

Subject knowledge and skills: The big debate

Mr Gareth Rogers
Dr Daniel Hyde

Singapore School,
Pantai Indah Kapuk



What is more important in your subject: knowledge or skills?

Take a Stance.....

'Knowledge' or 'Skills'?



Cast your vote

What *is knowledge?*

Question:

Who was Franklin D. Roosevelt?

The 32nd President of the United States of America.



What *is knowledge?*

Question:

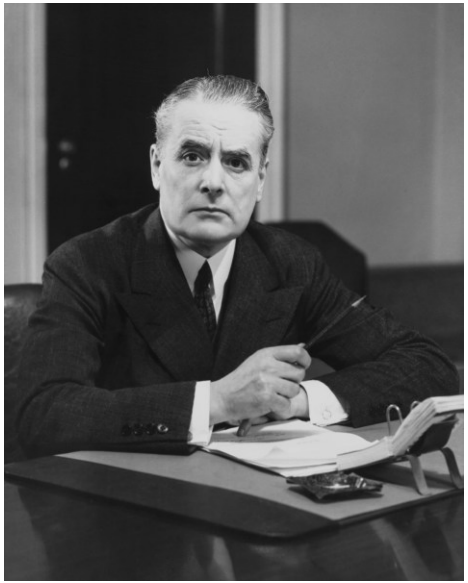
Who was Franklin D. Roosevelt?

The 32nd President of the United States of America,
a two-headed lizard alien.



What *is knowledge?*

Does the student *know* who Franklin D. Roosevelt was?



What *is* a skill?

Month	Birth Rate of Foxes in the UK	Month	Birth Rate of Foxes in the UK
January	0%	July	1%
February	0%	August	0%
March	60%	September	0%
April	25%	October	0%
May	10%	November	0%
Jun	3%	December	1%



Why is the birth rate so high in March?

Defining Knowledge and Skills

KNOWLEDGE

The understanding and awareness of facts, concepts, principles, and relationships that have been learned and stored in memory.

SKILLS

Such as critical thinking, collaboration, communication, creativity, self-management and digital literacies that can be applied across different settings. Skills are often labelled “21st Century skills” or “competencies”.



Academic Literature Review

The Debate: importance of Skills

Systematic reviews identify 21st Century skills as key for adaptability, continuous learning and complex problem solving in changing contexts.

Kain, C., Koschmieder, C., Matischek-Jauk, M. and Bergner, S. (2024) Mapping the landscape: A scoping review of 21st century skills literature in secondary education. *Teaching and Teacher Education*, 151, 104739. https://doi.org/10.1016/j.tate.2024.104739

Martinez, C. (2022) Developing 21st century teaching skills: A case study of teaching and learning through project-based curriculum. *Cogent Education*, 9(1), 2024936. https://doi.org/10.1080/2331186X.2021.2024936

Herlinawati et al. (2024) The integration of 21st century skills in the curriculum of education. *Heliyon*, 10(15), e35148. https://doi.org/10.1016/j.heliyon.2024.e35148

Rusmin et al. (2024) Critical thinking and problem-solving skills in the 21st century. *Join: Journal of Social Science*, 1(5), pp. 144–162. https://doi.org/10.59613/svhy3576

Schleicher, A. (ed.) (2012) *Preparing teachers and developing school leaders for the 21st century: Lessons from around the world.* Paris: OECD Publishing. https://doi.org/10.1787/9789264174559-en

The Debate: importance of Skills

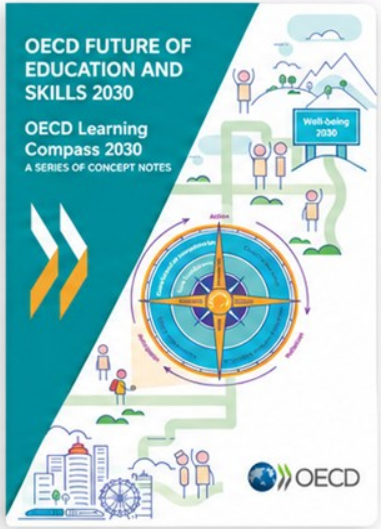
EMPLOYERS



Rapid technological and labour-market change is reshaping skill needs. Analytical thinking, creativity, resilience and adaptability remain important alongside technology skills.

World Economic Forum, Future of Jobs Report (2025).

POLICY MAKERS



Policy frameworks ask schools to prepare learners for uncertain futures.

OECD Learning Compass 2030 (2019).

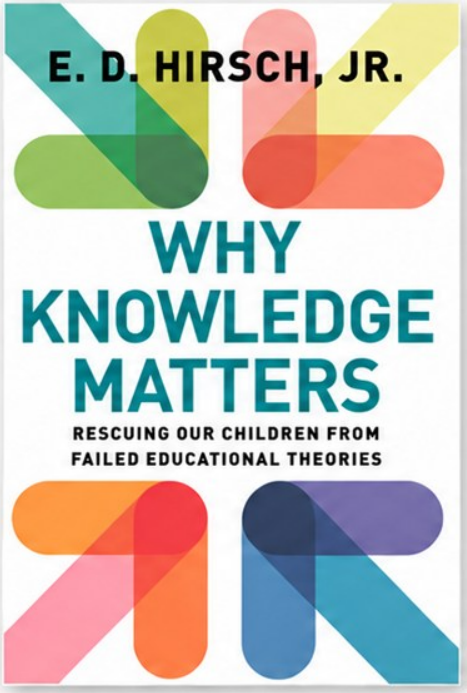
STUDENTS



Skills encourage student agency, creativity and effective collaboration in authentic tasks.

OECD Learning Compass 2030; Student Agency for 2030 (2019).

The Debate: importance of Knowledge

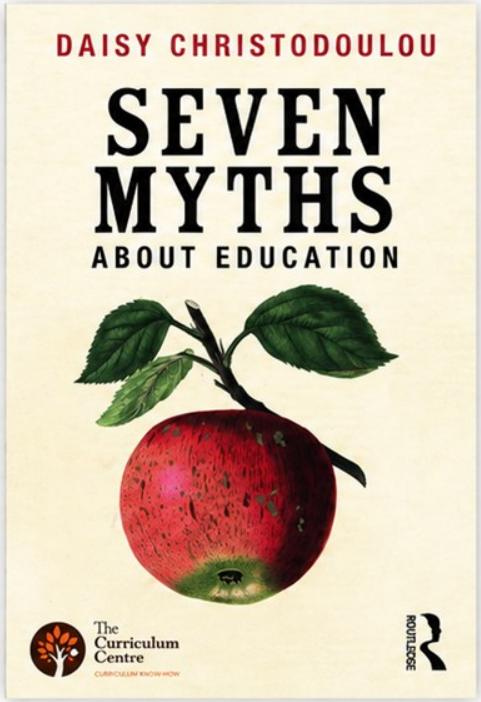


"Education systems that prioritise generic skills while neglecting systematic knowledge-building risk limiting achievement and widening educational inequalities, particularly for disadvantaged students."

