



# Robert Noyce: Urban Mathematics Educator Program

Christine Thomas  
Draga Vidakovic  
Pier A. Junor Clarke  
Janice Fournillier

# Background

- Secondary Mathematics
- Master of Arts Degree Program
- School Partners
- Recruitment/Selection Process
- Course Experiences
- Induction
- Professional Learning Community
- Retention Efforts

# Goal

The goal of UMEP is to increase the number of high-quality secondary mathematics teachers who seek jobs in urban school districts and are committed to remaining in urban school environments.

# UMEP Mission

Develop high quality secondary mathematics teachers for our urban environment

# Program Selection

- Hold a bachelor's degree or higher in mathematics, or an equivalent field that includes at least 24 semester hours of upper division or equivalent acceptable credit in mathematics content. The applicant's work shall include a minimum of 2.50 grade-point average for four of the five following courses: modern or abstract algebra, linear algebra, college geometry, mathematical statistics, or advanced calculus.
- GRE Score minimum score of 800
- Provide three recommendations
- Provide a statement of career goals in 300-500 words
- Interview successfully with the faculty in the program

# UMEP Selection

Recruit individuals who demonstrate a willingness and commitment to teach secondary mathematics in urban high need schools.

- Accepted for Master's Degree Program
- Successful interview with UMEP Leadership Team

# Selected UMEP Scholars

UMEP recipients will:

- Commit contractually to teach secondary mathematics for two years in APS or DCSS within 6 years after program completion.
- Participate in the assigned Professional Learning Community through the third year of teaching.
- Attend seminars for UMEP students.

# Program of Study

<b>Summer 1</b>	<b>Fall</b>	<b>Spring</b>	<b>Summer 2</b>
Introductory Block (12 hours)	Exploratory Phase I (12 hours)	Exploratory Phase II (9 hours)	Extension Block (9 hours)
<ul style="list-style-type: none"> <li>• EDCI 6600 (3 h)</li> <li>• EDMT6560 (3 h)</li> <li>• Professional or Content (3 h)</li> <li>• Professional or Content (3 h)</li> </ul>	<ul style="list-style-type: none"> <li>• EDMT 7560 (3 h)</li> <li>• Practicum I (3 h)</li> <li>• Professional or Content (3 h)</li> <li>• IT 7360 (3hr)</li> </ul>	<ul style="list-style-type: none"> <li>• Practicum II (3 h)</li> <li>• Practicum III (3 h)</li> <li>• Professional or Content (3 h)</li> </ul>	<ul style="list-style-type: none"> <li>• Professional or Content (3 h)</li> <li>• Professional or Content (3 h)</li> <li>• Professional or Content (3 h)</li> </ul>



# Key Course Experiences

- Content Focus
- Reflective Teaching Model
- Action Research
- Collaboration of Faculty
- Collaboration with Partner School Districts

# Content Focus

## Teacher content knowledge:

- influences how teachers engage students with the subject matter
- influences how teachers evaluate and use instructional materials
- is related to what their students learn

# Mathematics Courses

- Program of study is individualized – recommended mathematics courses teachers take are based on their prior education;
- Pedagogy in a majority of the mathematics courses model practices teachers are expected to use in their classrooms.

# Reflective Teaching Model

Through the Reflective Teaching Model, a pedagogical tool, the pre-service teachers learn how to plan, teach and debrief for effective teaching in the mathematics classroom.

- Micro-teach
- Practicum
- Student Teaching

# Reflective Teaching Model

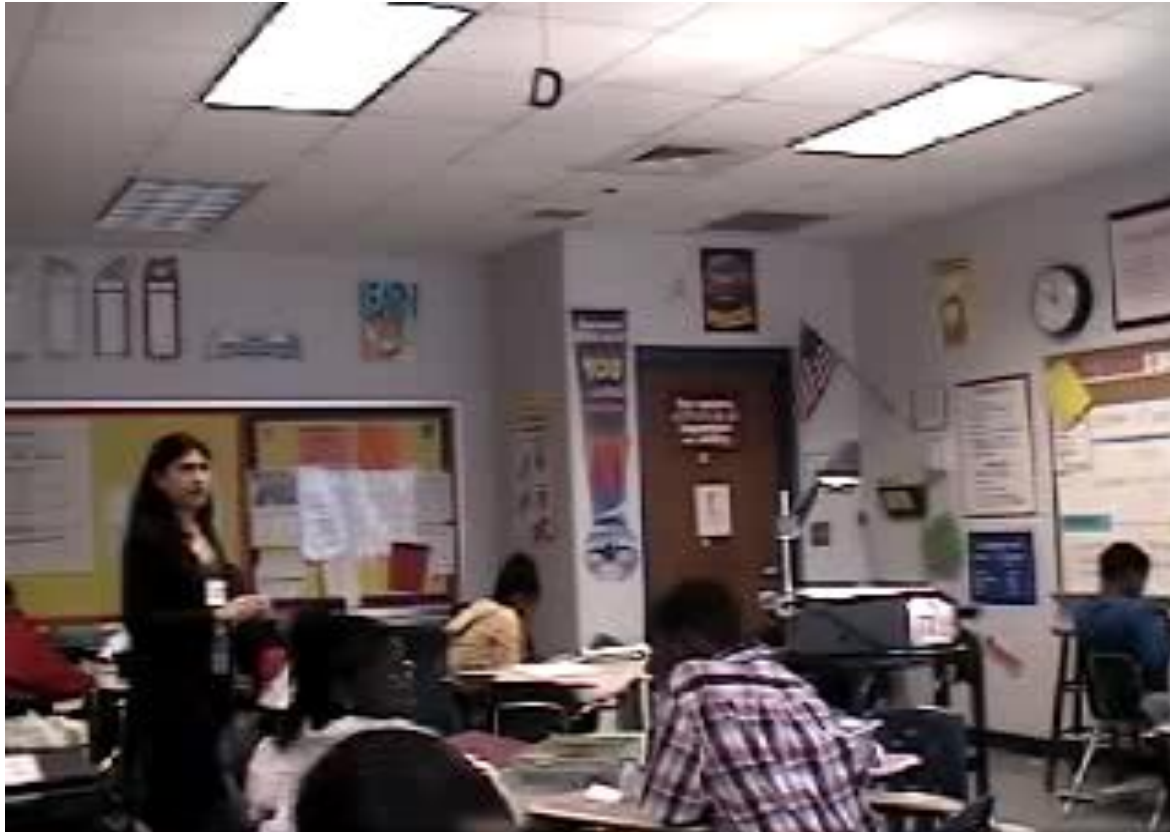
The RTM goals are:

