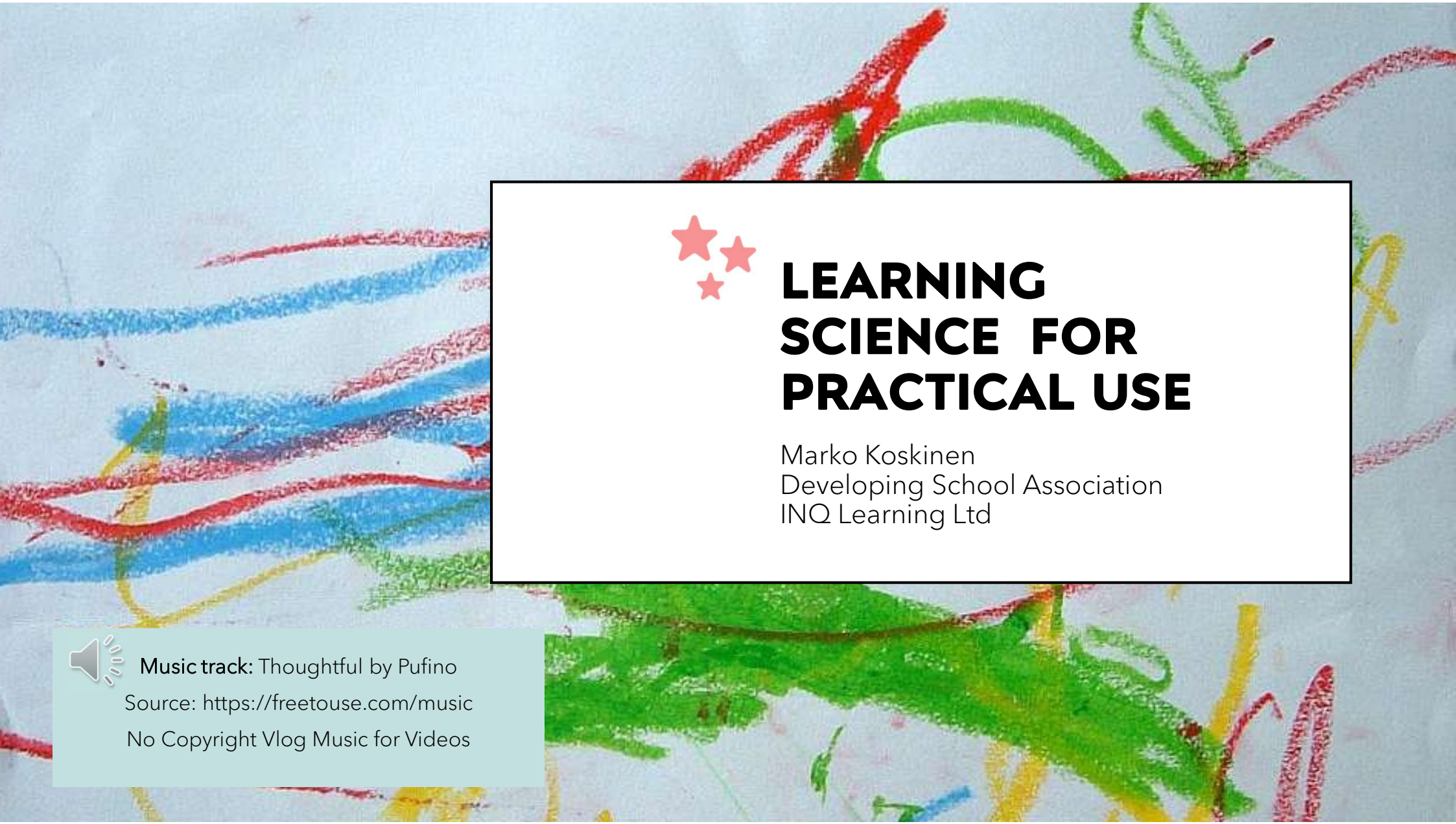

LEARNING SCIENCE FOR PRACTICAL USE

Marko Koskinen
Developing School Association
INQ Learning Ltd

Music track: Thoughtful by Pufino
Source: https://freetouse.com/music
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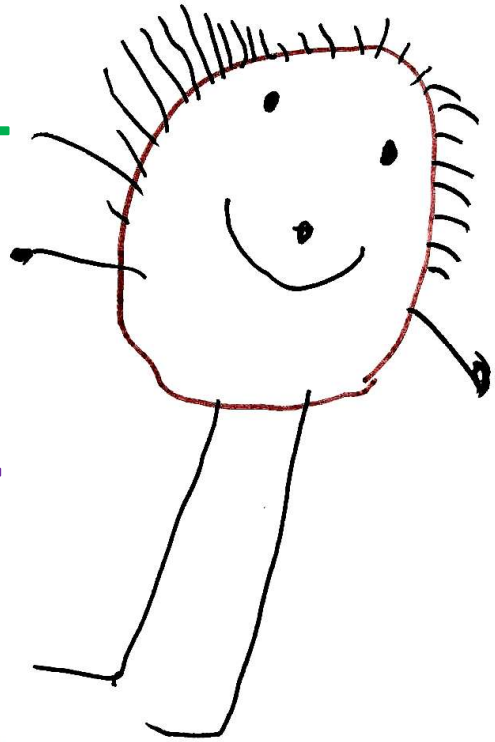
ABOUT US

DEVELOPING SCHOOL ASSOCIATION

SCHOOLS FOR STREET CHILDREN



INQ LEARNING LTD

MY IDENTITY SCHOOL

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LIFELONG SUPPORT

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- Seven webinars on Learning Science
- Lifelong access to the materials and education
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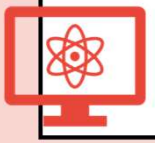
- Much, much more…

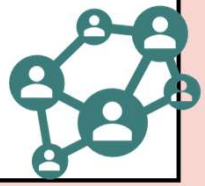
SEVEN WEBINARS

A COMPREHENSIVE OVERVIEW OF LEARNING SCIENCE IN PRACTICE AND THEORY, FROM THE CLASSICS TO THE LATEST RESEARCH.

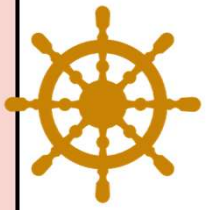
#2 – DESIGN YOUR CLASSROOMS FOR DEEP LEARNING



#3 – ORGANIZE YOUR CLASSROOMS FOR COOPERATION AND INTERACTION

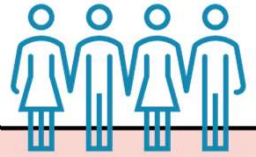


#4 – EDUCATING INDEPENDENT AND SELF-DIRECTED LEARNERS

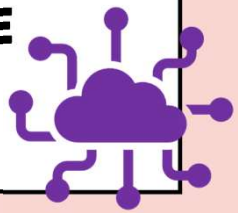


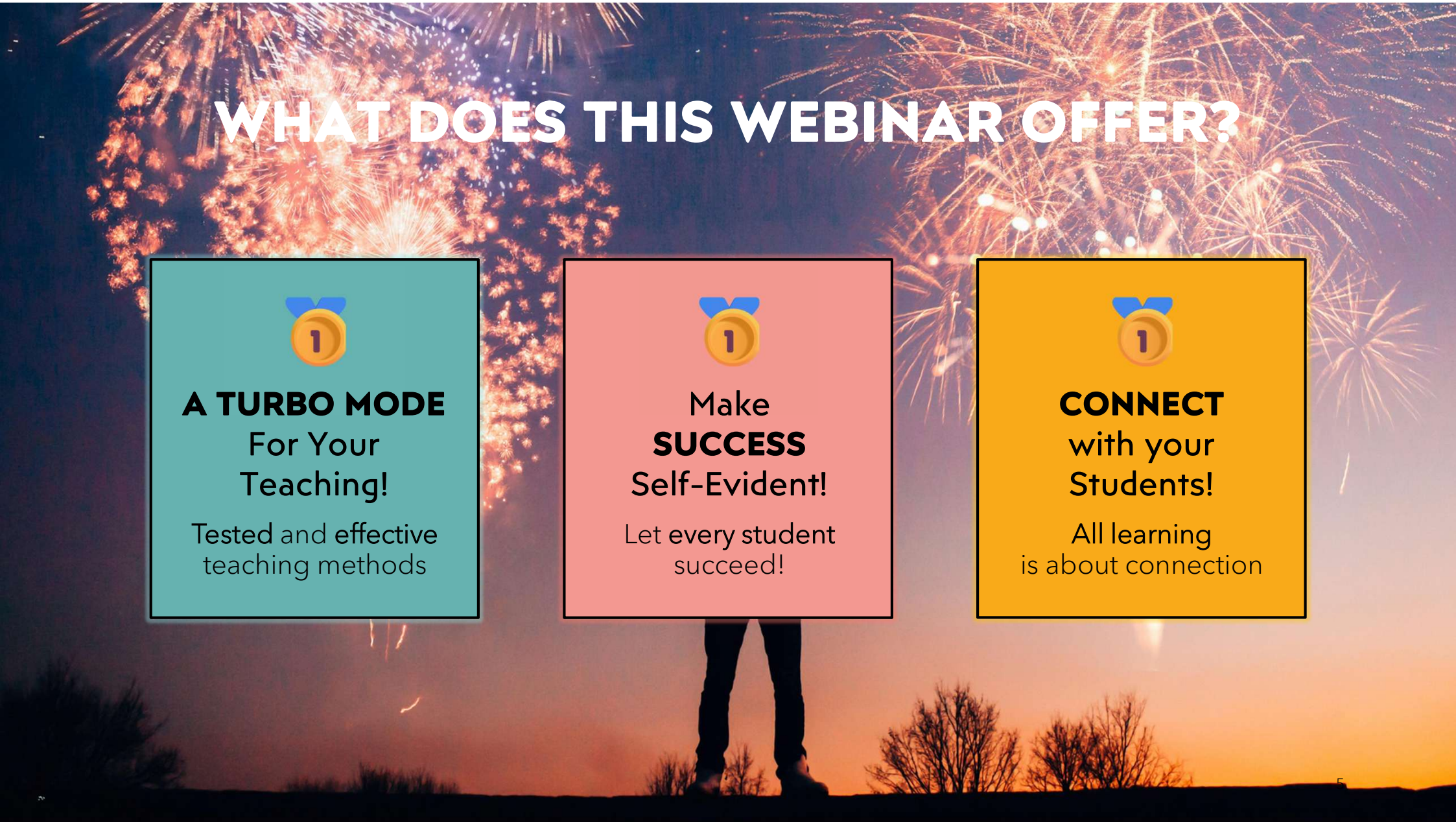
#5 – USE EVALUATION AS A TOOL FOR LEARNING

