Contemporary and Foundational Issues in Mathematics Education

Group Brainstorm:

What do you feel are the most important issues for the teaching and learning of mathematics? NOTE: Not just education in general but mathematics.

Have these changed for you in your scholarly life?

Are any of these unique to the 21st Century? In what ways?

Reflections on the Lappan and Briars article handed out last week on “A Model for Mathematics Education” – How does it inform us about the necessary focus for foundational issues in mathematics education in the US for the 21st Century

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Foundational issues/ problems for discussion:

- Content and pedagogy intertwined
- Practice is not pre-prepared, or fixed to an agenda, it should be malleable to meet student behavior and classroom norms (can vary a lot). What are teachers beliefs/norms of practice? Do these need to change? How many topics should be covered (cf. graphs from Lappan and Briars article comparing US with Japan.
- Communities of practice and inquiry
- Mathematics that is worth knowing: Not just about procedural vs conceptual. Role of research and impact on policy makers.
- What is the role of the NCTM Standards and MA Frameworks?

Class work

Examine MA Frameworks and compare with NCTM Standards – see website to download. What are their role in mathematics education?

Examine more MCAS questions including open response and students’ work:
- What mathematical topic does it attend to?
- What mathematical skills are necessary to answer the question?
- Where does it fit into the MA Frameworks – compare with what the State thinks.
- Knowledgeable of common misconceptions that students make in these standardized items how does it inform your future teaching?

Homework:

Read in detail the MA Frameworks for the age group you want to teach (focus on grades 9-12 if you are unsure). What are the core mathematical skills required of students? Can you rank them in order of relevance/importance to 21st Century mathematics? Are there other skills that you think students should be required to know (i.e. are they other frameworks you can think of?) – See Journal to enter responses
Some Contemporary Issues worth noting:

Reform and its impact on Curriculum
- Integrated Curriculum which is coherent, deepens and broadens knowledge and understanding
- Curriculum that is focused on problem-solving vs repetition (cf. Japan and TIMSS)
- What makes an activity a good activity? What is the impact of such on teaching?

Professional Development that deepens content knowledge and build communities of inquiry
- Relate to the mathematics you have explored with new software environments recently
- What have you learned about your own mathematical problem-solving?

Role of Technology
- Not about new tools but instead new environments to explore fundamental and new mathematics using dynamic, interactive methodologies.
- Should impact the way we think mathematically
- What will 21st Technology look like? How will it look in a 21st Century mathematics classroom?