Becoming a Critical Consumer and User of the Science of Learning

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Goals

- ✓ Science communication benefits and pitfalls
- ✓ Start your journey as a critical consumer and user of the science of learning
- ✓ Understanding research papers
- ✓ Disussion of questions and answers

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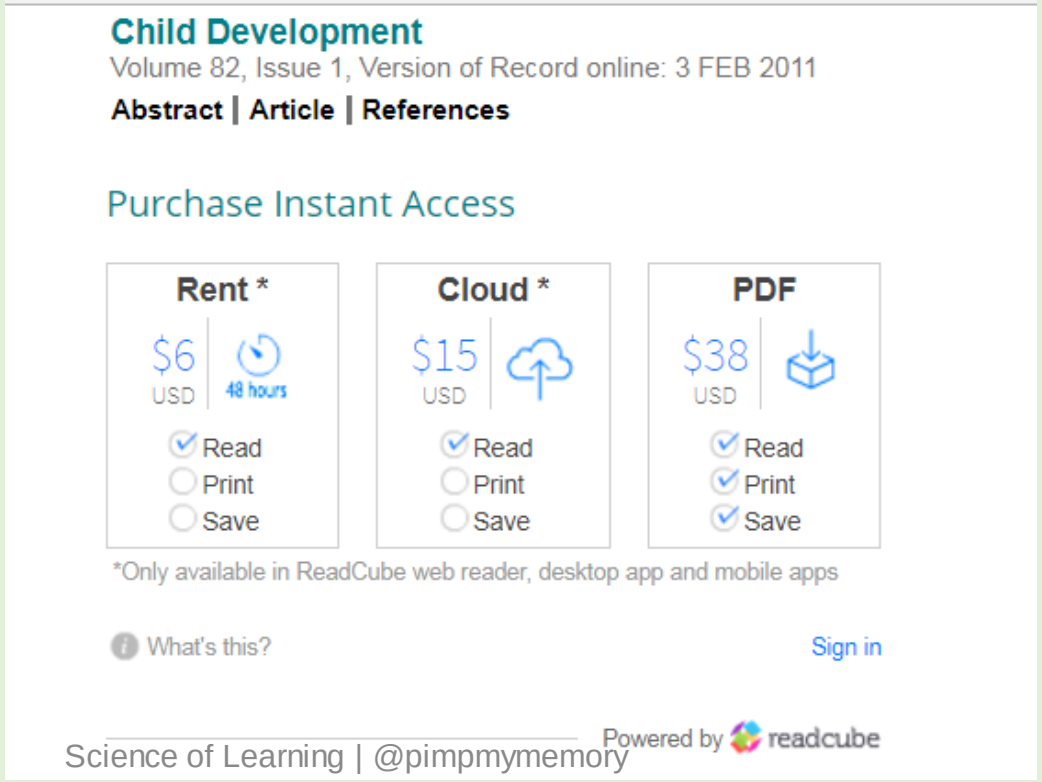
Science communication benefits and pitfalls

Accessing scientific findings

- Scientific papers aren't accessible.



Accessing scientific findings

- Scientific papers aren't accessible.

CHILD DEVELOPMENT

Child Development, January/February 2011, Volume 82, Number 1, Pages 17–32

Science Does Not Speak for Itself: Translating Child Development Research for the Public and Its Policymakers

Jack P. Shonkoff
Harvard University

Susan Nall Bales
FrameWorks Institute

Science has an important role to play in advising policymakers on crafting effective responses to social problems that affect the development of children. This article describes lessons learned from a multiyear, working collaboration among neuroscientists, developmental psychologists, pediatricians, economists, and communications researchers who are engaged in the iterative construction of a core story of development, using simplifying models (i.e., metaphors) such as "brain architecture," "toxic stress," and "serve and return" to explain complex scientific concepts to nonscientists. The aim of this article is to stimulate more systematic, empirical approaches to the task of knowledge transfer and to underscore the need to view the translation of science into policy and practice as an important academic endeavor in its own right.

"the need to view the translation of science into policy and practice as an important academic endeavour in its own right"

