Chicago Transformation Teacher Institutes (CTTI)

Effective Teaching through Teacher Leadership, Content Understanding, and Pedagogical Training

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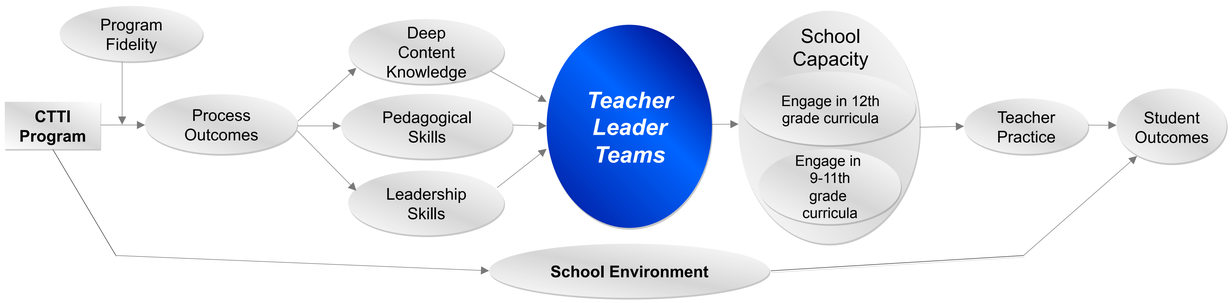
Theory of Action Related to Effective Teaching



The CTTI Program Model (not shown) was developed by our evaluator, program stakeholders and our research team. The Theory of Action, shown above, builds on our Program Model in an attempt to envision the chain of events put into motion through the implementation of the CTTI program leading to the formation of Teacher/Leader Teams. These teams are seen as agents of change guiding curriculum development, change in teacher practice, and student outcomes. Among the core program strategies articulated in the CTTI program model are:

Workshops: Participating teachers share a common leadership training experience, with one workshop for the entire cohort and one in either math or science.

Networking Meetings: Provide opportunities for two way communication between CTTI teachers and university faculty to increase content knowledge, discuss issues arising in the school projects, and build cross-area understanding.

CTTI Math/Science Courses:
- Reflect current understandings and research in mathematics and science
- Are based on an interdisciplinary approach to course design
- Are based on collegial course design and development through input from the two institutions cooperating on a given track (math, physical science, life and environmental science)

In-school Teacher Team Meetings and Interactions in which Teacher-Leader Teams:
- Are aware of and responsive to the needs and opportunities of the students in their particular school and use information from student assessments to help guide their thinking and planning
- Work with and, where appropriate, serve as part of the school leadership team
- Work with others in their school (e.g., non-CTTI teachers from the discipline in question, when applicable and/or CTTI teachers in math and science)

Findings about Teaching Practice within CTTI

Qualitative data were gathered on the following teacher practices. We include deep content learning outcomes, as they were a primary focus of this year's research and evaluation.

GREEN font indicates areas in which teachers experienced high levels of success. **BLUE** font indicates moderate levels of success.

Facet of Teacher Practice	Evaluation Findings
Deep content learning	Teachers are: • Acquiring deep content knowledge in math and/or science at the graduate level such that their knowledge level is not an impediment to pedagogy • Understanding, seeing, and comprehending big ideas in math and science • Understanding integrating concepts in math and that math is more than a set of processes • Seeing the importance of issue-oriented science • Appreciating contemporary math issues and recent research in science
Classroom practice	• Integrating big ideas in math and science
Curriculum development	• Bridging ideas in math and science throughout the high school curriculum • Use current content knowledge and contemporary research in curriculum modifications and development
In-school teaming	• Engaging in 12th grade curricula (identification, adaptation, and implementation) through active teacher-leader teams • Engaging in 9-11th grade curricula (identification, adaptation, and implementation) through active teacher-leader teams
In-school leadership	• Acting as change agents within their individual schools • Using leadership skills when engaged in curriculum changes and lead teams in producing school-based changes in curricula

Effective Teaching: A Rubric Based on our Program Model

Based on our CTTI Program Model and other sources, we created a rubric which we intend to use to examine the 12th grade capstone course work undertaken by CTTI-trained teachers. This rubric has six categories of program strategies, of which core strategies are given below.

Curriculum: (Overall)
1. Anticipates the requirements of post-secondary careers or college work in math or science.

Curriculum: Assessment
1. Includes diagnostic assessments throughout to determine what students need to learn and what teachers need to teach.
   a) Identifies misconceptions held by students.
2. Provides summative assessments and includes guidelines for their use and instructional interpretations.

Curriculum: Pedagogy and Student Engagement — *Provide opportunities*…
1. For learners to build on prior knowledge and construct meaning (build expertise).
2. To model conceptually- based and inquiry- oriented instruction.
3. To facilitate high levels of engagement of students.
4. For students to work individually and collaboratively on meaningful mathematics and/or science.
5. For student-centered activities, questions or problems directed by student learning.

Curriculum: Content and Design
1. Reflects current understandings and research in mathematics and/or science.
2. Is designed to reflect the findings of research and knowledge of best practice.
3. Lessons are designed with an appropriate balance of concepts, problem solving and strategies/practice.
4. Rich conceptual problems allow for students to engage with the material on a deep level by encouraging inquiry, discourse, conjecture, and sense-making opportunities, in an authentic way that is appropriately scaffolded.
5. Integrates big ideas in mathematics and/or science.

Curriculum: Specific to Math
1. Includes specific examples to illustrate the roles of big ideas and connections in mathematics.
2. Course work is sequenced in a logical way.
3. Provides opportunities for mathematics to be understood, not memorized.
4. Offers ample opportunities to present content using reformed-based pedagogy and relevant or real-world applications.
5. Connects concrete concept to abstract ones (i.e., multiple representations).
6. Addresses mathematical practices in Common Core State Standards

Curriculum: Specific to Science
1. Content reflects current opportunities and needs within science as a discipline.
2. Is project-based pulling from inquiry-based science.
3. Provides a capstone project opportunity (inquiry-based and incorporating inquiry- based activities).
4. Opportunities throughout the curriculum for teacher to exercise best practice pedagogy.
5. Emphasizes nature of science and knowledge about scientific inquiry.
6. Involves students in actually doing science that demonstrates that research has unknown outcomes, uncertainties, and loose ends.

Challenges and Questions

- **How can a program aiming to increase effective teaching buffer the impact on teachers in the midst of radical district leadership change?**
- **How have STEM faculty, leadership workshop leaders, and district and school administrators impacted teacher practices for improved student outcomes?**
- **How do we show that documented teacher planning and practice have resulted in improved instruction and student outcomes?**
- **How can a program document the value it has added to the teaching of its group of teacher participants when each teacher and each school has had a significantly different intervention?**

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