



UNIVERSITY OF
LIVERPOOL

Educational Theory and Evidence

How can we help students learn better on placement?
What works?

Please interrupt!

GP Tutor study day 23.05.24

David Lewis, GP and CCT





Who are you and why are you here?

What do you want students to get out of placement?

1. Learn / teach it or test / remember it?
2. Be told or work it out?
3. Make it easy or difficult?
4. Give feedback or not?
5. Get it right or wrong?
6. Watch an expert or fumble along?

1. Learn it or remember it?

1. Learn it or remember / test it?

Study study study study

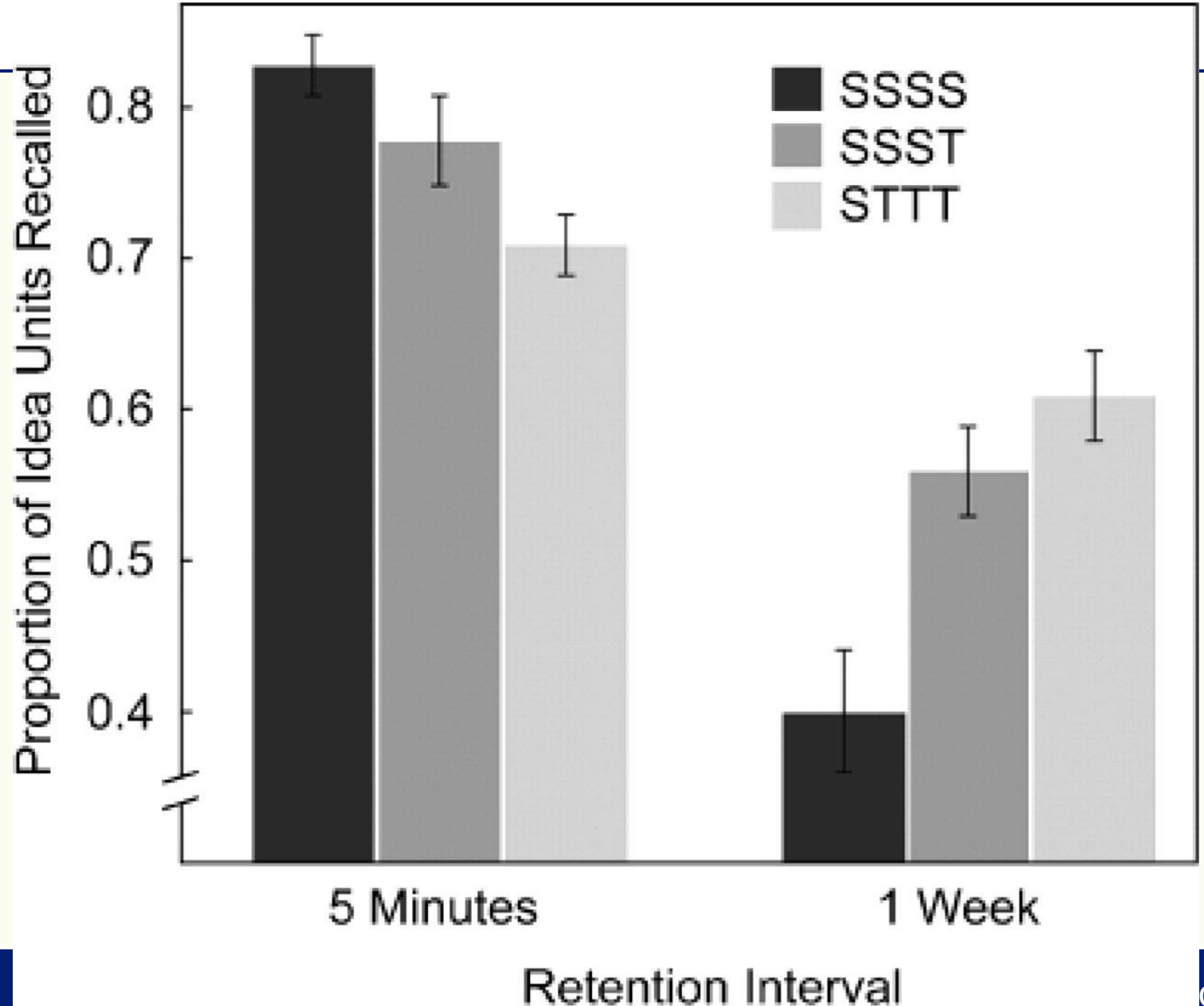
→ Forget most

Study test test test

→ remember 50% more

Roediger + Karpicke. Test –enhanced learning: taking memory tests improves long-term retention.

