THE TEACHER TOOLKIT

GUIDE TO MEMORY

PRAISE FOR THE TEACHER TOOLKIT GUIDE TO MEMORY

'We are constrained by our memory skills, especially for students sitting in a class bombarded by facts pressured by an upcoming test, struggling to find relations between ideas and building coat hangers to remember the details, and surrounded by others who seem to find it easy to recall what the teacher said. This book is **M**asterful, **E**vidence-based, **M**emorable, **O**perational, **R**eadable, and the best book for **Y**ou on memory.'

Professor John Hattie, Melbourne Graduate School of Education

'*The Teacher Toolkit Guide to Memory* is a real treasure box for teachers and parents. Packed with accessible information, backed up by research, this book keeps on giving. The practical examples, rooted in classroom practice, will be something teachers can go back to. QR codes with downloadable templates are the icing on the cake!'

Louise Sugden, teacher and MAT lead, @Louiseab72gmai1

'Being research-informed is one thing; having time to do it is another. Solve both issues by reading and acting upon this excellent introductory guide to the theory and practice of memory. Highly recommended.'

Dr Paul S. Ganderton, education consultant, @ecogeog

'Ross McGill has managed to beautifully execute and simply explain the fundamentals of cognitive learning and the importance of understanding the "how" in the context of the brain, complete with wonderful illustrations perfect for the classroom teacher, learner and parent. So, no matter who you are, no matter how successful, no matter how much you already may understand about this topic, Ross has something to offer you.'

Victoria dos Santos, assistant athletic director and pastoral lead

'In my work as a psychologist in schools, staff often tell me about children who have "difficulties with retention". I can now imagine myself recommending this book as a good starting point. Ross has provided an easy-to-access overview of research into memory, as well as an exploration of pedagogy. He has provided practical tips based on concepts from cognitive science and neuropsychology while also incorporating the social and emotional processes which are an integral part of the learning process.'

Dr Jo Taylor, child and educational psychologist, @jgetaylor

'*The Teacher Toolkit Guide to Memory* not only provides concrete, easily implementable teaching strategies, but gives a detailed and clear overview of the intricacies of the human brain. I can't wait to apply this knowledge in the classroom.'

Larissa Gibb, deputy head of science

'This text is long overdue! How can it be that teachers are not taught how their students learn, and how to make that learning stick? This book includes just enough technical information, providing educators with the cognitive and neuroscience research that will be useful and meaningful to them. Thank you for sifting through and translating the research to present practice-based knowledge and strategies necessary to facilitate evidence-based instruction.'

Sarah Oberle, first grade teacher and doctoral student (education leadership and cognitive sciences)

'An impressive collection of findings that draws on the latest research within cognitive science and education. Ross succinctly discusses, clarifies and offers practical, research-informed examples for busy leaders and teachers.'

Mark Leswell, research lead

'The "human teacher first" meets the science. A clear and practical guide to "debunking" teaching practices, with excellent use of analogies and ideas to support teacher development.'

Samantha Torr, Vice Principal: Director of Alpha Teaching School Hub, @alpha_tsh

'A fantastic book that successfully interweaves the breadth of cognitive theory and practical strategies in a clear and accessible way. A great book to begin understanding the science of learning and the complexity of influences on this.'

Sarah Benskin, assistant principal (teaching & learning, curriculum & CPD), @drblearning

'An exceptional effort of presenting the vast and difficult topic of "the learning brain" in a practical and understandable way.'

Yves Moerskofski, educational psychologist

'In this wonderful teacher toolkit, Ross Morrison McGill advocates for more "active learning" opportunities in all our schools. As a cognitive psychologist, I fully endorse the idea that to stimulate thinking, you've got to keep moving.'

Dr Peter Lovatt, author of *The Dance Cure*, @DrPeterLovatt

'This book is informative and accessible for quick reads. The consistent approach to each chapter works really well, especially for utilising the practical applications. The embedded use of diagrams adds to the reader's understanding of some complex concepts.'