Accessing scientific findings

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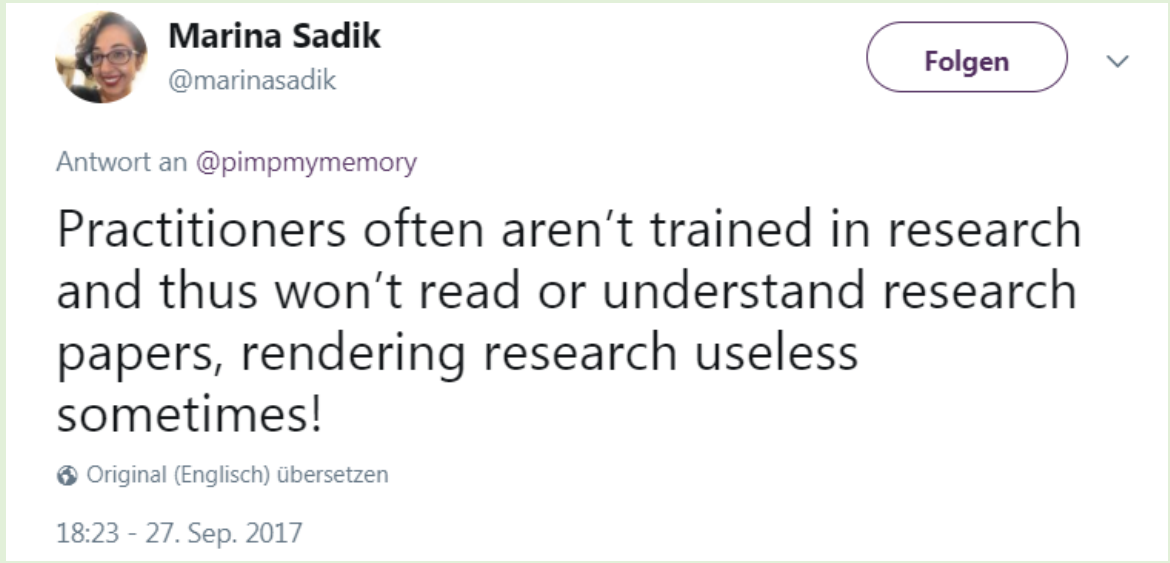
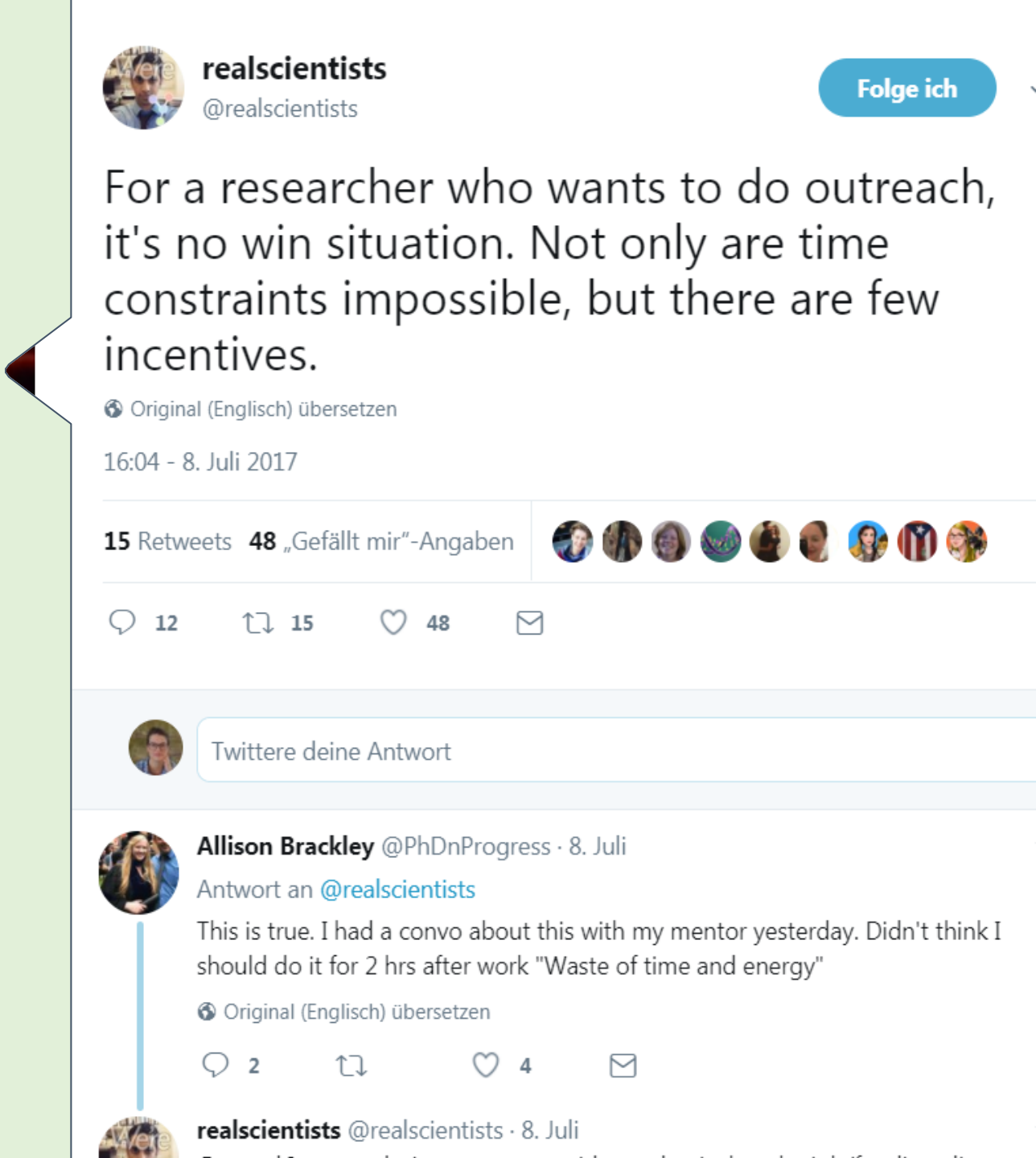


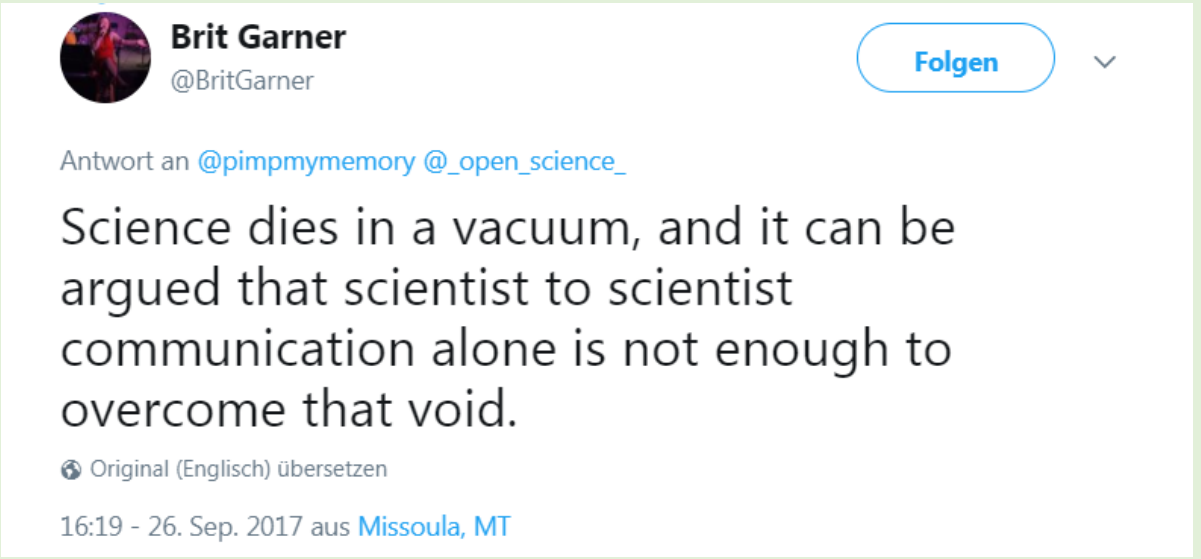
Motivation behind
Science communication

- Application of scientific knowledge to real-world problems
- Correction of prevailing myths/misconceptions in society
- Build collaborations across disciplines and sectors
- Duty to the public whose funds research relies on



Motivation behind
Science communication

Crowdsourced on Twitter



Different sources to learn about science

- Media
- Science Writers
- Scientists

Science Communication by The Media

- Bright side
  - Scientists save time
  - Research is broadcasted to a wide audience

Science Communication by The Media

- Dark side
  - Tendency to exaggerate and over-stretch research findings
  - Use of flashy headlines that distort and completely misrepresent findings

Science Communication by The Media

Bad, but true example:

HOME / SCIENCE NEWS

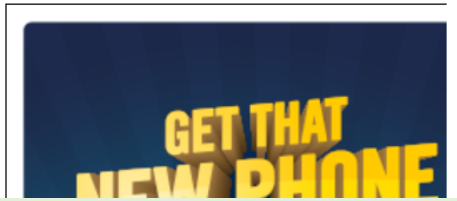
Scientists say sniffing farts could prevent cancer

Dr. Mark Wood says hydrogen sulfide "could in fact be a healthcare hero with significant implications for future therapies for variety of diseases."

