

Integrating a Math Methods Course and Field Experience: Opening a Can of Worms

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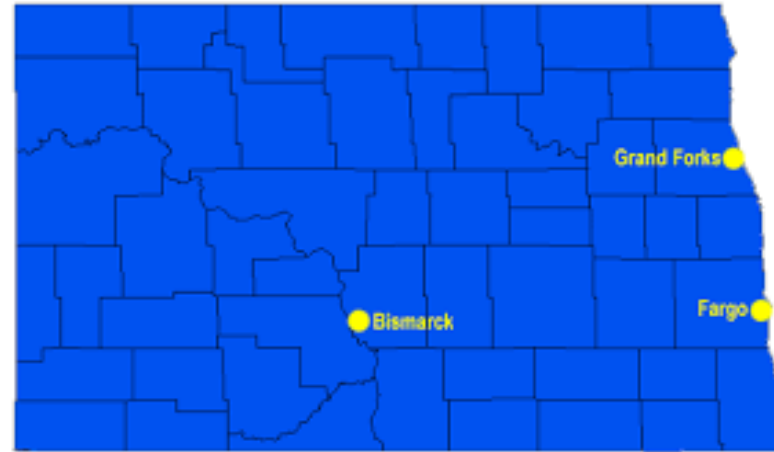
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April 16, 2015

National Council of Teachers of Mathematics
Annual Meeting

Context...

- ▶ Grand Forks, North Dakota
 - ▶ Eastern North Dakota
 - ▶ Approximately 55,000 people
 - ▶ Three middle schools & three high schools



- ▶ University of North Dakota
 - ▶ Approximately 13,000 students
 - ▶ 100 Mathematics majors
 - ▶ 35 - 40 Mathematics Education majors

How it all began...

- ▶ **January 2012** - UND applied to be part of Mathematics Teacher Education - Partnership (MTE-P), which operates under the Association of Public and Land Grant Universities (APLU)
 - ▶ Partnership included Grand Forks Public Schools, Minot State University, Turtle Mountain Community College and UND
 - ▶ Initial work with MTE-P resulted in Guiding Principles for Secondary Mathematics Teacher Preparation Programs *promoted integration of methods courses with field experience work*
 - ▶ Learned about models of integrated secondary mathematics methods courses and field experiences
 - ▶ Became part of the Clinical Experiences Research Action Cluster (RAC) - *working to improve methods field experiences and student teaching/internships*
- ▶ **February 2013** - Association of Mathematics Teacher Educators (AMTE) Annual Meeting - learn about others incorporating various degrees of integration...we decided to do it!

What we were doing...

- ▶ Mathematics Department faculty began teaching the Methods and Materials for Middle and Secondary Mathematics (Math 400) in Fall 2007
- ▶ Secondary Education majors take one methods course (Math 400)
- ▶ Middle Education majors with mathematics concentration take Math 400 and a middle school methods course
- ▶ T&L 486 (method's field experience)
 - ▶ 60 hours in middle or high school mathematics classroom
 - ▶ general requirements
 - ▶ no consistently scheduled time
 - ▶ placements given 4 or more weeks into the semester
- ▶ Math 400 instructor faculty of record for T&L 486 - connection to field experience not clearly defined
- ▶ One teacher candidate (TC) placed with one cooperating teacher (CT)

What we are doing differently...

- ▶ T&L 486 scheduled for 3-hour block one day a week
 - ▶ CTs' schedules includes 2 sections of same course
- ▶ A pair of TCs are assigned to one CT
 - ▶ Co-planning 3 lessons with Methods instructor and CT
- ▶ TCs teach each lesson twice
 - ▶ Each TC is predominantly responsible for instruction during one class
 - ▶ Other TC is expected to focus on student interaction with the lesson
- ▶ Math 400 instructor
 - ▶ Arranges placements with CTs
 - ▶ Regularly in schools with TCs and visiting with CTs
 - ▶ Observe as many lessons as possible - all lessons are recorded
 - ▶ Some opportunities to debrief during Math 400 (still not enough)
- ▶ Created Mathematics Content for Secondary Teachers course

How did we get this far...

- ▶ Made a case for integrating Methods & Field Experience
 - ▶ MTE-P White Paper on Clinical Experiences and Guiding Principles, MET-II (CBMS, 2012), Preparing Teachers: Building Evidence for Sound Policy (NRC, 2010) and others provided supporting evidence
- ▶ We asked for what we needed
 - ▶ Chairs of Mathematics and Teaching & Learning Departments
 - ▶ information about courses typically taken by TCs in methods
 - ▶ a scheduled 3-hour block for T&L 486
 - ▶ resources to develop new mathematics content for teaching course
 - ▶ High School Mathematics Department Chair and teachers
 - ▶ create schedule to accommodate pairs teaching lesson twice
 - ▶ open to having two field experience students at the same time
 - ▶ willing to let the TCs teach 3 to 4 lessons

Our first run...