Charlotte McLean, SENCO and senior leader

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THE TEACHER TOOLKIT
GUIDE TO MEMORY



ROSS MORRISON McGILL

BLOOMSBURY EDUCATION
LONDON OXFORD NEW YORK NEW DELHI SYDNEY

CONTENTS

ACKNOWLEDGEMENTS VIII
FOREWORD BY PATRICE BAIN IX
INTRODUCTION XI
HOW TO USE THIS BOOK XIX
CHAPTER 1: AN OVERVIEW OF THE BRAIN 1

Explainer 3
Practical idea: Direct instruction 10
Worked example 17
Template 18

CHAPTER 2: HOW MEMORY IS SHAPED 19

Explainer 20
Practical idea: Retrieval practice 25
Worked example 29
Template 30

CHAPTER 3: AN INTRODUCTION TO TYPES OF MEMORY 31

Explainer 32
Practical idea: Spaced practice and interleaving 44
Worked example 48
Template 49

CHAPTER 4: LEARNING IS EMOTIONAL 50

Explainer 52
Practical idea: Spaced and active rereading 61
Worked example 65
Template 67

CHAPTER 5: COGNITIVE LOAD THEORY 68

Explainer 69
Practical idea: Managing cognitive load 74
Worked example 77
Template 79

CHAPTER 6: MENTAL MODELS FOR LEARNING 80

Explainer 81
Practical idea: Using mnemonics 85
Worked example 87
Template 89

CHAPTER 7: BRAIN PLASTICITY 90

Explainer 91
Practical idea: Elaboration 95
Worked example 100
Template 101

CHAPTER 8: COGNITIVE APPRENTICESHIP 102

Explainer 103
Practical idea: Self-explanation 109
Worked example 111
Template 112

CHAPTER 9: WELLBEING AND MEMORY 113

Explainer 115
Practical idea: Prioritising student wellbeing 119
Worked example 121
Template 122

CHAPTER 10: WHAT NEXT FOR TEACHER CPD? 123

Explainer 124
Practical idea: A teacher CPD session on memory 133
Worked example 135
Template 136

BRINGING IT ALL TOGETHER 138
CONCLUSION 143
REFERENCES 147
INDEX 152

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To **Jenni** and **Freddie** who, at home, now think it's hilarious that I forget things. I do wonder if this book title will see me receive a lifetime of jokes for being forgetful! On that note, if I did publish a follow-up to this book, it would be on why and how we forget. There's plenty of research on the brain, memory and remembering, but it's a little harder to find out why we are *all* so forgetful.

My thanks also go to **Hannah**, Helen, Laura and the wider team at Bloomsbury – our sixth book together with another in the pipeline! Thank you so much for all your efforts in the process. Your work is meticulous and it's definitely getting easier and quicker! After several years of reading, research and practice, this book took one year from contract to printing. The fastest turnaround!

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To **Dr Kripa Sundar** in particular, who kindly offered a critical and scientific eye across the entire text to ensure that the information shared here in relation to cognitive science is factually correct. I look forward to sharing your words of wisdom on my teaching travels as I clarify the terminology and strategies cited in the book. Thank you for your knowledge and feedback.

Finally, thank you to all the teaching colleagues, educators and academics who publish work and share information so that we can learn from one another. These people are mentioned in all the sources I have referenced throughout, including all the academic papers at the back of this book. These people are the real specialists, not me, and there is so much more I could have read and quoted. And to the wonderful teachers who kindly offered to proofread the book before publication – this is for **you**! This is my journey to understanding memory and I hope it contributes to your understanding too.

I guess I should finish by thanking my **Mother** – never miss the opportunity to thank your mum!

Mnemosyne

The one who knows everything, what was, what is, and what will be.

Scan the QR code to listen to a short welcome message I have recorded for you.

FOREWORD

As instructors, we spend years in teacher preparation programmes and professional development focusing on how we teach. Yet how many of us have been encouraged to ask the question, 'How do we learn?' It is not a new question. In fact, it has been asked in many cultures and languages. Although answers vary, a common thread refers to the ability to retrieve knowledge stored in our memory. According to Cicero (circa 106–46 BCE), 'Memory is the treasury and guardian of all things.' If the importance of memory has been acknowledged for over 2,000 years, how is it that understanding how to get information into memory is a field somewhat new to teachers?

I agree with Ross McGill when he advocates, 'All teachers must be research-informed.' The future of our profession lies in methods proven – by science – to achieve the results we want for our students. *The Teacher Toolkit Guide to Memory* boosts us into that future by sharing the how and why of learning and memory. We are better teachers when we understand concepts and questions such as the difference between our students' working and long-term memory. What do neurons and synapses have to do with their learning? How do retrieval, and spaced retrieval, strengthen knowledge retention? Dual coding, chunking, the forgetting curve, cognitive load theory… it's all here in this book, ready to help us boost learning in our classrooms. Understanding the science of learning makes us better teachers. As Daniel Willingham (2017) states in his book, *Why Don't Students Like School?*, 'Education makes better minds, and knowledge of the mind can make better education.'

