

Student Outcomes Assessment Plan

Master's Degree in Mathematics for the Middle Grades (4-8) Program

A. Program Goals and Assessment Philosophy

The program goals focus on the Five Core Propositions set forth by the National Board for Professional Teaching Standards and professional development of mathematics teachers as:

- Teachers are committed to students and their learning (professionals with a growing vision for teaching, for mathematics and for teaching mathematics to children),
- Teachers know the subjects they teach and how to teach those subjects to students (are lifelong students of teaching and learning)
- Teachers are responsible for managing and monitoring student learning (reflective practitioners),
- Teachers think systematically about their practice and learn from experience (reflective practitioners),
- Teachers are members of learning communities (leaders and contributors to mathematics education)

The assessment philosophy of this program is to measure student progress towards the goals listed above in a climate that supports those very goals. For example, a collegial climate is established in which:

- Mathematics teachers are participants in creating, shaping and applying their knowledge of mathematics, of teaching and learning, and of mathematics education;
- Mathematics teachers are encouraged and supported in examining their teaching;
- Mathematics teachers are encouraged and supported in the development of plans for initiating, analyzing, and assessing new strategies for teaching;
- University faculty of mathematics education provide a supportive atmosphere that encourages teachers to take risks and accepts teachers as committed professionals;
- The middle grades mathematics program content, understandings and experiences are directly and explicitly linked to the world of practice
- University faculty monitor and encourage feedback regarding the program's goals from mathematics teachers so that the vision of the program aligns with the needs of middle grades mathematics classrooms

B. Schedule for Collection of Data

It is important to note this program is designed for a cohort of teachers to complete in three summers and two academic years. In addition to taking coursework in the summer months, the program follows an institute model where three all-day professional development sessions, which has been supported by external funds, link the courses they are taking with the professional development of teaching. As long as external funds are available, the data collection described below is based on the assumption that there will continue to be summer institutes.

Prior to starting the program:

Files and space for a portfolio to collect data will be created for each individual teacher in the program. Each teacher will have access to his/her portfolio and will be able to insert documents in the portfolio. Faculty members will also insert documents in each individual teacher's portfolio. Collectively, this evidence will document individual professional growth and progress towards the goals of the program. Applications for this program including a department application, resume, and essay describing commitment to professional growth are the first entry in the individual teacher's portfolio.

Additionally, there will one program portfolio for the cohort group. Evidence to document the program will be collected in this file. Individual teachers will not have access to this portfolio.

Data related to program goals:

Another copy of the applications for this program including a department application, resume, and essay describing commitment to professional growth are the first entry in this cohort portfolio. The cohort portfolio provides baseline data for later comparison. An assessment of each individual's essay based on the CBAM rubric will also be included.

During the first summer institute:

During the first summer in the New Developments course, the teachers write plans for reform in their classrooms. These documents will provide a baseline as teachers reflect on them and compare them to their plans during the second summer and at the time of their "exit" interviews.

UNI faculty members will assess each of the teachers in each course. Besides the specific goals of the course, efforts are being made to relate each course to the more general goals of the program. Teachers submit a paper for each pedagogy course on plans for change in assessment, lesson planning, use of innovative curricular materials, and involvement in becoming a leader in mathematics education at their school/district. Faculty members will select at least one example of each teacher's tests, work, writings, or reflections that demonstrate professional growth for inclusion in that teacher's portfolio.

Data related to program goals:

The summer institute provides teachers the opportunity for learning much more than just by taking three courses. These sessions offer professional development for teachers in the areas of leadership, technology, curriculum and research. Teachers' reflections about their experiences during this participation will provide an opportunity to assess needs and professional growth.

The summer institute also provides teachers the opportunity to participate in field trips to high-technology industries, spend time visiting experts in some aspect of teaching, presentations led by mathematicians in our department and participate in seminars on a variety of current issues and plan ways in which they will change their own classrooms

during the next school year. Teachers complete an evaluation of the entire summer institute near the end of the summer.

During the first academic year:

UNI faculty members will assess each of the teachers in each course. Besides the specific goals of the course, efforts are made to relate each course to the more general goals of the program. Faculty members will select at least one example of each teacher's tests, work, writings, or reflections that demonstrate professional growth for inclusion in that teacher's portfolio. A paper is written by each of the teachers where they have videotaped and analyzed an aspect of their teaching. The paper follows the guidelines and rubric for the submission of one of the artifact entries for National Board Certification-Middle Childhood through Early Adolescence/Mathematics.