By Brooks Hays | July 11, 2014 at 3:06 PM Follow @upi

0 Comments Share Tweet Email Print

EXETER, England, July 11 (UPI) -- When people pass gas, most bystanders scatter and hold their breath, but researchers at the University of Exeter in England suggest sticking around and inhaling through the nostrils.



http://www.upi.com/Science_News/2014/07/11/Scientists-say-sniffing-farts-could-prevent-cancer/3851405102633/

Science Communication by The Media

The actual journal article in Medicinal Chemistry Communications that inspired the press release was not about smelling farts or preventing any particular disease. Instead, it discussed the development of a compound, called AP39, that in laboratory experiments delivered very small amounts of hydrogen sulfide to mitochondria, an organelle that is the powerhouse of cells.

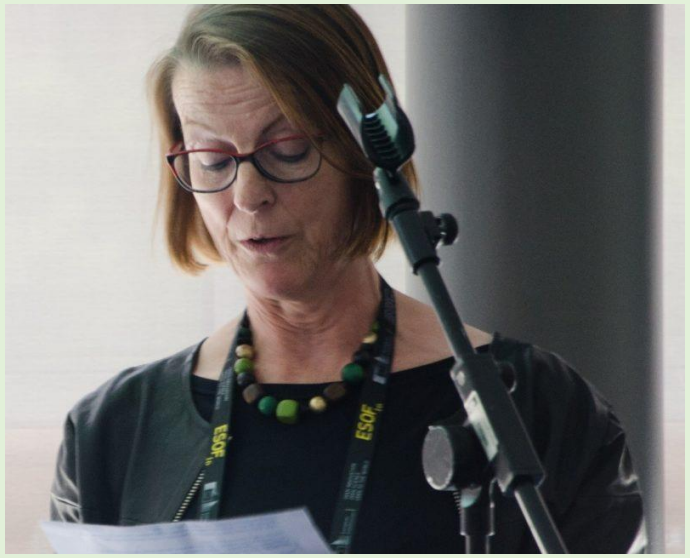
> "None of this research says you should go and inhale farts."

https://www.nbcnews.com/health/health-news/no-farts-dont-prevent-cancer-claims-dont-pass-smell-test-n156136

Science Communication by Science Writers

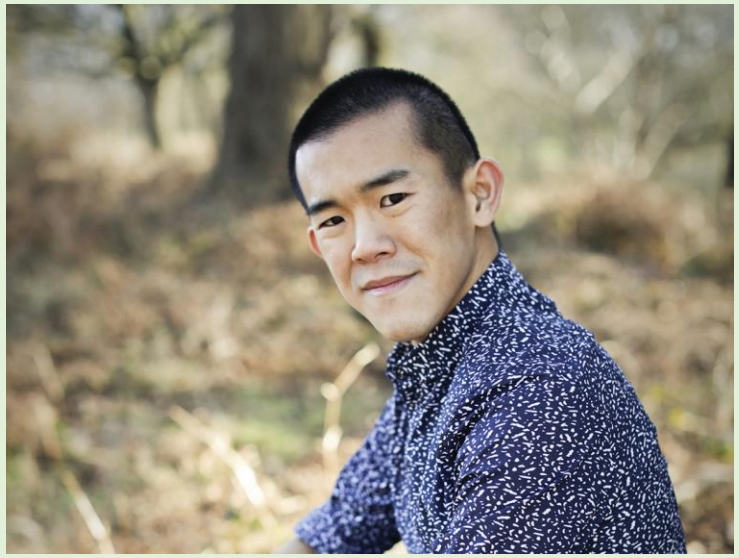
- Bright side
  - Usually experts in a specific area
  - Know the literature well
  - Provide a balanced report
  - Can often correct misrepresented headlines

Science Communication by Science Writers



Nuala Moran

Science & Technology Journalist



Ed Yong

Science Journalist

Annie Murphy Paul

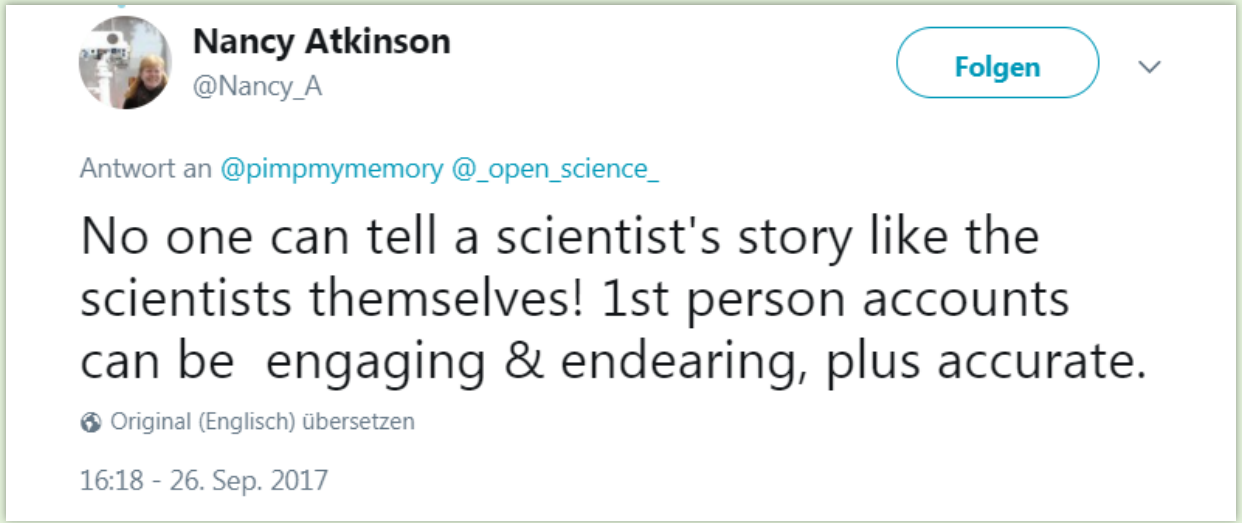
Social Sciences Journalist

Science Communication by Science Writers

- Dark side
  - Information is not first hand
  - Does not compare with knowledge depth and breadth of scientists

Science Communication by Scientists

- Bright side
  - There are many ways to do this



Science Communication by Scientists

- Dark side
  - Lost in jargon
  - Lost in details
  - Lost in translation

Science Communication by Scientists

- An anecdote: During a Q&A session to primary school children:

10-year-old child asks:
“What would happen if I stepped into a black hole?”