► Fall 2013

- Math 400 taught on campus in 3-hour block Tuesday (8:00 - 11:00 am)
- T&L 486 at high school 3-hour block Thursday (8:00 - 11:00 am)
- First two weeks of classes TCs met on campus 6 hours/week
- 9 TCs - 4 pairs and one solo placement
- Attempted to have all TCs teach on same day (modified this after trying to schedule first lesson)
- Pairs co-planned and taught 3 lessons
- Lessons to CTs for feedback at least 3 school days before teaching
- Methods instructor observed at least part of all lessons
- Lessons video recorded and shared with TCs
- Debriefing with TC, CT, and methods instructor after each lesson
- Textbook: Teaching Secondary and Middle School Mathematics, 4th Edition, Daniel J. Brahier.

Our second run...

► Fall 2014

- Math 400 taught on campus in **75-minute classes Tuesday & Thursday**
- T&L 486 at a high school **& middle school** 3-hour block **Tuesday** (8:00 - 11:00 am)
- First two weeks of classes TCs met on campus **5** hours/week
- **13** TCs - **6** pairs and one solo placement - **2 pairs at MS**, rest at HS
- **TCs arranged teaching dates with CTs**
- Pairs co-planned and taught 3 lessons
- Lessons to CTs for feedback at least 3 school days before teaching
- Methods instructor observed most lessons
- Lessons **audio** recorded and shared with TCs
- Debriefing with TC, CT, and methods instructor after **most** lessons
- Textbooks: **Success from the Start: Your First Years Teaching Secondary Mathematics (NCTM, 2013) & Principles to Action: Ensuring Mathematical Success for All (NCTM, 2014).**

Benefits...

- ▶ Communication lines opened between CTs and methods instructor
 - ▶ Methods instructor directly connected to school setting
 - ▶ CTs more aware of methods course expectations
 - ▶ Concerns of CTs and TCs more likely to be addressed
- ▶ Recording of lessons made available to inform TCs' reflection
- ▶ Methods instructor's observation of TCs' lessons informed methods course instruction & discussions
 - ▶ Engaging students in the mathematics through the SMP
 - ▶ Enacting Mathematics Teaching Practices
 - ▶ Provides context for reading TCs' lesson reflections
 - ▶ Instructor's lens is still under development

Needs identified...

- ▶ TCs need more support
 - ▶ Develop a new lens through which to interpret experiences
 - ▶ Develop knowledge of and ability to engage students in the Standards of Mathematical Practice (NGA & CCSSO, 2010)
 - ▶ Develop knowledge of and skills needed to enact Mathematics Teaching Practices (NCTM, 2014)
- ▶ CTs need more time and support
 - ▶ Difficult to schedule debriefing meetings
 - ▶ Integration of CCSS into practice
 - ▶ Smarter Balanced Assessment
- ▶ Develop a cohesive program
 - ▶ School partners and university share a common vision
 - ▶ CTs as teacher educators

Addressing these needs...

- ▶ Through MTE-P work
 - ▶ Continue developing relationship with school partners
 - ▶ Clinical Experience RAC subgroup developing modules
 - ▶ Introduce TCs to SMP through reading and engagement in SMP as learners
 - ▶ Develop new lens for noticing teacher moves for engaging students in SMP through the use of “Look-fors”
 - ▶ Facilitate communication between TCs and CTs around SMP
 - ▶ Enacting Mathematical Teaching Practices
 - ▶ The Mathematics of Doing, Understanding, Learning, and Educating for Secondary Schools (MODULES²) RAC
 - ▶ Modules in the areas of transformational geometry, statistics, and modelling
 - ▶ Formative assessment tools for providing feedback to TCs as they progress

Progress...

- ▶ Two required methods courses!
 - ▶ Math 399 Methods & Materials for Secondary Mathematics: Mathematical Content Knowledge for Teaching
 - ▶ Expand TCs view of mathematics and the teaching and learning of mathematics
 - ▶ Further develop mathematical content knowledge through engagement in SMP
 - ▶ Deepen mathematics content knowledge of secondary mathematics through SMP
 - ▶ Incorporate technology appropriately
 - ▶ Begin to operationalize lesson planning & enactment of lessons
 - ▶ Math 400 Methods & Materials for Middle & Secondary Mathematics: Pedagogical Content Knowledge
 - ▶ UbD lesson plans
 - ▶ T&L 486 Field Experience associated with Math 400
 - ▶ Time to discuss field experience observations and lessons
 - ▶ Class time for co-planning
 - ▶ Equity, tools & strategies, assessment, classroom management, curriculum analysis