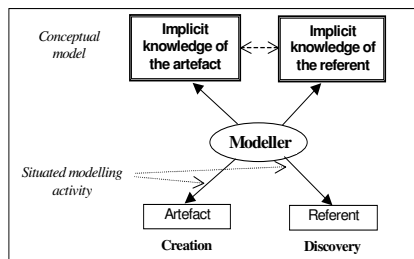
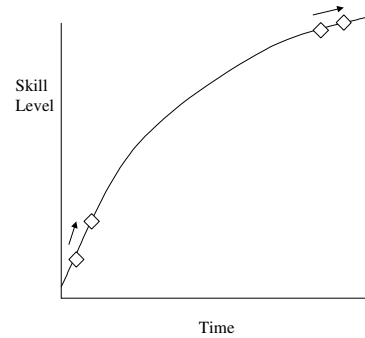


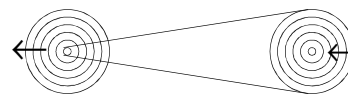
The Onion Metaphor

Beynon and Roe, 2002



Modelling the modeller's understanding

The Onion Metaphor

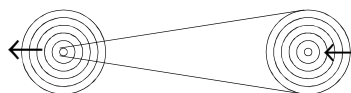


Theory building:
"Quality" of knowledge

Experimental understanding:
"Quality" of interaction

core knowledge	<i>innermost</i>	least tested understanding
<i>extending theory</i>	↓	↑ <i>refining experiment</i>
	↓	↑
advanced knowledge	<i>outermost</i>	most secure understanding

The Onion Metaphor

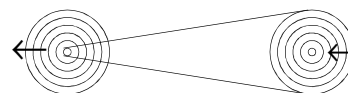


Theory building:
"Quality" of knowledge

Experimental understanding:
"Quality" of interaction

least established theory	<i>innermost</i>	most restricted interaction
<i>extending theory</i>	↓	↑ <i>refining experiment</i>
	↓	↑
most stable theory	<i>outermost</i>	least restricted interaction

The Onion Metaphor



Theory building

Experimental understanding

instructionist	constructionist
theory-driven ICT	experiment-driven ICT
formal symbolic objective	personal experiential
logic and language	artefact and interaction
method and system	exploration and environment

The SIN principle

- Situation
 - need context dependent representations of knowledge
- Ignorance
 - need to embrace idea of unknown but neighbouring knowledge
- Nonsense
 - need to be open to exploration that is open-ended and can lead to obscure/incoherent results
- Illustrated with reference to a clock model [#072]

SIN in EM activity

- Situation *observing*
 - where am I? what do I observe in the situation?
- Ignorance *experimenting*
 - what if? what is my role? what is my purpose?
- Nonsense *interpreting*
 - does it make sense to ... ? how come ... ?

Themes in EM model-building

- tolerance of error
- no 'right' answer
- favouring experiment
- orientation and purpose is open
- computer as an artefact
- open-ended extension of model
- (opportunistic) projection of meaning

Support for learning skills at the early stages