#6 – SCHOOL AS A SUPPORTING AND LEARNING ORGANIZATION



#7 – USING TECHNOLOGY TO IMPROVE AND INCREASE LEARNING




WHAT DOES THIS WEBINAR OFFER?
A TURBO MODE
For Your
Teaching!
Tested and effective
teaching methods
Make
SUCCESS
Self-Evident!
Let every student
succeed!
CONNECT
with your
Students!
All learning
is about connection

CONTENT OF THE WEBINAR

How to put theory into practice

#1 KEY COGNITIVE PRINCIPLES (30')

Retrieval practice, Spaced Repetition and Cognitive Load Theory

#2 TOWARDS DEEPER LEARNING (30')

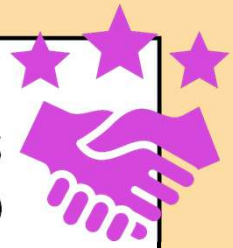
How attention, memory and motivation work together

#3 MISCONCEPTIONS ABOUT LEARNING (15')

Learning styles, left/right brain learners and multitasking

#4 QUICK AUDIT (5')

How well my teaching is aligned with Learning Science



#5 PARTNERS FOR LIFE (20')

How we can support you in your work and personal life.

Annual Training Calendar

How you can participate in our trainings

Questions and Answers

WHY THE SCIENCE OF LEARNING IS IMPORTANT?

WHY SELF-REFLECTION IS IMPORTANT FOR TEACHERS?

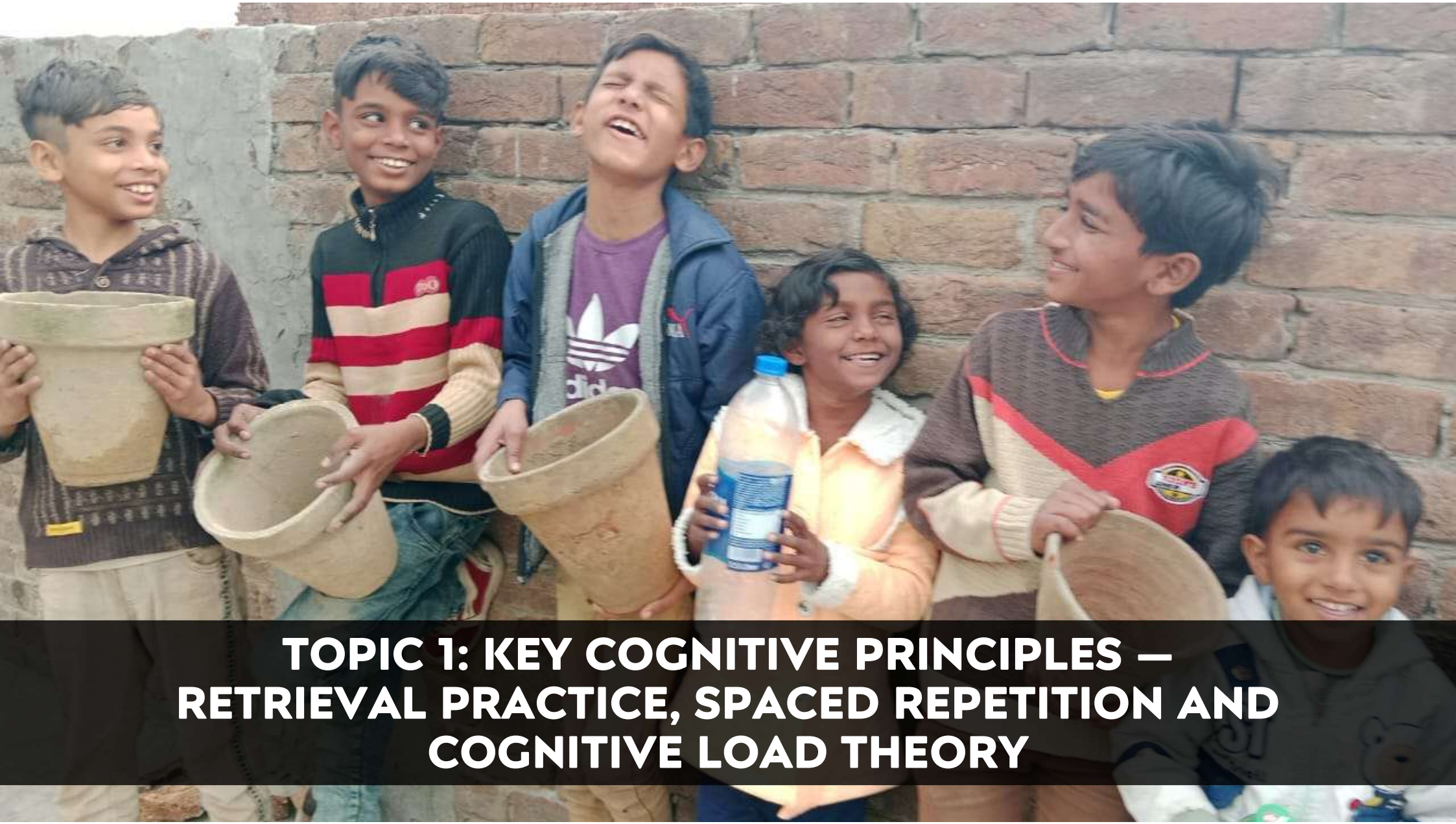
Research consistently shows that expert teachers are reflective teachers. They consciously evaluate what works, what doesn't – and why. (Hattie, 2009)

Self-reflection helps you:

- *Identify quick wins – easy-to-implement strategies*
- *Spot gaps – areas where small adjustments can improve learning*
- *Plan next steps – small, manageable changes*

Key study:

Hattie, J. (2009). Visible Learning.



TOPIC 1: KEY COGNITIVE PRINCIPLES — RETRIEVAL PRACTICE, SPACED REPETITION AND COGNITIVE LOAD THEORY

COGNITIVE PRINCIPLES

Retrieval practice

Spaced repetition

Cognitive Load Theory

RETRIEVAL PRACTICE

Better learning through repeated retrieval of learned information.

Students who practiced retrieval remembered 50% more a week later than those who only reread the material.

Key study:

Roediger & Karpicke (2006): Test-enhanced learning: Taking memory tests improves long-term retention. Psychological Science, 17(3), 249–255.

Roediger & Butler (2011). The critical role of retrieval practice in long-term retention.

RETRIEVEAL PRACTICE IN THE CLASSROOM

1. LOW-STAKES QUIZZES

2. " BRAIN DUMPS"

3. THINK-PAIR-SHARE

4. FLASHCARDS

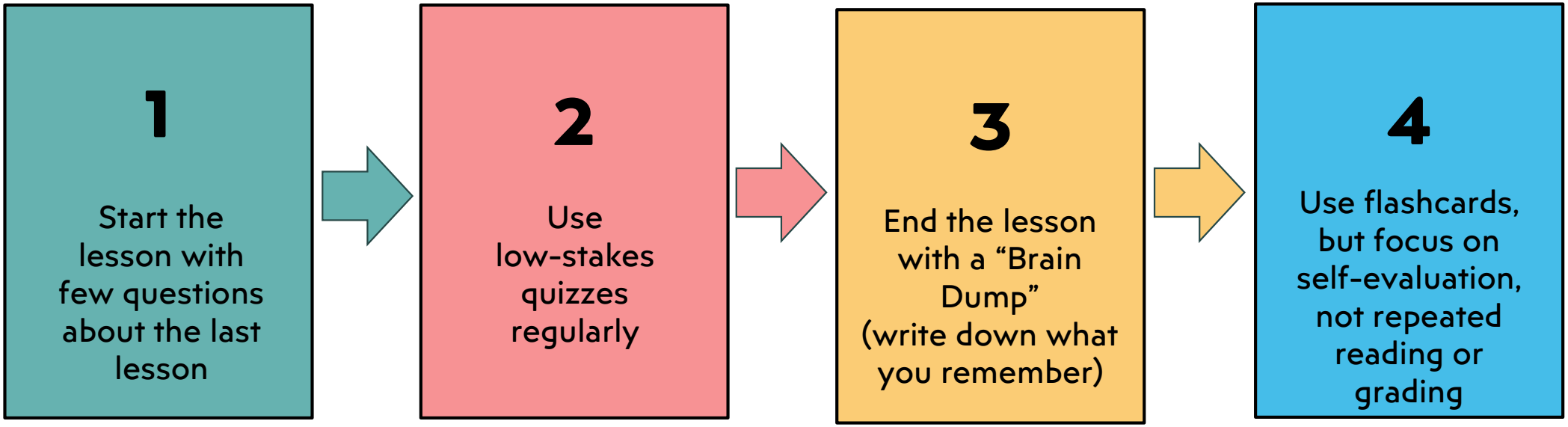
5. EXIT TICKETS

Self-reflection

- NEVER
- SOMETIMES
- REGULARLY

KEY IDEA: Don't just ask students to review — ask them to retrieve. The effort strengthens memory.

