



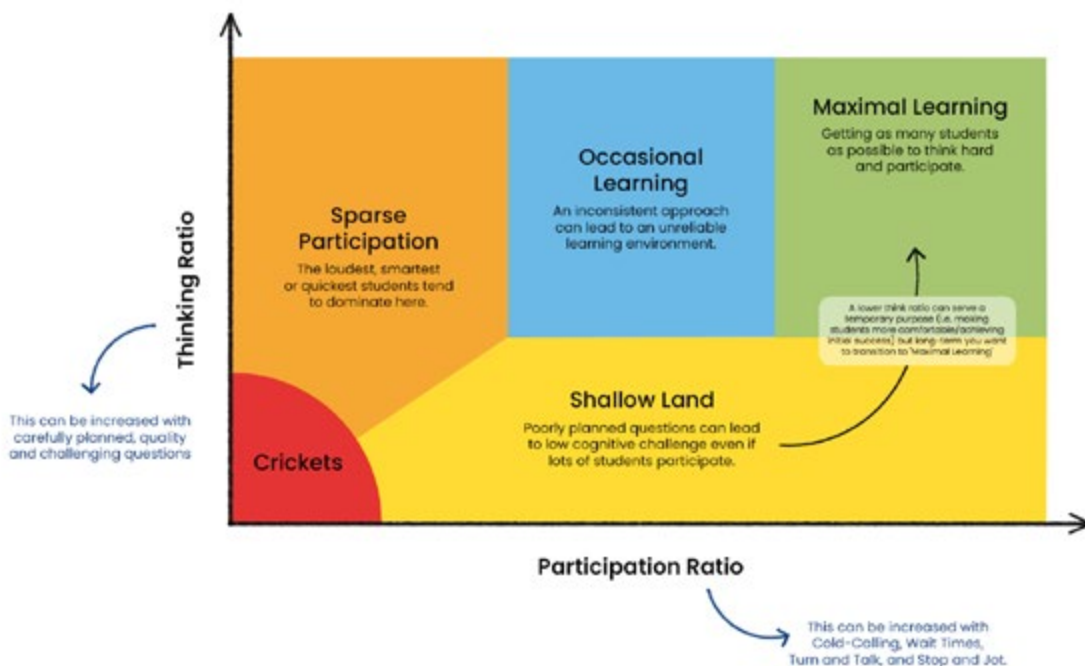
THINKING AND PARTICIPATION RATIOS: MAXIMISING COGNITIVE ENGAGEMENT

By teacherCPDacademy.com

Recently, InnerDrive's Bradley Busch was lucky enough to hear [Doug Lemov](#) present in person about how to maximise cognitive engagement in the classroom. As part of his presentation, he showed a graph to help explain how we can get students thinking deeply about the content, as well as participating in the classroom discussion. Doug was kind enough to let us make some tweaks to his original graph, as well as generously taking the time to sit down with us to explain some of the key terms and features of it.

Maximising Cognitive Engagement

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PARTICIPATION AND THINKING RATIO

Bradley Busch: What are Participation and Thinking Ratio?

Doug Lemov: Participation ratio is the percentage of the class who are actively participating in the lesson, while Thinking Ratio is how hard and deep students are thinking.

But I'd say that my definition of Thinking Ratio has changed slightly in the last year or so. I used to describe it as the rigor of the question. Now, I'd say it's a bit more useful to see it in the framework of Cognitive Science: are students thinking sufficiently to cause encoding and memory formation. For example is there deliberate difficulty?

Bradley Busch: What are ways to up the Participation Ratio in class?

Doug Lemov: There are several approaches that teachers can use that can increase student participation:

- **Cold-Calling** – This is calling on a student regardless of whether they have offered to participate. This allows you to invite everyone – even hesitant students into the discussion. If you know you're never going to answer aloud you're less likely to think as fully. So realistically, it can tell students that their voice matters, that their opinion matters but it also ensures that everyone feels accountable to answer the questions you ask.
- **Turn and Talk** – This is where students are asked to discuss the target question with their partner. This ensures that all students are able to process ideas actively while engaging in conversation with a classmate. It's great as a rehearsal before whole-class activities and often results in a larger number of raised hands because students are more confident.
- **Wait time** – This is the time between a teacher asking a question and calling out to get a response from a student. Increasing this time will effectively increase the level of student participation and cause students to think more deeply.
- **Stop and Jot** – This is where students are asked to quickly write down their thoughts. This short and formative activity gives students the opportunity to respond to questions or express creative insights with low stakes.

