

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

CSSME Seminar Presentation

25 June 2015

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What am I researching?
Why am I researching it?
How am (will) I research it ?
-Theoretical framework

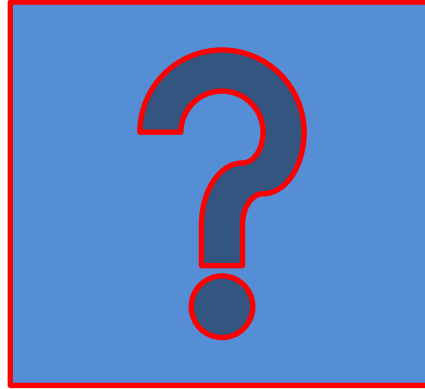


WHAT?

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

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graph TD; Calculus --> Differential["Differential calculus  
(Differentiation)"]; Calculus --> Integral["Integral Calculus  
(Integration)"]; Differential --> Rate["rate of change"]; Integral --> Accumulation["accumulation"]; Rate --- Study["mathematical study of change"]; Accumulation --- Study;
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Differential calculus
(Differentiation)



rate of change

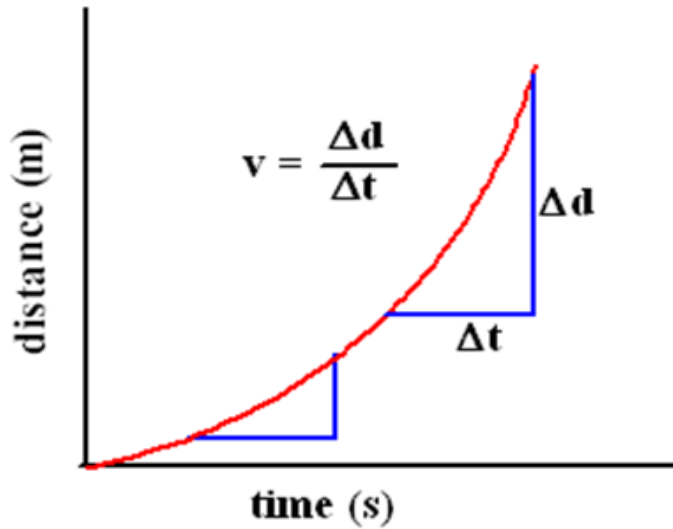
Integral Calculus
(Integration)



accumulation

mathematical study of change

Distance – time graph



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)



Mediational
(Tools)



Subject



Object --
>Outcome(s)

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).

AT

Original Vygotskian triangle

Micro level

(1st Generation)

- concentration on the **individual** actor/agent operating with tools

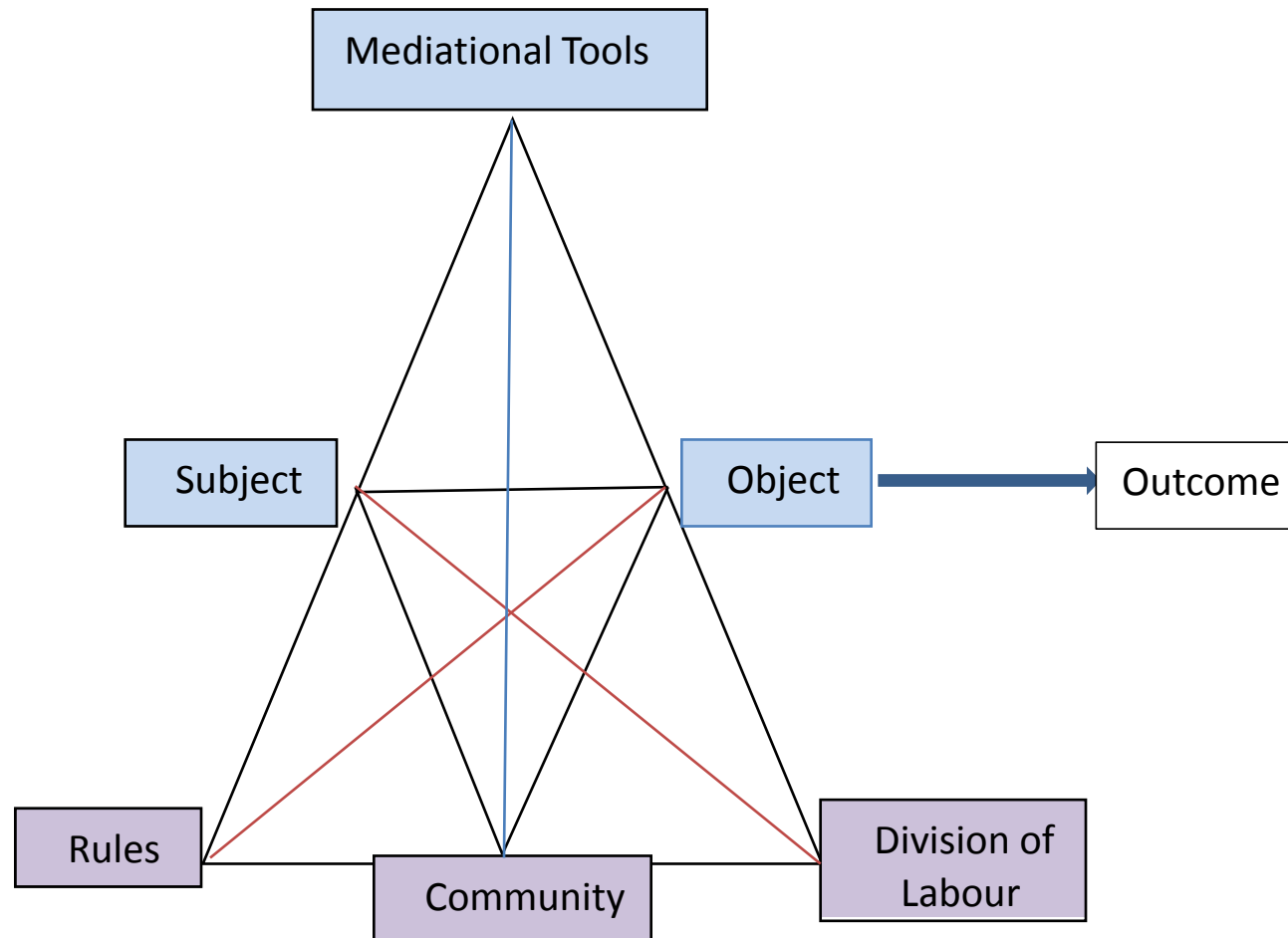
Engeström expanded triangle

Macro level

(2nd Generation)

- social/**collective** elements in an activity system
- Added elements : **community, rules** and **division of labour**
- importance on analysing their **interactions** with each other.

Engestrom's (1987) Model of AT



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

AT

Can you apply AT in your subject areas by identifying examples for each of the elements of the AT?

- Mediation tools
- Subject
- Object
- Rules
- Community
- Division of labour

Comments

Next seminar on my research will be reporting back on my pilot study.

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