For too long, teacher preparation programmes and professional development have been burdened with fad theories and pedagogy based on anecdotes rather than measurable, replicable evidence. Although various neuromyths (such as 'learning styles' and differing left-brain/right-brain abilities) were debunked years ago, education writing and advice based on similar unproven ideas are still prevalent.

On the other hand, research that previously had been tucked away in scientific journals is becoming accessible. Teachers around the world are finding, discussing and using evidence-gathered practices. Up until recently, most research studying how students learn was conducted on college campuses with college students. In 2006, in the United States, cognitive scientists began studies on how children learn in primary and secondary school classrooms. When I was asked by cognitive scientists if they could study how children learn in my classroom, I jumped at the opportunity.

A well-respected model of learning includes three steps: encoding, storage and retrieval. The focus of experiments in my classroom was retrieval: how my students improved their retention of material by methods requiring them to recall it. Ross McGill's *Guide to Memory* covers both storage and retrieval. He takes the science and translates it for teachers 'into practice, in a way that works for their classrooms and their students'.

This is key. There is no one-size-fits-all strategy that suits all teachers and all classrooms. I worked with cognitive scientists for 15 years developing the strategies that worked for my students in my classroom. How fortunate for teachers that Ross has made this book available. His layout of chapters includes explanations, practical ideas and examples of techniques that work. He makes his guide even more accessible by including QR codes that

lead to downloadable templates. I encourage teachers to understand the science of learning and find what works. For me, doing so allowed me to witness first-hand how the learning trajectory changed for my students. Students who previously had internalised failure now saw errors as feedback that targeted what needed work; a change of strategies helped fine-tune direction for achievement.

When I started teaching, little guidance based in science was available to me, as I wasn't versed in neuroscience jargon and didn't subscribe to the journals where findings were published. I had been taught how to teach, but never received instruction on how the learning happened. Ross McGill, in this book, gives us critical insights into that process. On the first day of school, when all those fresh faces are most alert and attuned, we can say, 'I'm your teacher, and I'm going to teach you how to learn.' Immediately we have made our students powerful partners in what we do at school. And if we can give them insight into the magic of learning, we give them the lifelong gift of how to do it.

Patrice M. Bain, Ed.S.
Teacher

Author: *A Parent's Guide to Powerful Teaching*

Co-Author: *Powerful Teaching: Unleash the Science of Learning* and *Organizing Instruction and Study to Improve Student Learning*

INTRODUCTION
MY JOURNEY WITH MEMORY

If somebody tells you that the ideas in this book are nothing new, they are probably right. You and I are not the first people to have ever wanted to discuss how we learn and how the brain operates. In fact, neuroscience has been developing as a field of study for over 2,500 years. In the fifth century BC, while his contemporaries believed the brain resided in the heart, Hippocrates argued his case for the brain being the centre of both thinking and feeling:

> 'And [humans] ought to know that from nothing else but (from the brain) come joys, delights, laughter and sports, and sorrows, griefs, despondency, and lamentations. And by this, in an especial manner, we acquire wisdom and knowledge, and see and hear, and know what are foul and what are fair, what are bad and what are good [...] And by the same organ we become mad and delirious, and fears and terrors assail us [...] All these things we endure from the brain.'

(Hippocrates, quoted in Adams, 1868)

This book is outside of my comfort zone, but covers a topic I am deeply fascinated with. At some point in our lives, we are all curious about what makes us remember. I wonder about the things people do that make them an expert in their field or societal perceptions of what makes somebody 'clever'. And we question the times we forget something because we have too many things to do and we become stressed and anxious.

Until recently, memory, and more specifically the brain, was an area I had never become familiar with as a teacher. Despite a very comprehensive teacher training background, covering psychology, child development, subject knowledge and behaviour management, a deeper understanding of the brain and how it works was one aspect of my training that I'd never had. Of course, life gets in the way and teaching is exhausting. If important content is left aside during formal training, there is not much time available for teachers to pursue it as part of their professional learning.

