

CI 5821: Teaching Mathematics in the Elementary School

Summer Session for StarTalk Participants, June 29 – July 2, 2009

Instructors:

Amy Egenberger & Debbie Monson

Instructor Contact Information:

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Amy Egenberger is an educator with nineteen years experience teaching students and teachers in an immersion setting. Her interest is in meeting the professional development needs of both new and experienced immersion teachers.

Debbie Monson is currently a graduate student in mathematics education at the University of Minnesota. Prior to her work at U of MN, she had 15 years of experience teaching mathematics. Her interest is in the mathematics education of elementary teachers.

Course Information:

Ski U Mah Room, McNamara Alumni “Gateway” Center, 8:45 – 4:00 daily

Required Text:

Elementary and Middle School Mathematics: Teaching Developmentally
Sixth edition by John Van De Walle

Course Description and Target Audience:

CI 5821 is designed to meet the mathematics content and methodology component required for elementary education licensure. More specifically, this summer course will address the unique curricular development and implementation considerations particular to Mandarin immersion educators as they relate to elementary mathematics instruction.

Course Objectives:

Participants will:

1. Become familiar with the main content strands of the NCTM (National Council of Teachers of Mathematics) Standards. The course is designed with these strands in mind and each half day will focus on one or part of the strands.
2. Identify and discuss language considerations for immersion students learning mathematics. Participants will learn and plan for language objectives and instructional strategies for teaching mathematics in the immersion setting.
3. Focus on student thinking for both mathematics and language learning. Participants will be encouraged to have student thinking and language needs guide instruction. Student thinking includes multiple solution strategies as well as common errors/ideas with respect to particular mathematics topics (i.e. rounding, division, fractions), as well as to language and communication in Mandarin.
4. Collaborate to create a mathematics lesson plan for immersion students using the Lesh model and be able to identify these representations in lessons. Participants will learn how to plan lessons attending to both language and mathematics content.
5. Participants will find, focus in on and follow through with language components of mathematics lesson preparation.
6. Consider the recommendations from research and experience to create their own definition about what it means to teach mathematics. This includes a definition of what mathematics is as well as how children learn and how the subject is most effectively taught in an immersion setting.

Course Requirements

Responsibilities of Course Participants:

- To attend all class meetings and participate in discussions at all levels
- To complete readings, reader responses and lesson plans as assigned
- To work actively in groups to discuss, synthesize, and learn from colleagues

Assignments:

All participants are expected to attend, be on time and participate in workshop sessions and complete assigned readings in mathematics education. Participants are expected to read the book chapters designated for each class prior to that class.

Those taking this class for credit are also expected to do the following assignments:

A. Student Interview: (To be completed collaboratively during the practicum)

In our classes on teaching basic facts, whole number arithmetic, and fractions you will learn how students can construct for themselves their own strategies for solving problems. For this assignment you are to develop interview items that you could use with students in your practicum setting to see if their strategies for solving problems are similar to student strategies we examine in class.

Write a short report that:

- describes the problems you would ask students to solve;
- describes questions you would ask students to investigate their thinking
- explains what you expect to learn about student thinking from these problems;
- reflects on the use of student interviews as a way of assessing student knowledge.

B. Manipulative List: (To be completed during the afternoon sessions of weeks 3 & 4)

- Develop a list of 5 different manipulatives you would want to have in your classroom.
- Give a rationale for your selection.
- Give an example of a learning activity you would use for each of the manipulatives you have selected.

C. Take Home Exam: Due July 16

You are to respond to items on take home test. You can use your textbook but are expected to work on your own.

D. Immersion Mathematics Mini-Unit Project (for teacher participants)

(Each lesson is due to Amy two days prior to actually teaching the lessons during July 6 - 17, 2009)

Overview

Your task for this assignment is to create an immersion mathematics “mini-unit” consisting of three lesson plans to be taught consecutively. This mini-unit may be connected to a unit overview/plan you created for Immersion 101 (week 1 of the program). The mathematics mini-unit should be designed for a group of students that will be teaching during the teaching practicum July 6-17 or in your own teaching context next year. Based on the needs of the students you will be teaching, you may select an appropriate mathematics topic for you mini-unit that is other than time or money.

1. The teaching of “new” content to learners. You are strongly encouraged to adapt lessons from the National Science Foundation curricula. This content may be introduced

via the use of a written or oral text (e.g., a children’s book, mathematics text, content from a website, a DVD, etc.). If a text is used, it should be “authentic,” that is, a text with a communicative intent.

2. The integration of at least two of the four modalities—reading, writing, speaking, listening.
3. The immersion lessons must actively involve students with manipulatives for mathematics instruction and attend to specific language objectives. The lessons must actively involve you teaching, not just supervising students.
4. Specific attention to instructional strategies that illustrate standards-based immersion lesson planning.
5. The integration of a specific learning strategy to support students’ content and/or language learning (e.g., summarizing, questioning, making inferences, classifying, monitoring, etc.—see the following CoBaLTT website for more information: <http://www.carla.umn.edu/cobaltt/modules/index.html?strategies/main.html>).
6. Evidence that you are able to apply concepts from the course to teach language in the context of meaningful mathematics content.