HOW TO?



Why it works: Forces students to retrieve information → strengthens nerve connections

SPACED REPETITION

Spaced Practice

A meta-analysis of 254 studies showed that distributed (spaced) practice almost always outperforms massed (crammed) practice.

Key study:

Cepeda et al. (2006): Distributed practice in verbal recall tasks: A review and quantitative synthesis. Psychological Bulletin, 132(3), 354–380.

SPACED REPETITION IN PRACTICE

1. SPIRAL CURRICULUM

2. CUMULATIVE ASSIGNMENTS

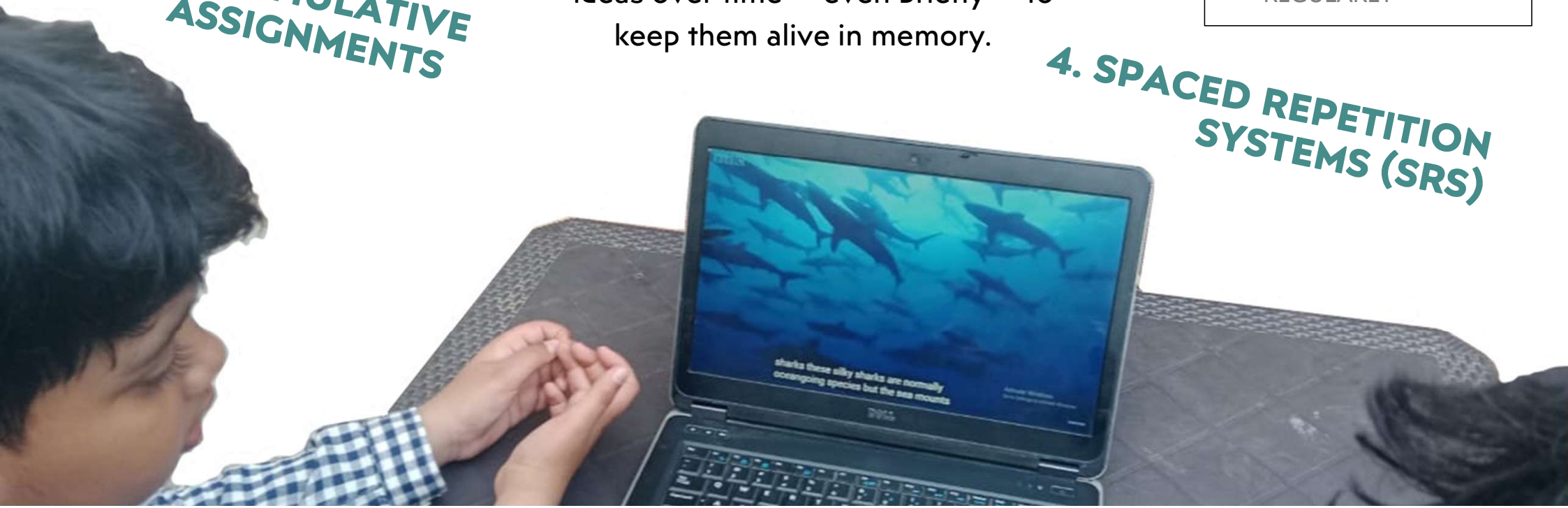
KEY IDEA: The key is to plan for forgetting and revisit important ideas over time — even briefly — to keep them alive in memory.

3. MINI-TESTS

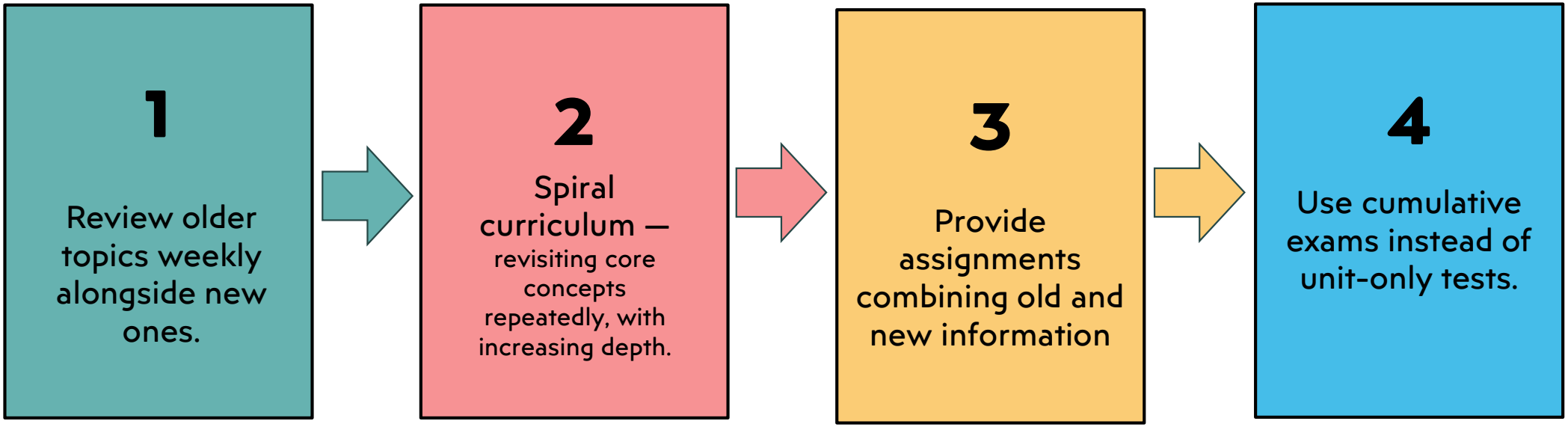
Self-reflection

- NEVER
- SOMETIMES
- REGULARLY

4. SPACED REPETITION SYSTEMS (SRS)



HOW TO?



Why it works: distributed practice prevents forgetting and strengthens memory.

COGNITIVE LOAD THEORY

In other words, mental strain

Overly complex or unstructured material overloads working memory and hinders learning.

Key study:

Sweller (1988): Cognitive load during problem solving: Effects on learning. Cognitive Science, 12(2), 257–285.

Sweller et al. (2011). Cognitive Load Theory

Cowan (2010). The magical mystery four

THREE TYPES OF COGNITIVE LOAD

INTRINSIC LOAD

The complexity of the material itself

EXTRANEOUS LOAD

unnecessary difficulty caused by unclear or confusing instruction

GERMANE LOAD

The mental work that helps build schemas (understanding)

HOW TO APPLY?

1. BREAK COMPLEX TASKS

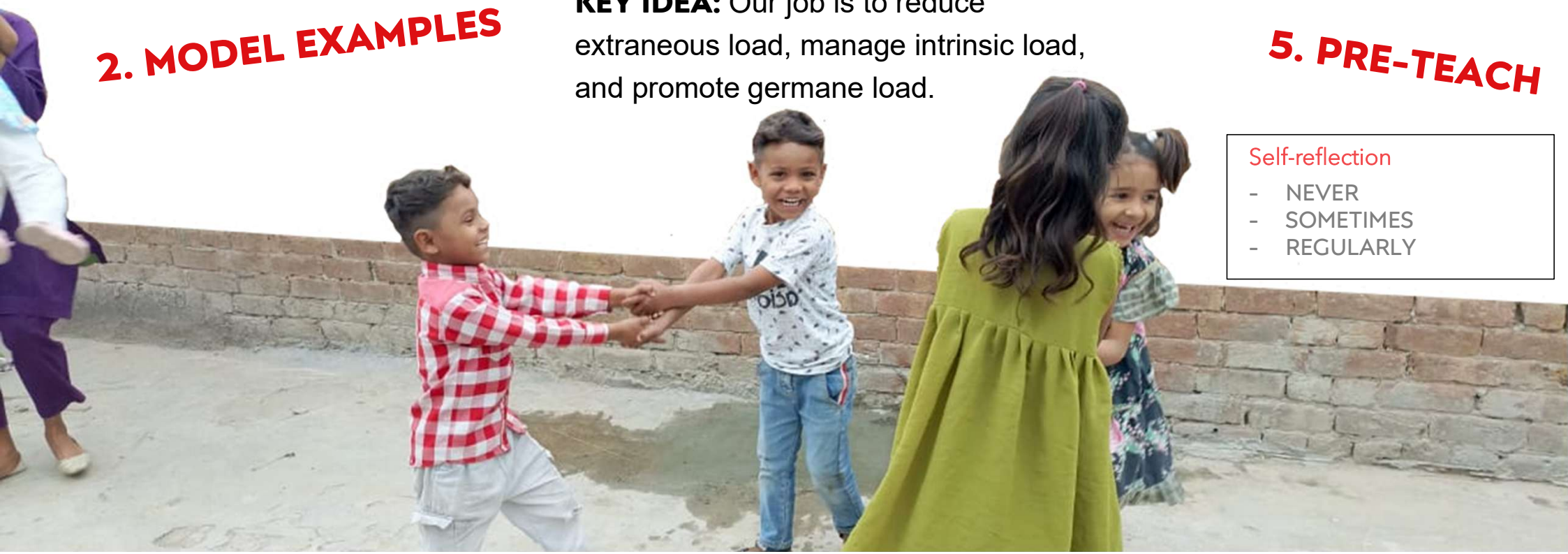
2. MODEL EXAMPLES

3. FOCUS ATTENTION

4. CLARITY

5. PRE-TEACH

KEY IDEA: Our job is to reduce extraneous load, manage intrinsic load, and promote germane load.



