PTED 7281-10

INDEPENDENT PROJECT:

LF08 SCIENCE CONTENT PEDAGOGY: GRADES 6-12

Semester Hours: 3

Semester/Dates: Summer 2008, June 2-6

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COURSE DESCRIPTION

Prerequisite: Bachelor's Degree and Academic Advisor's Approval

Exploration of models, techniques, strategies, formal assessment, and research for teaching middle/secondary science

CONCEPTUAL FRAMEWORK

The conceptual framework of the College of Education at SUWG 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 (INTASC), 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

Students will:

1. gain a working familiarity with professional literature in science education (Hatfield, Edwards & Bitter, 1997; Heddens & Speer, 1997; Posamentier & Stepelman, l995);

   (Decision Makers, Lifelong Learners, Collaborative, Culturally Sensitive, Empathetic, Knowledgeable, Proactive, Reflective; NBPTS 3, 4, 5, 8, 9, 10)

2. investigate current issues, practices, and materials in teaching, learning, and formal assessment of middle/secondary school science (Hatfield, Edwards & Bitter, 1997; Heddens & Speer, l997; Posamentier & Stepelman, 1995);

   (Decision Makers, Lifelong Learners, Collaborative, Culturally Sensitive, Empathetic, Knowledgeable, Proactive, Reflective; NBPTS 3, 4, 5, 8, 9, 10)

3. develop skill in the design and use of manipulative materials and other media/technology for the teaching and assessing of science (Hatfield, Edwards & Bitter, 1997; Heddens & Speer, l997; Posamentier & Stepelman, 1995);

   (Decision Makers, Leaders, Lifelong Learners, Collaborative, Culturally Sensitive, Empathetic, Knowledgeable, Proactive, Reflective; NBPTS 1, 2, 3, 4, 5, 7, 8, 10)

4. develop or extend those strategies and techniques considered most effective for the teaching and assessing of middle/secondary science (Hatfield, Edwards & Bitter, 1997; Heddens & Speer, l997; Posamentier & Stepelman, 1995);

   (Decision Makers, Lifelong Learners, Collaborative, Culturally Sensitive, Empathetic, Knowledgeable, Proactive, Reflective; NBPTS 3, 4, 5, 8, 9, 10)

5. experience first hand a variety of problem solving challenges and develop a repertoire of skills and strategies for teaching and assessing problem solving (Hatfield, Edwards & Bitter, 1997; Heddens & Speer, l997; Posamentier & Stepelman, 1995); and

   (Decision Makers, Lifelong Learners, Collaborative, Culturally Sensitive, Empathetic, Knowledgeable, Proactive; NBPTS 3, 4, 5, 7, 8)

6. utilize a variety of enrichment topics in teaching and assessing middle/secondary science (Hatfield, Edwards & Bitter, 1997; Heddens & Speer, l997; Posamentier & Stepelman, 1995).

(Decision Makers, Leaders, Lifelong Learners, Collaborative, Culturally Sensitive, Empathetic, Knowledgeable, Proactive, Reflective; NBPTS 1, 2, 3, 4, 5, 7, 8, 10)

TEXT, READINGS, AND INSTRUCTIONAL RESOURCES

Required Text: None

Recommended Texts:

Martin, R., Sexton, C., & Gerlovich, J. (2001). *Teaching Science for all children.* Needham Heights: Allyn and Bacon.

National Research Council. (1995). *National Science education standards*. Washington, DC: National Academy Press.

Eichinger, J. (2005). *Activities for integrating science and mathematics* (2nd ed.). Columbus, OH: Pearson – Merrill – Prentice Hall.

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

Brahier, D. J. (2000). *Teaching secondary and middle school mathematics*. Needham Heights, MA: Allyn & Bacon.

Other Resources:

National Council of Teachers of Mathematics. (1950-Present): *Arithmetic Teacher; Mathematics Teacher; Teaching Children Mathematics; Mathematics Teaching in the Middle School; Journal for Research in Mathematics Education*. Reston, VA: Author.

American Association for the Advancement of Science. (1993). *Benchmarks for science literacy*. New York: Oxford University Press.

Collette, A., & Chiappetta, E. (1994). *Science instruction in the middle and secondary schools* (3rd ed.). New York: Macmillan Publishing Company.

Gabel, D. (Ed.). (1989). *What research says to the science teacher, vol. 5: Problem solving*. Washington, DC: National Science Teachers Association.

Hansen, V. (Ed.) (1984). *Computers in science education*. Reston, VA: National Council of Teachers of Science.

Holdzkum, D., & Lutz, P. (1991). *Research within reach: Science education*. Washington, DC: National Science Teachers Association.

