

Formative Feedback from the Science Teaching Fellows on the Science Education Initiative at CU Boulder

Executive Summary

Sandra Laursen, Ethnography & Evaluation Research, and David Budd, Geological Sciences

June 2008

Introduction

We summarize findings from a survey conducted for the Science Education Initiative (SEI) of the Science Teaching Fellows (STFs) in five science departments participating in the SEI. The survey provides useful formative feedback about the SEI's working practices and leadership team, portrays the challenges faced by the STFs as central players in this large initiative to improve science education deeply and broadly on this campus, and shares their recommendations for addressing these needs and improving the SEI's efficacy. Appendix A describes the study method, and detailed responses to survey items are given in Appendix B.

STF Meetings

STF meetings were rated as moderately useful (see Appendix B for numerical ratings). Several STFs identified general features that contributed to productive meetings. Chief among these were a clear task or reason for meeting, defined in advance; a focus on exchange of ideas rather than reporting; crisp facilitation that is nonetheless responsive to input; and small group discussions. Some raised questions about the apparent one-way nature of interaction between the CU and UBC initiatives. Dialogue among STFs was consistently valued, and suggestions made for how this value could be magnified. Very few comments note difficulties with interpersonal dynamics in the meetings.


STFs were aware that their needs have changed since the start of the project, and suggested ways to be more responsive to these evolving needs. Several proposed less frequent, more focused meetings of the whole group, possibly interspersed with other types of gatherings among subsets with shared interests. This model appears a good match to the STFs' present focus on their research; many found it valuable to work through shared research tasks or trouble-shoot difficulties in small groups.

Interactions with SEI Central

Overall, ratings and comments emphasize the value of the STFs' interactions with each of the SEI Central leaders, [REDACTED]. STFs appreciate the leaders' expertise on a range of issues, and their habits of sharing information about particular strategies, useful research findings, and the broader context of STEM education reform. With few exceptions, the STFs view the SEI leaders as accessible, prompt to respond to questions or supply information, and fostering a stimulating intellectual climate. Several comments (here and elsewhere) recognize that, while models from physics education research are a valuable resource, it is also important to remember that other disciplines differ in important ways.

Other comments reflect mixed views or offer constructive advice. Overall, these reflect the STFs' affective needs rather than cognitive needs, which they report to be well addressed. Several comments ask leaders to reflect greater immediate openness to STFs' input. Another common thread is STFs' need for positive feedback on their work. This echoes a commonly reported issue in the literature on early-career faculty development, when young faculty encounter academic culture as full members of the academy rather than as students who are partially sheltered. Learning to give and take critique is an important professional skill, yet coupling such critique with positive feedback—and ensuring that it is heard—may be particularly critical when working with the STFs, who have a novel academic position that isolates them relative to postdoctoral or faculty peers of similar experience levels.

[REDACTED]



Interactions with Department Liaisons

On the whole, ratings and comments on department liaisons were quite positive. Practices of liaisons that were particularly appreciated include: listening and being open to feedback, keeping the department effort organized and on-task, and serving as an advocate in the department. Several comments acknowledged the liaisons' important mediating role in interpreting reactions of colleagues, advising on approaches to involving faculty and solving problems, running interference with departmental processes, and serving as a useful reality check. Humor, candor, collegiality, and supportiveness were valued, as was a concern for individual STFs' professional development and liaisons' personal interest in teaching. STFs reported, and valued, frequent e-mail exchanges and face-to-face meetings (typically, weekly).

STFs recognized some limitations to what their department liaison could offer, particularly surrounding expertise on educational research and, thus, confidence that educational impact can be measured. This point combined with comments (above) about the physics education orientation of SEI Central may suggest a need for opportunities to consult with experts in disciplinary research in their own fields. Liaisons were recognized as busy people with multiple commitments, thus sometimes hindering access or attention and raising concern about their "burnout". Like the STF role itself, the liaison role is novel; new liaisons may benefit from conversation with experienced liaisons about their role and structures for working with STFs.

The Job of Science Teaching Fellow

Responses on a question about the degree to which the STF job met expectations ranged widely (see Appendix B). Based on the write-in comments, we take these responses to indicate that most did not have clear expectations for the job when they took it.

Aspects cited as the "best" part of the job are, overwhelmingly, the people: other STFs, faculty and students. STFs cited a sense of purpose and collegiality from working on something that was important to them, on a team with others who held similar values. They enjoyed interacting with faculty and students. They value their own learning about student learning, faculty development, educational research, educational technologies, and gaining interpersonal and persuasive skills.

It is not surprising, then, that the most commonly cited barriers to effectiveness in their job are also the people. STFs cited challenges due to resistance from chairs and department members that could obstruct progress, and department cultures that did not reward excellence or effort on undergraduate education. They had concerns about the coherence, sustainability and meaning of the changes they were trying to foster, recognizing limitations in their ability to affect change and in the impact of their educational research. Some noted needs for deeper faculty understanding of the educational philosophies behind the methods they were trying, and others noted student resistance and lack of communication as barriers in their work with faculty. Practical barriers included fragmentation of their time and some research-specific difficulties.