Self-reflection

- NEVER
- SOMETIMES
- REGULARLY

REVIEW

Retrieval Practice

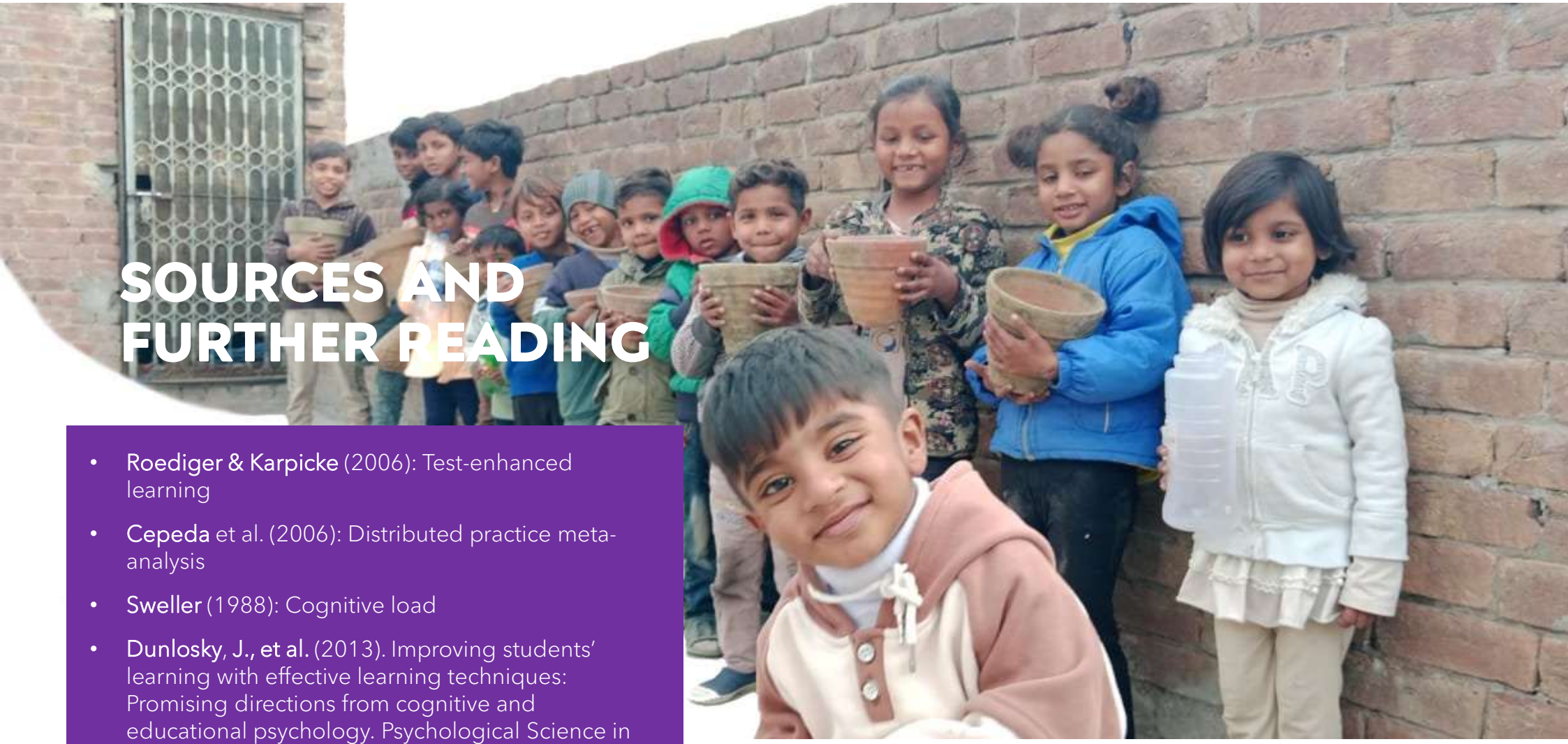
Low-stakes quizzes
"Brain Dumps"
Think-pair-share
Flashcards
Exit tickets

Spaced repetition

Spiral curriculum
Cumulative assignments
Mini-tests
Space Repetition Systems

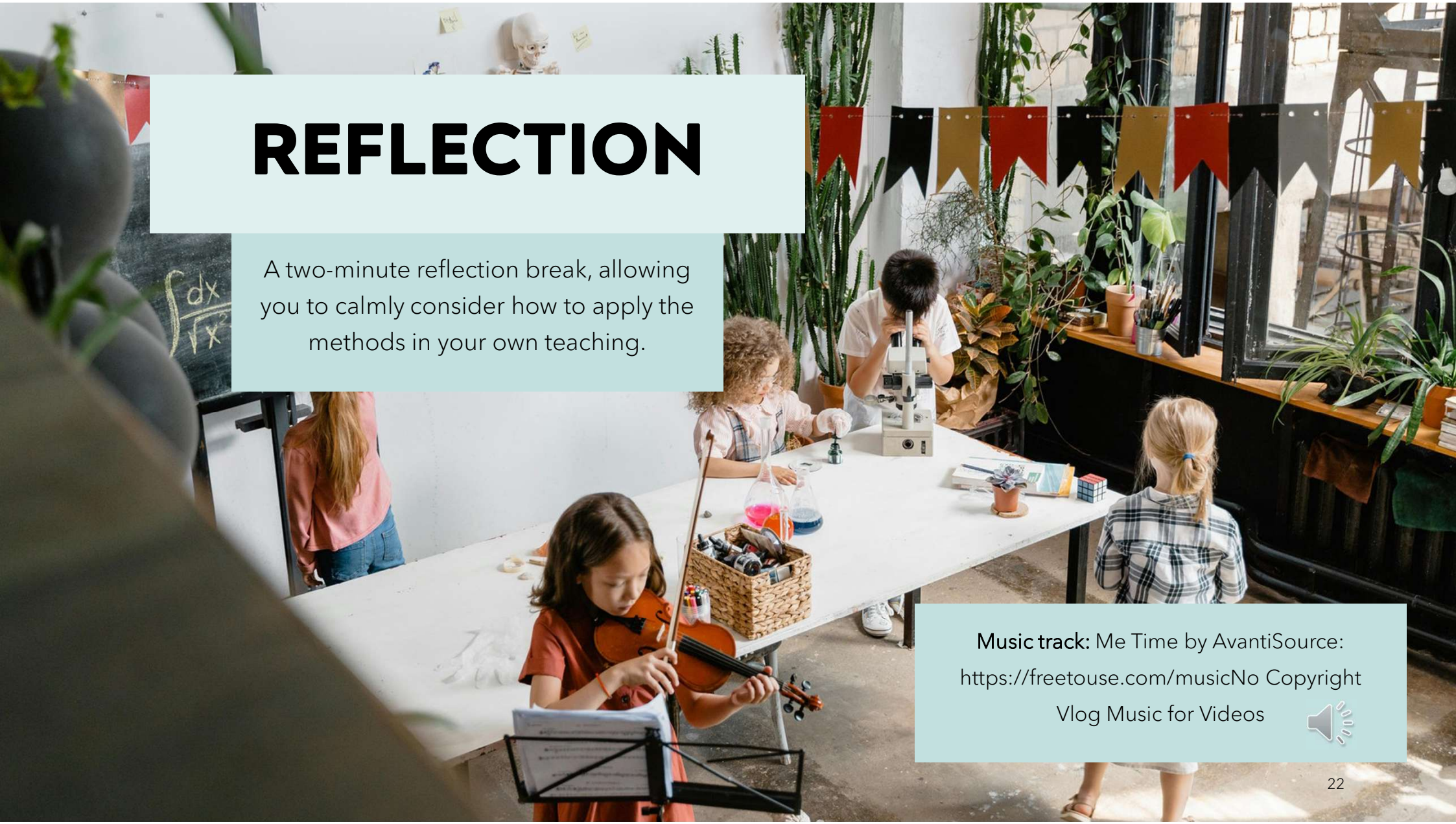
Cognitive Load Theory

Break complex tasks
Model examples
Focus attention
Clarity
Pre-teach



SOURCES AND FURTHER READING

- **Roediger & Karpicke** (2006): Test-enhanced learning
- **Cepeda** et al. (2006): Distributed practice meta-analysis
- **Sweller** (1988): Cognitive load
- **Dunlosky, J., et al.** (2013). Improving students' learning with effective learning techniques: Promising directions from cognitive and educational psychology. Psychological Science in the Public Interest, 14(1), 4–58.
  -> (summarizes most methods)