<https://journals.sagepub.com/doi/10.1111/j.1467-9280.2006.01693.x>





1. Learn it or remember it?

Repetition \neq Learning

Retrieval practice = 'testing effect' (and protects against stress induced forgetting)

Active retrieval (testing) ties the knot for memory

How long a gap between learning and testing?

Effortful retrieval eg short answer better than MCQ

But students often prefer re-reading ... ☹️

How do we apply this in practice?

- Quiz / ask Qs
- 'what have you learned?'



Bottom line

Retrieval (testing) practice

Spacing (distributed practice)

Stop cramming!





2. Get told the answer or not?

As a teacher should you:

- a. Tell the info
- b. Tell the info and explain why
- c. Tell the info and get students to think about why?



2. Get told or work it out

Students studied:

Short sentence

(e.g. the evil man wound up the clock)

37%

Or short sentence

+ why did the man do that?

71%

Or short sentence

+ precise explanation (e.g. to set a bomb)

35%

Pressley et al. Generation and
precision of elaboration...

<https://psycnet.apa.org/record/1987-24054-001>

Work it out → remember 2 x !

Pre-questions v none

Watch video

Test on material

→pre-Q group did better (65% correct) on pre-questioned info, **AND on other (non-questioned) info (50%)** than control group (38%).

Why?

Curiosity / engagement? Orientate? Reduce over-confidence?

Caution: may not help if self-directed learning (as focus on question only)

Carpenter , Toftness. The effect of prequestions on learning from video presentations.
<https://www.sciencedirect.com/science/article/abs/pii/S2211368116301103>



RCT of Maths teaching
for Maths resits.
for disadvantaged students →
'2 months learning benefit'
work in pairs with facilitative teacher.
'deliberately designed for students to
struggle' on concepts (no rote
learning)

<https://www.tes.com/magazine/teaching-learning/general/gcse-maths-power-of-productive-struggle>

‘**Elaborative interrogation**’

‘**priming**’ - struggle with problem before shown answer

Triggers curiosity / motivation

In practice:

- Pre-Questions.
- Better to struggle and get wrong than not try
- Ask - Why?
- Connect with other knowledge
- Teach someone (or prepare to!)



This all seems rather elaborate

3. Should learning be easy or difficult?

Discuss – and think about why

D_nkey

Mouse

Happiness

Garden

Gr__ngr_cer

Cat

Th_rsd_y

C_mpl_c_ted

Whistle

Supermarket

E_l_ph_nt

October

Battery

Intelligence

Desirable

Conventional vs integrated diagrams

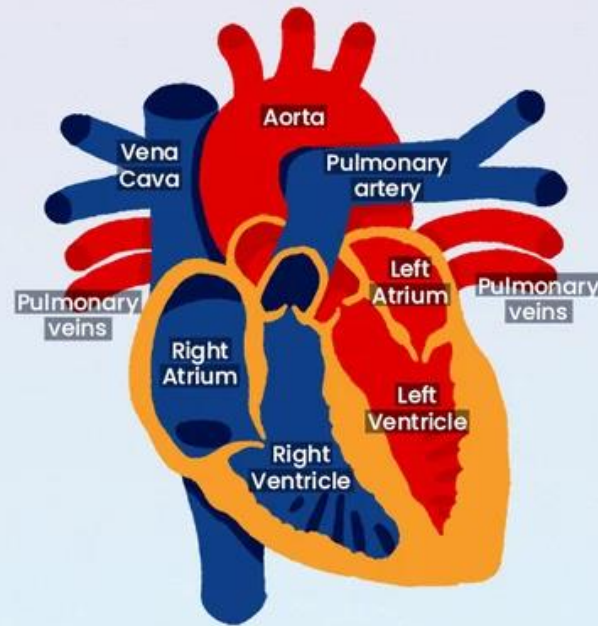
By @Inner_Drive | innerdrive.co.uk

Conventional diagram



- | | |
|--------------------|---------------------|
| 1. Vena Cava | 5. Left Ventricle |
| 2. Aorta | 6. Left Atrium |
| 3. Right Atrium | 7. Pulmonary Veins |
| 4. Right Ventricle | 8. Pulmonary Artery |

Integrated diagram



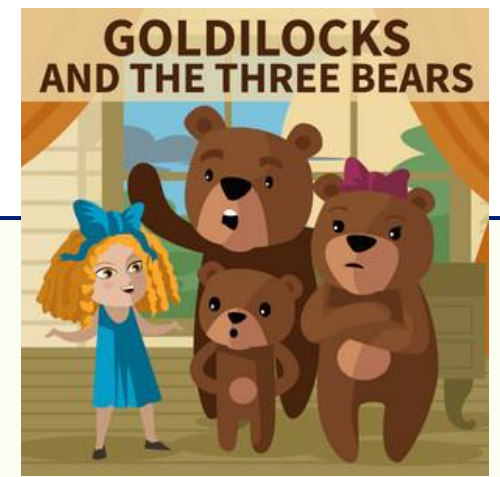
Inspired and adapted from Jenkins, 2017

Integrated → quicker to process
and exam results 22% better

Chandler, Sweller. The split-attention effect as a factor in the design of instruction.