Bradley Busch: These strategies that you mention are probably the fairest of strategies because they're designed to include everyone, as opposed to being dominated by the few.

Doug Lemov: Yes. You want to ensure that the classroom has voice equity. For example, one of the things I do when I Cold-Call is I tell students you're legitimate and have value to add to the conversation. This will make them feel welcomed to keep contributing to the discussion.

CRICKETS AND SPARSE PARTICIPATION

Bradley Busch: Can you explain a bit what is meant by "crickets" and "sparse participation" on the graphic?

Doug Lemov: I think there are two scenarios near that corner. The first is "crickets", where the teacher asks the questions and students just look at you with no answer. Because this is awkward, teachers often ask simpler questions afterwards as they think no one wants to participate. But at that point the question is often so simplistic that it's not worth answering. So, a better response to crickets is to Cold-Call or use turn and talk or one of the tools above rather than reduce the rigor of your question.

Another issue is that you get the same highly verbal students saying the first thing off the top of their heads. This causes lower Participation Ratio because the answers are impulsively fast and many students will know they'll never be faster than that impulsive student and so they stop trying. But it also means a lower Thinking Ratio. The quality of answer you can give when you're answering off the top of your head is low. We'd rather have students slow down a bit and think a little more.

SHALLOW LAND

Bradley Busch: Can you elaborate more on what we've dubbed as "shallow land" in the graphic? This area seems to give this great perception that the lesson is interactive, but it is actually just a bit superficial?

Doug Lemov: "Shallow land" is an area which looks like learning; but in reality, it's all happening at the surface level. This is normally

derived from easy and poorly designed questions that lead to low cognitive challenges. This can be deceiving to many teachers, as it creates the illusion that everyone is involved and happy. In reality, it is essential to push the rigor even when there's a high Participation Ratio so that students can reach maximal learning.

However, there are times when it is permissible for teachers to be briefly in something that looks a bit like "shallow land" but is more of a brief warm up or confidence building period. It can at times be a good idea to start a lesson with some easier questions to build people's confidence and energy, and then ratchet up the Thinking Ratio. This may be especially beneficial for students who are lack confidence or who give up easily as it is very helpful in helping them build motivation. Students are motivated when they are successful. But teachers need to keep in mind that this area is insufficient and seductive long term.

HOW MUCH PLANNING SHOULD GO INTO QUESTIONS

Bradley Busch: Do you think teachers should follow a plan or be more adaptive about the questions they choose to ask, and how might this affect the Thinking Ratio?

Doug Lemov: I think being well-planned helps teachers to be adaptive in many ways. Teachers should first make a general plan which includes writing out the questions they will ask during class. This is important because you're less likely to be able to think of the optimal question on the spot. And if you're trying to think of your next question while students are answering the current one, you won't be listening fully to the answer and students may sense that.

Teachers should also not neglect exemplar planning. This is writing out the ideal answer to the most important questions you're planning to ask. I think many often overlook this step because they know the answer. However, writing it out will allow you to glance at it as you listen to student answers and so your own working memory will be refreshed. You'll notice what's missing—or what's good in a student answer—more quickly that way. And it will help free your working memory so you are more present when students are talking and can respond more productively.

FINAL THOUGHTS: A LOOK AT TWO RECENT COGNITIVE SCIENCE STUDIES

Seeing Doug Lemov in action really help clarify and breakdown some of the key factors in helping all students think hard in lessons. His graph provides a nice starting point for a discussion.

It is interesting to reflect how two fairly recent studies from Cognitive Science support the key tenants of Thinking Ratio and Participation Ratio:

Study 1: [This study](#) found that although students may prefer easy questions when it comes to retrieval, they actually learned more from the more challenging ones. This suggests that "Thinking Ratio" is very important, especially as students may not be initially enthusiastic about the prospect of having to think hard, in the long-run it may be beneficial for their learning.

Study 2: [This study](#) found that the level of individual talk and participation from a student is a significant factor in how well students perform in our class. Specifically, the authors note that *"we found that high internal behavioural engagement did not guarantee student achievement if the engagement was not accompanied by talk. Our findings thus highlight the important role of classroom talk in relation to student learning"*.

This sort of research helps point us in a general direction as to how to help students accelerate their learning. But more than just increasing their rate of acquiring new information, the techniques mentioned above help also improve listening skills, concentration, oracy and motivation. In doing so, hopefully we can help all students maximise their cognitive engagement with our lessons.

A final thank you again to Doug for coming up with the original concept, his kindness in letting us adapt it, and working with us to make it better as well as his generosity in giving us his time to talk through it.