Purpose

The purpose of this assignment is for you to demonstrate your ability to:

1. Apply your knowledge of developing curriculum and mathematics instruction for immersion students.
2. Design a series of activities providing instruction that scaffolds your mathematics content and language objectives, including the selected learning strategy, utilizing Content-Based Instructional Strategies and/or the Lesh model of mathematics instruction.
3. Assess students’ content understanding, language use and use of the selected strategy.
4. Use the course readings and discussions to support the rationale for your decisions.

The lesson must be linked to the mini-unit overview and the following components must be included in your lesson:

- All components listed on the mini-unit overview. The final mini-unit overview must be included with this lesson plan.
- Lesson topic –The big idea and theme for the unit overview remain the same but the lesson topic typically changes for each lesson.
- Copy of the text if using (If you don’t want to give us the original or a photocopy of the text, you can type up the written text from a children’s book or provide a description/translation of an oral text that you would be using.)
- Lessons should be word processed and follow the immersion lesson plan format presented in class.
- Identification of language and mathematics standards targeted in the lesson (you may have more standards listed in the unit overview but you should identify those that this lesson targets)

- Objectives
Content (related to the mathematics content of the lesson):
Culture (optional, could be related to the content):
Language (these include language functions, grammatical structures, vocabulary; if you are in a two-way context, consider your two groups of learners—those learning through L1 vs. L2):
 Content-Obligatory
 Content-Compatible
Learning Strategies (includes strategies and skills targeted; be sure to highlight the learning strategy for mathematics and/or problem solving in mathematics that is focused on in this lesson):
Social/Affective (optional):
- Time frame for activities that comprise the lesson
- Description of materials needed, including technology if applicable
- Description of activities for each day, aligned with objectives (divided into stages; e.g., pre-, during, post, as well as prompts and questions you will use). Consider the 10 instructional strategies for CBI and/or the Lesh model of mathematics instruction as you design activities to engage learners.
- Lesson-level formative assessment procedures (documentation of learning, ways to inform students of progress, ways to inform further instruction—how will you know that your objectives for the lesson were achieved?)
- Alignment of objectives, activities, assessment. You should label objectives and show how objectives are reflected in activities and assessment.
- Appendices - documents that you have created or found/adapted that need to go with this lesson (such as handouts, graphic organizers, list of manipulatives, etc.).
- References - please use APA for citing references.
- Reflections - Write up a 2-3 page reflection following the teaching of each lesson during weeks 3 and 4 of the program.
- Before you teach, you are required to share your lessons with the course instructor, Amy Egenberger, who will observe your teaching. A process for both aspects of this assignment will be explained at a later date.

Refer to the **Scoring Rubric for the Immersion Mathematics Mini-Unit Lessons** provided in class as a guide

Grading:

Student Interview	25 points
Manipulative list	25 points
Take home test	50 points
Lesson planning and practicum teaching	100 points
Class participation	50 points

<u>Grade</u>	<u>Achievement</u>
A: 225 points or more	outstanding
B: 200 -224 points	above level to meet course requirements
C: 175 -199 points	meets course requirements
D: 150- 174 points	worthy of credit; fails to fully meet course requirements
F: less than 150 points	not worthy of credit

University of Minnesota Uniform Grade Policy:

The following policies and statements are uniform across the University. Should you desire additional information, visit the University Senate website that presents the policy:

<http://www1.umn.edu/usenate/policies/gradingpolicy.html>

Explanation of Grades (note that pluses and minuses may also be attached to most grades):

A = achievement that is outstanding relative to the level necessary to meet course requirements.

B = achievement that is significantly above the level necessary to meet course requirements.

C = achievement that meets the course requirements in every respect.

D = achievement that is worthy of credit even though it fails to meet fully the course requirements.

S = achievement that is satisfactory, which is equivalent to a C or better

F (or N) = Represents failure (or no credit) and signifies that the work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I.

I = (Incomplete) Assigned at the discretion of the instructor when, due to extraordinary circumstances, e.g., hospitalization, a student is prevented from completing the work of the course on time. *Requires a written agreement between instructor and student (see more information below).*

Scholastic Dishonesty: Scholastic misconduct is broadly defined as “any act that violates the rights of another student in academic work or that involves misrepresentation of your own work.” Scholastic dishonesty includes (but is not necessarily limited to): plagiarizing (which means misrepresenting as your own work any part of work done by another); cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting the same paper, or substantially similar papers, to meet the requirements of more than one course without the approval and consent of all instructors concerned; depriving another student of necessary course materials; interfering with another student’s work;; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; or altering, forging, or misusing a University academic record; or fabricating or falsifying of data, research procedures, or data analysis. Academic dishonesty in any portion of the academic work for a course shall be grounds for awarding a grade of F or N for the entire course.

Class Hour-Credit Ratio: For undergraduate courses, one credit is defined as equivalent to an average of three hours of learning effort per week (over a full semester), necessary for an average student taking that course to achieve an average grade in that course. For example, a student taking a three credit course that meets three hours a week should expect to spend an additional six hours a week on coursework outside the classroom. Graduate courses involve a greater time commitment on the part of students.

