

Michigan Teaching Excellence Program (MiTEP)

Michigan technological University PIs: Bill Rose*, Brad Baltensberger, Jacqueline Huntoon, Chris Wojick (Project Coordinator)
Grand Rapids Area Pre-college Engineering Program PI: Sandra Burmeister Grand Rapids Public Schools PI: Bill Smith



1) Student Successes

MiTEP's definition of "student success" couples evidence of improved student learning (in terms of content and skills) with increased interest in, and improved attitude toward science.

MiTEP's Expected Outcomes Demonstrating "student success":

1. Increase in science content knowledge and skills as evidenced by improved student scores on local, state, and national standardized tests.
2. Increased interest in and improved attitude toward science shown on student surveys.
3. Increase in number of students taking higher level science classes.
4. Increase in number and types of high school science classes offered.

2) Research design related to student success

MiTEP is using a mixed-method approach to assessing the project's impact on student success. Qualitative and quantitative data are being collected and analyzed using the following strategies:

Quantitative:

Analysis of scores on standardized tests, student attitude survey results, and change in number of students taking higher level science classes.

Qualitative:

- Observations of students engaged in learning activities in the classroom and in the field.
- Videos of student interviews conducted in the field during "place-based" learning activities.

3) Challenges and Future Work

Teacher Attrition – 60% of the teachers in MiTEP's first cohort are no longer in the same teaching position as when they began participation in the MiTEP program. Reasons for this exodus include in-district involuntary transfer of teachers to positions other than science, lay-offs, teacher retirements, and promotions to administrative positions. A solution we are currently implementing is to boost cohort 3 recruitment and to ask that our new partner districts lock teachers into the same science teaching position for the duration of their participation in the project.

Declining Enrollment – the district has seen declining enrollment as parents have had to relocate to find employment. Michigan is one of the states that were hit hardest by the recession; therefore many families have left the district. Declining enrollment and budget crises contribute to teacher attrition. While this external factor has a potentially significant impact on MiTEP's research findings, little can be done to ameliorate it.

Financial Issues and Curriculum Modifications in District – the district offered a limited teacher buy-out program to veteran teachers as an incentive for retirement. A restructuring of the curriculum and middle grades to decrease faculty also impacted our project. At the onset of the MiTEP program, 8th grade Earth Science was taught by teachers with background or experience in teaching Earth Science. This was seen as desirable because, though offered to middle school students, the course focuses on high school standards and utilizes a curriculum (EarthComm) written for students at the high school level. Since MiTEP's implementation, several schools within the district have adopted a "self-contained" structure from elementary grades through middle school. K-8 generalists have been employed to teach these self-contained classes rather than secondary certified science specialists. While these external factors have a potentially significant impact on MiTEP's research findings, little can be done to ameliorate them.

Student Absences and Relocation – MiTEP faces the dual challenge of tracking students who are frequently absent along with transient students that move from school to school, both within the district and with neighboring districts. While this clearly creates difficulty in distilling and measuring MiTEP's treatment-induced effects, it creates an even more substantial ongoing challenge within schools in measuring "student success" or improved learning.

Reassignment/Rotation of Building Principals in the District

Virtually all of the building principals and many assistant principals in the district have been reassigned since MiTEP's initial implementation. This has resulted in complications related to teacher support, release of teachers for MiTEP-related training sessions, and a nearly continual information briefing regarding the program.

Questions about Student Success:

- Is there evidence of intangible effects of student success that are not being (or *cannot be*) measured by the evaluation methods adopted by MiTEP?
- Can *student success* be distilled and isolated as an indicator of *project success* or are these indicators inextricably linked?
- Can student success due to the MiTEP treatment reliably be ascertained when continuity of the treatment is compromised by changes at the district level?

4) Project partner roles related to student success for improved student learning in science.

STEM

- STEM faculty will join participant teachers in the field and share expertise that increases teachers' content knowledge and makes teachers aware of cutting edge research in the STEM faculty's areas of expertise.
- The University will provide rewards for faculty who participate in K-12 activities by valuing these efforts during the tenure and promotion process

Education Faculty

University faculty provide participant teachers opportunities to improve content knowledge, improve skills for implementing inquiry-based learning, model content-specific pedagogy, and provide opportunities for network-based leadership development.

STEM

STEM faculty are available to teachers and students as part of the "Scientists On Call" dimension where scientists respond to student and teacher questions

Education Faculty

Provide in-service pedagogy days throughout the school year that model engaging inquiry based lessons that match district curriculum and are tied to the standards

Additional Supporting Partners

Midwest National Parks, Cass Technical High School, American Geological Institute, Grand Valley State University Geology Department

Objective 1
Students will demonstrate increases in science content knowledge

K-12 District

- Provide MEAP and MME scores
- Provide scores on Common Assessments in Earth Science Classes
- Provide support for participant teachers to engage in opportunities to develop their leadership potential and pedagogy skills

Project evaluators

- Analyze quantitative data submitted by the K-12 Districts
- Use SAMPI protocol for observation of inquiry based lessons in participant teacher classrooms
- Suggest collection of alternative data and alternative methods
- PIs and evaluators will survey university administrators regarding changes in the tenure and promotions process

Objective 2
Students will show increased interest in and attitude toward science

K-12 District

Teachers administer the interest and attitude surveys in their classrooms

Project Evaluators

Conduct formative evaluation through surveys, interviews, and focus groups to increase teachers pedagogy skills and ability to implement inquiry-based lessons

