Washington State University
MAJOR CURRICULAR CHANGE FORM - - COURSE
(Submit original signed form and ten copies to the Registrar's Office, zip 1035.)

Future Effective Date: 08/16/2012  ☑ New course  ☐ Temporary course  ☐ Drop service course
(effective date cannot be retroactive)
☐ There is a course fee associated with this course (see instructions)

☐ Variable credit  ☐ Repeat credit (cumulative maximum _____ hours)
☐ Increase credit (former credit _____)  ☐ Lecture-lab ratio (former ratio ______:_______)
☐ Number (former number ______)  ☐ Prefix (former prefix ______)
☐ Crosslisting (between WSU departments)  ☐ Cooperative listing (UI prefix and number ______)
(Must have both departmental signatures)  taught by:  WSU ☐  UI ☐  jointly taught ☐
☐ Conjoint listing (400/500)  ☐ S, F grading

☐ Request to meet Writing in the Major [M] requirement (Must have All-University Writing Committee Approval)
☐ Request to meet GER in _______ (Must have GenEd Committee Approval)  ☐ Fulfills GER lab (L) requirement
☐ Professional course (Pharmacy & Vet Med only)  ☐ Graduate credit (professional programs only)
☐ Other (please list request)

<table>
<thead>
<tr>
<th>MATH</th>
<th>534</th>
<th>Theories of Learning in Mathematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>course prefix</td>
<td>course no.</td>
<td>title</td>
</tr>
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</table>

3  3  3  3

credit  lecture hrs  lab hrs  studio hrs  prerequisite
per week  per week  per week

Description (20 words or less) Introduction to the study of math learning theories, including behaviorism, Information processing, constructivism, situated cognition, communities of practice, and their influence on teaching and learning mathematics.

Instructor: Libby Knott  Phone number: (509) 335-4122  Email: lknott@wsu.edu
Contact: SANDY COOPER  Phone number: 509335 3134  Email: scooper @math.wsu.edu
Campus Zip Code: 643113

- Please attach rationale for your request, a current and complete syllabus, and explain how this impacts other units in Pullman and other branches (if applicable).
- Secure all required signatures and provide 10 copies to the Registrar's Office.

Chair/date  Dean/date  General Education Com/date

Chair (if crosslisted/interdisciplinary)*  Dean (if crosslisted/interdisciplinary) *  Graduate Studies Com/date

All-University Writing Com/date  Academic Affairs Com/date  Senate/date

*If the proposed change impacts or involves collaboration with other units, use the additional signature lines provided for each impacted unit and college.
Rationale for MATH 534 Theories of Learning in Mathematics

Prior to this time, we have required our graduate (masters and doctoral) students in the Mathematics with an Emphasis on Teaching option to take a learning theories course through the College of Education. This has been problematic for two reasons; (1) it has meant that students take a course in general learning theories but are left on their own to try to figure out how that applies specifically in the area of mathematics learning. (2) Students have not always had access to this course since first priority is given to COE students, and the course has filled up. COE has been unwilling to extend enrollment to include our graduates. This is detrimental to our program.
Syllabus for MATH 534 Theories of Learning in Mathematics (3 credits)

Instructor: Professor Libby Knott
Office: Neill 301
Email: lknott@wsu.edu
Phone: (509) 335 4122 (Office)
(406) 370 3292 (Cell - do not call before 7am or after 10 pm)
Office Hours: TBA
Prerequisites: None
Meeting time & place: TBA
Textbook: None required. Readings will be chosen from both classic and current writings.

In this course, students will examine a variety of theories of mathematics learning. Readings will be selected from the following extensive list.

Students will be expected to read, discuss, summarize and report on their weekly readings. They will be expected to develop an understanding of theories of learning in mathematics.

Students will be able to describe in detail some version of each of the ten distinct learning theories identified in the list below. They will be able to identify a particular learning theory in the literature, recognizing and understanding the implications of the learning theoretical framework underlying any given mathematics education research article.

Students will be graded on their participation in discussions, their weekly summaries, and their final paper, in which they will synthesize several authors’ contributions to a particular mathematics learning theory, and include examples of research papers written with that theoretical framework.

Grading:
Weekly written critiques of readings 10 @ 20 points each 200
Weekly participation in classroom discussions 10 @ 10 points 100
Final paper 1 @ 200 points 200
Total points 500

Mathematics learning theories

Week 1: Behaviorism  Resnick & Ford (1981) Ch. 2, 3
Thorstike (1913, 1932)
Erlwanger (1973)

Week 2: Structuralism  Resnick & Ford (1981) Ch. 5
Bruner (1990)

Week 3: Information-Processing Theory  Mayer (1992)
Newell & Simon (1972)
Weeks 4 & 5: Piagetian Structuralism

Pufall, et al. (1973)
Kamii & De Vries (1976)
Resnick & Ford (1981) Ch. 7

Weeks 6: Dienes’ Stages of Learning

Sriraman (2008)

Weeks 7 & 8: Piagetian Constructivism & Genetic Epistemology

Beilin (1992)
Kitchener (1986) Ch. 1, 2, 4
Piaget & Garcia (1986)

Weeks 9 & 10: Radical Constructivism

von Glasersfeld (1995)
Steffe (1994)
Steffe & Tzur (1994)

Weeks 11, 12 & 13: Socio-Cultural Theory
Social Constructivism
Social vs. Radical Constructivism
Distributed Cognition

Communities of Practice
Situated Cognition

Lenses of Scale (Emergent, etc.)
Discourse

Vygotsky (1978)
Ernest (1994)
Lerman (1994)
Hutchins (1993)
Pea (1993)
Lave (1988)
Carraher, et al. (1985)
Brown, et al. (1989)
Cobb & Yackel (1996)
Davis (2007)

Week 14: Embodied Cognition

Lakoff & Núñez (2000) Ch. 2, 8

Week 15: Didactique & Epistemological Obstacles

Brousseau (1983) Ch. 1, 2
Sierpinska (1987)

Week 16: Teaching & Learning

Hiebert & Wearne (1996), Simon (1993)

Reading list


Brousseau (1983) Ch. 1, 2


http://books.google.com/books?id=XgXgRaG50xOC&lpg=PP1&ots=6UEI18bZB&dq=von%20Glasersfeld&lr&pg=PR4#v=onepage&q&f=false


Excellent connection between teaching and learning


Thorndike, E. (1913). Educational Psychology: The psychology of learning. New York: Teachers College Press. (Also available in Part 2 of Vol III of Educational Psychology, 1913.)


Students with Disabilities: Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, please visit the Disability Resource Center (DRC). All accommodations MUST be approved through the DRC (Washington Building, Room 217). Please stop by or call 509-335-3417 to make an appointment with a disability specialist.

WSU's Academic Integrity Statement: As an institution of higher education, Washington State University is committed to principles of truth and academic honesty. All members of the University community share the responsibility for maintaining and supporting these principles. When a student enrolls in Washington State University, the student assumes an obligation to pursue academic endeavors in a manner consistent with the standards of academic integrity adopted by the University. To maintain the academic integrity of the community, the University cannot tolerate acts of academic dishonesty including any forms of cheating, plagiarism, or fabrication. Washington State University reserves the right and the power to discipline or to exclude students who engage in academic dishonesty.

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Safety: Please familiarize yourself with these websites concerning your safety at WSU:
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http://alert.wsu.edu/
http://oem.wsu.edu/emergencies
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Grading Scale:
450 – 500 points A
400 – 449 B
350 – 399 C
300 – 349 D
< 300 F

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http://oem.wsu.edu/emergencies