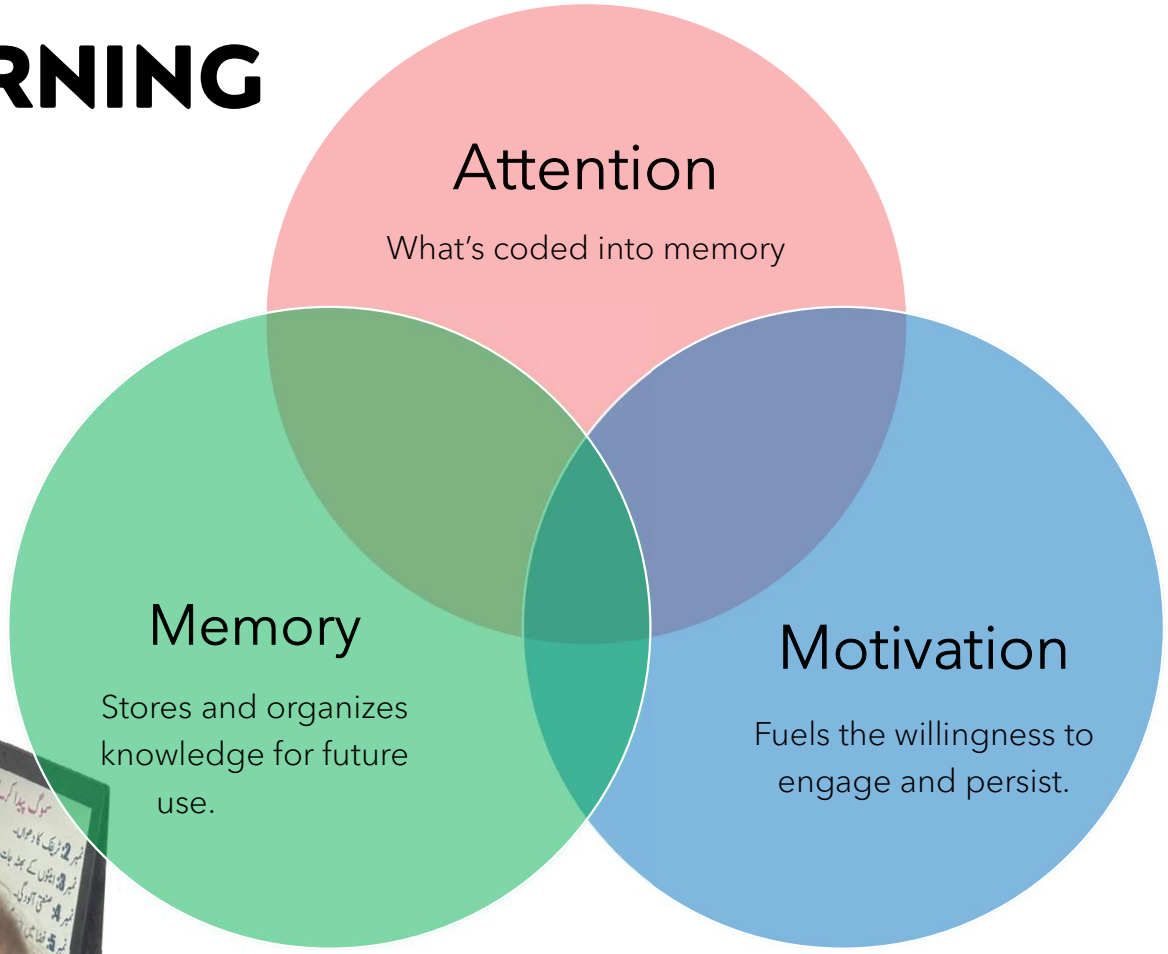
REFLECTION

A two-minute reflection break, allowing you to calmly consider how to apply the methods in your own teaching.

Music track: Me Time by AvantiSource: https://freetouse.com/musicNo Copyright Vlog Music for Videos

TOPIC 2: HOW MEMORY, ATTENTION, AND MOTIVATION WORK TOGETHER IN LEARNING

TRIANGLE OF LEARNING



ATTENTION — THE GATEKEEPER

Attention acts as a filter — deciding what gets encoded into memory.

But attention is limited and selective.

Cowan showed that working memory can only handle 3–5 pieces of information at once.

Key study:

Cowan, N. (2010). *The magical mystery four.*

HOW TO CAPTURE AND HOLD ATTENTION

1. NOVELTY AND VARIETY

change activity types,
use stories

KEY IDEA:
Interesting, clear, varied, and meaningful

2. MINIMIZE DISTRACTIONS

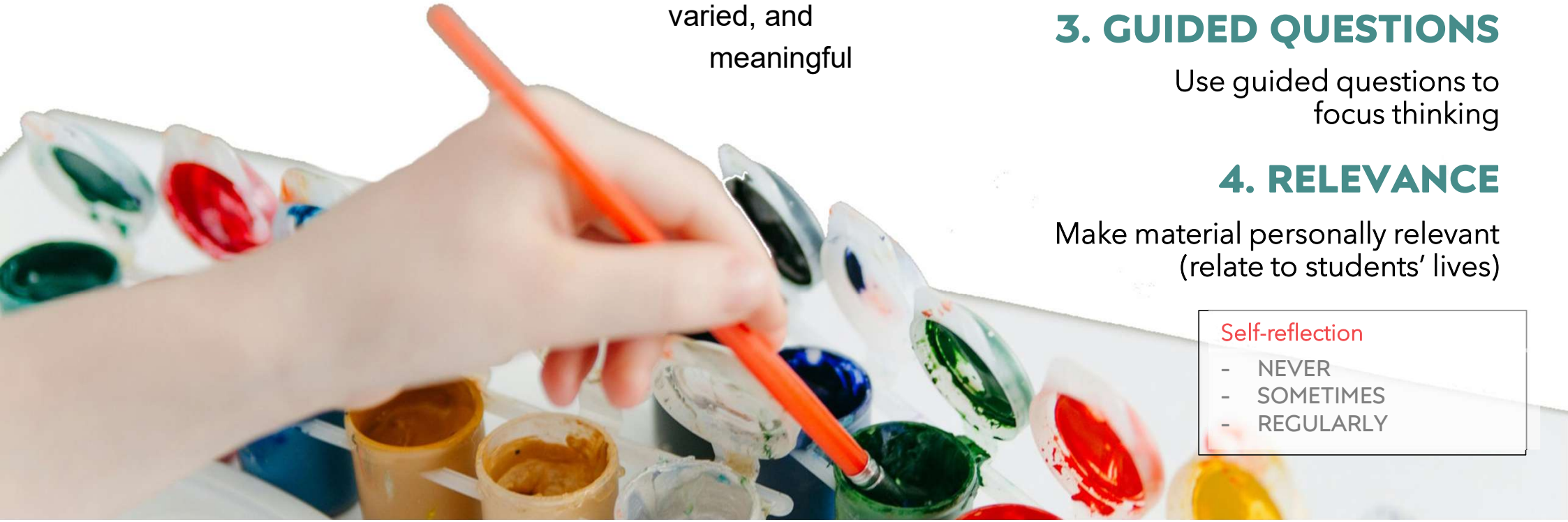
clear instructions,
organized materials

3. GUIDED QUESTIONS

Use guided questions to focus thinking

4. RELEVANCE

Make material personally relevant (relate to students' lives)



Self-reflection

- NEVER
- SOMETIMES
- REGULARLY

WHAT IS MEMORY?

Daniel Willingham (2009): "*Memory is the residue of thought.*"

In other words — ***what we think about is what we remember***

Key study:

Willingham, D. T. (2009): *Why Don't Students Like School?*

SUMMARY OF WILLINGHAM'S BOOK

1. Thinking is hard – and people naturally avoid it

2. Memory is the foundation of learning

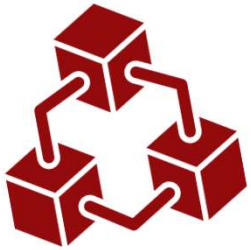
3. Understanding develops slowly – practice is essential

4. Students remember what they pay attention to

5. Teaching is effective when it builds on the student's level of knowledge

6. Learning styles are a myth

7. Motivation is built through experiences of success



METHODS SUPPORTING MEMORY

1. Spaced Repetition

Cepeda, N. J., Pashler, H., Vul, E., Wixted, J. T., & Rohrer, D. (2006). → A meta-analysis shows that spaced practice significantly improves memory compared to massed (single-session) practice.

2. Retrieval Practice (self-practice)

Roediger, H. L., & Karpicke, J. D. (2006). → Learners who prepared to teach retained information more deeply and remembered it better.

3. Mnemonics

Bellezza, F. S. (1981). → Cognitive memory strategies that continue to be developed in light of new technologies and learning theories.

4. Learning by Teaching

Fiorella, L., & Mayer, R. E. (2013). → Learners who prepared to teach retained information more deeply and remembered it better.

5. Chunking and Associations

Gobet, F., & Simon, H. A. (1998). → Chunking improves memory performance, especially among experts – applicable to study situations as well.

METHODS SUPPORTING UNDERSTANDING

1. Socratic dialogue / answering questions

Paul, R., & Elder, L. (2006). → The Socratic method of questioning develops thinking and deeper understanding.

2. Knowledge construction

Scardamalia, M., & Bereiter, C. (2006) → Present a model of knowledge construction in which students create meaning and develop their own understanding.

3. Comparison and analogies

Gentner, D., Loewenstein, J., & Thompson, L. (2003). → Using analogies supports transfer of learning and deeper understanding of new topics.

4. Creating concept maps

Novak, J. D., & Cañas, A. J. (2008). → Concept maps help learners organize information and build meaningful connections.

5. Problem-solving in authentic contexts (problem-based learning)

Hmelo-Silver, C. E. (2004). → Problem-based learning develops deep understanding, self-regulation, and collaboration skills.

THREE STAGES OF MEMORY

Encoding

GETTING INFORMATION INTO MEMORY

Active thinking

Storage

KEEPING INFORMATION OVER TIME

Long term memory

Retrieval

BRINGING INFORMATION BACK WHEN NEEDED

Retrieval practice helps

WHY MOTIVATION IS IMPORTANT?

Self-Determination Theory

(Deci & Ryan, 2000):

Students are most motivated when they experience:

- **Autonomy** (they have control over their own learning)

- **Competence** (they feel successful and capable)

- **Relatedness** (they feel a sense of belonging and being valued)

Key study:

Deci, E. L. & Ryan, R. M. (2000): The “what” and “why” of goal pursuits.