Paraphrasing Hirsch 2016

Hirsch, E.D., Jr. (2016) *Why knowledge matters: Rescuing our children from failed educational theories.* Cambridge, MA: Harvard Education Press.

The Debate: importance of Knowledge

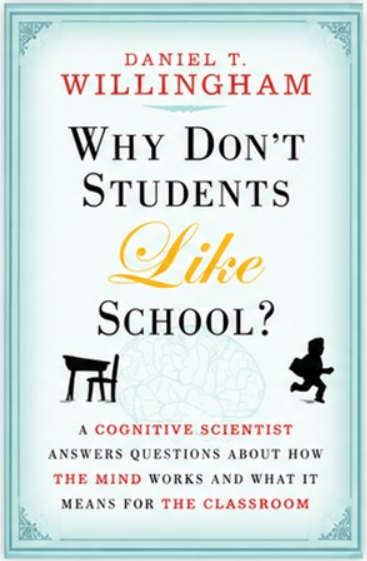


Critical thinking cannot be developed as a generic skill independently of subject knowledge. To analyse, evaluate and solve problems effectively, pupils need relevant knowledge securely stored in long-term memory.

Paraphrasing Christodoulou (2014; first published 2013)

Christodoulou, D. (2014) *Seven myths about education*. London: Routledge.

The Debate: importance of Knowledge



Daniel T. Willingham

Thinking skills such as analysis and problem-solving depend on relevant factual knowledge in long-term memory. Building knowledge supports pupils' ability to think effectively.

Paraphrasing Willingham (2009)



Michael Young

Powerful knowledge gives pupils access to reliable explanations and ways of thinking beyond their everyday experience, enabling them to engage in wider debates about the world.

Paraphrasing Young (2008)

Willingham, D.T. (2009) *Why don't students like school? A cognitive scientist answers questions about how the mind works and what it means for the classroom.* San Francisco, CA: Jossey-Bass.

Young, M. (2008) *Bringing knowledge back in: From social constructivism to social realism in the sociology of education.* London: Routledge.

What does Cambridge say?

Knowledge, Understanding and Higher Order Thinking Skills

"Cambridge programmes combine an emphasis on mastering subjects in depth..."

International Education, Cambridge

Summary of Cambridge's explanation

Deep subject knowledge

Master subjects thoroughly while developing skills for future study and work.

Conceptual understanding

Understand key ideas and connect different aspects of a subject.

Higher order thinking skills

Develop problem-solving, critical thinking, independent research, collaboration and the ability to present arguments.

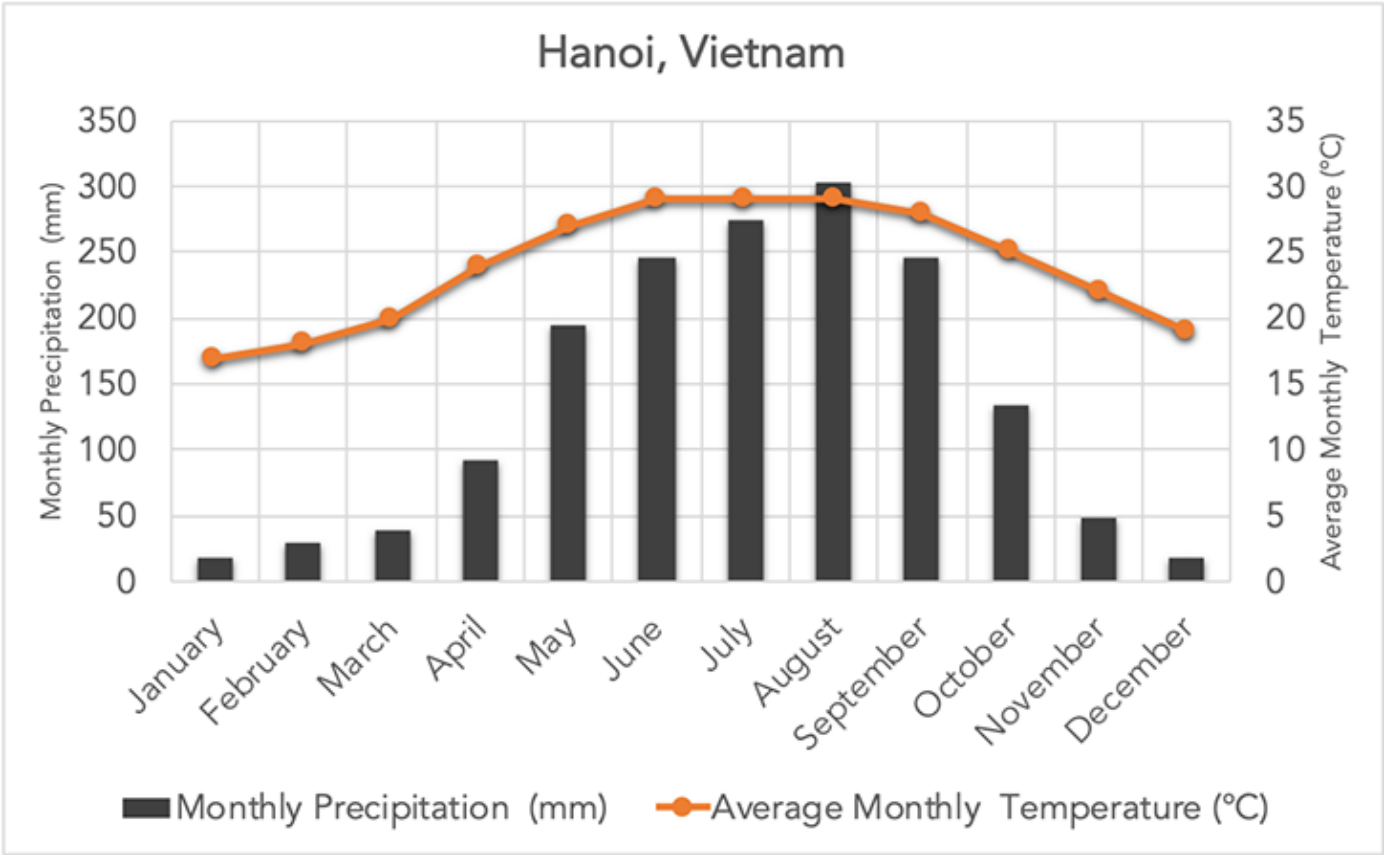
Cambridge describes these skills as transferable, preparing students for life and making learning enjoyable and rewarding.