Career Plans

Most of the information from this survey addresses how the STFs shape the SEI, as they share their experiences, needs, and advice. The career interests of the STFs inform us instead about how the SEI is shaping them, as young professionals. Many but not all are currently considering faculty positions of various types. Other interests include work in curriculum development, educational technology, science communication, and educational research. A few noted their interest in a more permanent education-related position in their current department. Department liaisons may wish to communicate clearly about

¹ LEAP, through the Office of Faculty Affairs, offers introductory leadership workshops that address communication, time management, and leadership skills, and career planning, with documented impact on early-career faculty. These workshops might also meet some professional development needs of STFs, described below.

the potential, or lack of it, for such a position, while the SEI may wish to consider the place of such positions relative to current strategic planning on this campus.

Four STFs indicated that their career plans had changed little since joining the SEI; most, but not all, of these remained interested in a tenure-track position. Of those who reported changes in career interests, two had reduced interest in tenure-track positions. Four reported more interest in education research, either in combination with (prior) teaching interests or as the main focus of their desired future work. In addition to their exposure to new types of work, in their current jobs, STFs had been able to closely observe faculty work. This had mixed results—some had gained new excitement about research in science or science education, some saw mismatches in their own values with the university's, and some raised concerns about compromised work/life balance that they perceive as coupled to university positions.² Nearly every reply reflected some uncertainty in how the STFs are feeling about their future careers. Such uncertainties are not uncommon among scientists at this career stage, and more common among those with non-conforming interests such as education.³ Because the STFs will, in their next positions, be ambassadors for the SEI, it is worth some attention to their career planning needs.

Suggestions for Improvement

To address the challenges they noted in their jobs, the STFs gave specific recommendations about ways that SEI Central could assist them, in response to several questions soliciting their suggestions and advice. Chief among these recommendations was for the leaders to interact more often and more directly with department faculty to address the resistance and cultural issues raised above, while still trusting the STFs as partners in this endeavor. They wanted more specific help with research, including some staff help with data cleanup and analysis to speed the research and use their time better. Some noted specific training that would be of use in their current job, especially time management and interpersonal skills, and a general interest in professional development opportunities. A few suggestions echo logistical concerns noted above about meetings, time management, and reporting.

In their advice to new STFs, faculty, departments, and SEI Central, we see a portrait of the challenges the STFs face as well as ideas for addressing them. Their advice to individual faculty collaborators emphasizes the value of patience, collegial exchange of ideas, and setting realistic goals that are informed by the literature. Their advice to departments emphasizes the importance of leadership in establishing the role and visibility of the SEI and in explicitly addressing the reward structures and values of the department. Some saw disciplinary education research faculty positions or STF-like positions as a route to sustainable change in departments.

Advice to new STFs focuses on the importance of developing good working relationships with faculty and using the STF group as a resource for intellectual input and emotional support. Indeed, given the evident collegiality and supportiveness among the group, they should be encouraged to take initiative to meet their own needs, while other needs may best be supported by SEI Central. Several comments emphasize the importance of developing interpersonal skills and understanding the broader process of change, and acknowledge frustration when change is slow.

Overall, the STFs' advice was thoughtful and constructive, if not always straightforward to enact. Their comments are articulate and reflect a wisdom beyond their years about the difficulties of educational change. They appreciated greatly the opportunity to provide feedback, and we hope their responses are useful to the Initiative.

² Such concerns are widespread in other data from graduate students, tenured and nontenured faculty in E&ER's studies of career paths in science, especially, though not exclusively, among women.

³ Thiry, H., Laursen, S. L., & Liston, C. (2007). (De)Valuing teaching in the academy: Why are underrepresented graduate students overrepresented in teaching and outreach? *J. Women Minorities Sci. Engr.* 13(4), 391-419.

Appendix A: Method

The survey was developed and analyzed by two members of the SEI advisory board, Sandra Laursen and David Budd, at the request of the board and the SEI. Questions were developed with input from Carl Wieman and Kathy Perkins. Most items were open-ended to gather STFs' ideas and advice; a few items asked STFs to rate their experiences on a Likert-style scale. The survey was administered online using SurveyMonkey over a two-week period, with three reminders to solicit responses. All ten STFs responded to the survey, though not every person answered all questions.

Responses were analyzed by grouping related comments made in responses to each survey item. Each individual generally made multiple comments in response to a single survey item. Readers will notice that certain themes reappear across items. For example, comments about the goals of STF meetings appear in response to items about what works best, what could be improved, and "advice" about STF meetings. For brevity, we omit most quotations here, but because responses to the questions were informative, thoughtful and articulate, we quote all comments (with exceptions noted below) in Appendix B. These are grouped by survey item and, where appropriate, by content theme. Minor edits have been made to correct typographical errors, increase clarity, and remove identifying information. For sensitive questions on departmental liaisons and career plans, not all comments are provided.

We took several measures to maximize the STFs' comfort in responding to possibly sensitive questions, to protect individuals' confidentiality, and to minimize conflicts of interest. As a professional evaluator and external board member, Laursen monitored the survey responses and was the only person to see responses linked with individuals' names. She also offered to speak by phone with any STF who did not wish to respond in writing. Budd, a departmental liaison, did not participate in analysis of items about faculty liaisons. He also did not analyze items about career paths, because of identifying information revealed in these, and because of his professional and evaluative relationship with several STFs.