Deci & Ryan (2000): Self-Determination Theory

PRACTICAL STRATEGIES TO INCREASE MOTIVATION

1. GIVE CHOICES

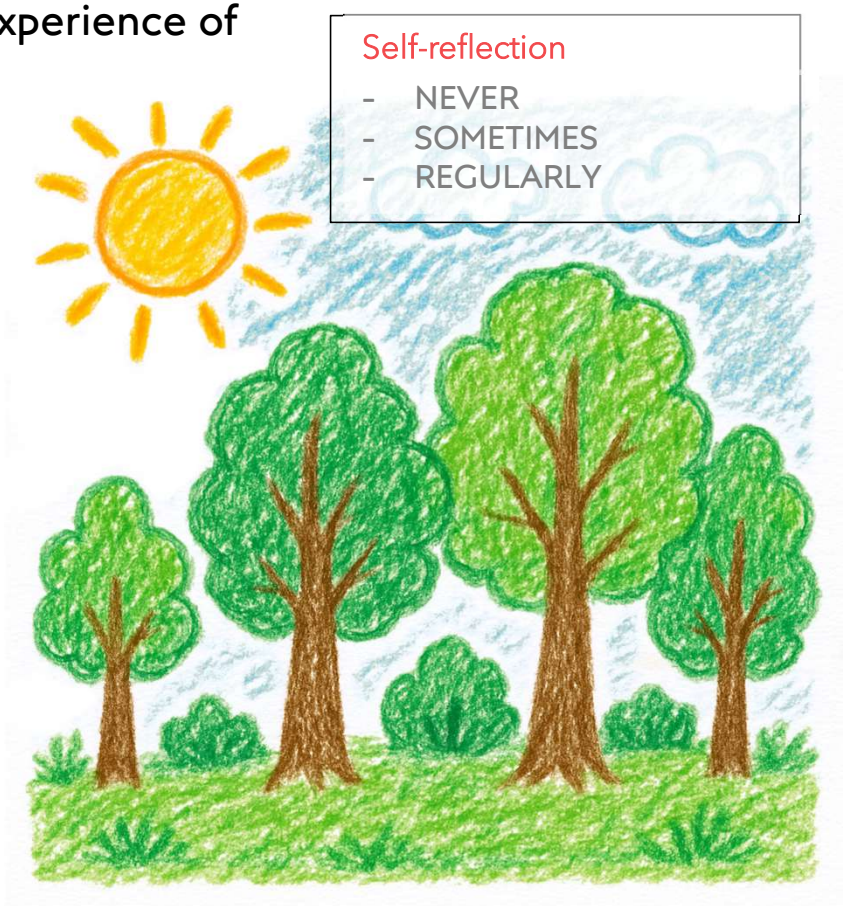
2. ENSURE SUCCESSES

3. GIVE ENCOURAGING FEEDBACK

4. BUILD A SUPPORTIVE COMMUNITY

5. MAKE CONTENT MEANINGFUL

MAIN IDEA: Participation, a sense of community, and the experience of competence



HOW THESE WORK TOGETHER?

A history lesson about the civil rights movement

Attention

Start with a surprising image or question (“Would you dare to be arrested for justice?”)

Memory

Use retrieval practice (quizzes, group presentations, connect to prior learning)

Motivation

Let students choose which activist they want to focus on researching

REVIEW

Attention

Novelty and Variety
Minimize Distractions
Guided Questions
Relevance

Memory

Spaced Repetition
Retrieval Practice
Mnemonics
Learning by Teaching
Chunking and Associations

Motivation

Give Choices
Ensure Successes
Give Encouraging Feedback
Build a Supportive Community
Make the Content Meaningful

SOURCES AND FURTHER READING

- **Willingham (2009):** Why Don't Students Like School?
- **Cowan (2010):** The magical mystery four
- **Deci & Ryan (2000):** Self-Determination Theory
- **Weinstein, Madan & Sumeracki (2018):** Teaching the science of learning

REFLECTION

A two-minute reflection break, allowing you to calmly consider how to apply the methods in your own teaching.

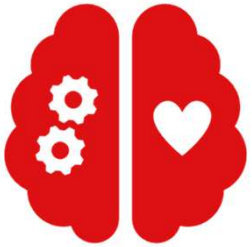
Music track: Always Love by Epic SpectrumSource: https://freetouse.com/musicFree No Copyright Music Download

TOPIC 3: MISCONCEPTIONS ABOUT LEARNING (E.G., LEARNING STYLES MYTH)

MISCONCEPTIONS ABOUT LEARNING: WHAT THE RESEARCH REALLY SAYS

WHY MISCONCEPTIONS MATTER?

Learning Styles



Right-brain / Left-brain learners

Multitasking improves learning

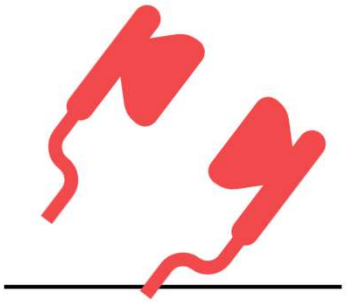
LEARNING STYLES

Decades of research show **no evidence** that tailoring teaching to a student's learning style improves outcomes.

Key study:

Pashler et al. (2008): Learning styles: Concepts and evidence

WHY LEARNING STYLES DON'T HELP

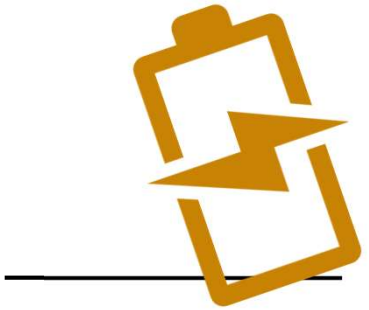


PEOPLE MAY **PREFER** DIFFERENT MODES

but preference doesn't mean effectiveness

MATCHING MODES WITH THE CONTENT

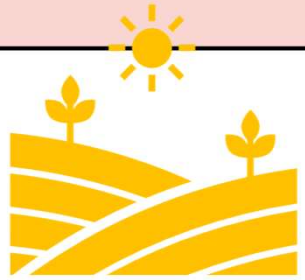
What matters is matching the content to the best mode



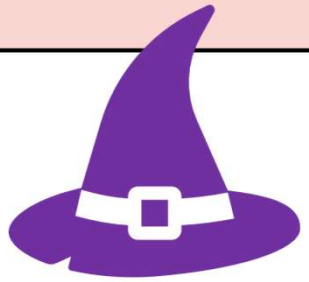
CAN LIMIT LEARNING

Self-limiting beliefs, such as "I can't learn this because I'm not an auditory learner."

WHAT TO DO INSTEAD

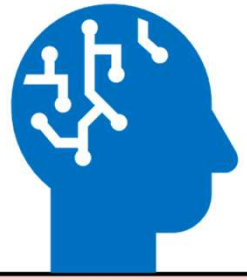


Use multiple representations (visuals, text, audio) to strengthen understanding



Focus on dual coding (combine words and images — see Paivio, 1991)

Help students develop skills in all modalities, not just a preferred one



RIGHT-BRAIN / LEFT-BRAIN LEARNERS

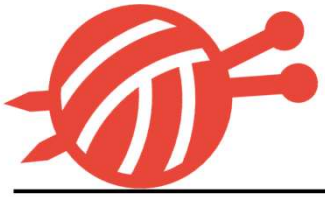
Neuroscience shows that **both hemispheres work together** in almost all tasks.

Key study:

Nielsen et al. (2013) - An evaluation of the left-brain vs. right-brain hypothesis with resting state functional connectivity magnetic resonance imaging.

Lindell & Kidd (2013): Why right-brain teaching is half-witted

WHAT TO DO INSTEAD



DIVERSITY AND PLANNING

Design tasks that engage **multiple brain networks** (e.g., logic + creativity)

BE MINDFUL ABOUT TERMS

Avoid labelling students in ways that **narrow their identity**

HOLISTIC APPROACH

Encourage **whole-brain thinking**: analytical and imaginative, verbal and visual

THE MULTITASKING MYTH

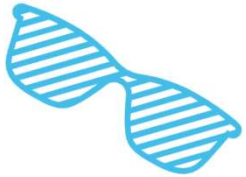
The brain cannot focus on two demanding tasks at once. Instead, it switches rapidly — losing efficiency and increasing mistakes.

Key study:

Junco & Cotten (2012). No A 4 U: The relationship between multitasking and academic performance. Computers & Education, 59(2), 505–514.

Ophir, E. et al. (2009). Cognitive control in media multitaskers. Proceedings of the National Academy of Sciences, 106(37), 15583–15587.