Source: International Education, Cambridge — International curriculum
https://www.cambridgeinternational.org/why-choose-us/benefits-of-a-cambridge-education/international-curriculum/



Defining what we mean by ‘Knowledge’ and ‘Skills’

Is this Knowledge or a Skill?



Success Criteria

1. *Describe the overall trend seen in the line*

1. *Include vocabulary 'increase/decrease/ fluctuate)*

1. *Describe the maximum and minimum point in the bar chart*

1. *Refer to X and Y axis*



Defining types of knowledge and skills

Three areas

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Factual knowledge

- Knowing facts, definitions, rules, ideas and principles
- "The knowing *what* and *that*"

KNOWING ✶ RECALL ✶ DEFINING

Conceptual knowledge

- Understanding relationships within factual knowledge
- "The knowing *why,* and *interconnections*"

UNDERSTANDING ✶ INTERPRETING ✶ ANALYSIS ✶ EVALUATING

'21st Century' Transferrable Skills

- eg. Communication, Critical Thinking, Collaboration, Creativity

From Knowledge to Skills: Language Example

1 FACTUAL KNOWLEDGE

Knowing 'what' and 'that'

Knowing facts, definitions, rules, ideas and principles

Knowledge of vocabulary

2 CONCEPTUAL KNOWLEDGE

Knowing 'why' and 'interconnections'

Understanding relationships within factual knowledge

Connecting vocabulary through grammatical rules

3 TRANSFERABLE SKILLS

Collaboration, Creativity, Critical Thinking, Communication

Dispositions that are applied across different content areas

Create new ideas, make suggestions.

From Knowledge to Skills: Biology Example

1 FACTUAL KNOWLEDGE

Knowing 'what' and 'that'

Knowing facts, definitions, rules, ideas and principles

Plants need water, sunlight and nutrients to grow.

2 CONCEPTUAL KNOWLEDGE

Knowing 'why' and 'interconnections'

Understanding relationships within factual knowledge

Explaining the process of photosynthesis.

3 TRANSFERABLE SKILLS

Collaboration, Creativity, Critical Thinking, Communication

Dispositions that are applied across different content areas

Critically assess how climate affects changing patterns of vegetation

From Knowledge to Skills: Geography Example

1 FACTUAL KNOWLEDGE

Knowing 'what' and 'that'

Knowing facts, definitions, rules, ideas and principles

Knowledge of trade, migration, economic flows, transport, communications.

2 CONCEPTUAL KNOWLEDGE

Knowing 'why' and 'interconnections'

Understanding relationships within factual knowledge

Explaining the links and interactions between places.

3 TRANSFERABLE SKILLS

Collaboration, Creativity, Critical Thinking, Communication

Dispositions that are applied across different content areas

Evaluation of the impact of Globalisation. Making future predictions.

Activity

1 FACTUAL KNOWLEDGE

Knowing 'what' and 'that'

Knowing facts, definitions, rules, ideas and principles

2 CONCEPTUAL KNOWLEDGE

Knowing 'why' and 'interconnections'

Understanding relationships within factual knowledge

3 TRANSFERABLE SKILLS

Collaboration, Creativity, Critical Thinking, Communication

Dispositions that are applied across different content areas

In the chat box, list three points:

1. Some factual knowledge required in your subject area
2. The conceptual understanding these facts support
3. A skill students engage in which requires this factual & conceptual understanding

Are there any skills that do not require prior knowledge?

Conflict resolutions

Critical thinking

Problem solving

Empathy

Respect and Inclusion

Teamwork

Creative thinking

Cultural awareness

Relationship building

Innovation

Adaptability

Design thinking

Negotiation

Public speaking

Active listening

Conflict resolutions | Critical thinking | Problem solving | Empathy

Respect and Inclusion | Teamwork

Are there any skills that do not require prior knowledge?

Creative thinking | Cultural awareness

Relationship building | Innovation

Adaptability | Design thinking | Negotiation | Public speaking | Active listening

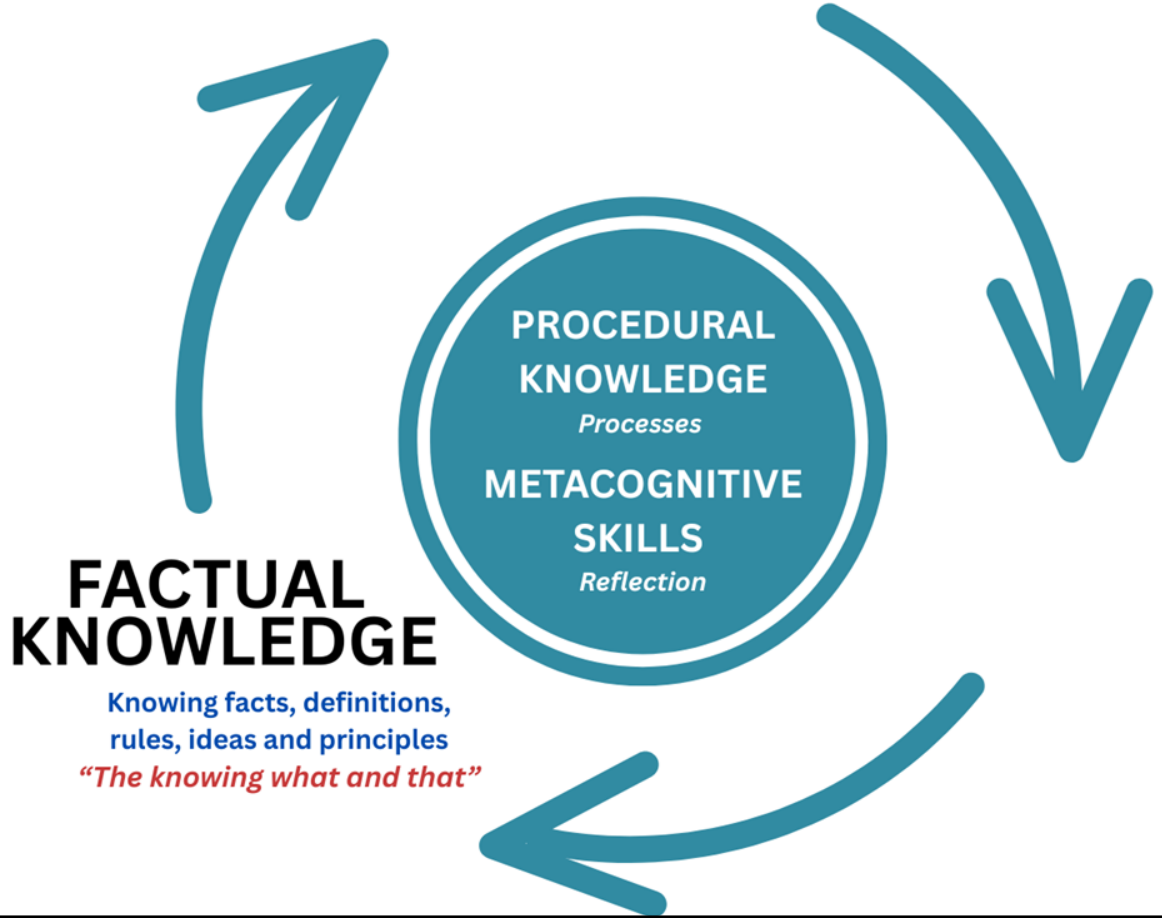
Choose one skill:

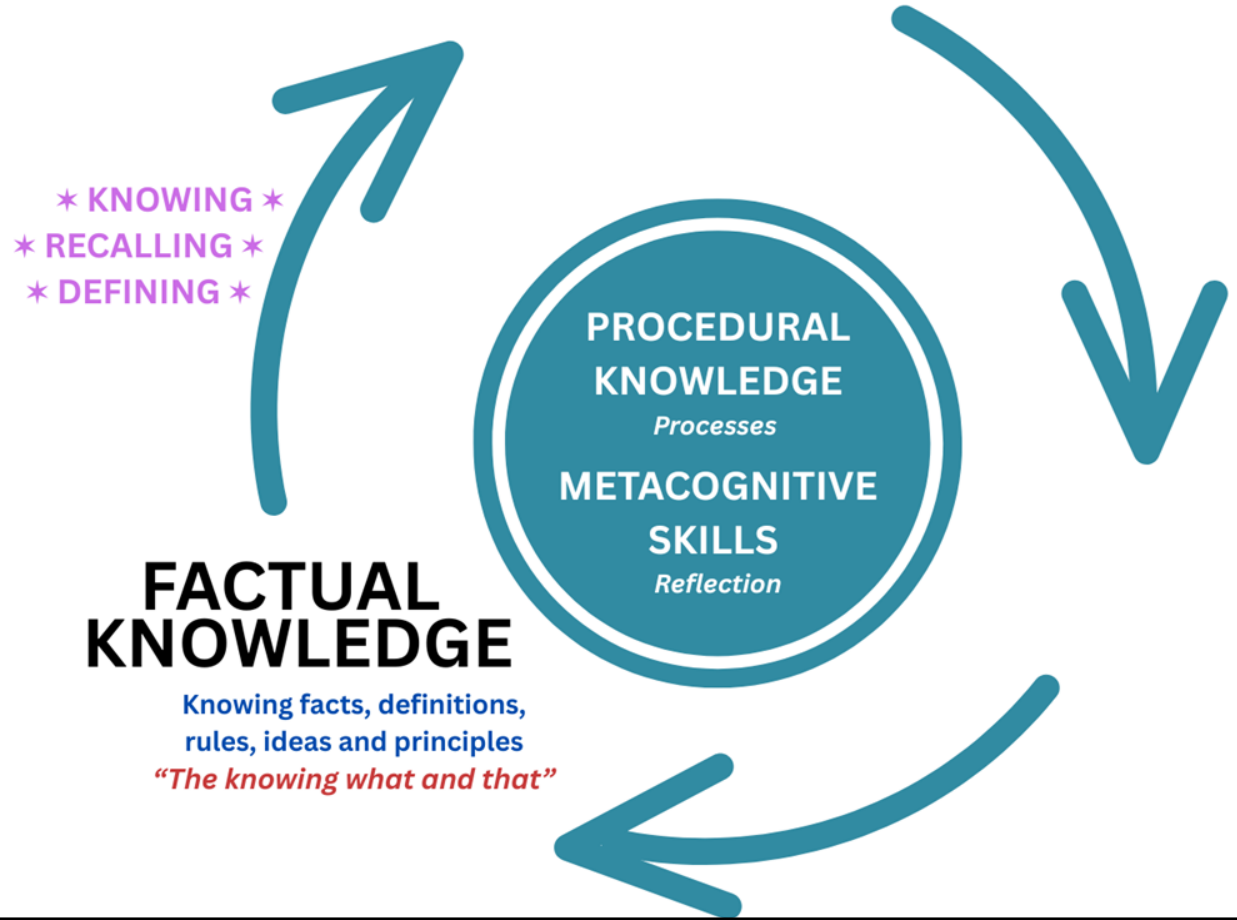
1. What knowledge is required to engage in this skill?