ACTIVITIES, ASSESSMENTS, EVALUATION PROCEDURES, & GRADING POLICY

Links to Conceptual Framework: The overall evaluation for this course is structured so that each assignment is aligned with learning a different teaching model and applying the model to the overall teaching of a science lesson. Because of the broad nature of the course, each conceptual framework descriptor is covered in the course assignments. At

the completion of the course, students will have demonstrated achievement in the areas of *decision making:* choosing models/innovations, lesson planning strategies, and assessment techniques **(Assignments 2.1-2.7, 3)**, *leadership:* taking responsibility for ongoing inquiry **(All assignments),** *lifelong learning:* studying the effectiveness of practices **(Assignments 2.1-2.7, 3)**, being *adaptive:* changing educational practices to meet students' needs **(Assignments 2.2, 2.1-2.7, 3)**, *collaboration:* working with colleagues and stakeholders to plan and carry out science studies **(Assignments 1.1, 1.2,2.3-2.7, 3)**, *cultural sensitivity:* adapting models and innovations to meet the needs of diverse students **(Assignments 2.3-2.7, 3),** *empathy:* demonstrating sensitivity to the needs of individual, family, and community needs when planning lessons **(Assignments 2.3, 3)**, *knowledge:* drawing on pedagogical, content, and professional knowledge, including knowledge from others, when planning the teaching of science **(Assignments 2.1, 2.2, 2.4-2.7, 3)**, being *proactive:* implementing new interventions and innovations to better serve children **(Assignments 1.1, 1.2, 2.5-2.7, 3)**, and *reflection:* engaging in ongoing, continuous reflection of the teaching process to determine effectiveness of models/innovations **(All assignments)**.

ACTIVITIES AND ASSESSMENTS

All activities must be completed in a typed, double space format, with Times / New Times Roman font, size 12 and 1-inch margins on all sides unless otherwise indicated. **Projects and papers are due in class on the designated date.** Failure to meet assigned due dates may result in grade reduction.

1. Philosophy: You will write about your Philosophy of Teaching Science on the first day of class. As part of your final day's activities you will repeat the exercise so we can compare/contrast how your philosophy regarding teaching science changed during the week. Be reflective: where do manipulatives, technology, multiculturalism, alternative teaching models, and alternative assessment fit into your philosophy? (Objective #10; Disposition; checklist)

2. Lesson Plan Sections based on GPS:
   You will be responsible for preparing five sections (part of a complete lesson plan) of a lesson plan (use the template at the end of this syllabus) based on the 5 new models of teaching discussed in class. The 5 lesson plan sections for this course do NOT need to be consecutive or in any particular sequence. They WILL utilize unpacked GPS, backward design, and EMPHASIZE a "new teaching model" in each lesson (complete lessons usually contain more than one model), according to the format discussed in class. Your plan sections are to be thorough and include everything that is pertinent to your lesson, especially a Formal Assessment (what they put in your hand) AND how it will be graded (scale, rubric, etc.) of that section of the lesson.

3. Individual Presentations: You will have at least one teaching presentation (as time permits) based on the lesson section you prepared. You will need to turn in a lesson plan for the presentation, due at the time of the presentation. The

presentations should be about 10-15 minutes in length, utilize a "new teaching model," and should include the use of most of the following: Example Theory (discussed in class), demonstrations, questioning techniques (Inductive questioning, as discussed in class), manipulatives and/or technology. Formal Assessment of the lesson should be discussed at the end of the presentation and included in the lesson plan, but not included as part of the presentation. (Objectives #1, 2, 3, 6; Knowledge, skills; peer critique, teacher observation)

EVALUATION PROCEEDURES

If you have registered for graduate credit for this course, we will discuss the remaining 15 hours of work and what you will turn in to be graded. Grading scale a alphanumeric, from "A" to "F" and is based on completion of assignments, not any particular content.

CLASS OUTLINE
<u>This schedule is flexible and may change during the week!</u>

DATE	TOPIC	DUE
Session 1 Monday	Course Introduction, Background Theoretical perspectives, GPS Standards, Lesson Plans	Philosophy
Session 2 Monday	Introduction to Models: New Idea Model 1; Lesson Plan format	Choose Content and Activity for LP #1
Session 3 Tuesday	Model 1 presentations, discussion of Formal Assessment	LP Section #1
Session 4 Tuesday	Problem-Solving Model 2	PS Lesson Plan #2 draft
Session 5 Wednesday	Model 2 presentations, discussion of Formal Assessment	LP Section # 2
Session 6 Wednesday	Integrated Model 3	IM Lesson Plan #3 Draft
Session 7 Thursday	Model 3 presentations, discussion of Formal Assessment	LP Section # 3
Session 8 Thursday	Social Interaction Model 4	SI Lesson Plan #4 Draft
Session 9 Friday	Model 4 presentations, discussion of Formal Assessment	LP Section # 4
Session 10 Friday	Long Term Model Philosophy Compare/Contrast	LT Lesson Plan #5 Draft

ACADEMIC HONESTY

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*.