WHY MULTITASKING HURTS LEARNING



Divides attention → weaker encoding in memory

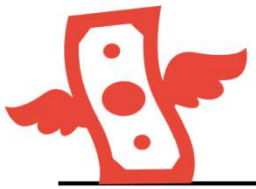
Increases cognitive load → more mistakes

Reduces deep processing → superficial understanding

WHAT TO DO INSTEAD

PUT THE DEVICE INTO POCKET

Create device-free or single-task learning times



THE COST OF MULTITASKING

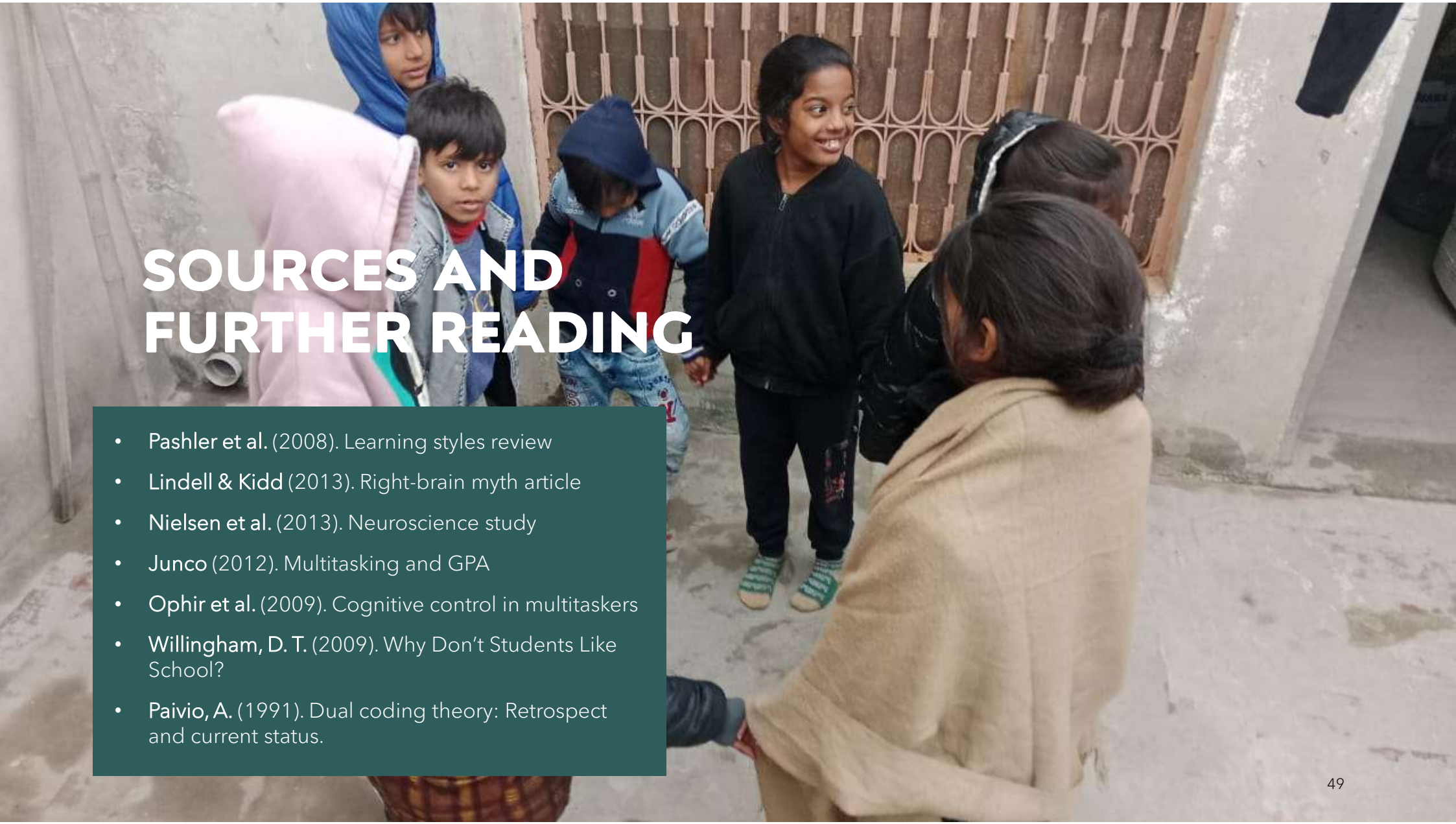
Teach students about task-switching costs explicitly

TEACH FOCUSING SKILLS

Encourage focused work (Pomodoro technique, attention breaks)

COMMUNITY SUPPORT

Model and value deep focus in your classroom culture



SOURCES AND FURTHER READING

- **Pashler et al.** (2008). Learning styles review
- **Lindell & Kidd** (2013). Right-brain myth article
- **Nielsen et al.** (2013). Neuroscience study
- **Junco** (2012). Multitasking and GPA
- **Ophir et al.** (2009). Cognitive control in multitaskers
- **Willingham, D. T.** (2009). Why Don't Students Like School?
- **Paivio, A.** (1991). Dual coding theory: Retrospect and current status.

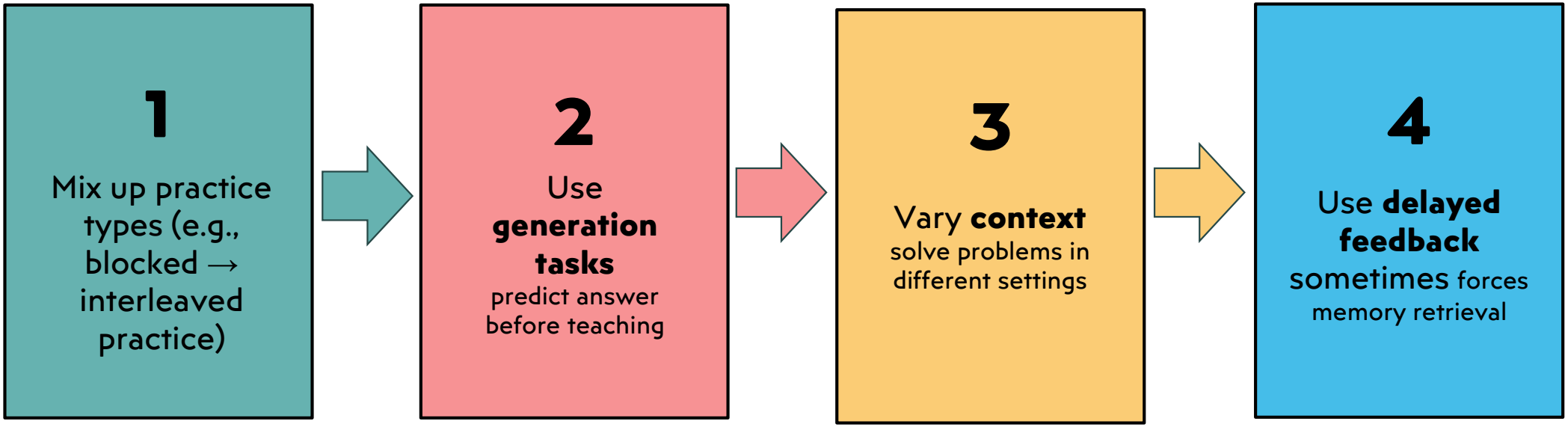
BONUS:
"PRODUCTIVE STRUGGLE DEEPENS LEARNING"

Counterintuitively, **making learning harder in the short term** can improve retention."

Key study:

Bjork & Bjork (2011). Creating desirable difficulties to enhance learning.

HOW TO DO IT

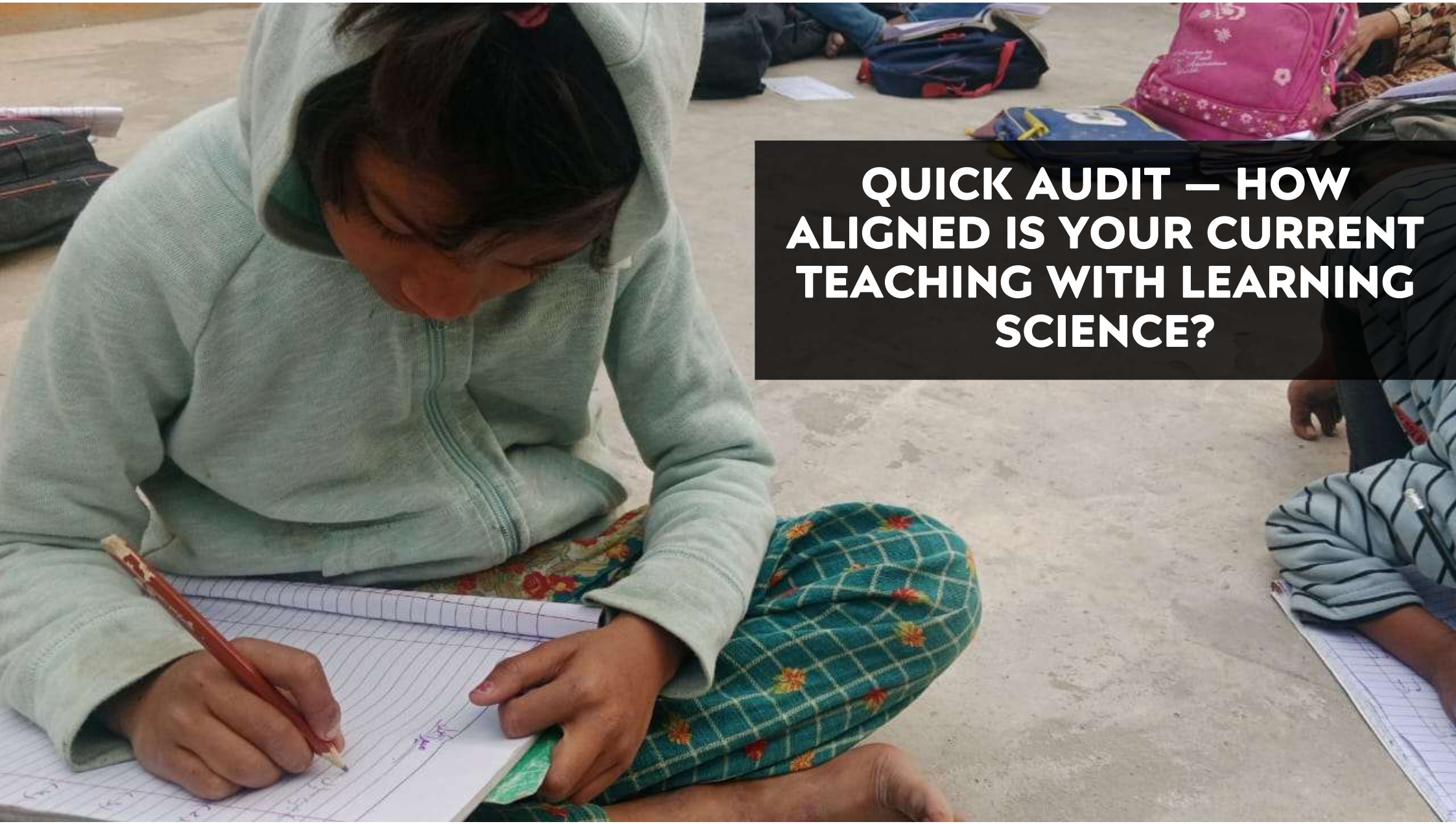


Why it works: Effortful processing → stronger encoding and flexible knowledge

REFLECTION

A two-minute reflection break, allowing you to calmly consider how to apply the methods in your own teaching.