Renowed astronomer starts:
“Well, let's suppose using general relativity – because we won't even get into the quantum mechanics…”

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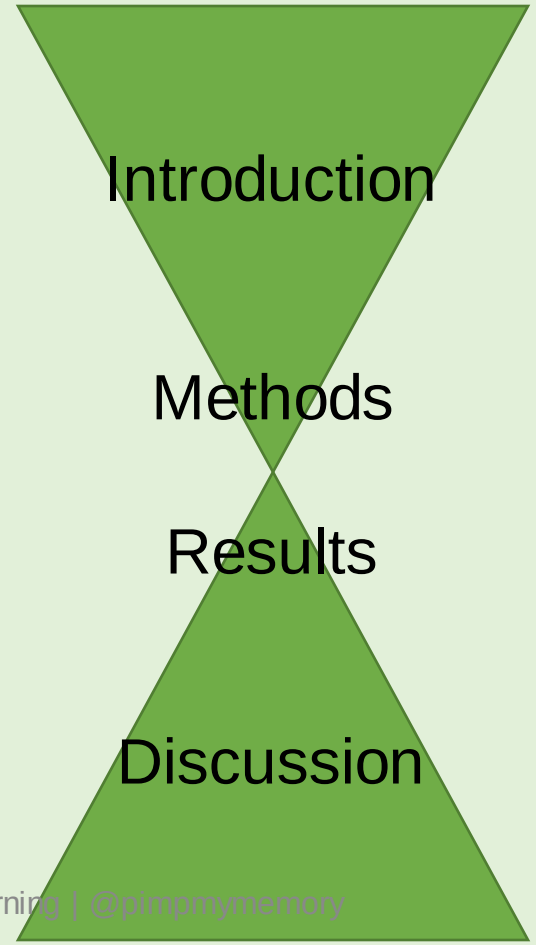
Understanding research papers

Understanding Research Papers



Introduction

- Answers ‘Why?’- questions
- Why was the topic investigated? Why was the study run?
- Gives an evidence-based justification for the study.
- Motivates the research question and hypothesis.

Teacher focus:

→ Relevance for your teaching

Methods

- Answers the ‘How?’-question
- How was the study carried out?
- A description of the Participants, Materials, Design, Procedure.
- Outlines how the hypothesis was operationalised → How it was tested.

Teacher focus:

→ Materials used and setup

→ Note: No study will ever perfectly match your classroom *(see point about theories later)*

Results

- Answer the ‘What?’- question
- What did they find?
- Report of statistics (descriptive and inferential)
- Presentation of tables and figures
- Support/reject hypothesis

Teacher focus:

→ Size of effects

→ Meaningfulness of results

Discussion + Conclusion

- Answers the ‘So What?’- question
- What was found and how does it relate to hypothesis, previous research, and theory?
- Evaluation, interpretation, and practical application of findings
- Limitations of study
- Future research avenues

Teacher focus:

→ Practical applications and limitations

→ Underlying theories and cognitive processes

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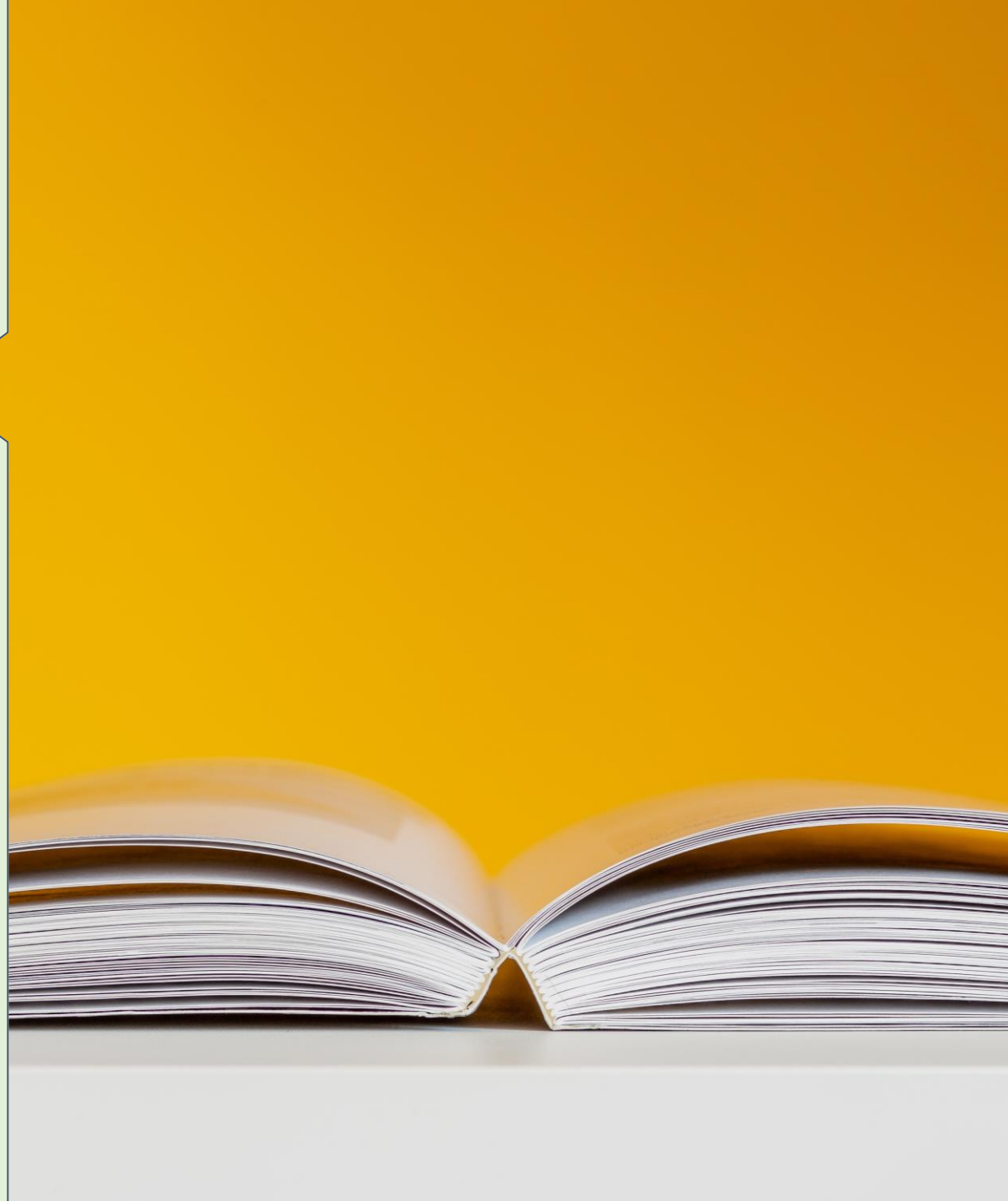
Wrap up & Homework

