

Mastery Learning

A guide to the key principles
of mastery

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1. What is mastery?

For too long we in education have over-complicated teaching. Mastery is an attempt to turn the tide, and through simplicity, achieve greater results with less teacher burnout. A helpful definition can be found in the government's recent report 'Assessment without levels': in mastery learning, 'learning is broken down into **discrete units** and presented in **logical order**. Pupils are required to demonstrate **mastery** of the learning from each unit before being allowed to move on to the next, with the assumption that **all pupils** will achieve this level of mastery if they are appropriately **supported**.'¹

What is so compelling about this approach is its **equality**: for too long, low expectations have plagued our sector: we have taught 'Skellig' in place of 'Oliver Twist' in year 7; asked children to make posters instead of write paragraphs. But while as individual teachers we have usually believed our pupils are capable, we haven't always had the tools to be able to make every student successful.

In mastery teaching, you firstly choose strong content: something worth teaching. For me, the guiding principles for deciding such content flow from E.D. Hirsch's 'Cultural Literacy': we need to teach children the ideas, concepts, and texts that have been most influential in later years. You then consider your individual students' **starting points**, and work out a way for them to **master** this content.

Along with selecting the best **content** to teach, we also need to use the **highest leverage activities** to ensure pupils engage with that content. What does 'high-leverage' mean? Simply the strongest lever, the best tool to winch pupils above their current muddling to the heights of academic achievement. Mastery learning is simple. The highest leverage activities don't change that much, so you will end up with similarly structured lessons. In my experience, far from being bored, pupils thrive on this certainty. They feel more confident and more secure when they really understand the text, and their progress is quicker as a result.

¹ <https://www.gov.uk/government/publications/commission-on-assessment-without-levels-final-report>

2. The science of learning

The situation of forgetting what we have learned is all too common. If students remembered everything they learned, our jobs would be easy. If we remember nothing, we have learned nothing: just think back to subjects you aced the GCSEs in but wouldn't score any marks on if you sat them today. Daniel Willingham tells us that memory is 'the residue of thought': if you think about something a lot, you are more likely to remember it than if you rarely or never think about it again. Willingham suggests there are four main reasons for forgetting:

1. You didn't pay sustained **attention** to what you were learning
2. You did pay attention, but it never stuck and so wasn't **stored** in your long-term memory
3. You did pay attention, but you never **used** the ideas, so they faded into disuse
4. You remember individual facts, but you can't **transfer** them from your long term memory to your current situation²

In short, we don't remember things because of insufficient focus, time or attention spent on them, and because of insufficient practice, usage, revisiting, consolidation or application.

Willingham suggests three ways to help students secure effects in long-term memory:

1. **Distributed practice**: rather than cramming, practice similar tasks over and over again at different times
2. **Overlearning**: keep revisiting even after students appear to have 'learned' something to prevent them forgetting
3. **Frequent tests**: students who always have to pull information from their memories are more likely to remember it in the long term

In his book 'Moonwalking with Einstein', Joshua Foer tells us that memory is **domain specific**: we can remember lots about our specialisms, but little about other aspects of our lives (so, history dates stick, but where we left our keys doesn't). He also tells us that **cues** help us remember; if we can tie concepts to other ideas, this can help us to remember them. (We see this when learning poetry by heart: the rhyme of one line can prompt our memory of the next.) Finally, he reminds us that **deliberate practice** is the only way to improve: **how** we practice is more important than **how much**: or as Doug Lemov would say, practice makes **permanent**, not perfect.

The final blocks to effective learning are outlined by Willingham:

1. **Background knowledge** enables us to think critically around a subject: without contextual knowledge, we can't make connections between ideas and come up with creative solutions
2. Abstract concepts require **concrete examples**: it is impossible to grasp abstract ideas without examples we can see and discuss
3. Learning is impossible without **extended practice**: we need to spend time on what we want to become good at

² <https://pragmaticreform.wordpress.com/2013/11/16/memory/>

3. What does a mastery curriculum look like?

A mastery curriculum prioritises **depth** over **breadth**. What the students study is as important as how they study it. We need students to be studying the most challenging and important knowledge in order to enable them to access the range of choices in their future.³ Too many generations of children have been pushed onto courses middle class parents wouldn't dream of allowing their children to take. Non-rigorous qualifications underestimate our children, and underestimate our potential as teachers to enact change in our students' capacity to learn.

The teaching profession has for too long remained fixated on **how** we teach, at the expense of **what** we teach.⁴ Also harmfully, we often underestimate the **prior knowledge** students need to have in order to access the lesson content, rather focusing on methods of teaching to engage students.

