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P3: Property-Opoly and other Powerful Pre-service Field Experiences

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Background

New York State requires teacher candidates to participate in at least 100 hours of field experience prior to student teaching. The field experience must occur in K-12 schools. Thus in 2003, field experience became an integral component of all mathematics education courses at Buffalo State College.

This paper highlights the field experiences in three courses— an initial field experience course, a middle school mathematics methods course, and a secondary school mathematics methods course. The field experiences better prepare pre-service secondary mathematics teachers for the realities of the teaching profession. In addition, these field experiences are designed to help pre-service teachers improve instruction, become more reflective about their practice, and make them better prepared to meet the needs of a diverse student population . Well-constructed field experiences can help pre-service teachers develop awareness and an understanding of important cultural considerations related to effective teaching and learning (Sleeter, 2001).

Initial Field Experiences

The course MED 200, Field Experience in Secondary School Mathematics Education provides initial field experiences. The purpose of this course is to introduce pre-service teachers to the profession of teaching mathematics and to state and national mathematics standards. Pre-service teachers reflect on questions such as, “Why do you want to be a mathematics teacher?” An anticipated outcome of MED 200 is that pre-service teachers solidify their decision of whether or not a teaching career is their correct path.

Pre-service teachers in the class are required to log 45 hours of experience in 7th through 12th grade mathematics classes. The teachers the pre-service teachers observe are part of a Professional Development School (PDS) consortium established in 2002, consisting of one urban high school, two urban middle schools, and two first-ring suburban middle schools. The field experiences typically progress from observing

through providing individual or small group work help or performing other tasks as requested by the teacher.

At most of the middle schools, pre-service teachers are assigned a cooperating teacher to shadow for two hours each week during a seven-week time frame, after which they switch schools and shadow another teacher. This shadowing allows the pre-service teachers to glean an understanding of the encompassing work teachers do over the course of several periods. Also, pre-service teachers experience a suburban, as well as, an urban setting.

Mathematics teachers at one middle school and at the high school prefer to have the pre-service teachers sign up to observe various classes on specific days. A master schedule book is compiled at Buffalo State containing all the teachers' schedules. The pre-service teachers sign up to observe as their schedules allow. Each week, the sign in sheets are taken to the main office of the PDS schools. When the pre-service teachers arrive at the PDS school to observe, they sign in next to their signature (See Fig.1). This procedure allows principals and others at the PDS schools to be aware of who is in the school at any given moment.

Time	Student Sign Up	Student Sign in at PDS School	BSC Course
Period 1 8:25 – 9:07 Seventh Grade	Jody Magner		MED200
Period 2 9:10 – 9:52 Seventh Grade (A,C,E DAYS)	Jody Magner		MED200
Period 3 9:55 - 10:37 Algebra	Jane Cushman		MED300

Figure 1. Sample Sign-in Sheet

In addition to the shadowing experiences, the pre-service teachers also participate in after-school tutoring. As a class, the pre-service teachers hold after-school tutoring at one nearby urban middle school. Children from many different levels of mathematics come for assistance. The pre-service teachers often are challenged to not just “tell” the children the answer, but rather work with the children to find an answer. Based on their availability and interest, pre-service teachers also have opportunities to tutor at other schools in the Western New York Region.

Middle School Field Experiences

Math Property-Opoly Day provides Buffalo State pre-service teachers with the opportunity to develop and teach math lessons to 6th grade students in a first-ring suburban school district. The pre-service teachers are enrolled in MED 309, Teaching Mathematics in the Middle School. Some of the pre-service teachers are Childhood Education majors who are also completing a Mathematics Extension which certifies them

to teach mathematics only in grades 5 through 9. The remaining pre-service teachers are Mathematics Education majors who are completing certification to teach math in grades 7 through 12. All of the pre-service teachers are within one or two semesters of student teaching.

For Math Property-Opoly Day, the approximately 250 6th grade students at a diverse suburban middle school are divided into twelve groups. Each group travels together throughout the day, participating in 6 different math lessons of 45 minutes each. The groups of students and classrooms are identified by real estate signs, colors and property names modeled after the game of Monopoly. The 6th grade teachers allow mathematics instruction to occur in all of their academic periods for the day, forgoing instruction in other academic areas such as science and social studies.

The pre-service teachers at Buffalo State College work in groups of three to five to design lessons using manipulatives in which the 6th grade students explore and apply various mathematical properties. The properties assessed in New York State for 6th grade are:

- the commutative properties of addition and multiplication;
- the associative properties of addition and multiplication;
- the distributive property of multiplication over addition;
- the identity properties of addition and multiplication;
- the inverse properties of addition and multiplication; and,
- the zero property of multiplication.

Prior to the creation of the lessons, a group of 6th grade teachers, including at least one Special Education teacher, visits the MED 309 class to discuss their students and their school, to give suggestions for making lessons effective, and to answer questions posed by the pre-service teachers. After reviewing the first draft of the lesson plans, the Buffalo State faculty recruit any necessary additional pre-service teachers to attend Math Property-Opoly Day. These additional pre-service teachers do not teach any lessons, but rather function as assistants or perhaps monitor a hands-on station for a lesson.

