Research Category: Who are the learners?

The fourth category, “Who Are the Learners” relates to the actual participants engaging in holistic STEM FD, what their individual needs might be in terms of personal and professional development, how they might go about aligning these needs with the varying goals across an institution, and how the outcomes of FD might impact their practice to support others. The ‘learners’ include faculty (in a variety of positions) and administration (e.g. department chairs, deans). The ‘others’ (or those who are secondary beneficiaries of development) include faculty if the development is focused on administration and students if the development is focused on faculty. Six themes emerged within this category: (1) Self-Regulatory Development, (2) Motivation, (3) Identity, (4) Student Outcomes, (5) Aligning Personal and Institutional Goals, and (6) Aligning Goals across Academia.

Self-regulatory development. This theme centers on the notion that a person is in charge of their own development and that FD should be a priority for participants. Faculty (or administration) must identify FD as an integral part of their professional life and professional identity (much like teachers in K-12 education). STEM FD should not be seen as a burden or something else to do, but rather as a way to create a more productive and happy faculty member. Goals related to this theme might include pushing past the stalling that can sometimes happen for professors at the associate level, getting faculty to set themselves up for success and act strategically, and enabling faculty to identify and set their own priorities for work and maintaining a healthy work/life balance. Self-regulatory development allows the faculty member to think strategically about their choices (what to work on, when to work on it, and with whom to work). Topics of investigation might include identifying how faculty perceive or define themselves, developing a process for identifying individual goals, and identifying the types of FD that current faculty choose to engage in and why they choose these models over others that may be available.

Motivation. A central area of research within holistic STEM FD must consider the motivation of participants to engage in and learn from FD experiences. Motivation can be extrinsic (e.g. tenure and promotion, salary, incentives, time) or intrinsic (desire for continuous improvement). In terms of extrinsic motivation, one might consider how sponsors of research and academic programs can be a source of motivation if they were to emphasize FD. For example, development of doctoral students for academic positions is considered an important broader impact by the National Science Foundation. Accreditation may also play a role in extrinsic motivation for institutional players. How would explicit requirements for faculty development activities from a regional accreditation body for colleges and universities affect financing of FD programs? Or if performance funding by state legislators was contingent on FD? Policy- and decision-makers beyond higher education might be important factors to investigate. Research might also pinpoint mismatches between institutional expectations and faculty motivations as potential barriers to holistic FD. One question that highlighted this issue is what if faculty only have passion for certain aspects of faculty life and not all. Would a holistic approach be effective? Intrinsic motivation may change as faculty move through their career. What are the changes, what are their influences, and are they typical? How might FD accommodate these changes in motivation? Another question was whether there is a definable, useful, and common body of knowledge about faculty life. Perhaps part of the internal motivation for faculty depends on
whether they are aware of their needs for FD. Perhaps a needs analysis should be conducted with the various factors such as faculty status, career stage, etc. considered. Further, how might the epistemic views of faculty affect motivation for FD? Are there patterns to be discerned in the relationship of self-efficacy and motivation? What is the individual faculty member’s readiness to change?

**Identity.** When examining the learner within holistic STEM FD, one must consider the professional versus personal identity issue with recognition of intersectionality of different facets of personal identity as well as professional identity. Therefore, the concept of only two end-members for the identity axis may be misleading. It is logical to apply the concept of holistic to the whole person who has multiple identities at work as well as beyond the boundaries of the workplace. Disciplinary identity may affect the reception and delivery of FD. The identity of the FD facilitator might also affect delivery. The discipline, tenure status and rank or staff position might affect the faculty’s perception of the facilitator’s effectiveness. Faculty of color and women or LBGTQ faculty might have different perceptions also. Conflicts may exist between STEM FD priorities and the identity of participants (e.g. non-tenure track faculty, contingent faculty, adjunct faculty, non-traditional faculty, and two-year college faculty who have extensive experience in industry). Further, identity (and motivation) change over the career trajectory of a faculty member. How should holistic STEM FD be adapted to various career stages? Is holistic development important for all aspects if one particular identity such as researcher or leader is not one that the faculty member is passionate about?

**Student outcomes.** In any discussion surrounding models of STEM FD, one must always come back to the question of how this relates to our students or how does STEM FD help our students. While the primary learners are often faculty, the others that are influenced by STEM FD are primarily students. How can we ensure that STEM FD is positively effective for students? Potential pathways of research related to this theme might examine the use of supervision to ensure high quality faculty teaching or having faculty in a department agree upon an educational philosophy or set of methods that they all will use in coursework (e.g. active learning). Faculty must find ways to teach more effectively in ways that will also allow for flexibility and room for creativity that reflects their own strengths and interests. To move towards this vision, research might examine the barrier that oftentimes young faculty experience when they hear from senior faculty that they are spending too much time on teaching and not enough on research productivity. Research might also examine how graduate students engage in development to ensure self-regulatory development as they transition to a faculty role. Within this focus on graduate training, research might consider the idea of a generational shift being necessary for cultural change. Does the development received during graduate school influence later consumption of FD? If the graduate school culture emphasizes FD will doctoral students seek institutions with effective FD programs in their faculty job search? If institutions expect certain aspects of research, service, leadership and teaching, then they should create cultures of doctoral training for their own graduate students that provide those aspects.

**Aligning personal and institutional goals.** This theme centers on the question, what happens when goals between the faculty member and the institution are mismatched. One example being the notion that some faculty are scared to change because of repercussions from the institution (i.e. using effective learning strategies when teaching or teaching to the wants of their students to ensure positive evaluations). When conducting research within this theme, one might wonder who we are excluding if expectations at a university are set so high that it requires working 24 hours a day to be successful. Further, is wellbeing a factor when it comes to tenure and promotion and what factors of holistic STEM FD increase faculty enjoyment of work? Research might examine potential alignment in standards and expectations for FD across faculty, departments, and the institution as a whole. Research might also examine pathways for faculty to
use STEM FD as a vehicle for finding connections between teaching, research, service, and leadership.

**Aligning goals across academia.** This theme related to the questions of whether or not STEM FD should be aligned across disciplines (Science, Technology, Engineering, and Mathematics) and whether or not STEM FD should be aligned across institutions on a national scale. Research focused on alignment between disciplines might question if there should be shared objectives across disciplines or if STEM FD should focus on one discipline at a time (e.g. should we focus on engineering first because it is the largest?). What do all STEM faculty have in common? What might be the role of general teaching and learning centers and how might holistic STEM FD fit in when the mission is centered on teaching and learning? Can we move towards alignment across institutions? Can STEM FD be institutionalized nationally and who is in charge of the process?