Music track: Chances by Burgundy
Source: https://freetouse.com/music
Royalty Free Music (Free Download)



QUICK AUDIT — HOW ALIGNED IS YOUR CURRENT TEACHING WITH LEARNING SCIENCE?

AUDIT AREA 1:
RETRIEVAL PRACTICE

Key question: How often do I ask students to recall previously learned content without notes?

Indicators:

– Daily retrieval questions

– Regular low-stakes quizzes

– “Brain dump” tasks / self-assessment

Self-evaluation (on scale 1-5):

1 = Never → 5 = Consistently and Effectively

AUDIT AREA 2:
SPACED REPETITION

Key question: How regularly do I return to previously taught content – not just teach and forget?

Indicators:

– Spiral review of previous topics

– Cumulative tests or mixed problem sets

– Questions from earlier units

Self-evaluation (1-5)

AUDIT AREA 3:
MANAGING COGNITIVE LOAD

Key question: How well do I manage the complexity of materials to avoid overload?

Indicators:

– Distributed, step-by-step instruction

– Clear, simple slides and materials

– Worked examples and graphic organizers

– Pre-teaching of key vocabulary

Self-evaluation (1-5)

AUDIT AREA 4:
MOTIVATION AND FEEDBACK

Key question: How much do I support students' autonomy, sense of competence, and belonging?

Indicators:

– Choice in assignments

– Frequent, growth-focused feedback

– Celebrating small successes

– Strengthening the classroom community

Self-evaluation (1-5)

AUDIT AREA 5:
"DESIRABLY DIFFICULT" TASKS

Key question: How often do I challenge students in a constructive way that strengthens learning?

Indicators:

– Interleaved practice

– Prediction tasks (estimation before instruction)

– Varied practice formats

– Delayed feedback

Self-evaluation (1-5)

SMALL STEPS, BIG IMPACT

BASED ON YOUR SELF-ASSESSMENT, CHOOSE ONE AREA FOR DEVELOPMENT AND ONE AREA OF STRENGTH

DEVELOPMENT AREA

What is one thing I can implement in my teaching?

SUPPORTING OTHERS

How can I support other teachers through my strengths?

TRACKING

How will I track my progress?

SHARING

Who can I share my goal with to help hold myself accountable?

Remember: small, consistent improvements compound over time.

PARTNERS FOR LIFE

A LIFELONG GUIDANCE AND EDUCATION PACKAGE THAT CAN TRANSFORM YOUR WORK AND LIFE!

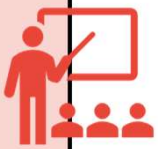
Six Webinars on Learning Science

Held approximately twice a year, includes lifetime access to all webinars and video recordings.

Lifelong Personal and Group Support

Includes regular 1:1 coaching sessions and support through a guided online community.

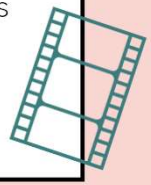
Two Live Online Trainings per Week



Each training is 1 hour long, with lifetime access to all sessions and recordings.

Separate Video Training for Each Method

Includes lifetime access to all materials. New video trainings and resources are added regularly.



Bonus #1

Regular Expert Q\&A Sessions – 6 Times a Year

Bonus #2

Alternatives in Education - Series of 6 webinars

Bonus #3

Routine Building and Change Course – 12 Sessions Per Year

PARTNERS FOR LIFE

A LIFELONG GUIDANCE AND EDUCATION PACKAGE THAT CAN TRANSFORM YOUR WORK AND LIFE!

Six Webinars on Learning Science

Value per participant

700 €

Lifelong Personal and Group Support

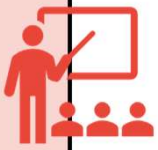
Value per participant

3500 €

Two Live Online Trainings per Week

Value per participant

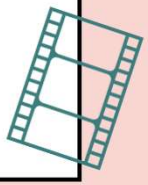
5000 €



Separate Video Training for Each Method

Value per participant

2500 €



Bonus #1

Bonus #2

Bonus #3

Value per participant

1750 €

VALUE OF THE LIFELONG SERVICE

13 450 €

Regular price

2 490 €

VALUE OF THE LIFELONG SERVICE

13 450 €

Deal of the Day

970 €

INDIVIDUAL TRAININGS

One Day Courses

Deal of the Day

90 €
per person

Webinars

Deal of the Day

49 €
per webinar

Lessons on Methods

Deal of the Day

25 €
per lesson

FEEDBACK AND ORDERS

FEEDBACK

www.learningscience.online/feedback

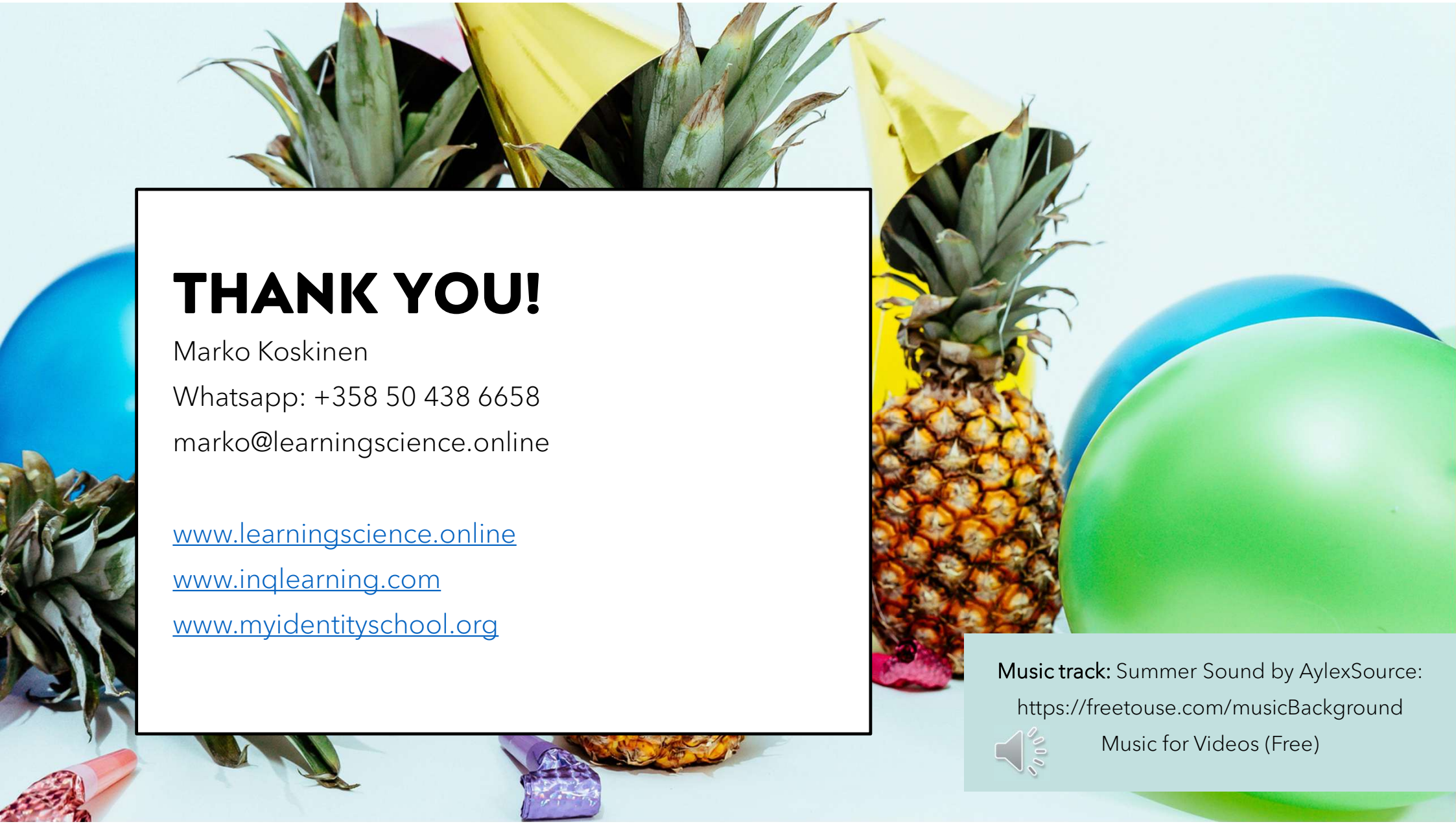
ORDERS

www.learningscience.online/orders

ADDITIONAL INFORMATION

www.learningscience.online/info

password: lswebinar25



THANK YOU!

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