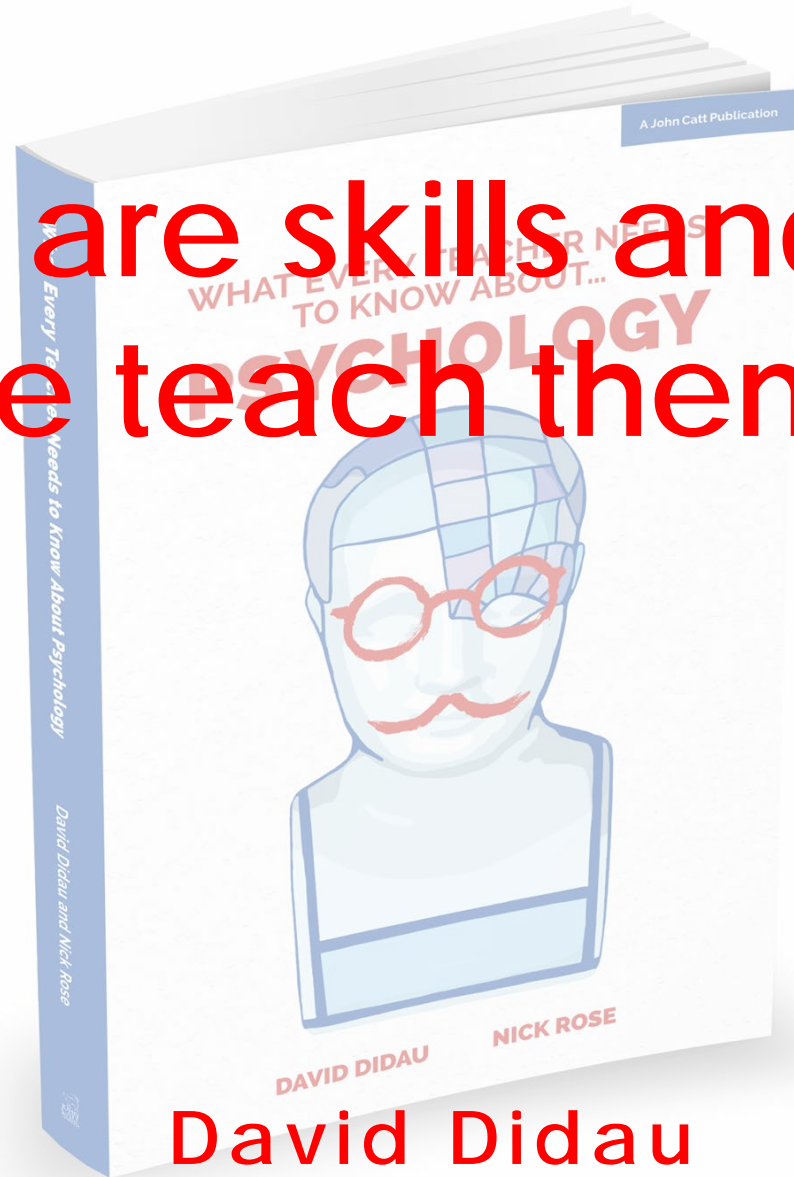


What are skills and can we teach them?



David Didau
researchED Rugby
9th June 2018

Knowledge or skills?

Definitions of knowledge:

1. facts, information, and **skills** acquired through experience or education; the theoretical or practical understanding of a subject.
2. awareness or familiarity gained by experience of a fact or situation.

Definitions of skill:

1. the ability to do something well; expertise.
2. a particular ability.

What's the difference?



You don't know what you don't know

There are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns – the ones we don't know we don't know.

Donald Rumsfeld

Three propositions

1. Knowledge is both what we think *with* and *about*
2. We cannot think with or about something we don't know
3. The more we know about something, the more sophisticated our thinking.



What is knowledge?

Aristotle:

- *Episteme*: timeless universal knowledge
- *Techne*: knowledge that is dependent on time and place
- *Phronesis*: knowledge of what is right.



What is knowledge?

Today:

- *Episteme*: propositional knowledge (what)
- *Techne*: procedural knowledge (how)
- *Phronesis*: practical wisdom; tacit knowledge



Propositional knowledge

Justified true
belief:

- Is it reasonable?
- Is it factual?
- Do you believe it?

What about these?

