Rosenshine's

Principles in Practice

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INTRODUCTION 1

Why Are Barak Rosenshine's Principles of Instruction So Good?

I first encountered Barak Rosenshine's *Principles of Instruction* after the British educator and graphic illustrator Oliver Caviglioli shared his excellent visual guide on Twitter. This prompted me to seek out the *American Educator* article from 2012 where Rosenshine's ideas are set out. This article is taken almost directly from a pamphlet in The International Academy of Education (IAE) Educational Practices Series in 2010. In his pamphlet Rosenshine sets out ten research-based principles of instruction based on the ideas he and his colleagues had developed over the preceding decades.

On first reading, I was struck immediately by its brilliant clarity and simplicity, and its potential to support teachers seeking to engage with cognitive science and the wider world of education research. In the last year, Rosenshine's *Principles of Instruction* has been circulating increasingly rapidly around schools in the UK as more teachers discover its insights, sharing via social media and the growing array of grassroots teacher conferences.

The purpose of writing this short booklet is to capture some of the many discussions I've had with school leaders and teachers, taking the ideas off the page and putting them into action in the classroom. Although the principles are superbly helpful as Rosenshine has expressed them, my hope is that this booklet provides an extra layer of guidance that people find interesting and useful, informing their staff training programs or the development of their personal practice.

Four strands

The organization of ideas that make up *Principles of Instruction* has evolved over time. In *Teaching Functions* (Rosenshine & Stevens, 1986), there were six. In the IAE pamphlet, Rosenshine outlines seventeen instructional procedures that emerge from the research:

Table 1.1 Rosenshine's Seventeen Instructional Procedures

• Begin a lesson with a short review of previous learning. • Present new material in small steps with student practice after each step. • Limit the amount of material students receive at one time. • Give clear and detailed instructions and explanations. • Ask a large number of questions and check for understanding. • Provide a high level of active practice for all students. • Guide students as they begin to practice.	• Provide models of worked-out problems. • Ask students to explain what they had learned. • Check the responses of all students. • Provide systematic feedback and corrections. • Use more time to provide explanations. • Provide many examples. • Re-teach material when necessary. • Prepare students for independent practice. • Monitor students when they begin independent practice. • Think aloud and model steps.

From these procedures he then formulates the ten principles. In seeking to explain the principles to audiences in the UK during various ResearchEd[1] conferences, I found that it helps to condense ten ideas down to four strands. Partly this is because of the requirements of timing a conference presentation where ten ideas feels like a long list, but mainly I found that after revisiting the document many times, I was continually skipping back and forth to make these connections.

Table 1.2 The Four Strands

The Principles of Instruction	Four Strands
1. Daily Review	**Sequencing Concepts and Modeling**
2. Present new material using small steps	2. Present new material using small steps
3. Ask questions.	4. Provide Models
4. Provide Models	8. Provide scaffolds for difficult tasks
5. Guide student practice	**Questioning**
6. Check for student understanding.	3. Ask questions.
7. Obtain a high success rate.	6. Check for student understanding.
8. Provide scaffolds for difficult tasks	**Reviewing Material**
9. Independent practice.	1. Daily Review
10. Weekly and Monthly Review	10. Weekly and Monthly Review
	Stages of Practice
	5. Guide student practice
	7. Obtain a high success rate.
	9. Independent practice.

[1] ResearchEd is a UK-based organization running teacher conferences that focus on educational research and its implications for teachers and school leaders. https://researched.org.uk

I will use the four strands as the structure for this guide. But first, I'd like to explore why the *Principles of Instruction* pamphlet is receiving such an enthusiastic response and why I am so excited to adapt it for classroom use.

Bridging the research-practice divide

Rosenshine provides a highly accessible bridge between research and classroom practice. His principles are short, easy to read, and packed with insights. This is refreshing. From a teacher's perspective, research is still hard to access. A lot of original research languishes in obscure journals that most teachers don't even know exist. Even when wonderful communicators like Daniel Willingham, John Hattie, Dylan Wiliam, and, more recently, Efrat Furst, Yana Weinstein, Megan Sumeracki, and other members of The Learning Scientists[2] publish books and blogs, it is still a challenge to secure major engagement across a large group of staff in a school. This is partly due to the limitations of teachers' time – they are busy! – but it's also a matter of school culture. Schools carry a lot of inertia; teachers' habits are hard to shift. The punchy simplicity of the principles cuts through a lot of that.