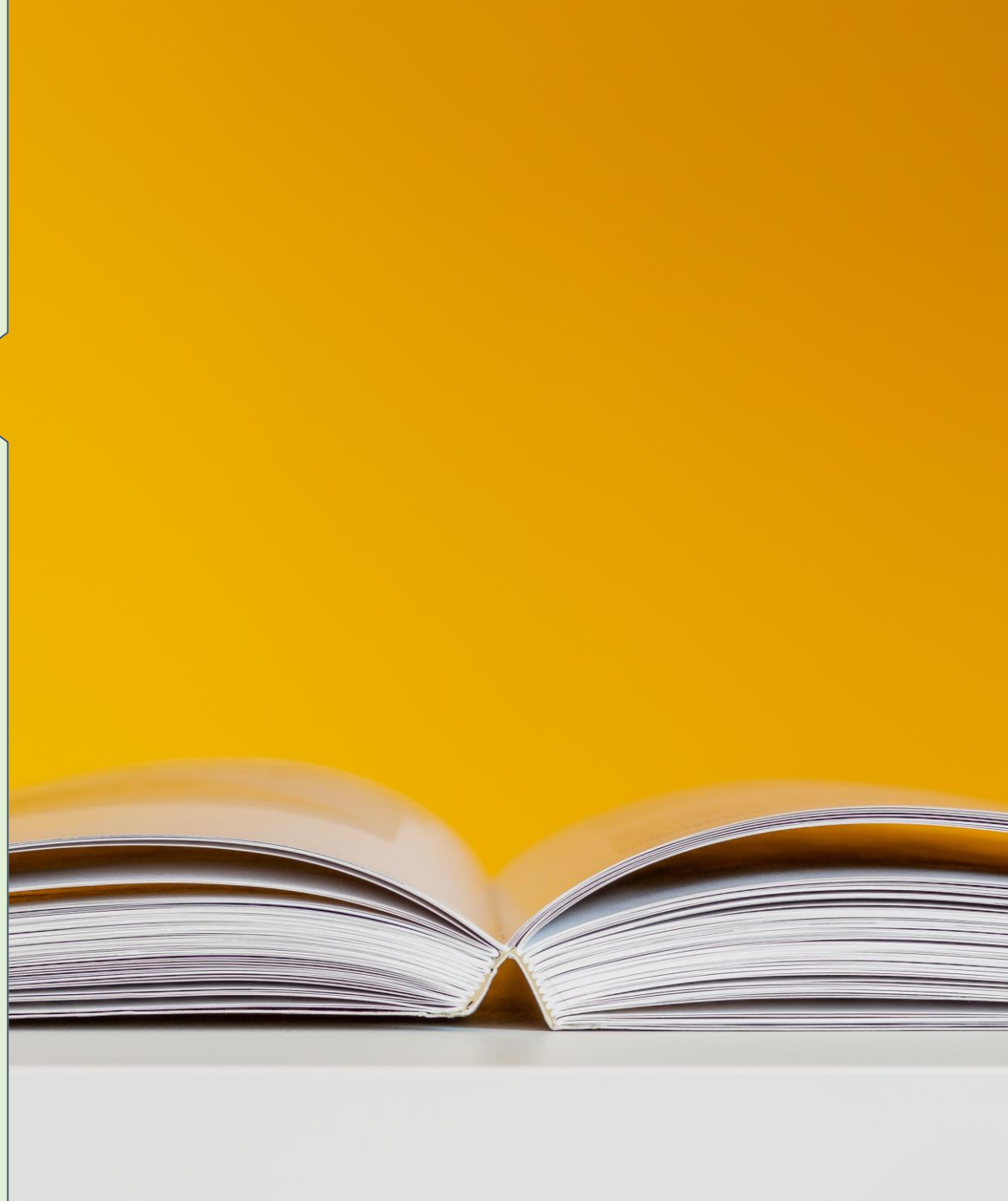
Importance of theory behind findings

- Scientific findings are a ‘screenshot’
- Never divorced from methods
- Understand the ‘why?’ and theoretical explanations → Allows extrapolation
- Maximise suggested cognitive processes in your classroom
- Accumulating evidence



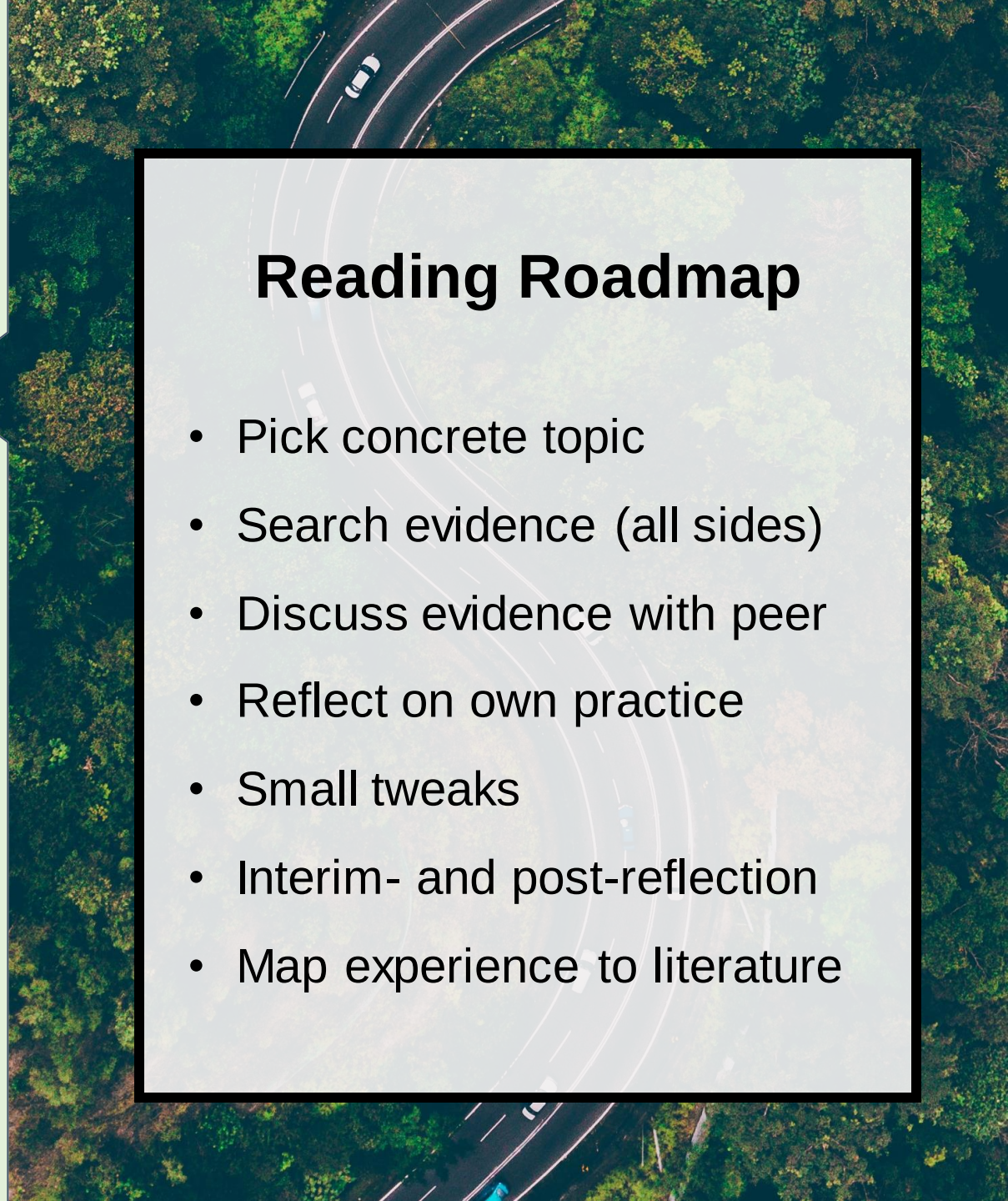
Implementing scientific findings in your practice

