Student-Centered Teaching, Teacher Leadership Development and Student Success: Mathematics Teacher Transformation Institutes (MTTI)

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1) Definition of "student success."

Student success is defined as an increase in students' engagement in their math classes, and their performance on in-class math topics.

Student success, therefore, encompasses these two elements:

- Level of student engagement as described through classroom observations, and;

- MTTI teachers' descriptions of their students' progress as it relates to the math topics and learning strategies addressed in their projects undertaken in MTTI's action-research course.

2) The MTTI project's theory of action related to student success.
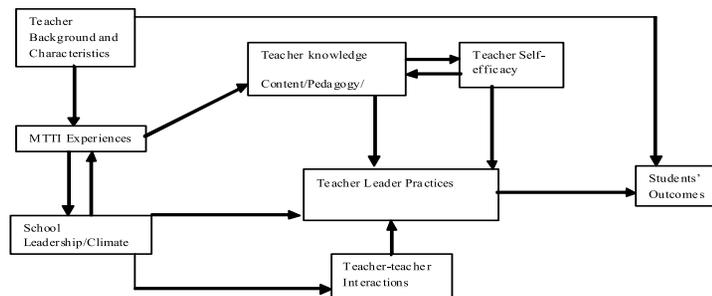
- **The research is designed to test the theory of action.**
- **The most direct link to student success is classroom instruction.   We observe MTTI participants in their classrooms and assess the extent to which teaching is student-centered and the degree to which their students are engaged in the math class.**
- **MTTI participation impacts participants' math content knowledge, pedagogical knowledge and practice, and leadership roles. These are measured by formal tests of content and pedagogical knowledge, classroom observations, and self-report surveys.**
- **This in turn impacts teachers' sense of self-efficacy in these areas. This is measured by self-report surveys.**
- **School leadership style and school culture (perceptions of shared leadership, professional community, teacher–teacher relationships indicated by sense of collective responsibility for student achievement) also affect the development of the teacher leader. These are measured by school-wide surveys and face-to-face interviews.**
- **Teacher-leadership practices impact MTTI participants' and other math teachers' classroom practices and, ultimately, student outcomes.**

3) Related to student success, what challenges, including unanticipated ones, has your project overcome, how did you do so and what challenges remain ahead? What questions does your project have about student success?

Challenges	Resolution
Unable to collect individual student data.	Overcome by collecting aggregate data.
Aggregate data from some schools were either unforthcoming or slow to be provided.	Partly overcome by asking participants to provide class data.
Changes in math performance tend to develop somewhat slowly over time, so it is challenging to show any change early in the project's time-frame.	Decision to concentrate initially on student data from MTTI participants' action-research projects rather than longer-term achievement data.
Unable to survey students directly regarding their attitudes towards math.	Students' attitudes to math estimated by level of classroom engagement as judged by trained observers.
Challenge to show cause and effect.	Attempt to do so by relating MTTI participants' changes (e.g. content knowledge, student-centered pedagogy, self-efficacy and leadership roles) to any changes in student performance.

Questions:
What constitutes student success (progress)?
Is it possible to create some composite measure of success?
Is progress best demonstrated quantitatively or qualitatively?

4) What are the roles of your project's partners (including STEM faculty, K-12 districts, education faculty, evaluators) related to student success?
- **STEM faculty run courses for MTTI participants in math fundamentals, geometry, technology for math, math and music, and statistics.**

- **K-12 districts assure that MTTI addresses real concerns such as students' achievement on state tests.**

- **Education faculty conduct an action-research course for MTTI participants focused on their questions about teaching and learning in their classes, and encourage them to conduct presentations in their schools.**

- **Some STEM faculty and education faculty serve on the MTTI Project Leadership Team to strengthen the links among the project's components..**

- **Teacher-consultants encourage MTTI participants to expand their leadership roles in their schools, and address specific issues and pedagogy.**

- **Evaluators suggest methods for gathering and analyzing student data, and stress the necessity of relating MTTI participants' data to student achievement.**