In the original publication, each short section outlining one of the ten principles follows a clear and persuasive structure: ***Research findings*** followed by ***In the classroom***. Rosenshine does a superb job of relating research findings to classroom practice in such a way that conveys the key outcome of the research without getting bogged down in methodology and problematic considerations of effect size. The 2010 paper carries all the citations for anyone wishing to look a little deeper, and they are included at

[2] The Learning Scientists are a group of cognitive psychological scientists interested in research in education. www.learningscientists.org

the end of this guide. There's power in the simple binary descriptor Rosenshine deploys to get his message across: ***more effective*** teachers vs ***less effective*** teachers. We all understand that implicitly there's a sliding scale—that more layers of nuance lie beneath—but 'more effective' cuts to the chase. And who doesn't want to be in that camp!?

Trustworthiness

In addition to highlighting samples of evidence, the overall tone and content of the principles give teachers confidence that these ideas are not fads; they are rooted in evidence that has stood the test of time. Rosenshine introduces his pamphlet with a brief overview of the three sources of evidence that have informed his principles:

a) Research on how our brain acquires and uses new information: *cognitive science*.
b) Research on the common classroom practices of those teachers whose students show the highest gains: *observational studies of master teachers.*
c) Findings from studies that taught learning strategies to students: *testing cognitive supports and scaffolds that help students learn complex tasks.*

He follows up with the acknowledgement that although the approaches are very different, "there is no conflict at all between the instructional suggestions that come from each of these three sources. In other words, these three sources supplement and complement each other." This fact "gives us faith in the validity of these findings."[3]

The convergence of ideas from classroom observations and cognitive science is important. If it were the case that cognitive science suggested a different set of instructional

[3] Rosenshine, B. (2012). Principles of instruction: Research-based strategies that all teachers should know. *American Educator*, *36*, 12.

practices to those being used by effective master teachers, then we'd be in trouble. How could we explain that? Happily, while learning and teaching are undeniably complex, it turns out that they are not *that* complex: we can formulate a coherent evidence-based model that links theory to practice. Rosenshine's principles provide the coherence teachers seek, and that fosters trust. This matters because without trust, teachers don't buy into information: they simply ignore it, and the inertia grows.

Authenticity

A third reason that I find is fueling interest in Rosenshine's *Principles of Instruction* is that, taken as whole, to many teachers it sounds like common sense. It's an entirely recognizable set of ideas. There are no gimmicks, no fads, nothing that seems implausible, nothing outlandish. Teachers either recognize themselves in the descriptions or they see valid and obtainable models to aspire to. After many years of having teaching defined by external powers, this feels like a grassroots document, which allows it to gain acceptance that cuts through teachers' well-honed defense systems.

From my perspective, as someone who now spends most weeks working with teachers seeking to improve their practice, it's great to have a set of ideas that are rooted so authentically in classroom experience that they are nearly uncontentious. The discussions are not about whether or not to adopt the principles; they are about how to adopt them more fluently, with more intensity, or at a higher frequency; they are about how to interpret them through the lens of each subject domain and how to adapt them for learners with different levels of knowledge and confidence.

For all these reasons, Barak Rosenshine's *Principles of Instruction* provide an incredibly useful platform for teacher development processes. It's a well-rehearsed notion that

the lessons that make the difference to student outcomes are all the many lessons that go unobserved, where it is just the teacher and the students in a classroom enacting the teacher-student interactions that either lead to learning gains or don't. If teachers are going to be successful in improving their practice, they have to be working consciously and deliberately to do so. Teachers need to be working on developing better habits, seeking to be more effective day-in, day-out when nobody else except their students are looking. The kiss of death to teacher development is a school culture or accountability framework that motivates "speed camera" behaviors – where teachers turn on the style when they are under scrutiny only to revert to less effective practices the rest of the time. If we're to avoid that, then we've got to foster a professional culture where good ideas gain acceptance, credibility, and momentum. I find that in the principles we have a superb tool for doing just that.

Theory of action: What is the underlying model?