- Small tweaks
- Realistic goals
- Look for overlap with your current practice
- Peer support for sharing ideas and experiences



Final tips

- Watch out how findings are communicated in the media
- Use trustworthy sources
- Start your own reading journey

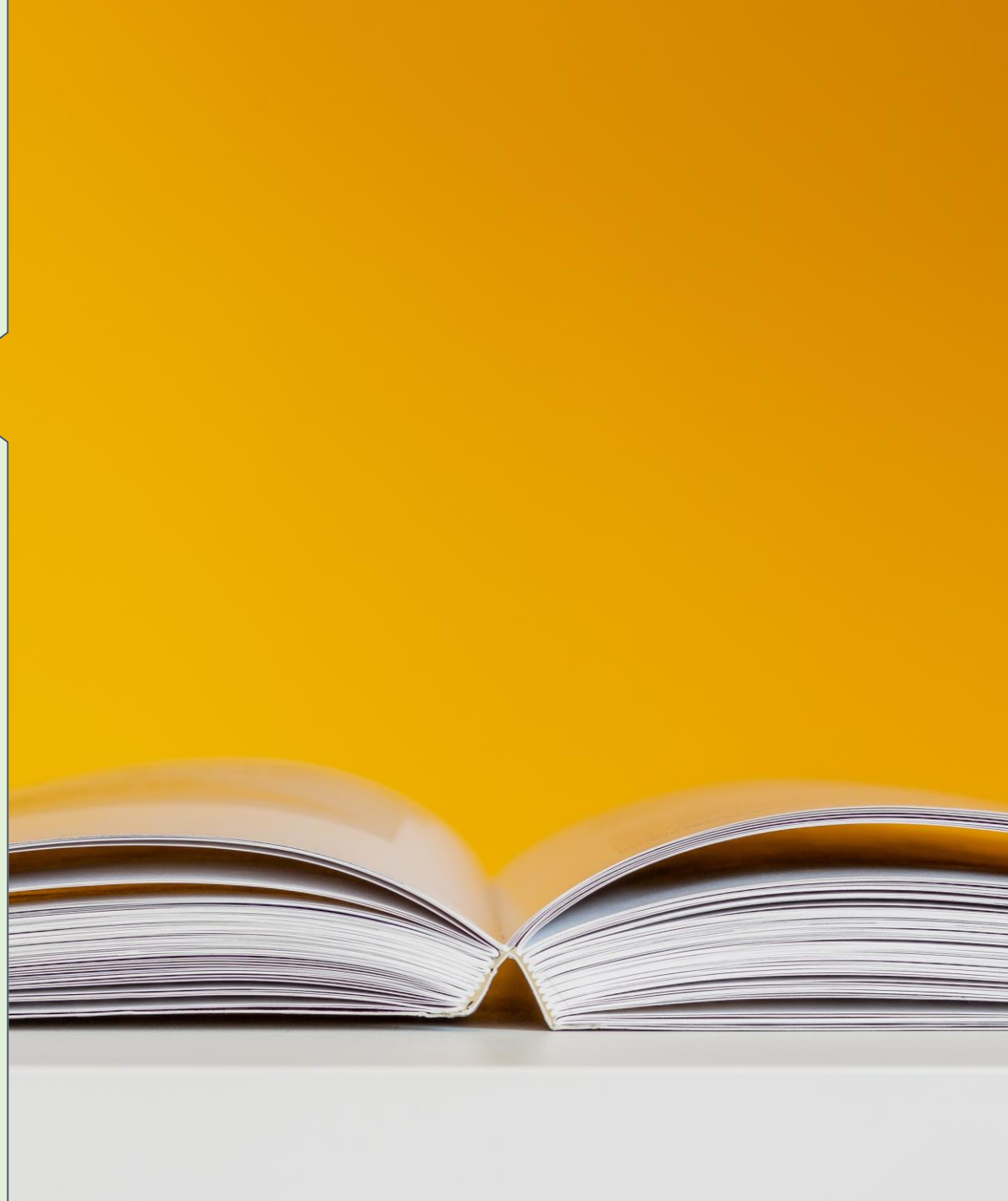


Reading Roadmap

- Pick concrete topic
- Search evidence (all sides)
- Discuss evidence with peer
- Reflect on own practice
- Small tweaks
- Interim- and post-reflection
- Map experience to literature

