Session Title:
Shared Vision to Practice: Early Lessons Learned from Developing a Partnership with Higher Education STEM Faculty

MSP Project Name:
U-FUTuRES: University of Florida Unites Teachers to Reform Education in Science

Presenters:
Rose M. Pringle, University of Florida
Jennifer Mesa, University of Florida

Authors:
Rose M. Pringle, University of Florida (Lead)
Jennifer Mesa, University of Florida
Lynda Hayes, University of Florida
Selman Hershfield, University of Florida

Project Session

Strand 1

Summary:
The development of a shared vision among the stakeholders in our National Science Foundation (NSF-MSP) innovative partnership is important for achieving the goal of improving middle school science achievement. In the initial phase of our project, we explore how STEM faculty navigate the challenges and view inherent benefits while developing a shared vision in preparing science teacher leaders. Guided by design-based research and analyzing a range of data sources, we assert that despite recognition of the mutual benefits, the bureaucratic structures within school districts and the university, and the need to maintain "perceived rigor" in university classwork, present unique challenges to partnerships, and the development and implementation of science courses that embrace current practices and beliefs in science education.

Section 1: Questions framing the session:
How do STEM faculty in a research-intensive university navigate historical norms to forge partnerships with science educators and school districts? How do STEM faculty view the challenges and benefits of developing a shared vision in preparing science teacher leaders?

Section 2: Conceptual framework:
Related to the conference strand "Different Perspectives on Implementation," we will share how STEM faculty joined our partnership and their role in developing specialized course work in science for practicing teachers across academic units. We will also share the perceived challenges and benefits of developing such coursework as viewed by the STEM faculty.

Well-planned teacher learning experiences that involve STEM disciplinary faculty can deepen teacher content knowledge (Foster, Bergin, McKenna, Millard, Perez, Prival, 2010), thus contributing to their effectiveness. Once we received the funding notification, we began working with our institution of higher education (IHE) partners from the College of Liberal Arts and Sciences to identify teams of scientists interested in working with our middle school science teachers. Each of the three science courses has a lead scientist who solicited colleagues to collaboratively develop the course with a science educator. For example, the development team of the first science course (Physics/Chemistry) offered summer 2012 included three scientists (two physicists, one chemist), two graduate assistants, and a science educator with K-12 science expertise. The course was implemented during four weeks of intense face-to-face class experiences complimented by an online component. A full week break was purposefully given after the first week of face-to-face class-time; thus the course extended over a five-week period. This break allowed the course development team to reflect on teachers' entry knowledge, instructor expectations, pedagogy, and the level of science content knowledge required to best prepare these middle school science teachers. Strategic measures were then implemented during the next three weeks to better address the needs of the teachers.

At this juncture in our 5-year project, we are interested in the continued development of a shared vision among the stakeholders. In this presentation, we focus on the experiences of STEM faculty working in partnership with educators and school district personnel toward increasing the science content knowledge of the middle school teachers and toward the achievement of the overall goals of the project. Our work is guided by design-based research, a systematic and flexible methodology grounded in integrative use of multiple sources of quantitative and qualitative data (Bryman, 2006; Creswell, 2003; DBR Collective, 2003). Data sources include formal interviews with the STEM faculty involved in course development; videotaped quarterly district leadership meetings; agendas and minutes from meetings with deans and department chairs, and monthly project leadership meetings; and preserved memorandums from academic and administrative units.

Section 3: Explanatory framework:

Drawing on qualitative analyses (Charmaz, 2006; Creswell, 2003) of agendas and minutes from all meetings, formal and interviews with STEM faculty, and artifacts from the course development and implementation, the following three preliminary assertions are presented:

Assertion one: STEM faculty, school district leadership, and university administrators perceive benefits in collaborative efforts to better prepare middle school science teachers.

Assertion two: Despite a recognition of the mutual benefits, many bureaucratic structures within the university and the need to maintain "perceived rigor" in university classwork, present unique challenges to the development and implementation of science courses that embrace current practices and beliefs in science education.

Assertion three: The nature of STEM faculty participation in partnership is dependent on existing educative relationships with science educators. Furthermore, STEM faculty experiencing tension between didactic college level teaching of science and reform-based pedagogical practices is a safe place to begin the process of change in university science classrooms.

Section 4: Discussion:
STEM faculty in our IHE are important partners in the transformation of science teaching and learning in middle schools. Their involvement will enhance teacher quality and improve student achievement. In order to effectively develop an IHE and K-12 school district partnership, more is needed than just agreement to collaborate. Partners need to identify the areas of mutual benefits and negotiate changes in some historical and institutional mode of operations. Recognition of the possible bureaucratic structures within the respective organizations that may impede the smooth attainment of the proposed goals needs to be realized early in the partnership. Furthermore, organizations need to be more transparent in how to navigate their bureaucratic structures and allow flexibility and changes in these structures as needed to support new programs. New programs have the potential to transform not only K-12 science education but also college level teaching. We interpret the tensions as signals that there is the need to adopt reform-based practices at the college level consistent with current beliefs about how people learn science.

In addition to guiding our project as we move forward, our findings have potential for informing other project leaders as they strategically identify and address the challenges of developing a shared vision with IHE partners toward enhancing teacher quality. Such lessons include pitfalls to avoid, characteristics of effective partnerships, and strategies to confront challenges. Understanding these lessons will enable project leaders to strategically navigate the limitations of established bureaucracies to achieve their project goals.

Section 5: How will you structure this session? What is your plan for participant interaction?
We will involve participants in whole and small group discussions of potential benefits and challenges in involving STEM faculty in partnerships at IHEs to enhance science teacher quality. We will engage participants in sharing their experiences and then share our own and the lessons we learned. Participants will complete a graphic organizer with the following sections: Benefits, Challenges and Lessons Learned. In addition, we will structure the discussion using the following questions: What do you see as the potential benefits to involving STEM faculty in partnerships? Specifically, to STEM faculty? To districts? To teachers? What do you see as the potential challenges in involving STEM faculty in partnerships? Specifically, issues in university bureaucratic structures? Issues in negotiating expectations of STEM faculty, education faculty, and teachers for instructional goals and strategies? How might such challenges be addressed? What are the lessons learned from our project in how we addressed challenges in involving STEM faculty?