Data related to program goals:

Teams of teachers will work together to study some aspect of teaching and learning mathematics during the academic year. In small groups, they will plan a topic of investigation and a procedure for investigation. They choose readings related to the topic and hold discussions via a discussion board in an online learning environment. After reading the articles the teachers change an aspect of their teaching and further discuss online the success of the implementation.

One member of the mathematics education faculty visits the classroom of each teacher during their first academic year of the program. The visits are designed to help UNI faculty better understand the teacher, the conditions under which s/he teachers, the constraints of reform, and provide support in the teacher's efforts to change. These visits provide an opportunity for assessment of each teacher's professional growth and reform. They also provide the opportunity for the coordinator to visit with the teacher's principal to further support the needs of the teacher as s/he progresses through the program and to suggest opportunities for the teacher to participate in a leadership position with the district in the area of mathematics. The coordinator presents a summary of her observations with UNI faculty.

During the second summer institute:

UNI faculty members will assess each of the teachers in each course. Besides the specific goals of the course, efforts are being made to relate each course to the more general goals of the program. Faculty members select at least one example of each teacher's tests, work, writings, or reflections that demonstrate professional growth for inclusion in that teacher's portfolio.

Data related to program goals:

An informal meeting is conducted with one member of the faculty and the teachers near the end of the second summer institute. The primary purposes of the meeting are to gather information regarding teachers' views of the program's courses, summer institute sessions, and use and effectiveness of online courses.

Secondly, the faculty teaching during the second summer institute meets with each teacher to discuss the teacher's proposal for the master's paper and to review evidence that each teacher is making progress towards the student outcomes for the program. A report of this meeting and an assessment of the student's progress towards the outcomes of the program using the CBAM rubric will be included in the program portfolio.

Lastly, the teachers each review their *plan for reform* paper written during their first summer of the program to make decisions about revising those plans with what they have learned and accomplished after one year in the program.

During the second academic year:

UNI faculty members will assess each of the teachers in each course. Besides the specific goals of the course, efforts are being made to relate each course to the more general goals of the program. Faculty members will select at least one example of each teacher's tests, work, writings, or reflections that demonstrate professional growth for inclusion in that teacher's portfolio.

Data related to program goals:

The teachers participate in on-going seminars on implementing change. These courses further support the changes the teachers are making and they receive feedback from UNI faculty with regard to their next steps.

During the third summer institute:

UNI faculty members will assess each of the teachers in each course. Besides the specific goals of the course, efforts are being made to relate each course to the more general goals of the program. Faculty members will select at least one example of each teacher's tests, work, writings, or reflections that demonstrate professional growth for inclusion in that teacher's portfolio.

The final product teachers will include in their portfolio is their master's paper. Each paper will provide additional evidence of the teacher's ability to make a contribution to the field of mathematics education.

Date related to program goals:

Another individual assessment will be an interview that two UNI faculty conduct with each teacher. The primary purpose of this interview is to review and reflect on the items in the portfolio to insure that sufficient evidence of quality professional growth is included towards each student outcome. Successful completion of this interview will result in a recommendation that the teacher may graduate upon successful completion of the remainder of the courses and the final master's paper.

A secondary purpose of the interview is to assess the teacher's progress towards the completion of the master's paper and to discuss professional possibilities for the teacher during the next few years. The UNI faculty will include a report from this interview in the teacher's portfolio.

Additionally, an assessment of the student's progress towards the outcomes of the program using the CBAM rubric will be included in the program portfolio.

After graduation:

Communication continues after graduation in order to advise and counsel teachers as they participate in new leadership positions within their school or district. A few show interests in continuing their studies for a Ph.D. in mathematics education while some apply for mathematics consultant positions with local area education agencies. Post-graduation surveys conducted about one year after completion of the program provide follow-up data after a teacher graduates. Sample questions include the teacher's involvement in leadership activities related to mathematics education, describing their involvement in professional organizations, leadership roles and to update their reform efforts. Each teacher evaluates the program and makes suggestions for improvement.