Open Access Journals

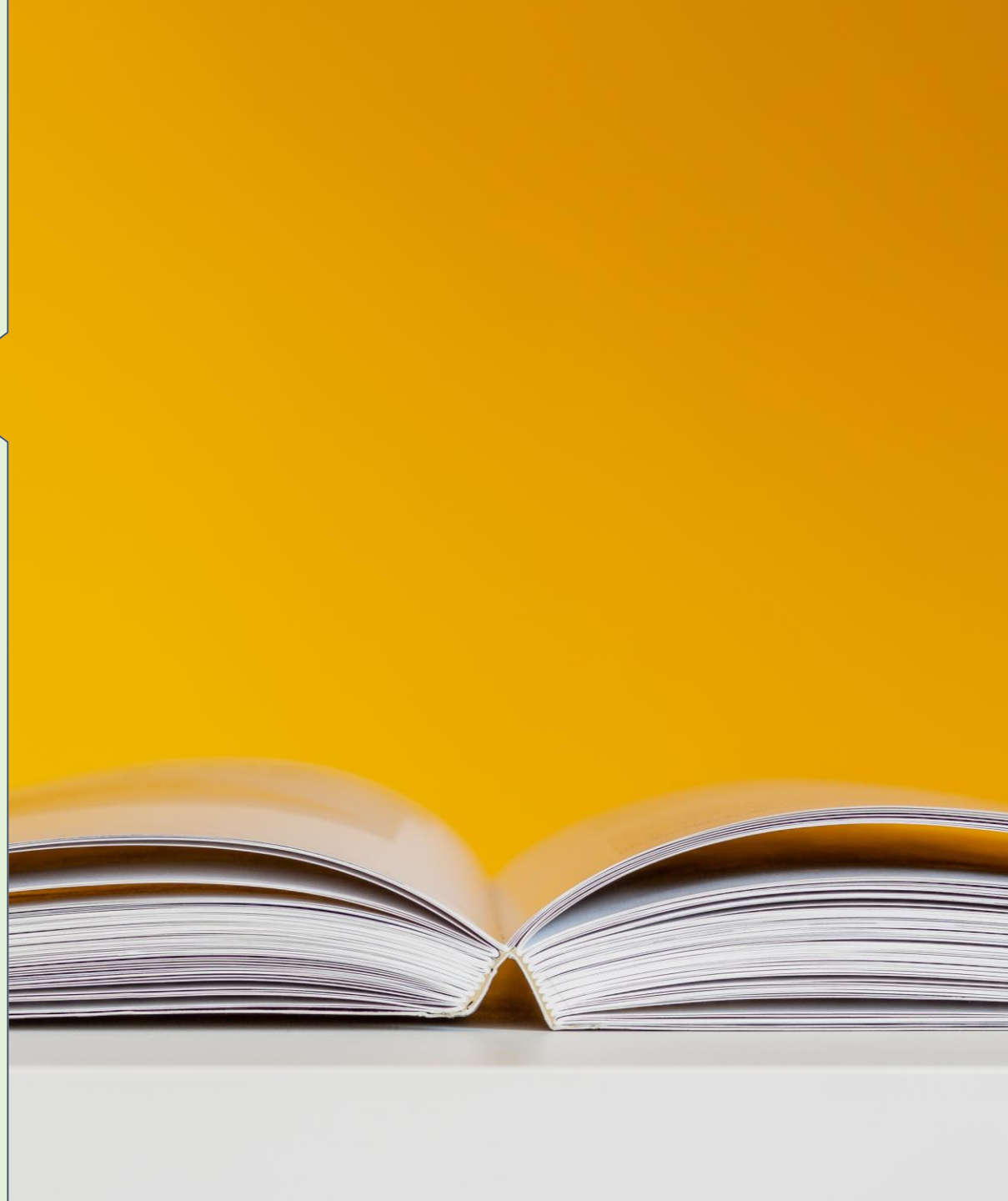
- Psychology of Learning and Teaching
- Psychological Science in the Public Interest
- PLOS One
- International Journal of Inclusive Education
- Frontiers in Psychology



Pre-Prints

Preprint platforms: Researchers upload paper manuscripts that they are about to submit to journals, so that others can access them.

- EdArXiv
- PsyArXiv



The Conversation | https://theconversation.com

Food variety is important for our health – but the definition of a 'balanced diet' is often murky

November 9, 2020 11.18am GMT

Many dietary guidelines fail to define what "variety" means. Ekaterina Kondratova/ Shutterstock