- I like coffee best at about midmorning.
- My hair needs cutting.
- When I was a child I was admitted to hospital with severe gastroenteritis.
- Superman is Clark Kent's alter ego.
- The language Ewoks speak in *Return of the Jedi* is ancient Tibetan.
- Ostriches do not bury their heads in the sand to avoid danger.
- Scotch eggs are boiled eggs wrapped in sausage meat and breadcrumbs.
- A horse is a quadruped.



Flexible of inflexible knowledge

- Inflexibility is a necessary stepping stone to flexible knowledge
- Inflexible knowledge:
 - commas are used to separate clauses in a sentence
 - Pythagoras's Theorem states the square of the hypotenuse is equal to the sum of the squares of the other two sides.
- How can we make this flexible?

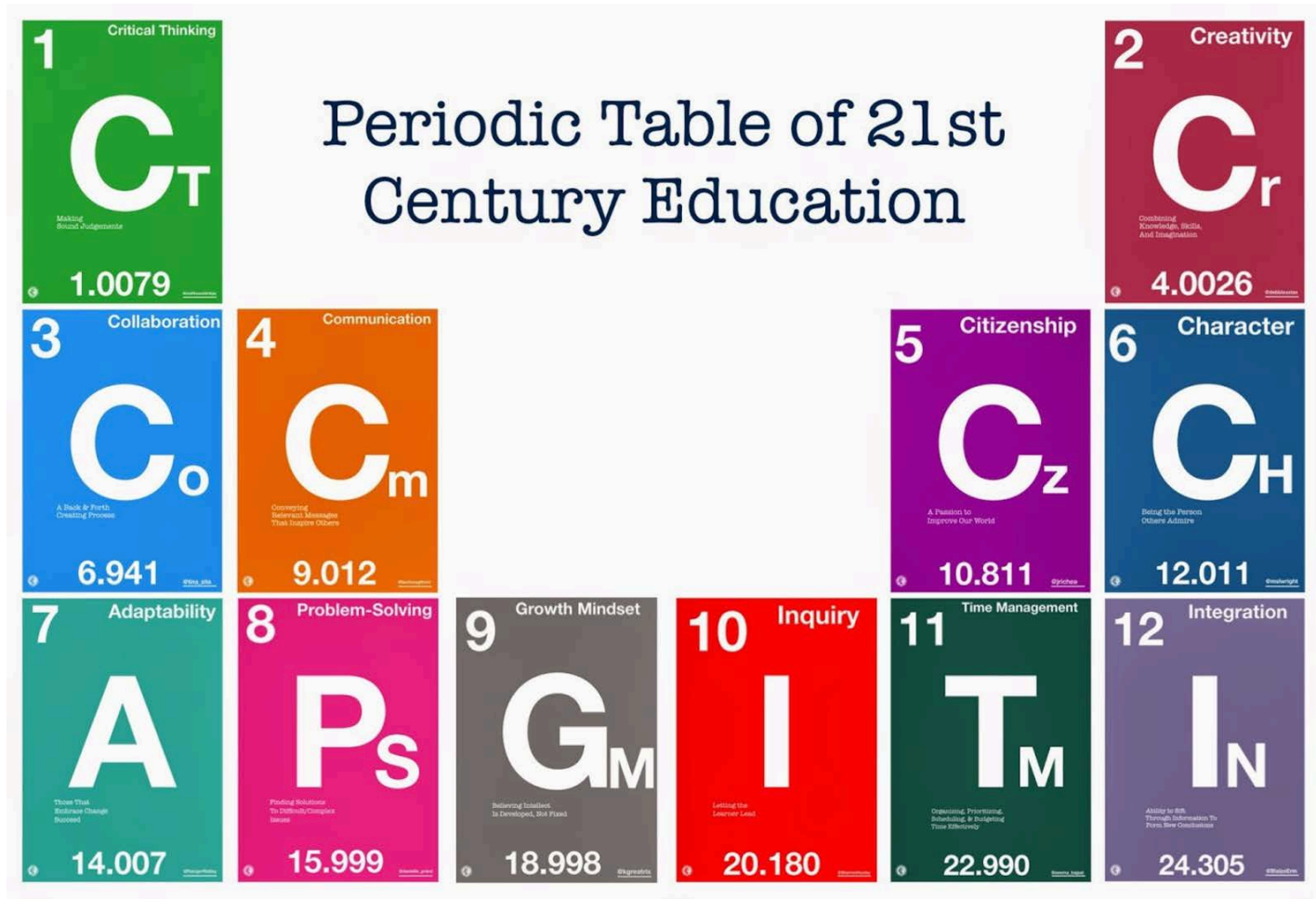


Procedural knowledge

- Think of a skill...
- What knowledge do you need to perform this skill?
- So, do skills *require* knowledge or are they *composed* of knowledge?



