

UNIVERSITY OF NORTH CAROLINA AT GREENSBORO
School of Education
Department of Curriculum and Instruction

Be the change you wish to see in the world
-- Gandhi

Operating Principles

- Be present and open
- Actively listen to self and others
- Suspend certainty and judgment
- Ask clarifying questions
- Process and reflect on learning from each segment
- Make time for eating and have a sense of humor!

COURSE SYLLABUS FALL 2005

Course Prefix and Number: CUI 667

Course Title: Technology in mathematics education

Credits: 3 SH

Time: W 5 – 7:50

Place: Curry 309

Course prerequisites: Admission to graduate studies in education or permission of instructor

For who planned: Students enrolled in Curriculum and Instruction Graduate programs

Instructor Information:

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Office Hours: Monday and Wednesdays 2-4 p.m., after class and by appointments

Course Purpose/Catalog Description: Technologies used to learn mathematics and ways of incorporating those technologies into mathematics instruction.

Teachers Academy conceptual framework mission statement: *The mission of professional education at UNCG is to prepare and support the professional development*

of caring, collaborative, and competent educators who work in diverse settings. This mission is carried out in an environment that nurtures the active engagement of all participants, values individuals as well as cultural diversity and recognizes the importance of reflection and integration of theory and practice. UNCG's professional education programs are guided by shared commitments to: (a) equity and excellence in teaching, research, and service; (b) professional integrity and ethical deliberation in dealing with students and colleagues (university-based, school-based, and community-based); (c) the construction of a professional knowledge base through collaboration and collegiality; and (d) the dissemination of professional knowledge, skills and dispositions through the preparation and continuing professional development of teachers, principals and other school personnel.

Course Goals and/or Objectives/Student Learning Outcomes: The course focuses on effective use technologies to facilitate learning and teaching of mathematics. We will explore graphing calculators, computer algebra systems, data collection devices such as the motion ranger, dynamic geometry software, TI navigator, TI presenter, statistical software, MS Excel, MS Word, Concept Mapping Software such as Inspiration and OmniGraffle, Visualization tools such as applets, Web sites, Search engines such as google, etc.

Teaching Strategies: We will deploy document analysis, collaboration, cooperative group work, discussion, presentation/facilitation/moderation, [electronic chat], [electronic discussion], written assignments, evaluation of technology, etc.

You will complete the following tasks during the semester:

- Read materials before we meet
- Summarize the main points
- Post a question (based on the reading) that you want discussed
- Respond to questions
- Take the lead in discussion
- Evaluate technology
- Design plan for integrating technology into teaching mathematics
- Implement technology in your classroom

Evaluation Methods and Guidelines for Assessment:

Technology Review (40%) Due Nov 9.

Plan for Integrating Technology into Teaching Mathematics (20%) Due October 12

Technology Infused Unit of Study (20%) Due Nov 30

Research Paper on the current state of technology use in US mathematics classrooms or education (choose a specific area of interest) (20%) Due Nov 18: Changed from Nov 25, due to Thanksgiving Break.

Grading Scale

A:	$\geq 90\%$
B:	$80 \leq \text{score} < 90$
Unacceptable performance:	$< 80\%$

Resources for class

- (1) National Council of Teachers of Mathematics, (2000). *Principles and standards for school mathematics*. Reston, VA: Author
- (2) NCTM statement on technology: <http://www.nctm.org>
- (3) Texas Instruments, TI 84 Plus Silver Editions Graphing Calculators
- (4) Texas Instruments, Voyage 200, Computer Algebra Systems (CAS)
- (5) Texas Instruments, CBR Rangers
- (6) Key Curriculum Press: <http://www.keypress.com>
 - a. The Geometer's Sketchpad
 - b. Fathom: Dynamic Statistics Software for deeper understanding
- (7) Wolfram Research (2002). *Mathematica: Teacher's Edition (TBD)*
- (8) Various Web Resources
 - a. nctm.org
 - b. www.shodor.com
 - c. www.wisweb.nl
 - d. www.fi.uu.nl/wisweb
 - e. www.mathforum.com
 - f. www.mathdl.org
 - g. www.mathworld.com
- (9) Videos
- (10) MS Word Equation Editor, Excel and PowerPoint
- (11) Inspiration or OmniGraffle

Tentative outline

Week 1 August 17: Introduction/Overview/Goals

Activity: Position statements on the use of technology in the classroom

Technology: A panacea, a detrimental force, or something else?