Fast forward almost 30 years, and I have spent the last decade trying to fend for myself (in and around the busy nature of school life) to understand how we learn. Whilst I am neither new to discovering memory nor the first or last person to develop an interest in this area, I wanted to put everything that I have learned on my own journey into a beginner's guide for teachers. From my travels delivering training to schools across the UK and internationally, as well as insights from social media, it is clear that teachers new to the profession are now being trained in neuroscience *and* cognitive science at an early stage in their careers. I am reassured to see teacher training universities in England now offering teachers a good background in cognitive science before they reach the classroom. It has been encouraging to see many school leaders being immersed in cognitive science also. Whilst this is welcome

and a wonderful thing, every teacher must initially master their subject knowledge and behaviour management in order to learn how and when to deploy effective teaching strategies in the classroom to help students remember. They need to engage with research and need to be provided with reliable and pragmatic advice to put this information into practice in the classroom.

In my academic life and as a teacher blogger, I have gradually discovered more and more cognitive science and academic research unpicking the world of the classroom. I am slowly beginning to know more about neuroscience and the language used to discuss parts of the brain. One aspect of my own journey has involved reading, taking part in online webinars and connecting with neuroscientists for my website and podcast. Many books have rekindled my affair with memory, most recently *Connect the Dots* by Tricia Taylor (2019), *How Learning Happens* by Paul Kirschner and Carl Hendrick (2020), and *Why the Brain Matters* by Jon Tibke (2019). In addition, I have learned much from the fantastic Learning Scientists (a small team of cognitive psychological scientists working in educational research and translating what appear to be complicated theories into meaningful advice and strategies that teachers can actually use). They have not only influenced me (since 2016) but, in my opinion, many teachers across the profession – and in some respects, English education policy too. Where possible, I will reference these sources throughout and offer some practical techniques based on what I have learned. A final book reference would be *What Works?* by Lee Elliot Major and Steve Higgins (2019), which unpicked the excellent *Teaching and Learning Toolkit* published by the Education Endowment Foundation (2018). The EEF has been publishing education research since 2011 and has been highly influential in transforming 'research-informed practice' for teachers and schools across the UK. I will return to *What Works?* later in this book, but for now I'll leave you with their Bananarama Principle, which resonates heavily with me: it's not *what* you do that counts, it's *how* you do it that matters – that's what gets results. As with this book, it's OK to read the material, but if it doesn't change the way you teach, then we have a problem.

Whilst I am no cognitive scientist, I do claim to be a teacher, a researcher and someone who, having led whole-school teacher learning and professional development in a number of large secondary schools, has a deep fascination with the mechanics of the classroom. This has also become very apparent to me in my life as a teacher trainer. Teaching teachers (crudely) is no different to teaching students per se. We all need information shared in manageable chunks, opportunities to reflect, to receive feedback and, where possible, assessment to gauge what we know and what we have yet to learn. The excellent research published by Barak Rosenshine (2012) does this perfectly. His original six principles of effective instruction evolved into ten and then 17. I have reduced this back to a manageable and memorable sequence for teachers to master: explain, question, practise and feedback. That is the teaching loop to support memory retention.

Understanding how we learn is a journey that everybody should undertake, whether a student, an educator or a parent. Yet, if we are to put ourselves into the position of a teacher or school leader, it becomes critical that we should know more about memory. A fresh-faced university graduate entering the classroom will need to learn how to master the classroom and also develop a wide range of pedagogical strategies – and regularly evaluate them as they teach their students. They will need to learn to adapt those strategies as they teach in different contexts. This is a journey we must all go on as we evolve throughout our career and we each develop an understanding of our day-to-day work and the world around us.

As more experienced teachers and school leaders, we have a duty to inform ourselves of the relevant research and to be able to translate this into bitesize and pragmatic summaries for others around us who are new to the profession and who may be more likely to be bombarded with countless other priorities.

This book is not a thesis on everything and anything to do with the brain, how we learn and how we shape memory, yet I do hope it will become your pocket guide to the key concepts relevant to teaching. I hope it will give you a beginner's grasp of memory, cognition and how we think, which will reassure you on your own journey to discovering more about how we learn. It is also worth noting that, alongside my own personal development in this area, I still hold the belief that learning can happen in a variety of ways and in different contexts. However, the real challenge lies in translating this complicated field of research into practical ideas that teachers can use in the classroom, particularly in schools with large numbers of students, teaching very detailed curriculum plans. What I hope to signpost in this book are some helpful strategies that teachers can use to support their students. As ever, I advocate that all teachers must be research-informed and translate theory into practice in a way that works for their classrooms and their students. Whilst I offer and reference a wide range of practical ideas throughout this book, everyone reading must translate my experiences and my understanding for their own context. Go play with the ideas and theory in your own classrooms and let me know how you are getting on. Use the hashtag #**GuideToMemory**.

