

Fresno Pacific University
Center for Professional Development

Course Syllabus

MAT 923 Assessing Students' Mathematics Learning (4-12)

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Course Description

This three-unit course will explore the various methods of mathematics assessment in the classroom. Specific resources and activities provided will encourage the development of appropriate standards-based assessment tasks such as writing, open-ended questions, portfolios, and journals. Teachers will learn how these various forms of assessment can provide detailed information about student learning and thought processes.

Teachers will read the text included with course materials as well as the selected article. Based on suggestions and sample assessments in the text, teachers will design and implement grade-level appropriate assessment tasks into their mathematics curriculum. These tasks should support as well as assess their current standards-based math instruction. The use of quality assessments clearly meets the goals outlined by the NCTM process standards as well as the National Mathematics Assessment Standards (see below).

Course Materials

Bush, W. & Leinwand, S. *Mathematics Assessment: A Practical Handbook, Grades 6-8*. Reston, VA: National Council for Teachers of Mathematics, 2000.

Stylianou, D. A., et al. "Gaining Insight into Students' Thinking through Assessment Tasks." *Mathematics Teaching in the Middle School* 6 (October 2000): 136-144.

Course Requirements

To complete this course satisfactorily, students must

- 1) Respond thoughtfully to the topic of assessment in mathematics and summarize the rationale for changing assessment practices.
- 2) Define the areas of mathematics that should be assessed.
- 3) Analyze an existing mathematics assessment from their current curriculum.
- 4) Design, administer, and analyze the results of three assessments appropriate for their current instructional goals and standards.
- 5) Summarize several key insights from article reading.
- 6) Create four questions/answers based on classroom experience and course reading.
- 7) List two internet sources on mathematics assessment.

National Standards

This course addresses the NBPTS five core propositions:

Proposition 1: Teachers are Committed to Students and Learning

Dedication to making knowledge accessible to all students; belief that all students can learn; recognition of the individual differences that distinguish students from one another

Proposition 2: Teachers Know the Subjects They Teach and How to Teach Those Subjects to Students. Mastery over the subject(s) they teach; familiarity with the skills gaps and preconceptions students may bring to the subject; use of diverse instructional strategies to teach for understanding.

Proposition 3: Teachers are Responsible for Managing and Monitoring Student Learning. Effective instructional delivery; use of range of instructional techniques; organization of instruction to meet instructional goals; assessment of the progress of individual students as well as the class as a whole; use of multiple methods for measuring student growth and understanding; clear explanations of student performance to parents.

Proposition 4: Teachers Think Systematically about Their Practice and Learn from Experience. Willingness to try new things; familiarity with learning theories and instructional strategies; critical examination of teaching practice on a regular basis to deepen knowledge, expand repertoire of skills, and incorporate new findings into practice.

Proposition 5: Teachers are Members of Learning Communities. Collaboration with others to improve student learning; involvement with other professionals regarding instructional policy, curriculum development and staff development.

This course is also based upon the mathematical process standards proposed by NCTM:

Problem Solving:

Students identify and solve problems that arise from a variety of experiences and encompass connected mathematical ideas. They analyze problems and apply a wide range of strategies in flexible ways.

Reasoning and Proof:

Students make conjectures (informed guesses), express these conjectures in multiple ways (through language and other forms of representation), and analyze and evaluate their reasonableness.

Communication:

Students organize their thinking by expressing their ideas clearly, and by considering and analyzing the ideas of others.

Connections:

Students recognize the connections among mathematical ideas and across experiences. They acknowledge, appreciate, and apply mathematical ideas outside the mathematics curriculum.

Representation:

Representation is both a process (to represent) and a product (or artifact). Representations include such forms as symbols, pictures, charts, models, and graphic displays. Representations are not ends in themselves, but tools for understanding and communication.

From Principles And Standards For School Mathematics, National Council of Teachers of Mathematics, 2000.

Also emphasized in this course are the NCTM National Mathematics Assessment Standards:

- The Mathematics Standard
- The Learning Standard
- The Equity Standard
- The Openness Standard
- The Inferences Standard

- The Coherence Standard

Students will be required to reference their respective state mathematics content standards for specific assignments. These standards can be found online at: <http://www.educationworld.com/standards/>

Learning Objectives/Outcomes

Participants in this course will:

