

PTED 7281 LF09 Teaching and Learning Mathematics for the 21st Century- 6-12

Semester Hours 3

Semester/Year: Summer 2009

Instructor: Dr. Fenqjen Luo

Office Location: Education Annex, Education Annex #204

Meetings: June 3, 3:10 – 5:20 PM, Education Center #226

Office Hours: June 8-12, 9:30—noon
July 20—24, 9:30 — noon

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Online Support:

- CourseDen Login and Help page: <http://CourseDen.westga.edu/>
- Distance Learning Library Resources: <http://www.westga.edu/~library/depts/offcampus/>
- Ingram Library Information: <http://www.westga.edu/~library/info/library/shtml>
- UWG Distance Education: <http://www.westga.edu/~distance/>
- NCTM Membership: <http://www.nctm.org/>
- Pbworks Site: <http://ewelcome.pbworks.com/>

COURSE DESCRIPTION

This course is designed to engage P-5 teachers of mathematics in investigations of their instruction in mathematics for the purpose of professional growth and teacher renewal. Through participation in the Learning Festival and an action research training module, P-5 teacher will gain knowledge regarding best practices in the teaching and learning of mathematics as well as strategies for researching teaching practices. With this knowledge, students will design an action research project that investigates some aspect of their mathematics instruction.

CONCEPTUAL FRAMEWORK

The conceptual framework of the College of Education at UWG forms the basis on which programs, courses, experiences, and outcomes are created. By incorporating the theme “Developing Educators for School Improvement,” the College assumes responsibility for preparing educators who can positively influence school improvement through altering

classrooms, schools, and school systems (transformational systemic change). Ten descriptors (decision makers, leaders, lifelong learners, adaptive, collaborative, culturally sensitive, empathetic, knowledgeable, proactive, and reflective) are integral components of the conceptual framework and provide the basis for developing educators who are prepared to improve schools through strategic change. National principles (NBPTS 1, 2, 3, 4 & 5), propositions (NBPTS), and standards (Learned Societies) also are incorporated as criteria against which candidates are measured.

The mission of the College of Education is to develop educators who are prepared to function effectively in diverse educational settings with competencies that are instrumental to planning, implementing, assessing, and re-evaluating existing or proposed practices. This course's objectives are related directly to the conceptual framework and appropriate descriptors, principles or propositions, and Learned Society standards are identified for each objective. Class activities and assessments that align with course objectives, course content, and the conceptual framework are identified in a separate section of the course syllabus.

COURSE OBJECTIVES

The students will:

1. address the relationships between children and mathematics (National Council of Teachers of Mathematics, 2000; Stein, et. al., 2000; Moon & Schulman, 1995);
(Decision Makers, Lifelong Learners, Adaptive, Empathetic, Knowledgeable, Reflective; NBPTS 1, 2, 3, 4, 5; NCTM 2.5, 2.9)
2. recognize the importance of the qualitative dimensions of children's learning (National Council of Teachers of Mathematics, 2000; Stein, et. al., 2000; Moon & Schulman, 1995);
(Lifelong Learners, Adaptive, Empathetic, Knowledgeable, Reflective; NBPTS 1, 2, 3, 4, 5; NCTM 2.5, 2.9)
3. build beliefs about what mathematics is, about what it means to know and do mathematics, and about children's view of themselves as mathematics learners (National Council of Teachers of Mathematics, 2000; Stein, et. al., 2000; Moon & Schulman, 1995);
(Lifelong Learners, Adaptive, Empathetic, Knowledgeable, Reflective; NBPTS 1, 2, 3, 4, 5; NCTM 2.5, 2.9)
4. gain an understanding of the Standards 2000 (NCTM, 1998) and apply recommended strategies in the classroom (NCTM, 1990; Stein, et. al., 2000; Moon & Schulman, 1995);
(Lifelong Learners, Adaptive, Empathetic, Knowledgeable, Reflective; NBPTS 1, 2, 3, 4, 5; NCTM 2.3, 2.8)
5. gain an understanding of the constructivist theory of math instruction (NCTM, 1998, 1990, 2000; Stein, et. al., 2000; Moon & Schulman, 1995); and
(Adaptive, Empathetic, Knowledgeable, Proactive, Reflective; NBPTS 1, 2, 3, 4, 5; NCTM 2.8)

6. gain an understanding of alternative assessment for use with instruction in mathematics (NCTM, 1990, 2000; Stein, et. al., 2000; Moon & Schulman, 1995). (*Lifelong Learners, Adaptive, Empathetic, Knowledgeable, Proactive, Reflective; NBPTS 1, 2, 3, 4, 5; NCTM 2.8*)

TEXTS, READINGS, AND INSTRUCTIONAL RESOURCES

Required Texts: NONE

*Selected journal articles will be used based on individual student needs

Readings:

AIMS Education Foundation. *Activities integrating mathematics and science*. (1995). Fresno, CA: AIMS Education Foundation

Barber, J. (1988). *Bubble-ology*. Berkeley, CA: Great Explorations in Math and Science (GEMS).

Bassarear, T. (2005) *Mathematics for elementary school teachers, 3rd edition*. Boston, MA: Houghton Mifflin Company.

Clarke, D. (1999). *Constructive assessment in mathematics: Practical steps for classroom teachers*. Berkeley, CA: Key Curriculum Press.

Dyer, M., & Moynihan. (2000). *Open-ended question in elementary mathematics instruction & assessment*.

National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Reston, VA: National Council of Teachers of Mathematics.

National Council of Teachers of Mathematics. (2001). *Mathematics assessment: Cases and discussion questions for grades K-5*. Reston, VA: National Council of Teachers of Mathematics.