What is the number one thing all teachers should know and do?

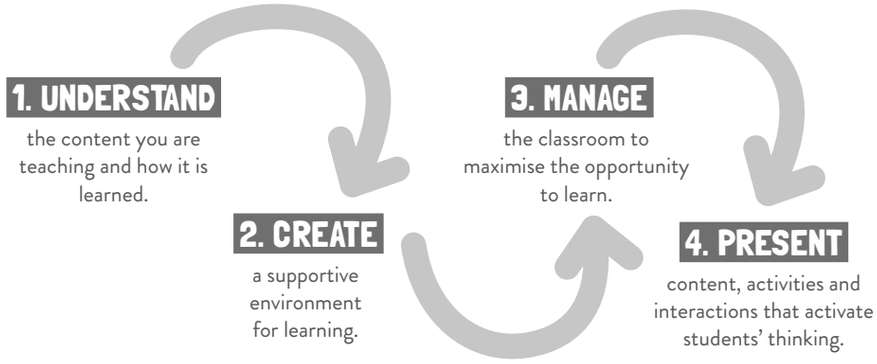
This subtitle is a phrase I have read, heard and used myself on a number of occasions. Teachers are consumed by all sorts of initiatives, curriculum reform, evidence gathering and research recommendations. The working life of a teacher can feel like a very busy and complicated space. How do teachers filter what's important, and what's important but could be learned at a later stage?

Often, teachers fill their time with trying to streamline their day-to-day: they strive to reduce the marking burden or find more efficient ways to plan lessons. However, when the opportunity arises for teachers to reflect on their own professional learning during the academic year, the vast majority will be engaged with more complex questions about how to make deeper connections with the students and how to make learning more accessible and engaging. They will want to discover and use practical techniques in the classroom to help students to remember and apply key information.

So, how can teachers go about this?

The Great Teaching Toolkit, published by Evidence Based Education (2020), is a comprehensive publication that offers an evidence review route map for all teachers. Peer reviewed by 74 educators (including myself) from 11 countries around the world, this document offers a comprehensive bibliography of some key pieces of education research. 'What are your best bets in terms of making the most difference to your students?' is the key question asked.

The review recommends four key priorities for teachers:



No one can deny that the first priority in this list is essential. Teachers need to have a deep and fluent knowledge of the subject they are teaching, an understanding of curriculum sequencing, tasks, assessments and activities, as well as an appreciation of common misconceptions and sticking points for students. The second and third priorities in the list focus on building effective relationships in the classroom, promoting a positive climate, motivating learners, building classroom routines, and ensuring rules, expectations and consequences are clear and consistently applied. I've always argued that if a teacher can manage classroom behaviour, only then can they develop their teaching repertoire; they must master their subject knowledge and sustain this. These three areas are elements of the teaching profession that all teachers, particularly those new to the profession, need to master before they become proficient. In keeping with the content of this book, we could refine the word 'proficient' and use the phrase 'automated' or 'subconscious' decisions.

In comparison, the fourth priority is something that every teacher has to continually work on and refine on an ongoing basis. This is where I would place teachers developing their understanding of memory and utilising this to best effect in the classroom. This fourth priority focuses on activating hard thinking and *The Great Teaching Toolkit* considers the following to be the key components needed to achieve this:

Structuring Giving students an appropriate sequence of learning tasks; signalling objectives and progress; matching tasks to learners' needs; scaffolding and supporting.	**Explaining** Presenting and communicating new ideas clearly, with concise, appropriate, engaging explanations; connecting new ideas to what has previously been learned; modelling using worked examples.	**Questioning** Using questions and dialogue to promote elaboration and to elicit student thinking. (I believe having the ability to ask 30 students a range of effective questions 'on your feet' and keep them actively engaged is a teacher's greatest asset.)
Interacting Responding appropriately to feedback from students.	**Embedding** Giving students tasks that embed and reinforce learning.	**Activating** Helping students to plan, regulate and monitor their own learning.