- 1) Demonstrate through written reflection an understanding of the value of authentic assessment tasks in the mathematics classroom and their potential to illuminate student thinking (NCTM ASSESSMENT STANDARDS: The Mathematics Assessment Standard; NBPTS Prop. 3)
- 2) Analyze various types of assessment methods which require students to reason and think critically (NCTM ASSESSMENT STANDARDS: The Learning Standard; NCTM PROCESS STANDARDS: Reasoning and Proof; NBPTS Prop. 3)
- 3) Demonstrate how to design an assessment task which measures student mathematical understanding and thought process (NCTM ASSESSMENT STANDARDS: The Learning Standard; NCTM PROCESS STANDARDS: Problem Solving; NBPTS Prop. 2)
- 4) Implement and evaluate selected assessment tasks and demonstrate successful integration with standards-based curriculum (NCTM ASSESSMENT STANDARDS: The Inferences Standard; NCTM PROCESS STANDARDS: Communication; NBPTS Prop. 4)

Schedule of Topics and Assignments

Further explanations of assignments and expectations are given in the course section of this packet. All work should be typed and sent to the instructor in one mailing (no binders or portfolios necessary) when the course is completed. Please make a copy of all work; work will not be returned. Students have one full year to finish the course but should not send completed work in less than three weeks from registration.

- 1) Summarize your initial reactions to the topic of assessment. Include examples from your personal experiences in the classroom. Total response: app. 200 – 400 words.
- 2) Read the introduction and Chapter 1 of the text, *Mathematics Assessment: A Practical Handbook*. Write a one-page summary that explains the rationale for changing assessment practices.
- 3) Create a presentation that defines and describes the elements of mathematics that teachers should assess.
- 4) Analyze a mathematics assessment from your current mathematics curriculum.
- 5) Design and administer three assessments, each of which assesses a current instructional goal and mathematics standard for your students.
- 6) Evaluate the outcomes of each of these assessments. Write several paragraphs reflecting on the results of each assessment.

Please note:

(If you are currently not teaching, you may substitute the administering and evaluating of your assessments with a digital (PowerPoint, etc.) or printed presentation of the various methods of mathematics assessment that could be shared with your peers or colleagues.)

- 7) Read the article included in the course packet, "Gaining Insight into Students' Thinking through Assessment Tasks." Identify any key insights you discover about assessment practices in the classroom. Total response:

200-400 words.

8) Create four questions and answers based on the issues discussed in Chapter 3.

9) Identify and briefly describe two web resources on mathematics assessment you would recommend to your colleagues.

Instructor/Student Contact

As you complete the assignments for this course, there are several opportunities for you to share your thoughts with me. Since it is my hope that this course is a meaningful, interactive experience for you, please email me your responses to Assignments 1 and 7. I will look forward to hearing how you are engaging with the course ideas and activities.

Evidence of Learning

- 1) Student demonstrated evidence of understanding of course objectives through reflective written assignments. (Assignments 1, 2, 3, 7, 8)
- 2) Student's writing reflected thoughtful engagement with the course readings. (Assignments 2, 3, 6, 7, 8)
- 3) Student demonstrated evidence of understanding of course objectives through presentation of assessments and analyses. (Assignments 5 & 6)
- 4) Student made connections to local instructional goals/state standards in the design and implementation of assessments. (Assignments 5 & 6)
- 5) Student included the use of critical thinking and reflection in the evaluation of assessments implemented. (Assignment 6)
- 6) Student demonstrated understanding of how to address classroom issues surrounding assessment through written response. (Assignments 7 & 8)

Grading Policies and Rubrics

Evaluation:

Written Responses (5)	40%
Assessment Plans (3)	20%
Assessment Evaluations (3)	20%
Presentation (1)	10%
Research (List of online resources)	10%

100%-90% = A

89%-80% = B

79% or below = no credit

Students who take the course for credit/no credit must earn an 80% or above to earn credit. Students who enroll in the course for a letter grade must achieve a grade of "A" or "B." Coursework that earns below a "B" mark will not receive credit; this applies to both the credit/no credit and the letter grade option.

References

Additional resources on mathematics assessment are suggested to expand course content and provide further study.

Bush, W. S. (Ed.) (2000). *Mathematics assessment: Cases and discussion questions for grades 6-12*. Reston, VA: NCTM.

NCTM: <http://www.nctm.org/resources/> Click on "Assessment Resources" in the left sidebar.

Policy on Plagiarism

“All people participating in the educational process at Fresno Pacific University are expected to pursue honesty and integrity in all aspects of their academic work. Academic dishonesty, including plagiarism, will be handled according to the procedures set forth in the Fresno Pacific University Catalogue.”

“Graduate level course work reflects Fresno Pacific University’s Desired Student Outcomes as it applies to professional development to demonstrate the following:

- Oral and written communication in individual and group settings
- Content knowledge, and application of such knowledge in the student’s area of interest to affect change
- Reflection for personal and professional growth
- Critical thinking
- Cultural and global perspectives to understand complex systems
- Computational/methodological skills to understand and expand disciplines, including an understanding of technological systems”