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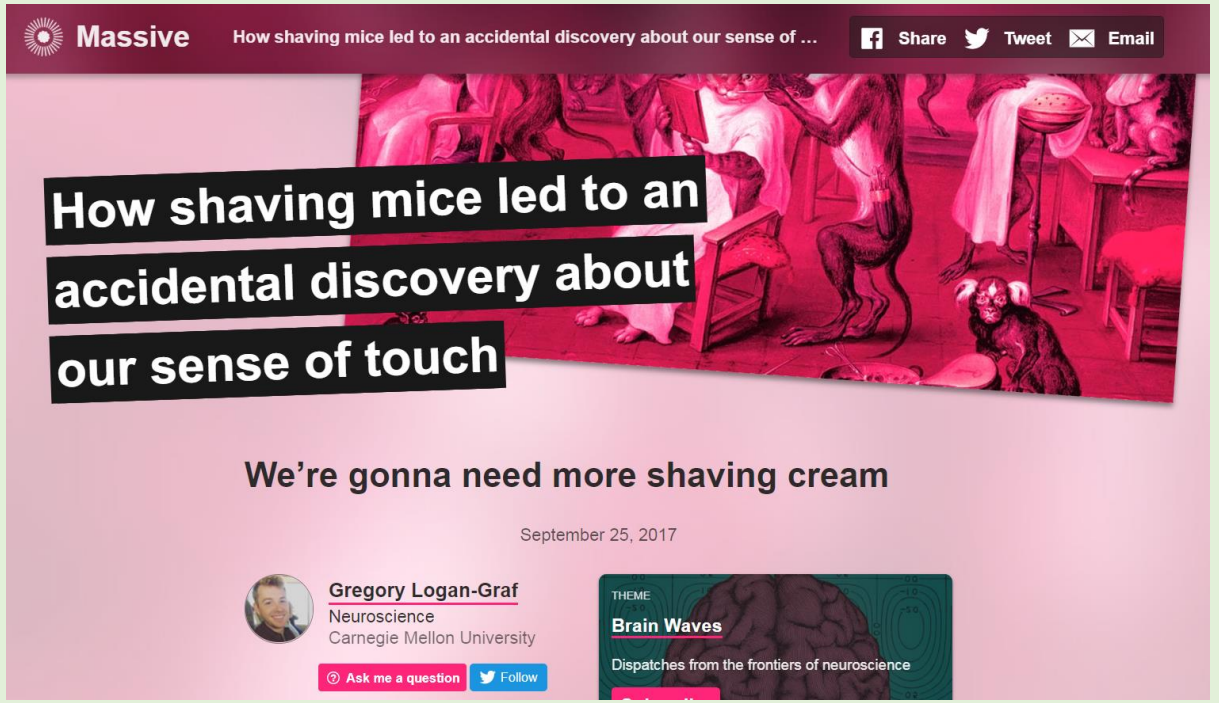
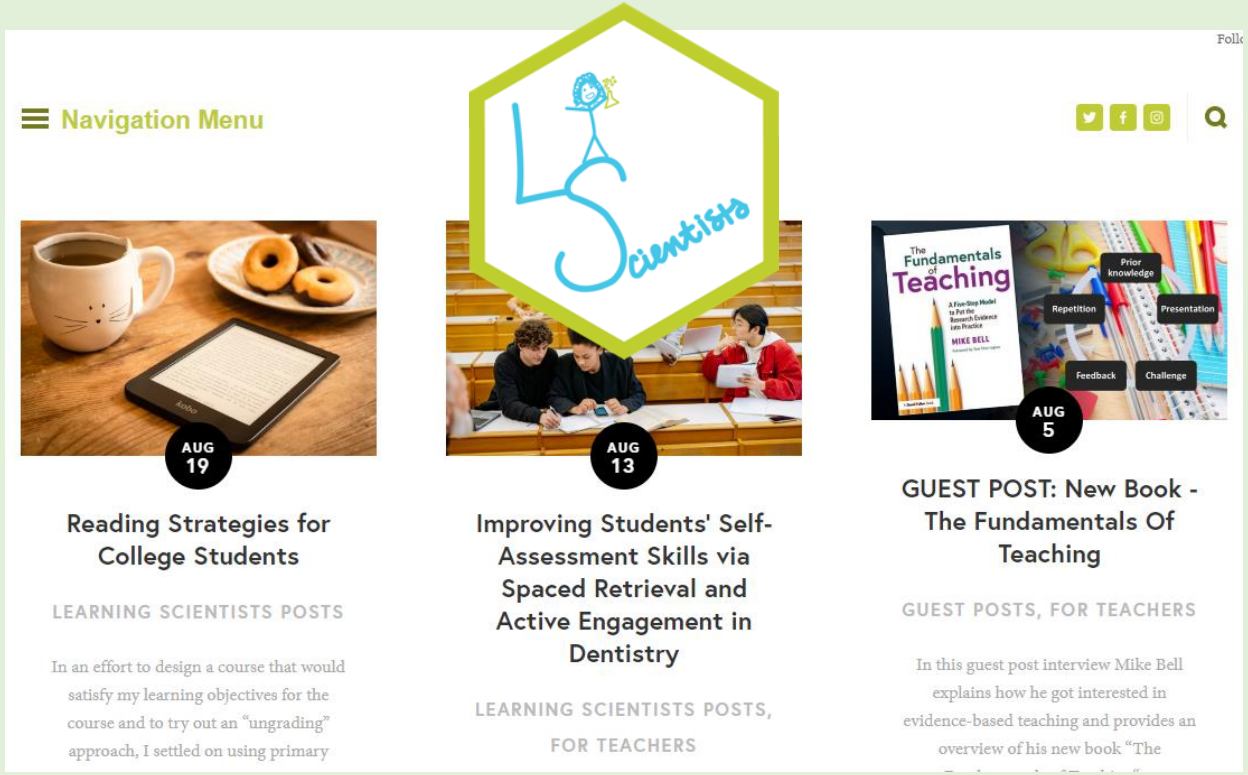
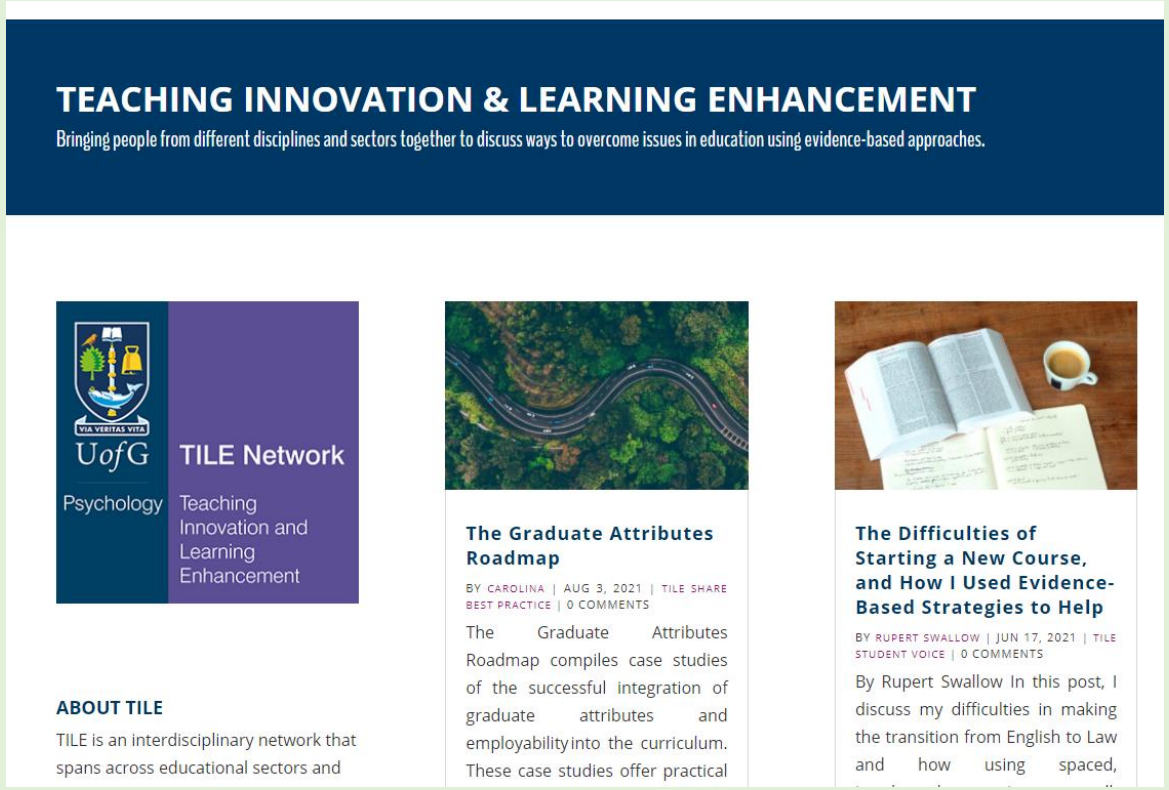


The Learning Scientists | www.learningscientists.org



TILE Network | https://tile.psy.gla.ac.uk/



Activities: Explore research papers and additional resources

- Read a review paper on the science of learning.
- Read a research paper on retrieval practice in primary school.
- Use guiding questions to work through the papers.
- Download my presentation slides.
- Read summary post of my presentation.

Thanks! Questions?

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