What about '21st century skills'?



<http://beyondangrybirds.blogspot.co.uk/2014/05/periodic-table-search-for-elements.html?m=1>



2 problems with '21st century skills'

1. They are not 21st century
2. They are not skills

They are evolutionary adaptations that require a domain to operate in.

[Geary \(2007\)](#) [Tricot & Sweller 2007](#)



Tacit knowledge

Some things we cannot explain or articulate. When we try we rely on maxims:

*Maxims are rules, the correct application of which is part of the art which they govern. The true maxims of golfing or of poetry increase our insight into golfing or poetry and may even give valuable guidance to golfers and poets; but these maxims would instantly condemn themselves to absurdity if they tried to replace the golfer's skill or the poet's art. **Maxims cannot be understood, still less applied by anyone not already possessing a good practical knowledge of the art.** They derive their interest from our appreciation of the art and cannot themselves either replace or establish that appreciation.*

Michael Polanyi, *Personal Knowledge*



The curse of knowledge

- Try explaining how to do something you are skilled at to someone who is not.
- 'Tappers' and 'listeners'
- Listeners guessed correctly 3 out of 120 times.
- Tappers estimated listeners got 50% right
- Newton, E. (1990) "Overconfidence in the Communication of Intent: Heard and Unheard Melodies."



The importance of knowledge

They gradually ascended for half a mile then found themselves at the top of a considerable eminence where the wood ceased and the eye was instantly caught by Pemberley House situated on the opposite side of the valley, into which the road with some abruptness wound.



Is comprehension possible?

1. What did they climb?
2. Where did the characters find themselves?
3. At what point did they first see Pemberley House?
4. Where was the house in relation to the characters?
5. How did the author describe the road?



Comprehension depends on reading speed

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Memory & reading

Long-term memory

- Accuracy
- Fluency
- Prior knowledge
- Vocabulary
- Stories

*Fast, automatic,
invisible*

Working memory

- Inferences
- Clarifications
- Hypotheses
- Predictions

*Requires attention &
effort*



The importance of knowledge

Does this make sense?

*The **NNB** should move jobs outside of the **T98**, employ more executives of a **LRT** background, and stop trying to copy **HGT**'s output.*

What about now?

*The **BBC** should move jobs outside of the **M25**, employ more executives of a **BME** background, and stop trying to copy **ITV**'s output.*



Skill or expertise?

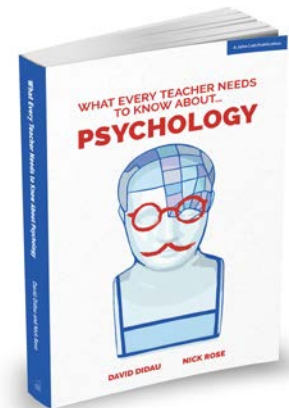
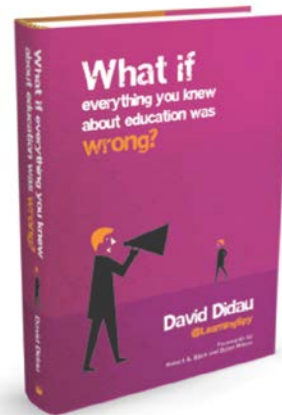
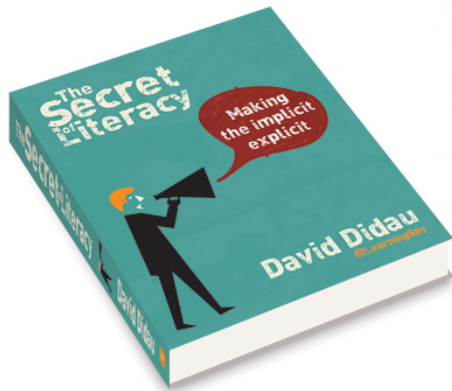
“How significantly [might] our view of schooling change if suddenly policy makers, instead of using the term *skill*, had to use the more accurate, knowledge-drenched term *expertise*.”

E.D. Hirsch Jr. *Why Knowledge Matters*

What follows from all this?

- Propositional knowledge can be learned through exposure, repetition and application
- Procedural knowledge must be practised until it is automatic
- Tacit knowledge is acquired through expertise (don't worry about it).

There's nothing
good or bad but thinking
makes it so.



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