

Schools for Thought

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Intelligent Novices

- General skills and reasoning abilities
- Vs
- Domain specific knowledge

- The New Synthesis : the notion of intelligent novices – not what we learn but how we learn and how we teach

Transfer

- “Mental strength” does not transfer
- When the two domains share common elements of knowledge a person who has learned one of them might be able to learn the second more quickly (singley & Anderson, 1985 – production rules overlap

The nature of expertise

- Expertise does not depend on general problem solving skills and strategies like ‘hill climbing’ and ‘means-ends’ analysis
- It depends on highly organized domain-specific knowledge that can arise only after extensive experience and practice in a domain.
 - The notion of ‘chunking’

Effects of familiarity on problem solving

- Effects of familiarity on the Wason and Johnson-Laird problem
- Domain specific knowledge and strong methods are the bases of expertise

Metacognition

- The ability to think about thinking, to be aware of the self as a problem-solver, and to monitor and control one's mental processing
- Flavel's highest level of mental activity
- Brown & DeLoach – metacognition is the voluntary control an individual has over his own cognitive processes – the growth of metacognitive abilities underlies many of the behavioral changes that take place with development

Metacognition and Intelligent Novices

- Metacognition is like a general skill – you may be a novice in a domain but still apply sophisticated metacognitive skills to help you be a more efficient learner- notion of an ‘intelligent novice’
- Monitoring of text comprehension – detecting inconsistencies, understanding failures to understand, initiate strategies to help deal with understanding failures, evaluate the success of these strategies, etc.

Metacognitive aware instruction

- Teaching students how to monitor their learning
- Metacognitive instruction attempts to transfer the role of the critic from the teacher to the student
- “Scaffolding” – support of students’ learning to learn
- Dialogic learning – thinking aloud, making thinking overt

The notion of informed instruction

- Teaching metacognitive skills and other general weak strategies – like modeling and analogy – can work if the teachers explain to the students exactly how to acquire these skills and also gives feedback as to why these strategies work
- -- not only what we teach but how we teach is important

New synthesis

- Domain specific knowledge
- Metacognition
- Teaching general problem solving skills in an informed way
 - Grounded in deep factual and procedural knowledge of the domain
 - Knowledge of when and how to use them
 - Flexibility of knowledge and high ability to transfer to everyday situations and other domains