How have you used technology in your teaching of mathematics?

Exploration of TI 84 Plus, Silver Edition via the MODE menu

Activity: (1) Unit fraction and terminating decimal representations

What is the role of technology in this activity?

(2) Guess my Age

What is the role of the technology in this activity?

Assignments: What is technology? Generate a philosophy of technology to share next week
Read NCTM PSSM Technology Principle

Week 2 August 24: Technology use in the teaching and learning of mathematics

Discuss assignment.

NAEP Data and NAEP Data Tool

Share findings from TI 84 exploration

Week 3 August 31: No f2f Class

I will be at a TIMSS Worksession on Algebra at NEA in Virginia

Week 4 September 7: Parameter Exploration on linear and quadratic functions

Week 5 September 14: Applets

Week 6 September 21: More on Applets

Week 7 September 28: Geometer's Sketchpad

Week 8 October 5: Geometer's Sketchpad

Week 9 October 12: Geometer's Sketchpad

Due: Plan for Integrating Technology into Teaching Mathematics

October 13 – 14: North Carolina Council of Teachers of Mathematics Annual Meeting

Koury Convention Center, Greensboro, NC

<http://www.ncctm.org>

Week 10 October 19: CAS

Week 11 October 25: Videos

Week 12 November 2: CBR Rangers

Week 13 November 9: Mathematica: Teacher's Edition
Curriculum CDs

Due: Technology Review

Week 14 November 16: Technology Review Presentations and Debriefing

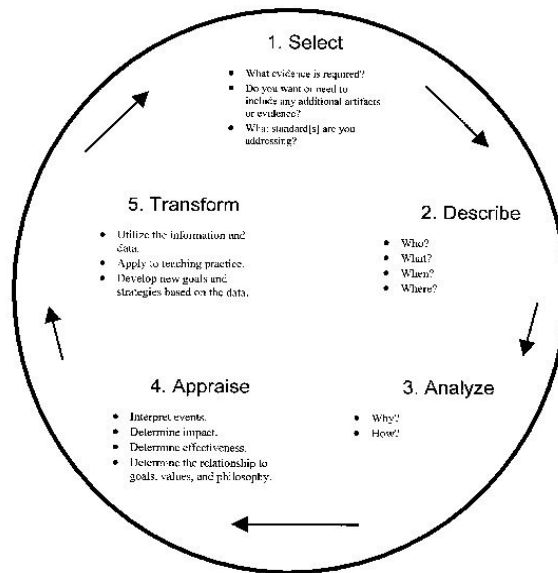
Week 15 November 23: No Classes (Thanksgiving Break)

Due November 25: Research Paper on the current state of technology use

Week 16 November 30: Technology Review Presentations and Debriefing

Due: Technology Infused Unit of Study

NCDPI Reflection Cycle



The Reflection Cycle

Select:

Identify the artifact (use reference citation, name, or code)

Describe:

What are the main points of the assigned reading?

What claims, theories, examples, conclusions, and questions are posed?

Analyze:

Why is this important?

How is *learning mathematics and teaching mathematics with understanding and sense making* implicated?

Appraise:

In the previous three steps, you have described and analyzed an assigned reading. The actual self-assessment occurs at this stage as you interpret the reading and evaluate its appropriateness and impact, relative to your educational experience and educational interests. What shocked you? What made you question your prior conceptions?

Transform:

This step holds the greatest opportunity for growth as you use the insights gained from reflection in improving and transforming your practice. How will you use the information to inform your practice or theoretical position?