Throughout Math Property-Opoly Day, each of the pre-service teachers has the opportunity to teach the lesson that he or she developed. Typically they each teach their lesson between three and five times, depending on the number participating. The 6th grade classroom teacher remains in the room, mitigating classroom management difficulties. Buffalo State faculty members move among the classrooms observing lessons and taking photographs when allowed. During the few minutes between classes, both the classroom teachers and the college faculty share insights and suggestions with the pre-service teachers. Usually minor modifications to the lessons occur during these times. In addition, the 6th grade teachers join the pre-service teachers for lunch and during that time, share general suggestions both about teaching and about interviewing for teaching positions.

The pre-service teachers often name Math Property-Opoly Day as the field experience in which they learned the most. They overwhelmingly state that the day greatly increased their confidence about their ability to become an effective teacher and are appreciative of the opportunity to teach an entire lesson with a classroom teacher in the room. Many comment that the sixth-graders were more engaged in the activities than they had anticipated. They sometimes admit that they were surprised by how much difference resulted from a seemingly small change suggested by a classroom teacher or college faculty member. They all agree that they learned many practical techniques and return to the methods class with concrete ideas on how to strengthen their lessons.

In addition to practical experience and pedagogical benefits, the pre-service teachers receive a CD of Math Property-Opoly Day photographs that they can include in their teaching portfolios. The Buffalo State College faculty members arrange the teaching schedule to ensure that every pre-service teacher is photographed while teaching. Math-Property-Opoly Day was originally developed as part of a Volunteer Service Learning project.

High School Field Experiences

The semester before student teaching pre-service teachers desiring 7 – 12 certification in mathematics, enroll in both MED 308, Methods in the Teaching of Secondary School Mathematics (7 – 12) and its co-requisite MED 300, Field Experience in Teaching Secondary School Mathematics. The MED 300 course requires pre-service teachers to amass 30 hours of field experience.

The original partnership with the local urban high school involved before-school tutoring for New York State's exit exam. Due to decreasing attendance of the high school students, it became necessary to discuss a new model. Together with input from the principal and some high school math teachers, college faculty selected two different classes to be the following year's partner. The courses were Algebra 1 with emphasis on the NYS exit exam and Geometry with emphasis on the NYS exit exam.

Beginning the next fall, the pre-service teachers enrolled in one of two sections of MED 308 and either a Monday/Wednesday section or a Tuesday/Thursday section of MED 300. Teams were assigned before the first class day to consist of two Tuesday/Thursday members and one Monday/Wednesday member. The teams were also assigned the responsibility to plan lessons for four weeks each. The high school teachers encouraged the pre-service teachers to design and grade the assessments administered on Fridays.

During the first three classes of MED 308 of the pre-service teachers learned how to design a lesson plan. Each team was responsible for designing lesson plans that covered Monday through Thursday and submitting them to the college faculty member on the Thursday before the lesson plans were to be taught by all of the teams. The team received detailed feedback by Saturday morning. The team then edited the lesson plans and submitted the lesson plans to the other teams by mid-night Saturday so everyone had

Sunday to review what was to be taught the coming week. Along with feedback from the college faculty member, the field experience made a noticeable impact in the sample lessons from the pre-service student teachers as was also found by Maheady, Jobot, Rey, and Michielli-Pendl (2007).

Team communication was facilitated by using the college's on-line course management system, which allowed pre-service teachers to easily communicate outside of class. If pre-service teachers chose alternative forms of communication, such as texting, the information needed to be forwarded to the college faculty member. This allowed the faculty member to be aware of all communication and intervene, as necessary. To maintain continuity of lessons, Monday/Wednesday team members and Tuesday /Thursday team members needed to sustain this high-level of communication. "[A]ccurate postlesson assessments of student understanding are an important means of obtaining more information about students for subsequent planning and classroom practice"(Artzt and Armour-Thomas, 2002, p. 39).

Each team of pre-service teachers in algebra was assigned a group of 5 – 7 high school students. The pre-service teachers in geometry were assigned a group of 3 – 5 high school students. Each college team had access to a chalkboard or whiteboard. If other materials (manipulatives, calculators, worksheets, etc.) were needed, the team that designed the lesson for that week was in charge of bringing the materials to the high school.

With this new model, high school student attendance vastly improved. The pre-service teachers stated as a result of this field experience that they felt more prepared to student teach the next semester. Those who student taught the following semester enjoyed a great deal of success in their experiences.

Conclusion/Discussion

The field experiences described has produced student teachers that appear to be reflective practitioners. Similar to the findings of Downey and Cobbs (2007), these field experiences provided an insight into mathematics instruction and the learning need of diverse mathematics students. With the active involvement of our PDS partners, the mathematics education faculty members have been able to craft a program that incorporates multi-level and multi-dimensional field experiences to enhance the preparation of student teachers. Based on feedback from both students and cooperating teachers, the strength of this initiative stems from the diversity of the experiences provided – observation, tutorial experience, and monitored teaching. This stepwise incorporation of activities provides pre-service teachers with varied perspectives and has immediate relevance to instruction at the college.

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