When we plan any unit of work, we need to keep in mind two crucial ideas:

- a) **Memory is complex**: it is hard to remember difficult things
- b) **Knowledge is vital**: less advantaged children lack the background knowledge of their wealthier peers⁵

Begin your unit plan by asking: what do we want students to **remember** long after finishing this unit? What is the most important knowledge for them to retain in **long-term memory**? What material will enable them to access the widest range of choices in their future?

You then need to sequence your unit by considering what students need to **practise**. In English and History, students most need to practise reading and writing. In Maths, they need to practise solving equations, or converting fractions, or basic numeracy.

³ <http://clioetcetera.com/2015/01/15/why-should-vocational-subjects-have-no-place-on-the-school-curriculum/>

⁴ <http://clioetcetera.com/2015/06/27/on-not-losing-the-what-in-the-how/>

⁵ <https://pragmaticreform.wordpress.com/2013/12/21/unit-plan/>

4. What does a mastery lesson look like?

In a mastery lesson, you need to strive for **simplicity**. **Content** is key: **what** students are learning is the focus. You need to begin by **recapping** on students' prior knowledge, before **reading** or **instructing** pupils (ideally both) in the new knowledge. **Questions** should be used to check for understanding as well as to stretch and challenge. Students then need a period of time for **deliberate practice**. Finally, **homework** should support the core purpose of the mastery curriculum: committing the most important knowledge to **long-term memory**.

a) Recap

This could be as simple as four direct **comprehension** questions. For students struggling with literacy, make them write these out in **full sentences**. For highly literate students, you could have more questions and **shorter** answers. You should always **recap** what you have **taught**, never assume prior knowledge. Students who don't know what you think they know will feel they can't access your lesson.

Consider recapping on content from **prior units** to ensure by revisiting your students are more likely to remember. Using knowledge maps is a quick and easy way of bringing back units from prior terms and years.⁶

b) Instruction

When thinking about teaching in a mastery curriculum, we must focus our efforts on the highest leverage teacher actions to bring about maximum learning for students. In order to do this, we need to be mindful of the **knowledge gap** and the **practice gap** for our students. In our particular context at Globe Academy, we need to be aware of the **literacy** issues our students face.

Students from disadvantaged backgrounds have long endured a **double disadvantage**. At home, they often lack the **social and cultural capital** of their wealthier peers, and they come to school less ready to learn, with **less background knowledge**. Once in school, prevalent teaching practices (often focused on group work, collaboration, and building self-esteem rather than mastery) disadvantage these students again. While their wealthier peers arrive at school further ahead, and are then **explicitly instructed** in the way that will bring about student learning the fastest, our students are often led by teaching practices that do not impact on student learning and that are based on dubious research.⁷

For our students to close the large **knowledge gap** and **practice gap**, they need to read and write a tremendous amount. All lessons, with the exception of Maths, need to prioritise the **reading of rigorous, subject-specific material**.⁸ The expectation needs to be that **every child reads**, and not only a select few.⁹ Following reading, teachers need to **script questions** to **check** for student **understanding**. We need to not ignore the possibility that students have not understood what they have read: teachers need to make use of **comprehension questions** to ensure students are showing

⁶ <https://pragmaticreform.wordpress.com/2015/03/28/knowledge-organisers/>

⁷ See, for example, focusing on learning styles, or group work; the former discredited here <https://www.youtube.com/watch?v=slv9rz2NTUk>, and the latter leading to social loafing, explained here <http://study.com/academy/lesson/social-loafing-definition-examples-theory.html>.

⁸ <http://clioetcetera.com/2015/10/22/what-are-our-pupils-reading/s>

⁹ As I explained in the training session on reading I delivered, summarised here <http://readingallthebooks.com/2015/10/29/how-to-read-tlt15/>

they understand, and they need to do these questions **silently** and **independently**, to ensure every student is working.¹⁰ Along with short-answer questions, students should be expected to write lengthier responses where possible. The advantage of the former is self or peer marking: while students write, the teacher **circulates** looking for **common misconceptions** or **misspellings**. When taking student feedback, the teacher can redress these on a **whole-class level** as students check their own work. This is much harder to do for the latter, where each individual student's piece of writing is likely to be different.

While wanting to encourage plenty of student writing, we must simultaneously ensure students do not expect teacher **feedback** on every piece. One way to avoid this is to use **checklist marking**, where students look for specific key words or ideas in a piece. That way, teacher marking is reduced to checking what students themselves have done. The more we **specify** the key knowledge we want students to be using in their writing, the easier such self and peer marking is. A knowledge focus is better for teacher workload.¹¹

Too often, teacher instruction has been based on discovery, or drawing out what students know. The issue here, is that our students don't often know very much. A higher impact strategy is to **teach** the needed knowledge **explicitly** up front, allow students to **practice**, and then **revisit** it.¹² The table below is in no way exhaustive, but is intended to guide teachers' thinking in terms of instruction.

