and why, they seemed to understand it better themselves. For example, one faculty member explained a writing exercise he had his students do in groups and said: "What I am trying to get them to do is to take the concept we are studying and write about it in a way that is understandable. It is hard to assess on the fly, but the writing assignment helps them to teach each other the concept." In the final focus group one faculty member commented that the program had given her enough "knowledge to feel comfortable giving up control of the class" and allowed her to "trust students more." Clearly this confidence was in part due to a greater understanding of how students learn.

### *Impact of the Program on Participant's Understanding of and Use of Assessment*

Just about every Faculty Fellows dinner session involved fellows reflecting on how assessment might be used to increase student learning. Fellows noted it was an area that they wanted to learn more about at the end of the first semester, and it was a key component of the curriculum in the second half of the program as a result. Table 2 presents fellows' responses to a survey question on use of assessment. Data in this area show an increase over the year in fellows' using assessment to a great extent, and a decrease in fellows noting that they use assessment very little or

**Table 2. Student Assessment**

To what extent do fellows use student assessment results to modify what is taught and how it is taught?

	To a Great Extent	Somewhat	Very Little	Not at All
January	0%	9 (69%)	3 (23%)	1 (8%)
May	1 (8%)	6 (50%)	5 (42%)	0%
December	3 (23.1%)	8 (61.5%)	1 (7.7%)	0%

\*January (2002)'s numbers were out of 16 responses, May (2002)'s numbers were out of 12 responses, and December, (2002)'s out of 13 responses.

not at all. Combining the first two categories of using assessment to a great extent or somewhat, fellows went from 69% at the beginning of the program to 84.6% at the conclusion. What the survey data cannot reveal but observations, focus groups, and interviews could was that fellows felt they learned what assessment really was and all of its potential uses over the course of the program. During one fall dinner session the coordinator provided a mini-lecture for participants on using assessment to improve teaching/learning. Discussions during this session suggest that the 69% of fellows noting that they understood and used assessment in the survey data was likely an overinflated number as many did not understand the diversity of forms of assessment or how or when they might be used. Many had only vague understanding of the term before the program but left feeling that they had a much better handle on specific assessment practices that they might use to receive feedback on student learning. However, there was also room to grow, as many fellows mentioned that they had no idea at the end of the program how to assess whether their integration of active-learning methods was effective, as illustrated by the following comments: "Did students learn more than with more traditional approaches? Stay more motivated? I find it impossible to say." Another faculty member said, "In terms of whether I was successful with this course redesign, I am not sure." However, these statements were almost always followed up by recognition that at least by their observations their students enjoyed the classes more, and so did they. So they were beginning to do some assessment anecdotally, even if many of them were not yet proficient in or applying new assessment techniques. Examination of course redesign portfolios and analysis of interview data suggest that while all fellows became more familiar with assessment, about 50% concluded the program not having tried these techniques.

### **Discussion and Implications**

In summary, the Faculty Fellows program was successful in meeting program goals. Fellows increased their understanding of student learning and assessment and about half seemed to increase their use of assessment methods in their classes. The program was also successful in stimulating professional development within faculty teaching careers. Conversations between fellows about teaching practices

that worked/didn't work, mini-lectures by coordinators, and development of final course portfolios seem to have been the most effective resources for achieving goals in this program. Harper's (1996) analysis of why and how certain learning communities "work" and are able to generate such positive outcomes, while others turn into opportunities for student bashing or become competitive, is useful in examining the context of this program. First, this program was created for faculty with an established commitment to teaching; thus it started with an interested and motivated group of participants. Second, the fact that most faculty were not from the same institution or the same department meant that individuals could "release their own need for control and strategic positioning in discussions and open themselves to real give-and-take in conversation with others" (Harper, 1996, p. 261). The fact that the conversations were not evaluatory, allowed openness to discussing mistakes in teaching critical to learning for self and others, and the fact that the conversations lasted over the course of a full year meant trust could develop as well as friendships and mutual support (Harper, 1996). Great conversations are often the work of great facilitators who invisibly keep them on track, ensure opportunity for equal participation from all participants, and provoke the group with thoughtful and enlightening questions. Such was the case in this study, where the author during observation, and the participants in interviews found these skills in abundance.

Similar to List's (1997) analysis of the Lilly program where 78% of fellows noted the individual teaching projects were critical to their growth, participants in this study found them essential to their own learning. They were perhaps most useful as a way for participants to document for themselves their own learning and how it was affecting their students. This reinforced their sense of confidence and commitment to teaching.

### **Conclusion**

By connecting with like-minded scholars and finding an intellectual community in the Faculty Fellows program, participants acquired knowledge of active-learning methods, how students learn, and assessment and acquired the skills and confidence necessary to use this knowledge, as well as a clearer sense of their own philosophy of teaching. Creating

such opportunities for learning and community are essential, not only for the individual growth of faculty, but also for the benefits that learning provides our students.

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