- to provide teachers with experiences that foster the construction of new knowledge about the teaching and learning of mathematics.
- to promote the implementation of standards-based instruction.
- to study how teachers' knowledge and classroom environments change over time.



## **Planning Together for Their Student Teaching**

Student teachers exploring the planning phase of the RTM. They plan their lessons with their cooperating teachers and then share their thoughts, techniques and strategies with their RTM pair.



## Teaching Phase

Here the student teacher is teaching as planned.



## Teaching Phase II

Students working in groups as needed and teacher circulates the classroom to facilitate instruction and learning. Student raises his hands for the teacher attention.





## Debriefing Phase

Student teacher is debriefing with her RTM partner after debriefing with her cooperating teacher. Here the RTM pair gets another perspective other than their own views of the discourse.

# Action Research Methodology

A tool for integrating pre-service teachers' content and pedagogical knowledge in their process of becoming highly effective mathematics teachers

# Why action research?

## The process allows for opportunities to:

- work for educational change that embraces the lives of children whose mathematical skills continue to be the source of concern and a challenge
- enhance the lives of professionals via development of a professional disposition
- incorporate into the daily routine of the mathematics teacher a reflective stance

# Implementation Process

- Finding an area-of-focus
- Creating a time line
- Definitions of key content and or pedagogical terms
- Deciding on research questions
- Searching the literature
- Description of the intervention
- Selecting Participants
- Ethical issues and negotiations to be undertaken
- The necessary resources for the project
- Data collection methods and resources for the projects

# Collaboration of Faculty

- Action Research
- Mathematics Education
- Mathematics
- Learning Technologies

# Collaboration with School Districts

- Atlanta Public Schools
- DeKalb County School System

# Retention Phase

Developing and retaining highly effective mathematics teachers in high need schools.

# GOAL

To explore ways in which we have integrated content knowledge, pedagogy, and action research methodology to prepare highly skilled and effective mathematics teachers in high needs schools.



# **Sustaining Highly-Qualified Mathematics Teachers in High Need Schools: Online Professional Learning Community**

Develop, implement and sustain an online Professional Learning Community designed to foster longevity of highly effective mathematics teacher in high need schools—specifically the UMEP Scholars.

# Second Life

Second Life is a multiple user virtual environment. It allows users to create and control a representation of themselves known as an avatar. They can use these avatars to explore and interact with a simulated reality.

# Processes in Online Learning

The dominating processes within the online learning communities are:

- collaboration through peer-to-peer communication,
- trust building, and
- information and knowledge sharing.

Community-building efforts seem to be a promising approach to enhancing the quality of collaborative learning environments and distance courses (Moisseeva & Steinback, 2007).

# Peer Mentoring

Selecting UMEP teachers to serve as leaders for the online PLC is supported in research-based literature (Swan & Dixon, 2006). Research has shown that teachers value learning from their colleagues more than from other sources. Specifically, teachers find their colleagues to provide more practical than theoretical presentations and value effective teaching practices from their colleagues' teaching experiences.

# Robert Noyce: Urban Mathematics Educator Program (UMEP)

## RETENTION DATA

Current Status as of April 2012

37 Graduates

33 in teaching

# Retention by Cohort Groups

Updated April 2012

## 2005 Cohort

6 out of 6 UMEP Scholars in 6<sup>th</sup> year of teaching;  
**100% retention** of program completers in teaching

## 2006 Cohort

6 out of 7 UMEP Scholars in 5<sup>th</sup> year of teaching;  
**85% retention** of program completers (1 student became full time doctoral student in mathematics education)

## 2007 Cohort

6 of 7 UMEP Scholars in 4<sup>rd</sup> year of teaching;  
**85% retention** (1 left teaching; 1 plans to begin teaching)

## 2008 Cohort

6 out of 7 UMEP Scholars in 3<sup>rd</sup> year of teaching;  
**85% retention**; 1 still in program and will enter teaching

## 2009 Cohort

9 out of 10 UMEP Scholars in 2<sup>nd</sup> year of Teaching;  
**90% retention** of program completers.

# Retention Data

## Beyond Three Years in High Need Schools

- It has been over three years since cohort groups 2005, 2006, 2007 completed the degree program.
- Eighteen scholars out of 20 program completers for these cohort groups have been in teaching beyond three years.
- **The UMEP has a 90% retention rate for the UMEP Noyce Scholars in high need schools beyond three years.**