

Project Instrument Development—What We Have Learned: Implications for Differentiated Professional Development

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Question(s) for Discussion: What findings do we have that can alter how teachers are prepared for teaching in the STEM disciplines? What are our implicit or explicit theories about teacher learning, and how do they affect teacher preparation and support?

Session Description: Much of the recent education research has focused on new teachers and why large numbers of them are leaving the profession (Ingersoll & Smith, 2003). Few studies have targeted experienced teachers in an attempt to identify factors that may have contributed to their retention. The purpose of this research was to develop an instrument to identify those pivotal experiences of career science teachers that have promoted their advancement along the teacher professional continuum and have helped them to persist in their careers. The researchers in this study initially used techniques of narrative inquiry, as well as behavior over time (BOT) graphing, to capture the experiences of 52 K-12 science teachers identified as having positively or negatively affected their feelings of empowerment. (Empowerment was defined for the purposes of the study as, “The opportunity and confidence to act upon one’s ideas and to influence the way one performs in one’s profession.”) The literature has linked teacher empowerment to teacher retention and student achievement. If empowerment is vital to effective schools, it is important to know how it develops and how it can be nurtured. Based on teacher input and in consultation with experts in both instrument development and technology, the researchers subsequently developed an instrument that collects similar kinds of data in more efficient ways. This session will summarize what the researchers have learned about the contextual issues that affect the quality of teacher learning opportunities. Discussion points include:

- Decision making had the most immediate effect on teacher empowerment as the events associated with changes in teaching context and the decisions that caused those changes caused their BOT graphs to plummet.
- Professional growth provided an intellectual remedy for lack of preparation for teaching and challenging teaching contexts, and eventually supported a mature sense of self-efficacy, as reflected in teachers’ increased confidence in their teaching, involvement in decision making, and status as professionals.
- The professional development needs of the teachers varied as their careers progressed and the context of their assignment changed.
- The stories told by the teachers as they interpreted their graphs did not reflect a need or quest for control over schools, but focused primarily on their quest for effectiveness as teachers, their need for targeted professional development, and the importance of collegial relationships.

In addition, the session will propose some applications for the information gained from the study. If we can identify pivotal events and gain some sense of when those events need to be made available to teachers, we will have a chronology that will help us better understand the paths that successful teachers have followed (although, in most cases, probably unintentionally), infer some implications for professional development policies, and maximize the use of quality STEM teacher programs identified or created via other research. In addition, the information, once disseminated, may help individual teachers better understand their own professional development needs and enable them to make wiser professional development choices.