MTE 653
Theories of Mathematical Learning
Spring 2011

Room: Fairhaven Room 153
Meets: Mondays, 4 p.m. - 6:30 p.m.

Instructor:
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Office hours: Mondays 1pm-3pm and also by appointment

Course readings: Most of the readings will be provided online. However, you will be expected to find the readings for the theory presentations on your own.

Course description
The primary goal of this course is to explore the theories of learning in mathematics education. We will also focus on the implications of those theories in mathematics education research through the investigation of relevant empirical research. Theory, whether implicit or explicit, forms the basis of a researcher's selection of a research question, framework, and methodology. Theory also guides the analysis and conclusions of the researcher. Therefore, it is crucial for novice researchers to realize the assumptions and characteristics of different theories in mathematics education. The course will not only give you opportunities to analyze each theory in detail, but it will also encourage you to form your identities as you situate your research interest in an appropriate theory of learning.

Course requirements
In class participation and discussions- It is quite important to have regular dialogue in the classroom to not only share our thoughts but also to learn from each other. Each lesson, we will discuss the articles we read for the week (for which you will write a critical commentary-see below). You will be expected to actively participate in the collective meaning-making process in the classroom throughout the course. In order to do so, it is crucial that you read the assigned articles before class.

Weekly writing assignments- The purpose of the weekly writing assignments is to get you in the habit of writing regularly. These exercises will enable you to reflect on, analyze, critique, and synthesize the content of the course and will contribute to the selection of your own stance with respect to the theories of mathematics education. These papers do not need to be formal pieces of writing. It is important, however, that there are no grammatical and logical errors in them. For the first couple of weeks, I will provide you some questions about the readings and ask you to respond to them. Later, you will be asked to write critical commentaries for the articles we will read in the class. We will use your writings for the discussion of the articles in the class.

The weekly writing assignments should not be less than one 12-pt single-space page and should not be more than two single-spaced pages. Late assignments will not be accepted since the main point
of these assignments is to give you the opportunity to reflect on the readings and prepare you for the discussions in the class. Your commentaries should be in NARRATIVE format (no bullets or personal notes).

Please submit your documents to me through e-mail in the following format: your last name-MTE653-WA#(number of assignment). For example, if I submit the 4th weekly assignment, I would send the document as Gucler-MTE653-WA#4. Submission deadlines: Saturdays 8 pm. Questions will be posted as a separate Word document.

**Mini-research and presentations on theory:** Weekly readings and class discussions will enhance your knowledge of the main learning theories of mathematics education. These will also support your skills in becoming critical readers of theory. As a further exercise, you will also have the opportunity to explore some of those theories on your own. You will explore one or two of the learning theories that we have not discussed in class, find relevant literature about those theories, write a paper that highlights the main tenets of the theories, and present your findings in the class. Additional details of the assignment will be announced later.

**Final paper:** For the final assignment, you will first formulate a research question or issue that interests you. You will provide a rationale why the research question or issue is important for mathematics education. You will then talk about the theory that you would use while addressing the question/issue and provide a justification for your choice. Finally, you will be asked to think about your methodology, which is in close relationship with your choice of theory. In short, you will propose a research study in the context of mathematics education, paying particular attention to the choice of theory. Further details of the assignment will be announced later.

**Evaluation**
- In class participation and discussions (20%)
- Weekly writing assignments (25%)
- Mini-research and presentations on theory (25%)
- Final paper (30%)

**NOTE:** All writing assignments should follow APA (6th edition) format. It is your responsibility to familiarize yourself with APA. You can use the following URL to learn more about APA: http://owl.english.purdue.edu/owl/resource/560/01/

**Readings**

**Week 1 (January 24)**-What is the role of *learning* theories in mathematics education research? What are some learning theories in math education research?


**Week 2 (January 31)**- Behaviorism, introduction to constructivism

Thorndike, E. L. (1913) Educational psychology: The psychology of learning (Vol. 2). New York: Teachers College Press. (Chapters 1 and 3)


**Week 3 (February 7)**-Introduction to constructivism cont’d, radical constructivism


**Week 4 (February 14)**-Radical Constructivism and mathematics


**Week 5 (February 22-Tuesday)**- Examples of research using the constructivist views. Discussion of theory, method, and analysis.


**Week 6 (February 28)**-Examples of research using the constructivist views. Discussion of theory, method, and analysis.


**Week 7 (March 7)**-Introduction to sociocultural views -Vygotsky


**Week 8 (March 21)**- Situated cognition and learning


**Week 9 (March 28)**- Examples of research using social constructivist views. Discussion of theory, method, and analysis.


**Week 10 (April 4)**- Examples of research using the socio-cultural views. Discussion of theory, method, and analysis.


Sfard, A. (2001). There is more to discourse than meets the ears: Looking at thinking as communicating to learn more about mathematical learning. *Educational Studies in Mathematics, 46*(1/3), 13-57.

**Week 11 (April 11)- Critical theories**


**Week 12 (April 25)- Student presentations**

**Week 13 (May 2)- Student presentations**

**Week 14 (May 9)- Concluding discussions on theories of learning in mathematics education**


**Information regarding academic regulations**

It is expected that you comply with the standards of academic integrity and scholarly practice set forth by UMass Dartmouth. Violations of academic integrity include, but are not limited to, cheating, fabrication, academic dishonesty, and plagiarism. We will talk about these issues, in particular plagiarism, in the classroom. However, it is your own responsibility to read and implement the document that can be found in the student handbook: [http://www1.umassd.edu/studenthandbook/academicregs/ethicalstandards.cfm](http://www1.umassd.edu/studenthandbook/academicregs/ethicalstandards.cfm)

**Important dates**

01/24 (Monday): Spring classes begin  
01/28 (Friday): Last day to Add/Drop/Audit  
2/21 (Monday): President’s Day – no classes  
2/22 (Tuesday): Follow Monday’s schedule  
3/14 - 3/18: Spring Vacation: no classes all week  
04/08 (Friday): Last day to withdraw from class  
04/18 (Monday): Patriot’s Day – no classes  
05/10 (Tuesday): Spring Classes end  
05/11 (Wednesday): Study Day  
05/12 - 05/18: Examinations