Outcomes

The outcomes or goals listed in Table 2 are the goals for conducting research and the ultimate reasons why a research agenda for Holistic STEM FD is necessary. To be clear, participants had varying opinions regarding the definition of Holistic STEM FD. Many emphasized that *holistic* may not have to capture ALL tasks or ALL faculty or may possibly be a subset of teaching, research, leadership, and service and that moving towards finding points of intersection between these areas may create more work. To that end, one major goal not listed in this table could be to further define Holistic STEM FD based on an emerging body of research.

Table 2: *Potential outcomes of research in holistic STEM FD.*

Metrics/Instrument Development for STEM FD	• Instrumentation for evaluating change in student learning or connections to workforce needs and success • Instrumentation to examine the norms, metrics, definitions, experience, level of agreement for FD • Ways to measure the true impact of output (e.g. value, community, knowledge, attitudes) • Instrumentation to evaluate effectiveness of STEM such that it is holistic, successful, useful, and appropriate • Develop/identify credentials or rewards for faculty development processes that are adopted from institutions that think of research/teaching/service/leadership in holistic ways and based on a variety of scales • Identifying strategies for making outputs synergistic and emergent • Create measurements of successful faculty development that include ways to measure return on investment • Identifying non-traditional measures of impact
Impact on Students	• Preparing graduate students to be prepared to integrate into academia successfully across research, service, and teaching • Refining graduate student preparation to leverage rather than hinder Holistic STEM FD • Ultimately, Holistic STEM should improve student learning at all levels • Research on Holistic STEM FD should identify how cultures vary across disciplines in the context of views about how STEM is best learned and best taught, and what theories of learning are most applicable to STEM disciplines
Generalizable Models of Holistic STEM FD	• Identifying the difference in needs between STEM faculty and faculty in general • Identifying the optimal scale of FD from small, personal to departmental to institutional to community to national

	• Finding alignment between individual faculty values, departmental values and institutional values and socializing one level to the next • Establishing optimal roles within FD (e.g. faculty role, administrative role), including an understanding of who should participate, how FD should be differentiated based on these roles • Examining the longitudinal impact of models of STEM FD across factors such as productivity, % achieving tenure, learning by students, confidence, retention and sense of well-being, feeling valued • Establishing FD as an integrated part of academic life rather than used as something that needs to "fix what is broken"
Impact on Faculty	• Supporting the development of positive faculty identity (including research, teaching, service, and leadership identity) as members of the academic community • Aligning faculty and institutional identity and goals • Supporting the development of positive faculty developer identity (including their role as scholars and advocates for faculty) • Understanding how FD needs change as faculty are at different career stages and in different positions (includes shifting positions, institutions, fields and leaving the professoriate) • Identifying and defining the difference between holistic outcomes and career long outcomes
Equity	• Impact of holistic STEM FD on the establishment or refinement of *inclusive* cultures and institutions • Defining FD practices that support inclusive cultures including eliminating stigmas around being "different" • Establishing FD practices that meet the needs of *non-traditional* faculty (professors of practice, teaching, other new forms of academic positions) • *Support* is important in environments where faculty identity or research interests are different from their department's, as well as where faculty are new to academia, are from marginalized communities, or otherwise feel isolated • Impact of FD on issues of diversity and work/life balance
Cultural and Community Context	• Influence of holistic STEM FD on departmental culture as compared to institutional culture to promote a more inclusive environment that is respective of contributions of all faculty • Examine if/how STEM FD support change in cultural context • Examine how institutions/units might remove the stigma associated with certain faculty activities through FD • Influence of STEM FD on community context in terms of understanding, valuing and supporting *collaboration* • Understanding how collaborations organize (inside and outside institutions) and the level from individual to large scale and measuring impact of the collaboration

	• Understanding the relationship between institutional climate (policies, procedures) and cultural context
Institutional Policy and Context	• Identifying the institutional policies that support/hinder holistic STEM FD (e.g. procedures related to tenure) • Using holistic STEM FD to support systemic change • Understanding the methods for *evaluation and measurement* that currently exist and how can new ones be created that include input from internal and external entities (i.e. Industry) • Identifying the metrics that should be used to assess faculty that value all aspects of productivity and innovation and are not just "numbers" • Aligning or adapting values and rewards between institution and faculty (i.e. job satisfaction vs. productivity or teaching effectiveness vs. research leadership) including policies that support parental leave and partner accommodation • Determining assessment strategies for faculty based on role (assistant, associate, full, teaching, clinical, research, lecturers, post docs, etc.) and based on varying indicators of effectiveness (lifelong learning, developing self, valuing holistic activities, collective metrics, and measure "success") to make the faculty review system productive and nurturing • Ensure that faculty are not just surviving but thriving • Defining what it means to be a successful faculty member • Increasing faculty well-being and determining impact on productivity • Establishing or increasing work/life balance and determining impact on productivity • Empowering faculty and removing barriers so they feel good at their job • Determine how does institutional transition impact faculty development (such as becoming R1) • Determining the bridges between FD and institutional alignment • Determining the economic impact on the institution of increased service, leadership, teaching, research