High leverage activities	Low leverage activities
Whole class reading	Card sort
Teacher questioning	Group discussion
Silent writing	Group writing
Peer or self-marking to set criteria	Group reading
Whole class discussion with teacher scribing key points and students taking those notes down	Silent reading
Crafting model exemplars and exploring these with students ¹³	Making predictions
	Making inferences before explicit instruction has taken place
	Showing video clips
	Students researching
	Drawing diagrams to demonstrate learning
	Reflecting on learning

c) Questions

Arguably, the best use of teacher time in planning would be to look at the **content** selected to be taught, and **script the questions** that will enable them to check all students have understood and later mastered that content. Our time as teachers is best spent looking at the lesson reading and thinking: which **aspects** will students **struggle** with? What **concrete examples** can I use to teach these difficult concepts? Which **words** do I need to **gloss** for students? Which do I need to **teach** more **explicitly**? Which **questions** do I ask to ensure all students have **understood** the essential points? Which questions do I ask to **stretch** the top students in the classroom?¹⁴

¹⁰ Also see Doug Lemov on 'Check for Understanding' in TLAC 2.0

¹¹ <https://pragmaticreform.wordpress.com/2015/02/07/a-knowledge-led-school/>;

<https://pragmaticreform.wordpress.com/2015/06/06/hornets-and-butterflies-how-to-reduce-workload/>

¹² <https://tothereal.wordpress.com/2015/04/29/why-this-post-is-wrong-and-dangerous-response-to-mastery-overload/>

¹³ <https://pragmaticreform.wordpress.com/2014/04/06/3-apps-cognitive-science/>

¹⁴ <https://pragmaticreform.wordpress.com/2013/12/21/unit-plan/>

d) Deliberate practice

Finally, in our lessons students need to be **practising** the things they **struggle** most at. For our students, that is reading and writing; in Maths, this could be basic numeracy for some students. We need to be mindful that when students struggle with complex tasks, the underlying issues might be the building blocks to those tasks. For example, when a supposedly 'high ability' student struggles to answer an essay question on an unseen text, the issue could be their conceptual understanding *or* their actual reading ability, which can be masked in classrooms where individual **reading aloud** is not given priority.

Teacher time needs to be spent working out what students struggle with, and building that into their lessons so students can have **deliberate practice** at those key skills.¹⁵

e) Homework

Homework is a potential **hornet**: difficult to set, burdensome to mark, difficult to chase up in considering who was there when you set it and absent when you collected it, and vice versa. For teachers with 10 or more classes, it is virtually impossible to stay on top of homework.

Homework needs to be **high leverage**, but without creating **teacher burnout**. Using homework as a time to **revise** using **knowledge maps** and learn the key knowledge is helpful. Teachers can then test students on this knowledge, and their mark will tell them whether they have or have not done the homework. This can be set in advance, so all students know the expectation is to learn one particular part of their knowledge map a week, even if they are absent or ill.¹⁶

¹⁵ <http://nickhillcoaching.com/?p=1056>

¹⁶ <https://pragmaticreform.wordpress.com/2015/03/28/knowledge-organisers/>

5. Further reading

a) Books

Daniel Willingham: *Why don't students like school?*
Daisy Christodoulou: *Seven myths about education*
Joshua Foer: *Moonwalking with Einstein*
Daniel Koretz: *Measuring up*
Benedict Carey: *How we learn*
Ybarra: *Explicit direct instruction*
Ian Leslie: *Curious*
Eric Kalenze: *Education is upside down*
Tom Bennett: *Teacher proof*
E.D. Hirsch: *The schools we need and why we don't have them*
Amanda Ripley: *The smartest kids in the world and how they got that way*
Graham Nuthall: *The hidden lives of learners*
Robert Peal: *Progressively worse*
Brown et al: *Make it stick*

b) Blogs

Daisy Christodoulou: <https://thewingtoheaven.wordpress.com/>
Joe Kirby: <https://pragmaticreform.wordpress.com>
Katie Ashford: <https://tabularasaeducation.wordpress.com/>
James Theobald: <https://othmarstrombone.wordpress.com/>
Michael Fordham: <http://clioetcetera.com/>
Andrew Old: <https://teachingbattleground.wordpress.com/>
Bodil Isaksen: <http://blog.bodil.co.uk/>
Kris Boulton: <https://tothereal.wordpress.com/>
David Thomas: <http://www.mrthomasmaths.com/>
Steve Adcock: <https://afewthoughtsoneducation.wordpress.com/>