<https://bpspsychub.onlinelibrary.wiley.com/doi/10.1111/j.2044-8279.1992.tb01017.x>

3. Easy or difficult?



Desirable v undesirable difficulty.

Desirable

Undesirable

Effortful retrieval (short answer > MCQ)

Productive struggle – GCSE Maths example

Spaced, Interleaved, Varied practice

Vygotsky Zone of Proximal Development (not too easy, not too hard)

Cognitive Load Theory

Dual Loading (picture + words)

v.

Split attention (conventional diagrams)

v.

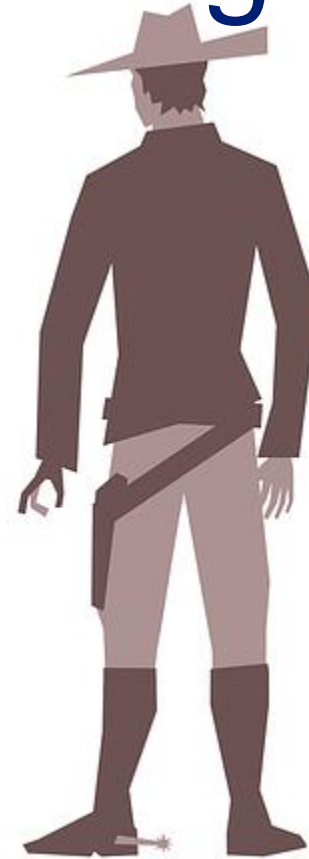
Redundancy effect

Concentration (hard / curious)

v.

distraction - hot / cold / noisy

Dual loading not Duel loading!



4. Give feedback or not

Think of examples of helpful feedback (that you gave or received)

Any unhelpful feedback?

Any harmful feedback?

4. Feedback

Problem solving game. All told got 80%. Then:

- Praised for natural intelligence
- Or praised for effort.

Mueller, Dweck. Praise for intelligence can undermine children's motivation and performance.

<https://psycnet.apa.org/doiLanding?doi=10.1037%2F0022-3514.75.1.33>

‘intelligence’ → enjoyed less, less persistent, less well in future tasks, more likely to lie about how many they got right, more concerned about how others did.

‘effort’ → enjoyed more, chose future tasks that would help them learn, asked how to get better.

Growth Mindset – better self-esteem, more resilient, better grades

(v fixed mindset = believe you cant change / improve)

4. Feedback

1/3 is harmful!

Feedback on PROCESS → improves performance. (for person is harmful)

Praise for EFFORT → improves motivation (but avoid dependence on it)

Feedback on TASK → corrects mistakes (good!)

Grades → pointless (if high) or harmful (if low)

2 reviews:

Kluger, DeNisi. The effects of feedback interventions on performance. <https://psycnet.apa.org/record/1996-02773-003>

Hattie, Timperley. The power of feedback. <https://journals.sagepub.com/doi/abs/10.3102/003465430298487>

5. Better to get it right or wrong?

5. Get it right or wrong?

Parents who viewed failure as enhancing → children had growth mindset.

Haimowitz, Dweck. What Predicts Childrens Fixed and Growth Intelligence Mind-Sets? Not Their Parents Views of Intelligence but Their Parents Views of Failure.
<https://psycnet.apa.org/record/2016-28443-009>

Teaching that failure is ok → improves grades.

Lin-Siegler, Ahn. Even Einstein Struggled: Effects of Learning About Great Scientists' Struggles on High School Students' Motivation to Learn Science.
<https://psycnet.apa.org/record/2016-07217-001>

5. Get it right or wrong?

Transformational learning – troublesome knowledge, threshold concepts.

(also Vygotsky ZPD)

Coaching

Spotlight Effect (Barry Manilow t-shirt)

Thomas Edison ‘I’ve not failed, I’ve just found 10,000 ways that don’t work’

→ Encourage students to ask questions.

in safe, **trusting** environment.





6. Watch an expert or fumble along?

Thoughts?

Observe or fumble?

?see one, do one, teach one?

Adults watched videos of experts (tablecloth trick, moonwalking, darts, video game, juggling). At end did task.

Watching more times → increased confidence, but not ability (may worsen).