C. Assessment Methods

A portfolio is developed for each of the teachers in the program. The purpose of the portfolio is to provide evidence that the teachers are committed to students and their learning (professionals with a growing vision for teaching, for mathematics and for teaching mathematics to children); know the subjects they teach and how to teach those subjects to students (are lifelong students of teaching and learning); are responsible for managing and monitoring student learning (reflective practitioners); think systematically about their practice and learn from experience; are members of learning communities (leaders and contributors to mathematics education).

One cohort portfolio is also developed. The evidence in this portfolio will document the extent to which the cohort has achieved the goals of the program.

Items included in each individual portfolio:

- The teacher's application with an essay containing their statement of commitment to reform
- Plans for reform in their classrooms, written during the New Developments course
- At least one example of the teacher's tests, work, writings, or reflections from each course. Efforts are made to include item(s) that demonstrate professional growth
- Revised plans for reform in their classrooms, written as a revision of their plans for reform during the first summer during the second summer
- The UNI faculty will include a report from the "exit" interview
- The teacher's master's paper

Additional items teachers might include in their portfolio:

- A copy of an effective innovative unit of instruction, developed by the teacher with samples and/or pictures of student work. The impact of the unit on student learning should be summarized and a teacher journal or reflection should be provided.

- Include a description of how a unit of instruction was modified and why it was more effective. The impact of the unit on student learning should be summarized and a journal or reflection should be provided.
- Include a description of how technology and/or manipulatives are used to enhance the teaching and learning of mathematics. A description of how the specific activities, type of technology, software programs and/or manipulatives have contributed to student learning and a teacher reflection should be provided.
- Provide a description of a mathematical fair, a family mathematics night, parent communications or community involvement. Include a description of the activity, an evaluation and a teacher reflection.
- Include a video tape of a mathematics lesson that illustrates innovative instruction and/or curriculum. Provide an outline of the lesson, samples of student work, an evaluation of the lesson and a teacher reflection indicating how this demonstrates teacher change.

Items that UNI faculty might include in the portfolios:

- During the summer institutes, the teachers will write reflections about new approaches to teaching and learning mathematics and with innovative curriculum materials. Evidence of professional growth and acceptance of change may be included.
- Reports of the results of the investigations that teams of teachers conduct.
- Reports of the classroom visits conducted by the coordinator may provide evidence of professional growth and the teachers' efforts to change.

Items included in the cohort portfolio:

- The teachers' applications with essays containing their statements of commitment to reform, including an assessment based on the CBAM rubric.
- The individuals' plans for reform in their classrooms, written during the New Developments course
- Revised plans for reform in their classrooms, written as a revision of their plans for reform during the first summer, during the second summer
- A faculty report of the interview during the second summer, including an assessment of each individual on the CBAM rubric
- The UNI faculty will include a report from the "exit" interview, including an assessment of each individual on the CBAM rubric.

D. Methods of Evaluating and Interpreting Results

Assessment of the teachers:

- Assessment of the applications will be based on the potential that a teacher has to meet the program goals.
- Assessment for each course based on the goals for that course.
- The UNI faculty mentor will assess the teacher's progress towards the goals of the program and provide counsel as needed.
- The UNI faculty, who has been selected to read the master's paper, will assess the teacher's success in meeting the student outcomes for the program. This

assessment will be based on evidence presented in the portfolio and during the “exit” interview. For each student outcome, the teacher will be evaluated by using the Concerns-based Adoption Model (Arithmetic Teacher, January 1993, p. 286-289).

- The final assessment of the teacher’s professional growth and contribution to mathematics education will be based on the master’s paper.

Assessment of the program:

- Ongoing planning and assessment of the courses and the program occurs at the regularly scheduled UNI faculty meetings. The teachers in the program are asked to provide input for plans and to make suggestions for improvement of the program. During the summer institute these meetings occur weekly. During the academic year they occur about once a month.
- Each September the UNI faculty will review the formal evaluation of the summer institute and reflect on the experiences of the teachers to determine ways in which the institute might more effectively help teachers meet the program goals.
- Results of the assessment based on the CBAM rubrics will demonstrate growth from summer one, to summer two, to summer three.
- After the post graduation surveys have been collected, the UNI faculty will assess the effect of the program based on the contributions that the graduates have made in the first year after graduation.