Metacognition: how academics think and how they teach students to think

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Overview

- What is metacognition and why is it important
- Study outline
- Results
- Future directions

How do you read an article?
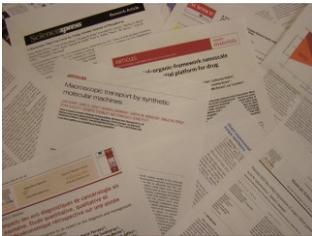
Metacognition

- "thinking about thinking"

Knowledge of cognition
- Procedural
- Declarative
- Conditional

Regulation of cognition
- Planning
- Evaluation
- Monitoring
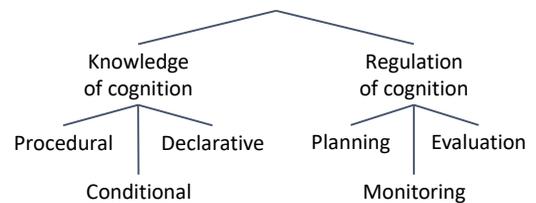
Metacognition and education

- Metacognitive ability starts in childhood and increases through learning and deduction.
- Significant, although small, correlations with academic performance, independent of intelligence
  ($r \approx 0.2 \approx$ socioeconomic status)
- Metacognition is not the only factor which affects academic performance.

Research questions

1. To what extent are lecturers aware of metacognition?

2. Is metacognition included in teaching practice?

3. What is the relationship between metacognition in academics' teaching practice and their research practice?

Overview

- What is metacognition and why is it important
- Study outline
  - Online questionnaire
  - Interviews
- Results
- Future directions

Questionnaire

1. Participant details

2. Have you heard of metacognition?
   - Outline your understanding of it

3. Metacognitive methods used in teaching
   - 16 methods
   - frequency of use: never, rarely, sometimes, often

4. Metacognitive Awareness Inventory for Academics (MAIA)
   - 24 items, knowledge & regulation of cognition
   - strongly agree – strongly disagree

Examples of metacognitive methods

- Explicitly categorise thinking, e.g. Bloom's taxonomy.

- "Think alouds" where staff or students talk through their thinking while solving a problem.

- Rate confidence in an answer.

- Reflect on their approach and identify what to do differently next time.

"Great Questions. I feel like I want to print them out as a reminder of things that I could be doing better in my classes."

Semi-structured interviews

- In-depth responses from a subset of questionnaire respondents (n = 5).

Ethical approval

- Obtained from QMUL and UCL.

72 questionnaire respondents (57% response rate)

Subject	#	%
Biochemistry	7	10
Biological Sciences	20	28
Biomedical Sciences	21	29
Chemistry	10	14
Medicine	4	6
Psychology	7	10
Other	3	4

Teaching Qualification	#	%
Yes	48	67
No	24	33

Gender	#	%
Male	46	64
Female	26	36

Overview

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Research questions

1. To what extent are lecturers aware of metacognition?

- 27/72 (37.5%) had heard of metacognition

Definitions:
- Understanding one's thinking ($n = 12$)
- Awareness of own thinking ($n = 7$)
- Thinking about thinking ($n = 6$)

2. Inclusion of metacognitive methods in teaching practice

- Number of methods used: 2-16, mean = 11.8

- "Comments reflect age and experience. If asked the same questions at [an] earlier time point in my career I would have answered differently."

- Number of methods used did not differ significantly with:
  - teaching experience
  - subject taught
  - gender

- But did differ with teaching qualification ($p = .002$).

## Effect of teaching experience & qualification
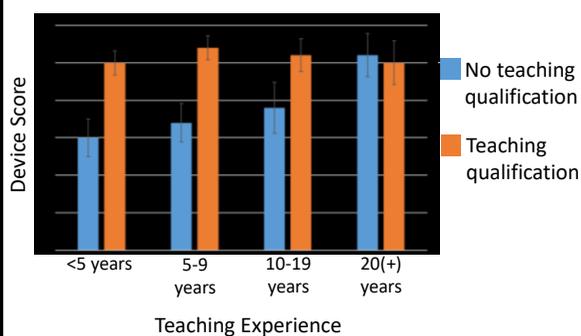
Why use metacognitive methods?

- Staff think it is important to develop students' thinking skills...

- ... in the context of doing science:
  - experimental design
  - reliability of published results

- Could we use metacognition to develop students' thinking skills more broadly,
  - learning to learn
  - graduate skills

3. Metacognition in research practice

Knowledge of cognition correlates with regulation of cognition

$r = .636, p < .001$
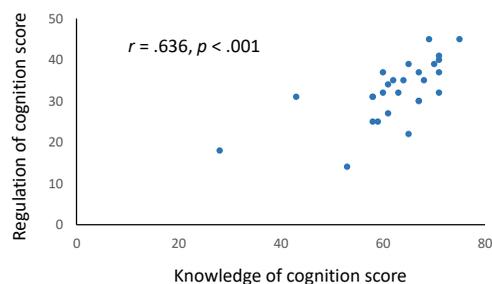
Metacognition in research and teaching practices correlate

	Device score in teaching
Regulation of cognition score in research	$r = .503$, $p < .001$
Knowledge of cognition score in research	$r = .363$, $p < .002$

What next?

- Support staff in embedding metacognitive practices in their teaching.

- Help students "learn to learn" at university.

- Graduates take their thinking skills into their professional lives.

- Questionnaire respondents
- Interview participants
- Richard Pickersgill & Matthew Evans (SBCS HoS)
- Matt Somerville (Project supervisor at UCL)