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C&I 595.01: Models of Professional Development in Mathematics and Science

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Overview and Goals of the Course:

The goals of this course are to explore, through journal and chapter readings, as well as through hands-on observations and discussions, a variety of approaches to professional development for teachers of mathematics and sciences in middle school, high school, and college. Students will investigate the challenge of sustained support for effective and long-lasting professional development. Questions to be investigated include how to encourage professional development, how to put PD models into practice, how to get teachers and administrators to realize that they want PD. Students will develop a grounding in models of professional development (in content, leadership, and pedagogy) that are appropriate in a variety of environments. Students will learn about appropriate resources for the planning and design of professional development, including on-line web resources, as well as the more traditional book and journal resources. Students will design a professional development module.

Required Text:

Loucks-Horsley, S., Love, N., Stiles, K.E., Mundry, S., & Hewson, P.W. (2003).
Designing professional development for teachers of science and mathematics, 2nd Ed.
Thousand Oaks, CA: Corwin Press.

Course Outline:

1. Critique of OR, CO, OK, and MT state standards for mathematics and science. Or, critique your own state standards except Iowa ☺
2. Different Models of Professional Development in general
Nuts and bolts – on giving a presentation or workshop
Mathematics and science for the diverse learner
Ineffective models – Characteristics. What makes them ineffective?
Effective models - Characteristics. What makes them effective?
e.g. Workshops and follow-up
Paired mentoring
Lesson study, action research
Distance delivered e.g. T³ workshops
3. Models of Professional Development in Mathematics
Various models will be examined, for example, students will learn about the QUASAR Project, and the mathematical task analysis framework that was developed

as part of this project. Students will learn how to implement this task analysis in a classroom situation where paired teachers will use the framework as a point of discussion for their classroom teaching.

4. Models of Professional Development in Science

Various examples of Professional Development Models in Science will be explored and discussed. For example, The Framework for Designing Professional Development, found in the NSTA publication *Professional Development Planning and Design*.

Bibliography:

Darling-Hammond, L. (Ed.). (1994). *Professional development schools*. New York, NY: Teachers College Press.

Killion, J. (2002). *Assessing impact, evaluating staff development*. Oxford, Ohio: National Staff Development Council.

Loucks-Horsley, S., Hewson, P. W., Love, N., & Stiles, K. E. (1998). *Designing professional development for teachers of science and mathematics*. Thousand Oaks, CA: Corwin Press.

Love, N. (2001). *Using data/getting results: A practical guide to school improvement in mathematics and science*. Norwood, MA: Christopher-Gordon Publishers.

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

National Research Council. (1996). *National science education standards*. Washington, DC: National Academy Press.

National Staff Development Council's Standards for Staff Development, Revised. (2001). Oxford, Ohio: National Staff Development Council.

National Staff Development Council in Cooperation with National Association of Secondary School Principals. (1995). *Standards for staff development, High School Edition*. Oxford, OH: National Staff Development Council.

National Staff Development Council's Standards for Staff Development, *Middle Level Edition*. (1994). Oxford, OH: National Staff Development Council.

Rhoton, J., & Bowers, P. (Eds.). (2001). *Professional development leadership and the diverse learner*. Arlington, VA: National Science Teacher Association Press.

Rhoton, J., & Bowers, P. (Eds.). (2001). *Professional development planning and design*. Arlington, VA: National Science Teacher Association Press.

Sparks, D., & Hirsh, S. (1997). *A new vision for staff development*. Alexandria, VA: Association for Supervision and Curriculum Development.

Assessment/Evaluation:

Weekly Threaded Discussion (3 pts weekly for 15 weeks)	45%
Professional Development Module (Due May 3)	25%
Paper (Choose a topic and address PD)	
First draft Due March 8	10%
Final draft Due May 3	10%
Homework Assignments	
MathEdology or SciencEdology (Bio with picture) Due 26 January	5%
Webliography Due February 16	5%

A: $\geq 90\%$

B: $\geq 80\%$ and $< 90\%$

C: $\geq 70\%$ and $< 80\%$

Failing: $< 70\%$

Expectations: The University of Montana *Student Conduct Code*

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University.

All students need to be familiar with the Student Conduct Code. The Code is available for review online at <http://www.umt.edu/SA/vpsa/index.cfm/page/2585>

Please be aware of the expectations for academic student conduct. If you have any questions related to this code, please ask.

Accommodations

Please let me know at the beginning of the semester if you need accommodations for learning in my online classroom or through Disability Services for Students (DSS). I am happy to help facilitate these needs.