Mathematical subject knowledge

Mathematical Knowledge in Teaching Seminar Series
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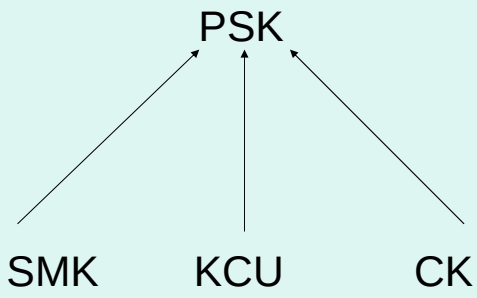
Shulman

- Subject matter knowledge
  - Amount and organisation
  - Substantive – facts, concepts, principles, explanatory frameworks
  - Syntactic – rules of evidence and proof
- Pedagogical content knowledge
  - ways of representing it to others to make it comprehensible
  - what makes specific topics easy or difficult

Aubrey



Do these models help us?

- More than being able to do the mathematics.
- About organisation as well as amount.
- About reasoning and proof as well as concepts and procedures.
- About transforming knowledge
- About using personal knowledge as a resource

At interview (secondary)

- How would you teach children how to find the area and perimeter of a rectangle?
- How do you calculate 6÷¾ ? How could you explain this meaningfully?
- How do you calculate $0{\cdot}3 \times 0{\cdot}2$? How could you explain this meaningfully?
- How would you explain what a sine is?

Implications

- What should we focus on at interview?
- How should we attend to SMK/PCK in teacher training (in the university and school) and CPD?
- How should we support weak students? Courses/materials?
- How should we attend to affect?
- What is the balance between substantive and syntactic?
- Is there any place for a audit?
- Does SMK get better? Under what conditions?