How to Access Your Grades: Go to OneStop for Students (<http://onestop.umn.edu/onestop/index.html>) click on Academics, then click on Grades.

A Note on Incompletes: Grades of “Incomplete” are not automatic! In accordance with University policy, students may take incompletes only under particularly unusual or unanticipated circumstances, which will have to be explained to the instructors. The decision of allowing a student to take an incomplete is one that we will make on the basis of serious negotiation. At the time the decision is made, the student will be required to negotiate a due date, and a written agreement must be signed by both the student and instructors. See <http://intranet.cehd.umn.edu/CI/LateWork.asp> for C&I’s late work policy and form to use for requesting a grade of incomplete.

University Policies: All University of Minnesota students should be familiar with the following University policies (websites provided for complete policy statement).

Accommodations: It is University policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities that may affect their ability to participate in course activities or to meet course requirements. Students with disabilities are encouraged to contact their instructors to discuss their individual needs for accommodations.

Classroom conduct: <http://www1.umn.edu/usenate/policies/classexpectguide.html> and/or <http://www1.umn.edu/regents/policies/academic/StudentConductCode.pdf>

Sexual harassment:
<http://www1.umn.edu/regents/policies/humanresources/SexHarassment.pdf>

Support Services: For support with writing, please make use of the Center for Writing at the University of Minnesota: <http://writing.umn.edu/sws/index.htm>

This material is available in alternative formats upon request.

The University of Minnesota is an equal opportunity employer and educator.

Course Schedule

<i>Date/Time</i>	<i>Topics</i>	<i>Required Readings</i>	<i>Recommended Readings</i>
June 29			
8:45 – 10:20	NCTM Standards Modeling a Standards-based lesson	Ch. 3	Ch.1-2
10:35 - 12:00	Learning Theory: Lesh Translation Model		
1:00 – 2:30	Cognitive Guided Instruction + - Story Problems	Ch. 11	Ch. 9-10
2:45 - 4:00	$x \div$ Story Problems		
June 30			
8:45 – 10:20	Place Value and Whole Number Algorithms	Ch. 12,	Ch.13-14
10:35 - 12:00	Estimation		
1:00 – 2:30	Geometry: Primary grades	Ch. 21	
2:45 - 4:00	Geometry: Intermediate grades		
July 1			
8:45 – 10:20	Measurement: concepts and skills	Ch. 7	
10:35 - 12:00	Measurement: area, perimeter, volume		
<i>Remember to go please to Room 325 in Peik Hall for the afternoon session.</i>			
1:00 – 2:30	Data Analysis: using technology	Ch. 22	
2:45 - 4:00	Patterns and Functions	Ch. 15	
July 2			
8:45 – 10:20	Fractions: $X \div$	Ch. 18	
10:35 - 12:00	Decimal Models		

1:00 – 2:30	Fractions- concepts, order, equivalence	Ch. 16	Ch. 17
2:45 - 4:00	Fractions: Addition/Subtraction		

WEEKS 3 & 4 of the STARTALK MEISTEP PROGRAM:

During weeks 3 and 4 of the program (July 6-17) you will have an opportunity to engage in practice teaching of mathematics in the context of a STARTALK student program, Yinghua Academy’s summer math camp. You will begin by observing experienced teachers during morning sessions with students (9:00-12:00 daily) and then you will have an opportunity to engage in practice teaching throughout the two weeks. During afternoon sessions (1:00-4:00) you will remain at Yinghua Academy for lesson planning, reflection on your teaching, collaborative activities and one-on-one interaction with MEISTEP instructor, Amy Egenberger. On Wednesday July 8 and July 15, we will return to the U of M campus (Confucius Institute Library) to utilize the resources available and extend understanding and experience with developing learning activities for immersion students.

Expectations:

- In triads, teachers will collaborate to develop a mini-unit overview into which at least 3 individual lessons will fit.
- Participants will develop at least one lesson that integrates language, math content, culture in a meaningful, developmentally appropriate way as part of this mini-unit.
- During the mornings or the first two days of the practicum, participants will observe teachers teaching lessons and leading activities with the students. On subsequent mornings, participants will be teaching the lesson(s) they have prepared and had reviewed, observe others teaching and/or provide feedback.
- Participants will be present for the mornings and afternoons during weeks 3 and 4 unless expressly worked out otherwise with Amy Egenberger in advance. The afternoon sessions will focus on concrete math materials development for learning center activities and self-correcting math activities for independent work as well as group reflection and feedback on teaching and lesson development experiences.

Opportunities:

- During the center activities portion of the mornings, participants will have the opportunity to assist students and engage interviewing to gain insight into student thinking about mathematics and their use of the target language.
- Participants will have the opportunity to develop one or more complete, well-thought-out lessons within a larger unit frame of reference that can be used in their particular grade-level next year and then revised based on input from Amy Egenberger and peers teachers.

- The shared development and use of the MEISTEP wiki at pbworks.com provides a forum for ongoing collaboration and sharing of resources.

A. Student Interview: (To be completed collaboratively during the practicum)

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