Research Category: Processes of Conducting STEM Faculty Development

This category focuses on potential models of holistic STEM FD and how they might be implemented in a variety of contexts. Institutional contexts must be highlighted in the research surrounding potential models, but the substantive nature of these questions should focus on the “what”, or the structure or model of FD, and the “how”, or the process of FD implementation. Two main themes were identified under this category: (1) Delivery and (2) Innovation. What follows is a description of these themes.

**Delivery.** While the “Who is Responsible” theme in category one related to which entities should provide and pay for STEM FD, this theme relates to the actual model of FD and who is responsible for conducting sessions, where FD should be located, and how to go about supporting faculty developers. In particular, questions surrounding delivery could include, where is faculty development best conducted (internal or external locations), is there a difference about who delivers FD, how do we develop faculty developers, and how does who implements FD impact faculty members’ acceptance of FD? In addition to where FD should be conducted and who should facilitate, this theme relates to what model of FD should be chosen (based on the particular needs and contexts of FD participants). For example, the needs of two year institutions might differ from four year institutions and perhaps the model of FD should be different based on this variable. Stakeholders agree that the basic tenets that all models of FD should contain include inquiry-based learning and participant-centered pedagogy, but beyond that structure, FD should be grounded in context. Questions surrounding the type of model might include: what is different in terms of models and practices for FD at small colleges as compared with large institutions, how are structures and models designed and adapted for different institutions, what mechanisms work for which aspects of FD and in which contexts and faculty populations, and what are the questions the faculty developer need to ask to determine FD?

**Innovation.** While discussions surrounding the “what” of FD are clustered within the delivery theme above, these topics are all related to a general view of FD and not centered on a specific model. The innovation theme relates to the specific models of holistic STEM FD. Included in these models are mentoring, productive reflection, and communities of practice. Mentoring of doctoral students, new faculty, associate professors, and even full professors who are thinking of leadership positions could provide significant support for holistic STEM faculty development. But the role of mentors is not well understood nor how to become an effective mentor or a mentee that can take advantage of opportunities. Research might examine how to structure mentoring (e.g. junior faculty/senior faculty pairs, annual induction groups or cohorts, weekly writing groups) or the role of faculty in mentoring graduate students and how to best support faculty in learning how to mentor students. Further, one might examine whether or not these groups need to be disciplinary to be effective. Productive reflection focuses on identifying different models of reflection and identifying structures that can create a culture of development which stresses processing and debriefing within FD activities. Finally, how might communities of practice (with a variety of stakeholders, including institutional staff) be used to advance practice (such as implementing writing circles or peer reviewers)?
In addition to identifying these specific models of FD, it is important to identify which attributes of models external to STEM could be used to inform models of STEM FD. Questions related to this topic might include: what are the models of teaching and learning centers and how can these be tied to impact, can we use medical or clinical training as a model for faculty development, and what happens when we turn lenses for best student learning (e.g. active learning) on our faculty development processes. In addition, it is imperative to examine the perceived weakness of short FD interventions and identify the need to explore which forms of FD are most effective (e.g. a semester long experience, clusters of short sessions, workshops, etc.).

If focusing on Innovation, one might wonder whether FD needs to be discipline oriented or even individualized. In terms of being discipline oriented, one might question if a STEM approach could be achieved and, if so, how could we break down the separations between content disciplines? In addition, how can faculty assessments be differentiated across disciplines? In terms of FD being individualized, might we need to categorize STEM FD? For example, could conference attendance be a form of FD? How might action research be categorized as individualized FD? Is the notion of a ‘one size fits all’ approach detrimental and how can we balance the needs of the masses with the needs of the individual?

This theme also focuses on how to approach FD systemically and how holistic FD should be viewed in a systemic manner. Rationales related to this theme might center on the notion that we should stop trying to fix the person and instead fix the system. Strategies such as examining and comparing models of faculty development to determine overall impact and mapping programs and curriculum to determine the state of FD might help to understand the systemic FD needs at an institution.