To implement the above recommendations to best effect, teachers must have a secure grasp of memory and how we learn. Only then can they understand how to deliver content, set tasks and ask questions to activate hard thinking, which is where true learning happens. *The Great Teaching Toolkit* concludes that this fourth priority is 'something that some teachers could profitably work on'. I see this priority as the crux of effective classroom practice: the one thing that all teachers should know and do to greatest effect – and it all starts with memory (which is referenced in the 'embedding' stage of this fourth priority). I hope the information and ideas in this book will support you in this endeavour.

What do we mean when we talk about memory?

Where are your shoes for work? Can you find your black dress or your stripy socks? Where did you leave the house keys, and how do you cook a chicken soup? To answer any of these questions, we refer to our working memory: we need to retrieve the relevant information and process it to find the answers we need or to perform an action. The more often we retrieve or organise information, the more likely we are to retain it and remember it quickly when we next need it. If we do not regularly retrieve or organise information, we lose it. However, if we regularly read or deliberately organise concepts, rules or facts, we can be overloaded with information and this information can become redundant (wasted), or worse, lost.

I suspect you may have learned how to ride a bike. Even if you haven't sat on a bicycle for 20 years, after an initial five or ten minutes, it's likely you will soon be able to balance again and begin riding down the pavement with your feet on the pedals. How do we manage to do something again after such a long absence? Why do we retain this information even though we're not using it regularly?

In her book *Connect the Dots*, Tricia Taylor (2019) references the 'wardrobe metaphor', which is the best analogy I can think of when explaining how our minds work. She quotes American psychologist Henry L. Roediger III:

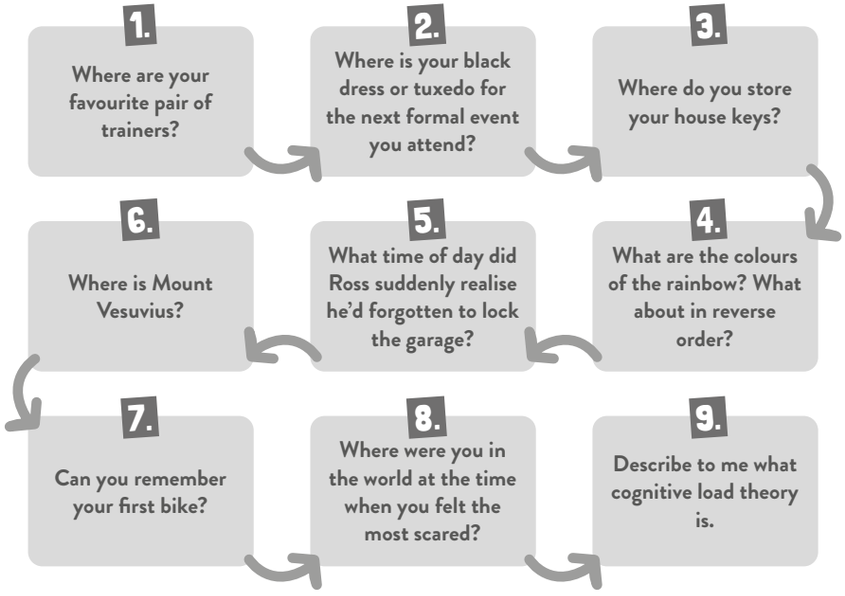
> ❛ Memories are objects stored in that space; and retrieving a memory is akin to searching for and finding an object in a physical space. ❜
>
> **(Roediger, 1980)**

The 'wardrobe metaphor' essentially explains the conscious practice of information storage and retrieval. What are the colours of the rainbow? When did Mount Vesuvius erupt and destroy Pompeii, near Naples in Italy? Do you remember when you first tied a shoelace? To answer these questions, we need to look back through the information stored in our memory (the wardrobe) and retrieve the relevant details.

It goes without saying that we can't always rely on our memories to recall the information we need. We can't always find what we're looking for in our wardrobe. To give you an example of a time when the 'wardrobe metaphor' didn't work, let me tell you about one evening when I forgot to lock my garage door. Falling asleep that night, you will not be surprised to learn that I woke up at four o'clock in the morning thinking about it. Knowing that I was not confident that the garage door was locked, my already anxious mind equated this unknown fact to a restless night's sleep! This 'subconscious' risk and fear clearly woke me up to a conscious state in the middle of the night. The key question being asked of my memory was: 'Did I or did I not lock the garage?' You'll be pleased to know that I did go outside that night to lock the garage door. I knew that if I didn't do this I would have struggled to sleep for the rest of the night. There are many reasons why we might not be able to recall information,

but this particular case is a good example of the many factors that influence whether we remember or not. This includes sleep, competing demands and even our biology.

