The Situated Nature of Mathematics Teacher Knowledge

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Lave & Wenger's Situated Learning

- Apprenticeship
- Practice
- Communities of practice
- Newcomers and old-timers
- Authenticity
- Identity
- Participation

The social turn

The social turn is intended to signal … the emergence in the mathematics education research community of theories that see meaning, thinking, and reasoning as products of social activity. … and to incorporate the substantial body of research on mathematical cognition, as products of social activity. (Lerman, 2000)

Transfer

It is easy to misinterpret scholars in the situative camp as arguing that transfer is impossible—that meaningful learning takes place only in the very contexts in which the new ideas will be used. The situative perspective is not an argument against transfer, however, but an attempt to recast the relationship between what people know and the settings in which they know—between the knower and the known. (Putnam & Borko)

Not a rejection of knowledge but …

- How is knowledge supported by context, other people, artifacts & tools?
- How is knowledge transferred between contexts and people?
- What is the relationship between knowledge and action?

Teacher Mathematical Knowledge

- Pedagogical Content Knowledge
  - Dynamic rather than static?
- Knowledge of the expert teacher
  - More intuitive and less explicit?

Situated Knowledge

"intertwined collections of more specific patterns that hold across a variety of situations" (Putnam & Borko, 2000)

- Situated, social, distributed

Alexandra

- Primary CAME & lesson development
- Numeracy Consultant & professional development
- Mathematics interview & maths learner

Fractions & multiplicative reasoning

- 0.5 x 0.2 3 ÷ 0.75 $1\frac{3}{4} \div \frac{1}{2}$
- Primary-CAME Teacher-Researcher
  - Diagram: "I know it's not scientific"
  - Area model: Repeated multiplication by $\frac{1}{2}$ and $\frac{1}{3}$
- Numeracy Consultant
  - Area model & equivalence

Division & fractions

- $1\frac{3}{4} \div \frac{1}{2}$: "If I was doing it the way I was taught to do it, I would just turn that all upside down. I have real problems with this idea of division by fractions."
- **But …**
- 1.75 ÷ 0.5 then calculator

Multiplication & fractions

$$\begin{array}{rrrr} & 0 & . & 5 \\ \times & 0 & . & 2 \\ \hline & 1 & & 0 \\ 0 & 0 & & 0 \\ \hline 0 & . & 1 & 0 \end{array}$$

Models

- $1\frac{3}{4} \div \frac{1}{2}$: If you said that was one, and that was three quarters you'd get three halves and half a half out of it. But that's not very helpful is it? … One, OK, that's one and three quarters, so you can get one, two, three. Three halves out of it. And half of a half.
- 3 ÷ 0.75 : How many lots of seventy five pence can you get from three pounds
- 0.5 x 0.2 : No model

Alexandra's Subject Knowledge

- Situated, social, distributed
- Fragmented?
- Application & transfer?
- Means of influencing change / learning?

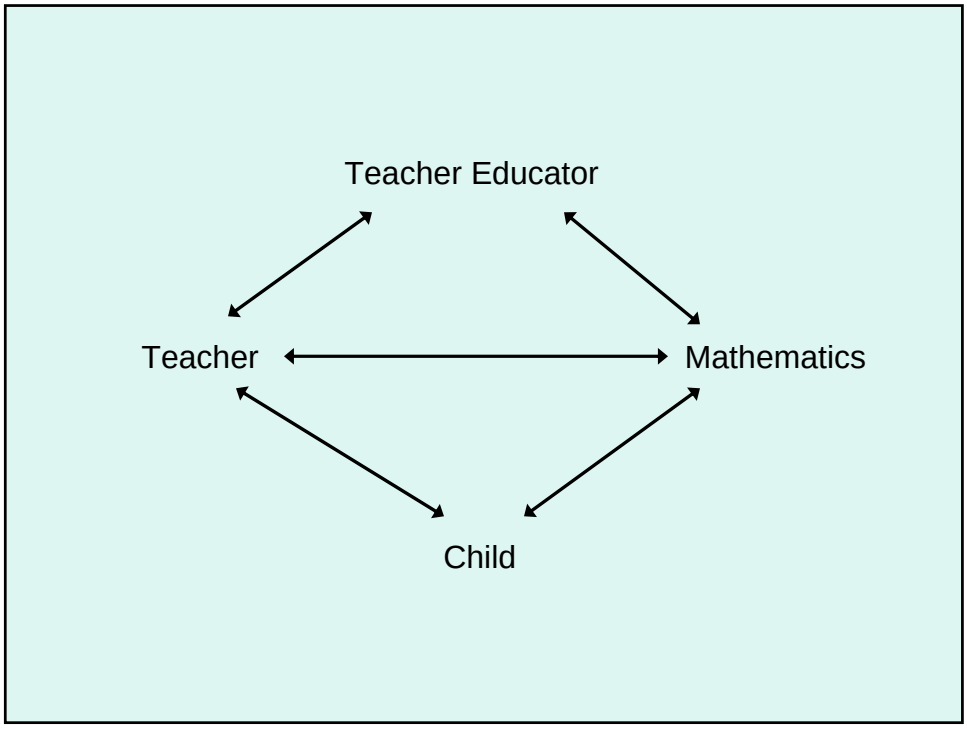
The contribution

- Community *and* individual knowledge
- Authenticity
  - Recontextualisation
- Problematises the application of knowledge
- Talk *about* and *within* mathematics education
  - Narrative, identity, the "defended self"
  - Authority & authorship
- Analysis of learning situations
  - Constraints & affordances
  - Similarity & difference
  - Communities of practice: engagement, enterprise, repertoire

Implications

- Researching Mathematics Teacher knowledge
  - Problems of measurement
  - Current research small scale & theory-building
  - How important is teacher knowledge?
- Relationships, care and emotion
  - Care for the discipline
  - Identities in mathematics education
- Collaboration (teachers / researchers)

Education …has one main goal, a goal that guides the establishment and priority of all others, it should be to promote the growth of students as healthy, competent, moral people. …We cannot ignore our children – their purposes, anxieties, and relationships–in the service of making them more competent in academic skills. (Noddings)


Teacher Educator
Teacher
Mathematics
Child