One of the big variables I find in working with teachers in a range of contexts is their ideas about how learning works. How do the actions and activities that a teacher engages in, or that they require their students to engage in, lead to learning? Sometimes teachers talk in terms of concepts "sinking in," and I often hear complaints that despite explaining a concept over and over, students still managed to misunderstand it—or even worse, despite seeming to have been successful in a lesson, they forgot it all immediately afterward. Too many teachers still believe that teaching according to students' preferred learning styles is a good idea, even though this has been soundly debunked.[4]

[4] Weinstein, Y., Sumeracki, M., & Caviglioli, O. (2018). *Understanding how we learn: A visual guide*. Abingdon, United Kingdom: Routledge.

All of these problems stem from a weak model of the learning process. If teachers are going to improve their practice, then it's essential for the ideas they are basing their thinking around to be formulated on a sound model. Understanding the model isn't a necessary condition for successfully implementing the strategies the model suggests, but my personal view is that teachers are more likely to connect with ideas and implement them well if they can formulate a mental model of learning that underpins the practice. This is supported by the work of Deans for Impact in their excellent "Practice with Purpose" document:

> *Deliberate practice both produces and relies on mental models and mental representations to guide decisions. These models allow practitioners to self-monitor performance to improve their performance.*[5]

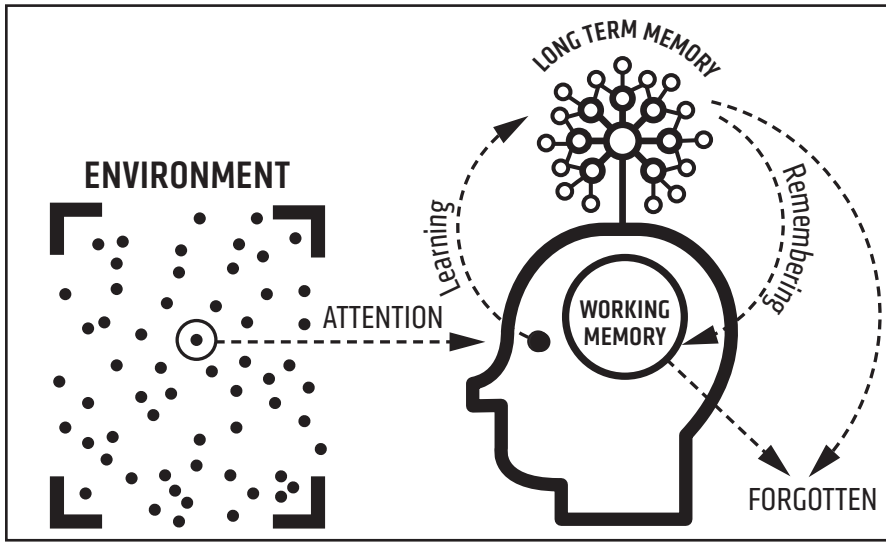
It's fascinating to me just how well the *Principles of Instruction* are supported by the learning model that emerges from contemporary cognitive science. For the purposes of this short book, it will help to rehearse the key elements of this model. It is based on ideas from the following sources:

- Daniel T. Willingham's *Why Don't Students Like School* (2009)
- Graham Nuthall's *The Hidden Lives of Learners* (2007)
- Arthur Shimamura's *MARGE: A Whole-Brain Learning Approach for Students and Teachers* (2018)
- Weinstein, Sumeracki, and Caviglioli's *Understanding How We Learn* (2018)

[5] Deans for Impact. (2016). Practice with purpose: The emerging science of teacher expertise. Austin, TX: Deans for Impact. Retrieved from https://deansforimpact.org/wp-content/uploads/2016/12/Practice-with-Purpose_FOR-PRINT_113016.pdf

As well as the many others who collectively contribute to our current understanding, most notably Robert and Elizabeth Bjork, John Sweller, Paul Kirschener, and Carol Dweck.

A simple model for how memory works is based on the concept of building schemata in our long-term memory, as follows:



Conceptual information initially enters from the environment into our working memory.

Working memory is finite and actually rather small, so we can only absorb a limited amount of information at once.

We process information so that it is stored in our long-term memory. This is effectively unlimited, and we retrieve information back into our working memory as needed.