Reading or thinking about task did not (falsely) increase confidence.

Sensory experience (just holding juggling pins) reduced false confidence

One must learn by doing the thing; though you think you know it, you have no certainty until you try. —Sophocles (~500 BC/2015)

Dunning Kruger effect

Implication for practice?

Kardas, O'Brien. Easier seen than done: merely watching others perform can foster an illusion of skill acquisition.

<https://journals.sagepub.com/doi/abs/10.1177/09567976177406>

46

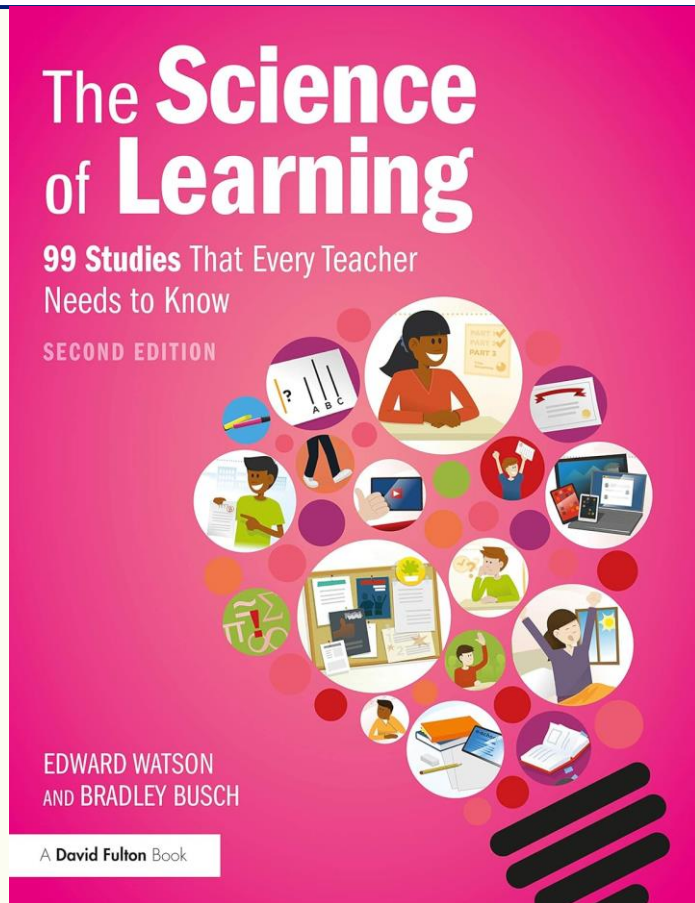


I made this



I reckon I could play for
England ... or San Marino at least

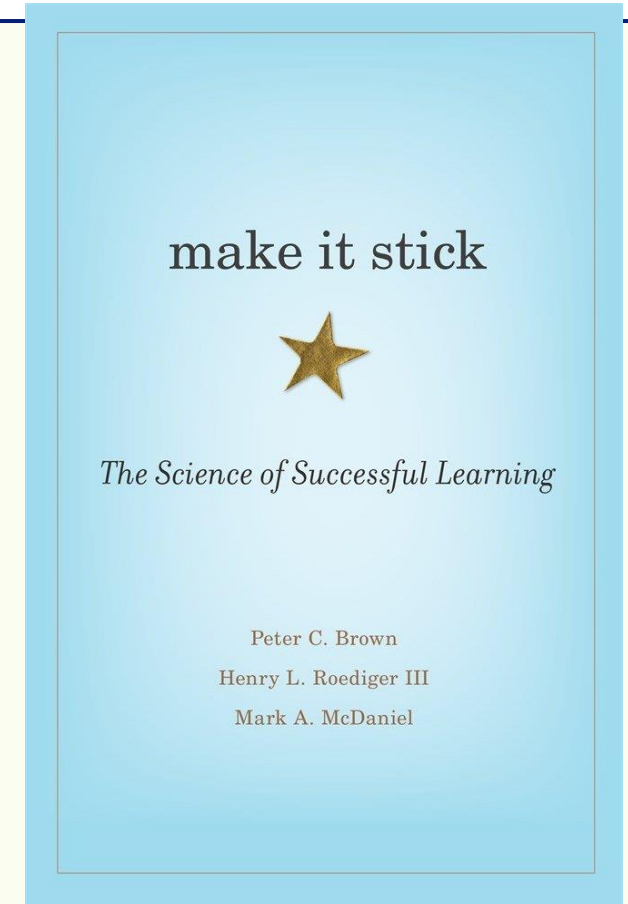
Implications for practice?



Edward Watson + Bradley Busch

What have you learned?

What two (or more) things will you do differently?



Peter C Brown et al