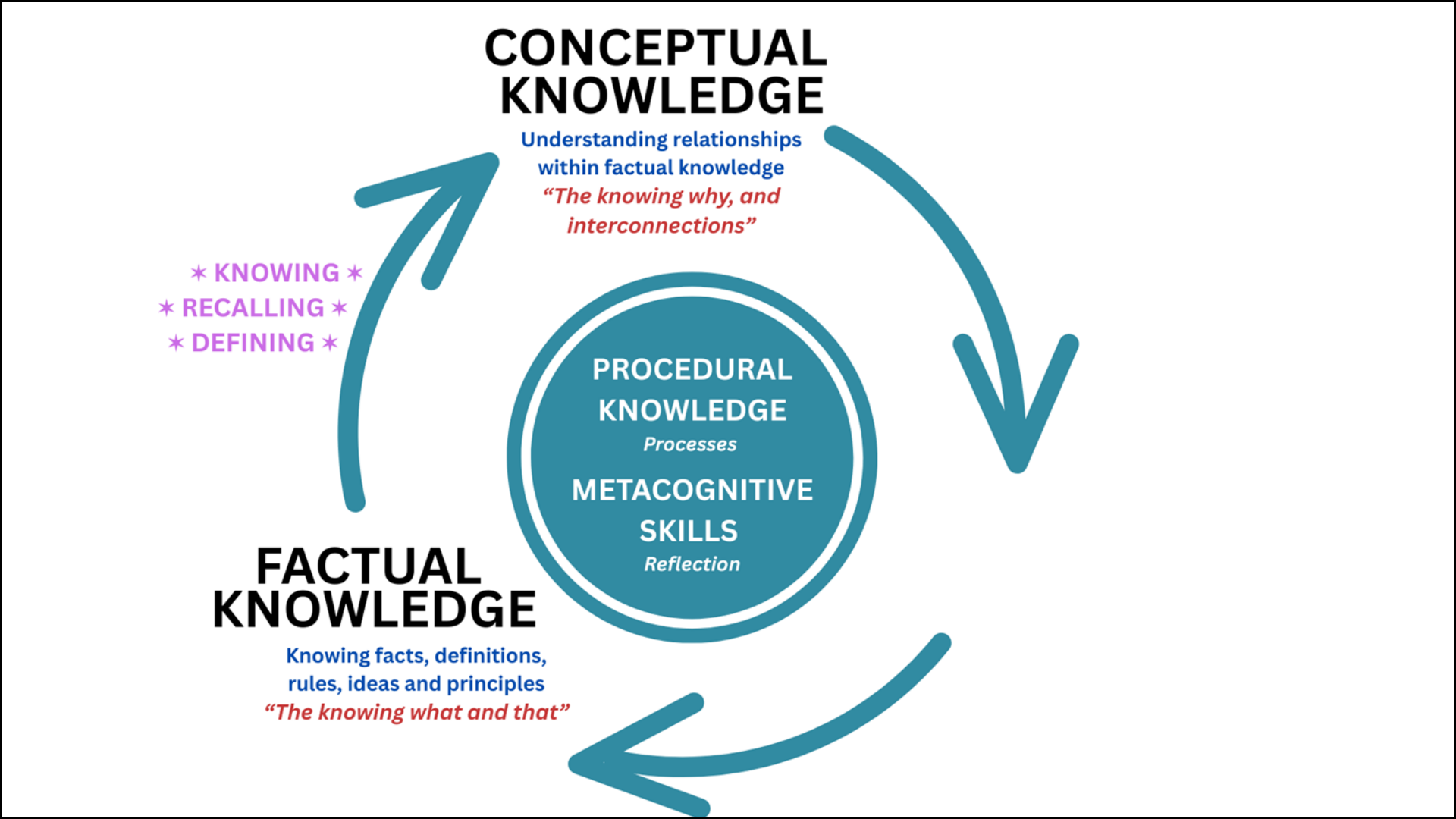
E.g. ***Active Listening >***
Understanding language, noticing cues, knowing how to respond

