Activity theory model - the ‘lens’ through which to view the teacher’s professional activity.

CSSME Seminar Presentation
25 June 2015
Innocent Tasara
What am I researching?
Why am I researching it?
How am (will) I research it?

- Theoretical framework
WHAT?

Mathematics teacher ‘knowledge and practice’

aspects of teacher knowledge for calculus teaching
RQ1. How do they plan lessons on differentiation?

RQ2. What resources do they use for teaching differentiation?

RQ3. How do they teach lessons on differentiation?
What is Calculus?

Calculus

Differential calculus (Differentiation)

rate of change

Integral Calculus (Integration)

accumulation

mathematical study of change
Distance – time graph

\[ v = \frac{\Delta d}{\Delta t} \]
WHY?

• Background
• Professional Learning – mathematics teacher educator
• Contributing to wider mathematics educational research
• Contributing to the teaching and learning of mathematics teaching
• Contributing to the teaching & learning of mathematics
HOW?

Research Design

Theoretical Framework

Activity Theory
Activity Theory
(Vygotsky’s concept of mediation)
Why AT?

AT investigates human activity

Activity in a specific social setting
(Murphy & Rodriguez-Manzanares, 2008)
e.g. work or learning

The main **unit of analysis** in AT is the **activity system**

defined as “object oriented, collective, and culturally mediated human activity” (Engeström & Miettinen, 1999, p. 19).
Original Vygotskian triangle

Micro level
(1\textsuperscript{st} Generation)

- concentration on the \textit{individual} actor/agent operating with tools

Engeström expanded triangle

Macro level
(2\textsuperscript{nd} Generation)

- social/\textit{collective} elements in an activity system
- Added elements: \textit{community, rules} and \textit{division of labour}
- importance on analysing their \textit{interactions} with each other.
Engestrom’s (1987) Model of AT

Mediational Tools

Subject

Object

Rules

Community

Division of Labour

Outcome
Elements of Engeström’s model of AT

**Subject** - individual or group whose viewpoint is adopted.

The **Object** precedes and motivates activity. It ‘refers to the raw material or problem space at which the activity is directed and which is moulded or transformed into *outcomes* with the help of *physical and symbolic, external and internal tools*” Engeström (1993, p. 67).
Elements of Engeström’s model of AT

**Tools** *mediate* the object of activity; mediational means

- *external, material/physical* – e.g. a textbook, a computer; or

- *internal, symbolic* – e.g. writing, speaking, language.

Tools can enable or constrain (affordances & constraints) activity.
Elements of Engeström’s model of AT

Community - participants of an activity system, who share the same object.

Division of labour

– division of tasks and roles
– divisions of power and status

Rules- norms, both explicit and implicit that regulate (cultural constraints) actions and interactions within the activity system

(Engeström, 1993; Kuutti, 1996).
My Research

Pilot Study
• Phase 1
• Phase 2

Data collection

1. Lesson plans
2. Pre-teaching interviews
3. Lesson observations - Video and audio recording
4. Post-teaching interviews
Can you apply AT in your subject areas by identifying examples for each of the elements of the AT?

- Mediational tools
- Subject
- Object
- Rules
- Community
- Division of labour
Next seminar on my research will be reporting back on my pilot study.
Reference


Reference (cont.)


  http://llt.msu.edu/vol11num2/basharina/default.html