The good news is that humans can shape and strengthen their memory to help improve their ability to recall information. Throughout this book I would like you to try out several exercises so I can demonstrate how I can shape and strengthen your memory as you read this book – and how you can strengthen your students' memories in turn. Let's get warmed up with a few examples, starting by using the wardrobe metaphor. Have a go at retrieving the information below.



Some of these questions will be easy to answer. Some will require a little bit of a struggle. Others will evoke an emotion or a particular timestamp in your life. Others will require some prior knowledge on your part. Each of these variations in how we respond are some things that I would like to unpick throughout this book. Episodic and semantic memory, intrinsic and extrinsic load, the hippocampus and amygdala are just some of the terms that I would like to share with you from my journey with memory.

Recall doesn't mean you have learned it

From a teacher's perspective, learning is usually identified with the encoding of new knowledge or building upon prior knowledge to help shape schemas: patterns of thought to organise information. We want students to remember things as they develop a degree of self-regulation in their learning and their behaviour.

Schemas are patterns of thought, mental mind maps of how we store and process information and how we decide how this information will be used. I often associate the word 'schema' with a visual mind map or a spider web; this is my schema for recalling what a schema actually is! How memory is shaped and constructed to connect one piece of information to another. Developing schematic knowledge is one challenge we all face; we must connect all the various pieces of information and organise them to make sense of

them. In my academic life, for example, I conduct social media network analysis, research and evaluate how conversations spread online, and look at how they are connected. To draw conclusions, I must organise this information to make sense of it. Thinking about schemas supports good curriculum design. Consider the information you are presenting to your students and how you want them to connect this information and organise it to make sense of it. Visual representations of schemas might help us map out a curriculum plan in a visual organiser.

Teachers must build into their curriculum planning schematic maps which offer 'opportunities to retrieve' in and around a crowded curriculum. Most of the research around developing memory – as well as teacher workload – recommends that we 'teach fewer things at greater depth' (see Myatt, 2020). Teachers can support knowledge retention by regularly practising retrieval techniques with their students. Countless pieces of research have shown that retrieval practice produces more learning than engaging in other effective teaching techniques. The crucial question is, if we can recall something, particularly in an immediate scenario, does it mean we have learned it?

We know retrieval is a powerful way to improve learning and memory, and merely studying words once without ever recalling them will produce 'extremely poor performance' (Karpicke and Bauernschmidt, 2011). What teachers must do more is encourage students to practise until taught information can be recalled at a deeper level, and with new information added at specific points. If we learn how to use mass retrieval in our everyday lives, as well as in the classroom, we can each improve our own memory and that of others we work with. The research recommends avoiding the immediate repeating of information. We may be able to recall the answer, but it may not produce any additional gain in learning in the long term. Memory, at least in the classroom when developing subject knowledge, is shaped when we use repeated retrieval – and only then when the repetitions are spaced. As we will see in Chapter 3, the effects of repeated spaced retrieval can be very large.

On the point of remembering, I wish to make it clear that you can use whatever term for memory rehearsal that you wish: rehearsal, practice (the application of an idea or method) and practising (to perform an activity several times to become better), rote learning, retrieval, recap, regurgitate, recollect or remembering. Call it what you want; they are all broadly the same thing. If we want students to remember, they need to repeat from memory their acquisition of concepts, rules or facts to the point of automation. It's worth mentioning that most of these words begin with 're', meaning 'to go back' or to visit 'again'.

As I dig into more details with you throughout this book, I will unpick how we learn and what happens in our brains as we learn. What I would also like to unravel in this book is how some of our personal memories stay with us throughout our lives and what influence emotion has on these episodes. What does this mean for teaching and in particular paying attention to the experiences our students have in the classroom and what we can do to ensure their wellbeing?

I will also draw on a fabulous piece of research, 'Improving students' learning with effective learning techniques' published by John Dunlosky et al. (2013), which offers some robust research into the efficacy of teaching methods to use for developing retention. So important is this article that much of the research and recommendations contained within it inform the practical ideas in this book. Whilst the research paper suggests that there is a low, moderate and high efficacy to the ideas, all of the techniques do have an impact on outcomes. As always, we should define what we mean by outcomes and also consider how these techniques