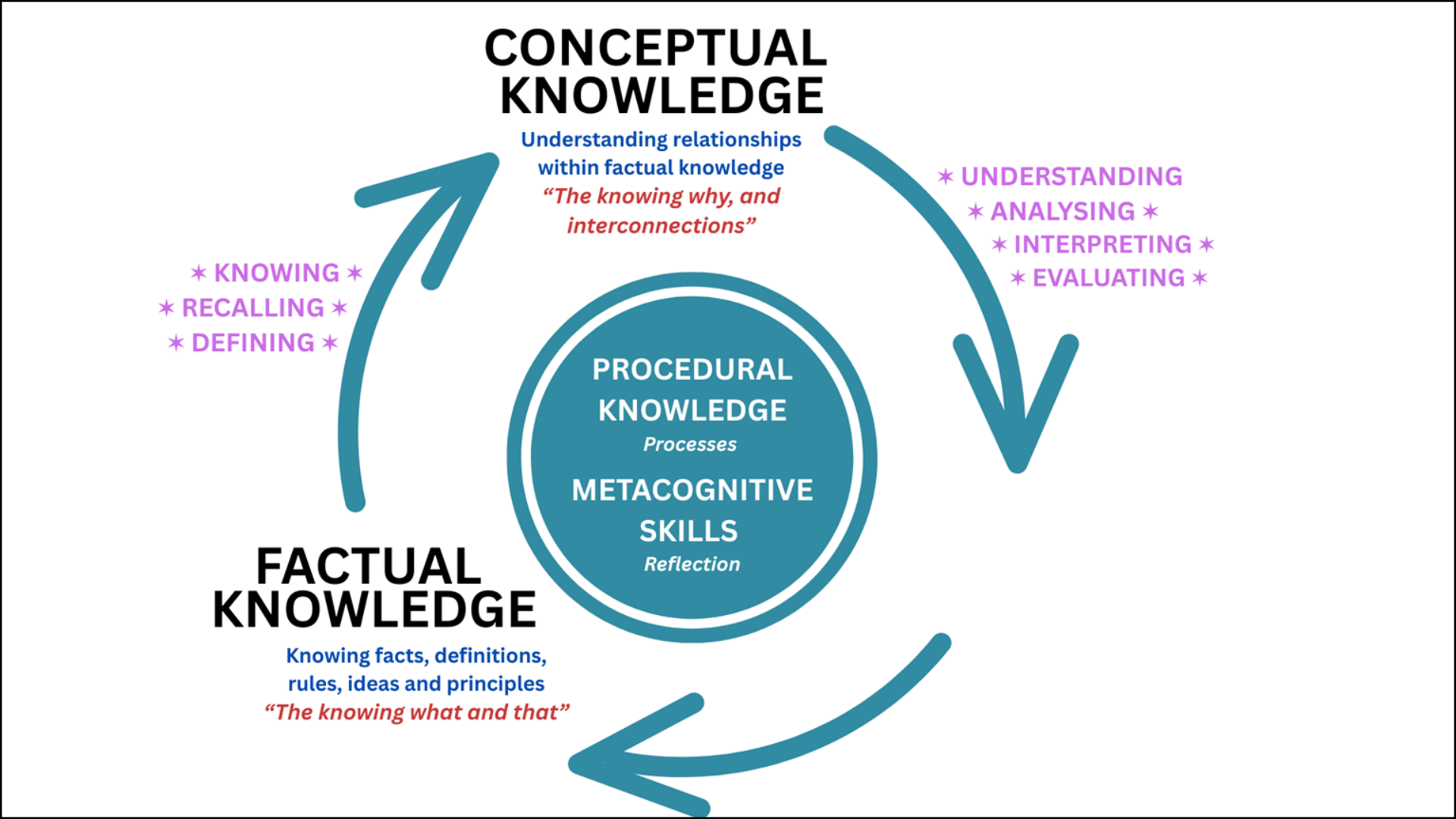


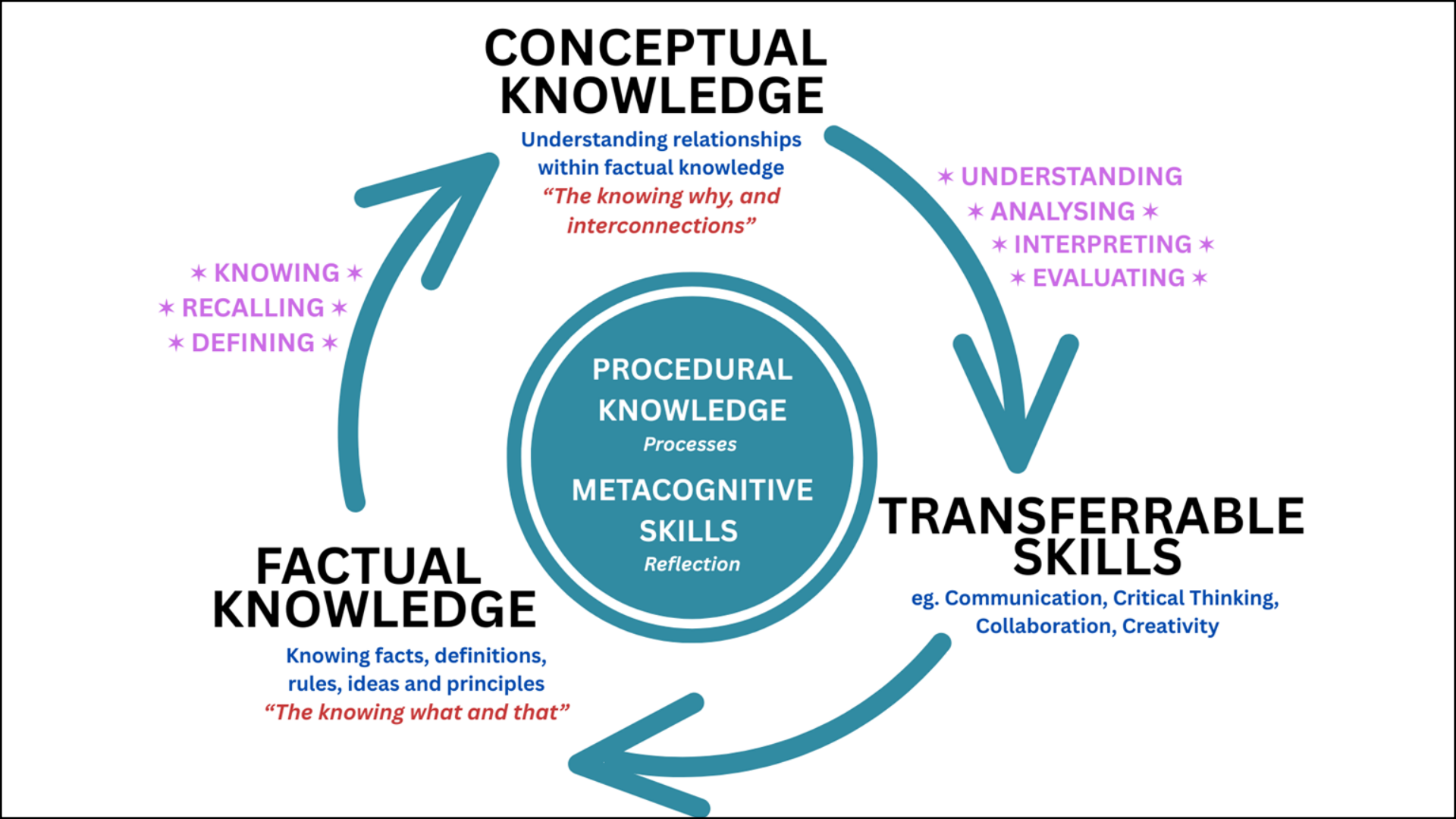
The Cyclical Model

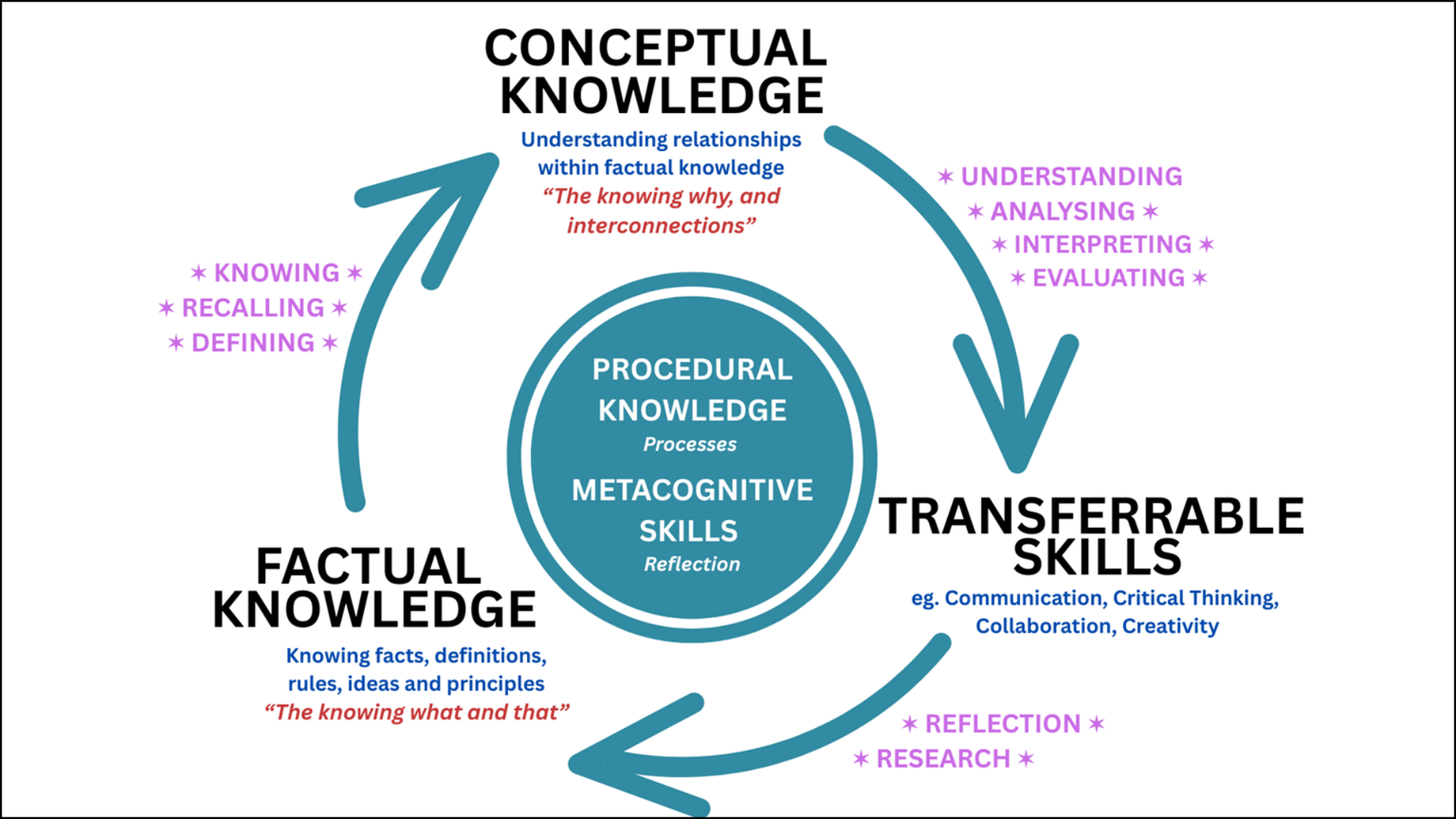

PROCEDURAL KNOWLEDGE
Processes
METACOGNITIVE SKILLS
Reflection
FACTUAL KNOWLEDGE
Knowing facts, definitions, rules, ideas and principles
"The knowing what and that"

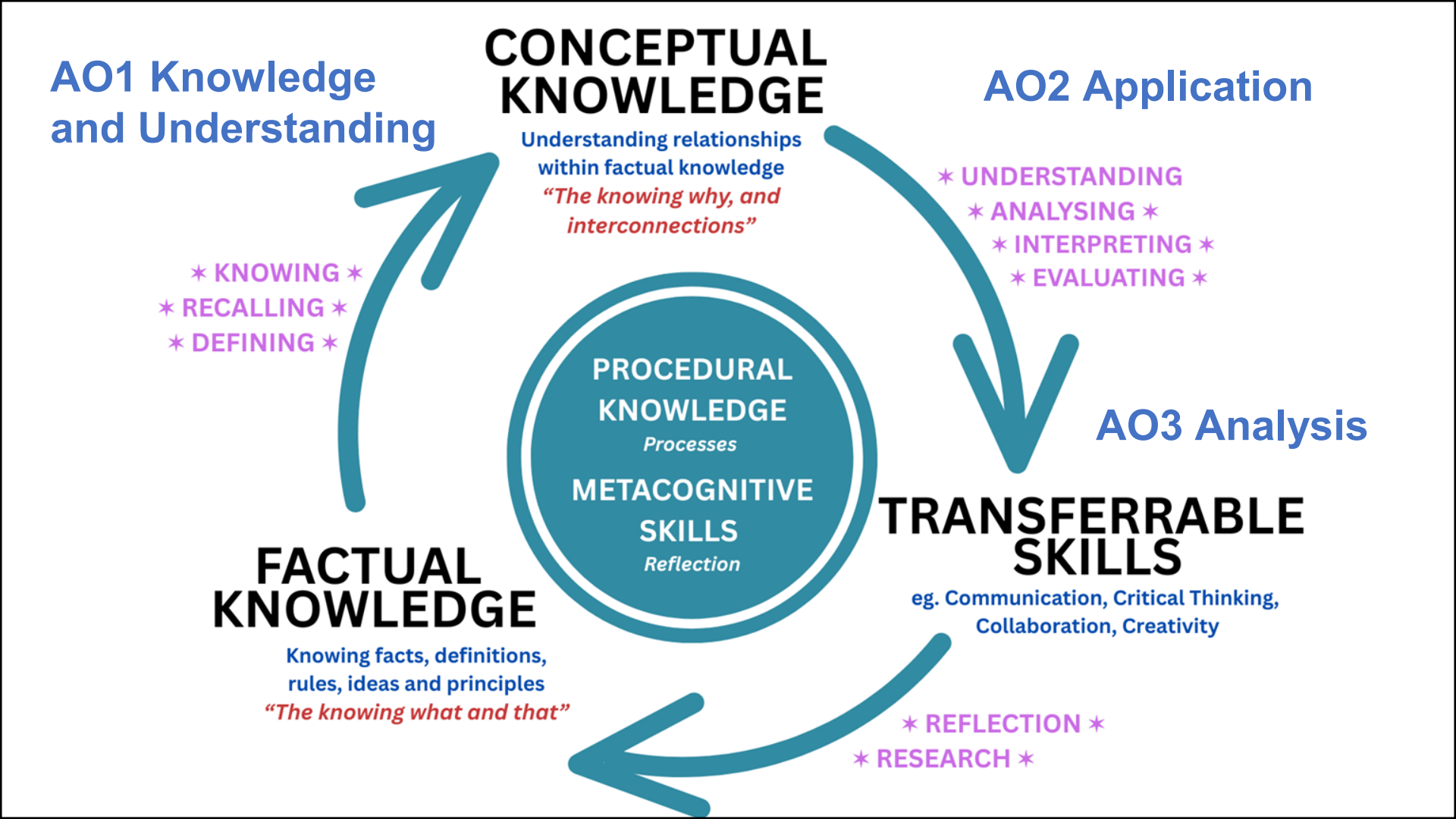

✶ KNOWING ✶
✶ RECALLING ✶
✶ DEFINING ✶
PROCEDURAL KNOWLEDGE
Processes
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Knowing facts, definitions, rules, ideas and principles
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CONCEPTUAL KNOWLEDGE
Understanding relationships within factual knowledge
"The knowing why, and interconnections"
✶ KNOWING ✶
✶ RECALLING ✶
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✶ UNDERSTANDING
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✶ EVALUATING ✶
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TRANSFERRABLE SKILLS
eg. Communication, Critical Thinking, Collaboration, Creativity
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CONCEPTUAL KNOWLEDGE
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✶ UNDERSTANDING
✶ ANALYSING ✶
✶ INTERPRETING ✶
✶ EVALUATING ✶
PROCEDURAL KNOWLEDGE
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METACOGNITIVE SKILLS
Reflection
TRANSFERRABLE SKILLS
eg. Communication, Critical Thinking, Collaboration, Creativity
✶ REFLECTION ✶
✶ RESEARCH ✶
FACTUAL KNOWLEDGE
Knowing facts, definitions, rules, ideas and principles
"The knowing what and that"
✶ KNOWING ✶
✶ RECALLING ✶
✶ DEFINING ✶