National Council of Teachers of Mathematics. (2001). *Learning from assessment: Tools for examining assessment through standards*. Reston, VA: National Council of Teachers of Mathematics.

National Council of Teachers of Mathematics. (2001). *Mathematics assessment: Myths, models, good questions, and suggestions*. Reston, VA: National Council of Teachers of Mathematics.

Van de Walle, J. A. (2007) *Elementary and middle school mathematics: Teaching developmentally, 6th edition*. Boston, MA: Pearson Education, Inc.

ASSIGNMENTS, EVALUATION PROCEDURES, AND GRADING POLICY

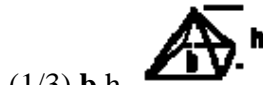
Assignments

1. Learning Festival (30%):

- (a) Students will attend the University of West Georgia Learning Festival in its entirety. Each class member should receive a **copy of the Learning Festival Session Form** by which each student will document the sessions attended. Student will submit 3-5 page reflection paper discussing their experiences and knowledge gained from attending the UWG Learning Festival morning sessions. **Paper Due on CourseDen: Friday, June 12, 2009.** (24%)
- (b) Each student will attend the face-to-face meeting and lab practice on **Wednesday, June 3rd from 3:10 pm to 5:20 pm**. Each student will set up his or her Pbworks' front page with making hyperlinks to at least two valuable Websites. Students will submit their Pbworks addresses to CourseDen **by 8:30 am, Monday, June 8, 2009.** (Objectives: 1, 2, 3, 4, 5, & 6)

2. Project Development: Mini-Lessons and Assessment on Pbworks (25%)

- (a) Develop two mini-lessons on Pbworks. The given mini-lesson(s) may include simulation using a calculator or software (PowerPoint, Excel, Fathom, Geometer's Sketchpad, and so on. It may include video demonstration (e.g., <http://www.truevo.com/Volume-of-Prisms/id/2547709935>) for the measuring the volume of a prism).
- (b) The mathematics topic students try to work on is flexible, but it must be related to the grade level(s) you are teaching. Your mini-lessons must be able to contribute to the understanding of mathematics knowledge. Please DO NOT focus on mastering mathematics facts. For example, you can explain why the area of pyramid is equal to



- (1/3) bh using two different ways as a mini-lesson. Then, give real-world examples of measuring a pyramid as another mini-lesson.
- (c) On Pbworks, develop appropriate assessment questions for students to answer regarding to the developed mini-lessons.
- (d) Students are highly encouraged to develop a project related to use informal mathematics (science) activities to enhance formal mathematics learning.
- (e) In addition to the textbook, students can find valuable ideas from the university's online library system to support the selected topic. Students can also visit the NCTM Website at <http://www.nctm.org> to look for ideas.
- (f) The due day for this project development is **Wednesday, July 15**. However, at least 30% progression must be made between June 8 and June 12 shown on students' Pbworks. The project must be updated on the Pbwiki every week.
(Objectives: 4, 5, & 6)

3. Teaching Article Writing (25%)

- (a) Develop a teaching article related to the developed project. The style of article must be similar to the articles from Mathematics Teachers, Mathematics Teaching in the Middle School, and/or Teaching Children Mathematics published by NCTM. Students are encouraged to join NCTM membership.
- (b) Each student's article must include a rationale for the topic selection, a theoretical support for the ideas a student tries to introduce in the article, specific mathematics teaching/learning examples, and references.
- (c) The due day for this article writing development is **Thursday, July 16**. However, at least 10% progression must be made between June 8 and June 12 and shown on Pbworks. The project must be updated on the Pbwiki biweekly.
(Objectives: 1, 2, 3, 4, 5, & 6)

4. Project Reflection (10%)

Write a 600-words reflection paper regarding to the project development, article writing, and peer evaluation. The reflection paper should include three sections: **(1) exploration, (2) invention, and (3) application**. The exploration section includes student reflection on the experience of exploring supporting resources. The invention section includes student reflection on the experience of project and article invention. The application section includes student reflection on the potential application of the developed project.

(Objectives: 1, 2, 3, 4, 5, & 6)

5. Peer Evaluation (10%)

Write **TWO** 400 words peer evaluation reports regarding to peers' project development and article writing. The first evaluation must be conducted on **Monday, June 29** and the evaluation report must be submitted to the **CourseDen** by **Tuesday, June 31**. The second evaluation must be conducted on **Friday, July 17** and the evaluation report must be submitted to the **CourseDen** by **Saturday, July 18**. All peer projects can be accessed via the instructor's Pbworks Website at <http://ewelcome.pbworks.com>.

Evaluation Procedures

Learning Festival	30 points	A = 100 - 90%
Project Development	50 points	B = 89 - 80%
Action Research Project in Mathematics	10 points	C = 79 - 70%
Peer Evaluation	10 points	D = 69 - 60%
Total	100 points	

Professionalism Policy

Professionalism will be graded as follows:

Attendance Policy: Students are expected to attend class and be respectful of the instructor and other students. Since emergencies do occur, you will be allowed one absence without grade reduction. Absences beyond one will require a written summary or power point presentation of the chapters covered during that class. 10% will be deducted from your final grade for each absence not accompanied by a summary/Powerpoint.

Students are expected to adhere to the highest standards of academic honesty. Plagiarism occurs when a student uses or purchases ghost-written papers. It also occurs when a student utilizes the ideas of or information obtained from another person without giving credit to that person. If plagiarism or another act of academic dishonesty occurs, it will be dealt with in accordance with the academic misconduct policy as stated in *The Student Handbook, Undergraduate Catalog, and Graduate Catalog*.