We organize information into schemata. Typically, new information is only stored if we can connect it to knowledge that we already have; as a result, prior knowledge is a major factor in our capacity to learn new information. The more complex and interconnected our schemata are, the easier it is to make sense of new related information and we

are better able to organize it so that it makes sense. The concept of *understanding* is really "memory in disguise."[6] This means that our schemata are more fully formed, are more interconnected, and can be explored and recalled more fluently.

If a schema contains incorrect information – a misconception or an incomplete model of how a process works – we can't simply over-write it; a more primitive schema can return to dominate unless we unpick and fully re-learn a correct schema.

We forget information that we do not initially store successfully in a meaningful schema or that we do not retrieve frequently enough. This is entirely natural – we're primed to filter out information we might need and to discard the rest. Our capacity to retrieve information improves if we practice doing this more often and do so in more depth.

If we undertake enough retrieval practice, generating formulations of our memory and evaluating it for accuracy, we gain a degree of fluency and, ultimately, automaticity. This is true of anything we learn, be it reading, driving, or speaking a foreign language. A consequence of this, as explained by cognitive load theory,[7] is that the more fluent we are with retrieval of stored information, the more capacity we have in our working memory to attend to new information and problem solving. If we are efficient in bringing up the information from memory, then there's more working memory space left to deal with *applying* the information. The opposite is also true; when we are less fluent with recall, our capacity to attend to new information and problem solving is diminished. This is a key difference between novice and expert learners. Think of novice drivers,

[6] Willingham, D. (2009). *Why don't students like school*. San Francisco, CA: Jossey-Bass.

[7] Sweller, J., Ayres, P., & Kalyuga, S. (2011). *Cognitive load theory*. New York, NY: Springer.

who become easily overwhelmed by the pressures of traffic and road signs: they are more likely to have difficulty absorbing all the external information as well as focusing on the skill of driving itself.

A key implication of this is that novice learners need more practice than more confident, experienced learners.

Following the work of Nuthall and Shimamura, I find it instructive to imagine a classroom of students as a room full of hidden schema-forming brains, each doing things we cannot see, each processing information differently depending on what they already know, on the level of attention they are giving to the new knowledge, and on their capacity to self-regulate and to organize information successfully. In that context, instructional teaching needs to be highly interactive. We need to gain as much feedback as we can from our students, telling us how well the learning is going so that we can then plan the next steps in our teaching. Learning is hidden, so we need to seek out evidence for it in a dynamic fashion during our lessons.

This interactivity, the need for "responsive teaching,"[8] underpins many of the ideas in the *Principles of Instruction*.

Knowledge-specified curriculum

A final preliminary consideration that teachers should keep in mind before we explore the principles themselves is the notion of a knowledge-specified or "structured" curriculum. In the 1986 paper by Rosenshine and Stevens, *Teaching Functions*, they talk about the limitations of the principles:

> *It would be a mistake to claim that the teaching procedures which have emerged from this research*

[8] Wiliam, D. (2011). *Embedded formative assessment*. Bloomington, IN: Solution Tree Press.

apply to all subjects, and all learners, all the time. Rather, these procedures are most applicable for the "well-structured" (Simon, 1973) parts of any content area, and are least applicable to the "ill-structured" parts of any content area.

They go on to explain that all subjects have "well-structured" elements – some more than others. It's an important bit of nuance in the implementation of Rosenshine's principles. Evidently, some content needs more teacher-directed instruction than others and so the subject-specific curriculum context is important.

This also suggests that the more precise we are about the knowledge goals for learners, the more rigorous we can be about the process of ensuring that all students meet them. This rings true in my experience, having observed thousands of lessons. Very often, when engaging in feedback conversations with teachers, I feel that everyone in the class could have benefited from more precise knowledge goals – both teacher and students. It's hard to form a strong schema, to practice retrieval, or to evaluate the true extent of your knowledge if you are unsure what the knowledge is meant to be; if you are unsure what exactly "success" looks like.

This will be illustrated further as we explore each of the principles.

In the following sections, I will take each strand in turn, referencing the original seventeen instructional procedures where I think they belong. My aim is to amplify and augment the ideas as Rosenshine has expressed them, giving further examples without repeating those he used himself.