AO1 Knowledge and Understanding
CONCEPTUAL KNOWLEDGE
Understanding relationships within factual knowledge
"The knowing why, and interconnections"
AO2 Application
✶ UNDERSTANDING
✶ ANALYSING ✶
✶ INTERPRETING ✶
✶ EVALUATING ✶
✶ KNOWING ✶
✶ RECALLING ✶
✶ DEFINING ✶
PROCEDURAL KNOWLEDGE
Processes
METACOGNITIVE SKILLS
Reflection
AO3 Analysis
TRANSFERRABLE SKILLS
eg. Communication, Critical Thinking, Collaboration, Creativity
FACTUAL KNOWLEDGE
Knowing facts, definitions, rules, ideas and principles
"The knowing what and that"
✶ REFLECTION ✶
✶ RESEARCH ✶

What is needed in the 21st Century?



7,000 teachers and students across 150 countries

Future-Ready Learners (2025)

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- Education systems must balance **curriculum knowledge** with the **skills** young people need to thrive in an uncertain, technology-driven future.
- **Factual knowledge** remains essential, but learners must also develop **transferable competencies** such as critical thinking, collaboration, creativity, and adaptability.
- The next generation of curricula should be **coherent, concept-rich and interdisciplinary**, supporting real-world application of learning.
- **Teacher expertise and agency** are central to achieving this balance — educators need professional autonomy and ongoing development.
- Assessment must evolve to **recognise a wider range of skills and outcomes**, not just factual recall.
- Cambridge's vision: help students become **confident, responsible, reflective, innovative, and engaged** — able to apply knowledge purposefully and ethically in a changing world.

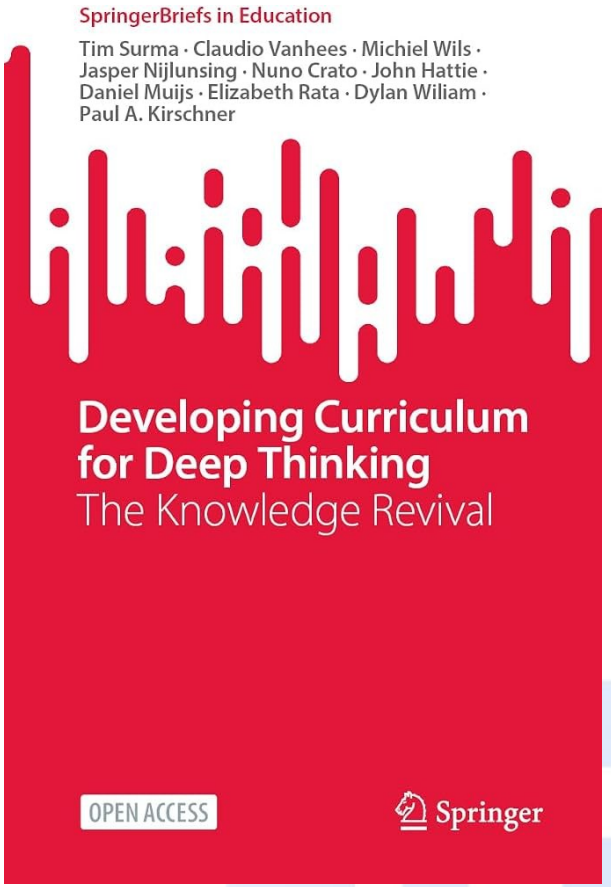
Knowledge for Skills

The Knowledge Revival (2025)

John Hattie, Dylan Wiliam et. al

Teaching students ‘how to think’ does not work. A knowledge-rich curriculum provides the basis for acquiring complex cognitive skills.

Knowledge > Understanding > Connections > Skills



Surma, T., Vanhees, C., Wils, M., Nijlunsing, J., Crato, N., Hattie, J., Muijs, D., Rata, E., Wiliam, D. and Kirschner, P.A. (2025) *Developing Curriculum for Deep Thinking: The Knowledge Revival*. Cham: Springer.



Implementation

Next Steps: Engagement

- Spread the word!

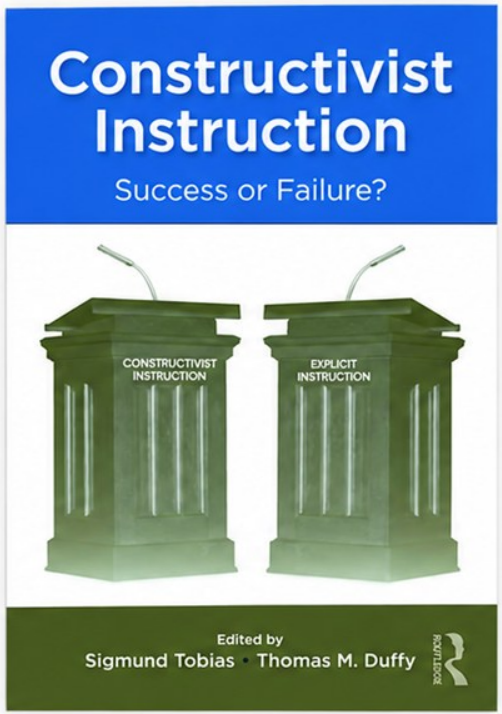
  Engage teachers in the knowledge > skill cycle



Next Steps: Implementation

- Review unit plans, curriculum design
- Consider the effect in lesson planning
- Consider use of the cycle in assessment/exam design
- How else might the Knowledge/Skills cycle impact practice?

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Content in the absence of **thinking** is inert and meaningless; but **thinking** in the absence of **content** is vacuous.

Robert J. Sternberg, foreword in Tobias and Duffy (2009, p. x)

Tobias, S. and Duffy, T.M. (eds.) (2009) *Constructivist instruction: Success or failure?* New York: Routledge.