**Week 2**

**BIG IDEAS / BRAINSTORM**

**Methodologies**

* Mastery, fluency, project, problem, simulation- based
* Origins and outcomes of new methodologies

**Level of instruction**

* K-12
* High school
* College and beyond

**Mathematics education**

* Fundamentals in math education
* “introductory” courses (at higher levels)
* Core skill set

**READINGS & NOTES**

*Mastery Learning*. James H. Block & Robert B. Burns

<http://www.jstor.org/stable/1167112>

Summary of multiple studies done on mastery learning

Development and improvement of PSI strategies over multiple revisions

*Effectiveness of Mastery Learning Programs: A Meta-Analysis.* Chen-Lin C. Kulik, James A. Kulik and Robert L. Bangert-Drowns

<http://www.jstor.org/stable/pdf/1170612.pdf?refreqid=excelsior%3A17e41a2a45238515ad37c65a50b3dcf0>

Meta-analysis of various runs experimenting mastery learning courses in college, particularly in math, science, social sciences

Detailed breakdown of variables in LSM and PSI features, along with results based on “effect size”

* Stronger positive effect shown with LSM

**Week 3**

Meeting with Jessica to explore databases:

ERIC, Education Full Text, PsycINFO

**READINGS & NOTES**

*The Impact of an Online, Mastery, and Project-Based Developmental Math Curriculum on Student Achievement and Attitude.* Zollinger, Steven.

Doctoral Dissertation

Includes a literature review and research conducted on online, mastery and project based learning, specifically in mathematics in college level classrooms. Research needs for each learning style are outlined. In particular, for mastery based learning, qualitative research is needed, in particular because of contradictory results on student stress levels and engagement.

Research questions explored quantitative data on content knowledge as well as qualitative input on things like student attitude.

*Effect of mastery learning approach on senior secondary school students’ achievement in geometry.* Abakpa, Benjamin O.

Journal of the Science Teachers Association of Nigeria

Study conducted on students in a secondary school mathematics course on geometry. Quantitative results show massive improvements after mastery learning methods.

*Evaluating the effects of mastery learning in postsecondary developmental mathematics.* Bradley, Kirk.

Doctoral Dissertation

Specifically targets students above the age of 18 in mathematics. Details of the classroom setting and features of the mastery learning program logic model is outlined in how it was incorporated into the classroom. Results again showed positive for mastery learning.

Meeting:

Ask Prof Yong to look into recent learning/education styles

Vanderbilt University - Luis Leyva

Thesis presentation – brief intro into math education (major themes: cognitive, psychological approaches, pedagogical approaches), mastery education, math40, literature & meta-analysis, content

**Week 4**

Goal: Look into current trends and figure out a direction to move into

**Meeting with Prof Yong –**

IBL – Inquiry based learning

Standard Space learning

Project based learning

POGIL

Look in to MAA, JMM programs and search for speakers

RUME – undergrad math education journal (conference 2/23-25)

John Hattle – Meta-meta analysis (only look at significant data)

**READINGS**

*Assessing Course Redesign: The Case of Developmental Math.* Ariovich, Laura; Walker, Sadé A.

Study of modulated curriculum with computer software assistance

*Active Learning in a Math for Liberal Arts Classroom*. Lenz, Laurie

Process Oriented Guided Inquiry Learning

IBL

**CONFERENCES**

Releavant speakers from JMM: Dina Yagodich, Lochana Siriwardena, Yasanthi Kottegoda,

RUME: Andrew J Krause (learning frameworks), Benjamin Sencindiver (self regulated learning)

**MEETING**

MAA MathFest, CIME (Critical Math Education), JMM, RUME

In general: Learning with more structure and guidance > open-ended activities, active learning styles

Current math40 experiment – questions arising: “how do you assess this?” “is this better for IBL/other learning methods?” “how do you assess ‘inquiry’ and when?”

Arguing against: mastery based learning doesn’t allow for students to look at further material

**Week 5**

**READINGS**

*Learning for Mastery*. Bloom, Benjamin

* Re-reading in detail to get ideas on how to write parts of my thesis
* General outline:
  + “pillars” of the method’s philosophy
  + strategies for action
  + preconditions
  + operating procedures
  + outcomes / evidence

Learning methods in college breaks down into largely x categories:

1. lecture – recitation
2. **lecture only**
3. seminar style
4. lab based
5. flipped classroom

of which **lecture only** style of learning takes the largest portion of teaching methods in mathematics classes

**Week 6 & 7**

**Self-paced Assessment Based Learning (SPABL)?**

Decrease non-academic-related stress factors

Individualize time allowed for learning

Personalize feedback

Require reflection and self-evaluation

Self-regulated learning (Shraw, Crippen, Hartley):

Cognition

Basic strategies, problem solving, critical thinking

🡪 varied methods to augment and accompany traditional lectures

Metacognition

Knowledge and regulation of cognition

🡪

Motivation

Self-efficacy, epistemology

**Week 9 – Outline**

* annotated bibliography