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Moving from Engagement to Deeper Thinking

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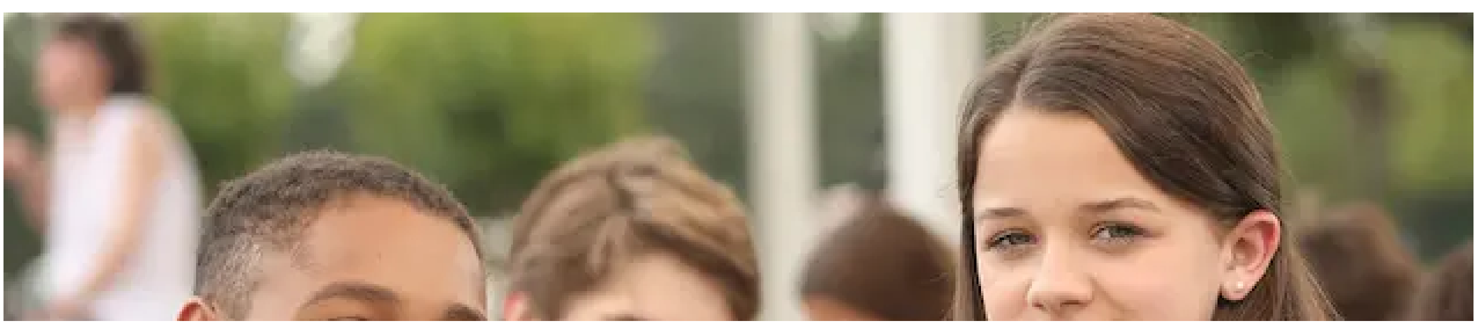
To make learning last, educators need to design instruction that reflects how the brain works.

Abstract

PREMIUM RESOURCE

INSTRUCTIONAL STRATEGIES ENGAGEMENT



The term *engagement* has evolved to mean many things in education. Some teachers believe it's found whenever students are diligently focused on a task. For others, engagement represents the joy in creativity that happens when students are fully absorbed in the flow of learning.

But there's another form of engagement that's all too common in many classrooms that cuts against these definitions: the *illusion* of engagement. Students may appear engaged—creating ornate dioramas, glitzy posters, exploding volcanos, or other "busy" projects, for example—but ultimately, they do very little actual learning or thinking about their learning.

Next time you're observing a lesson and see students in the middle of what appears to be an engaging task, ask them: "What are you working on?" and "What is this task teaching you about?" If the activity is truly engaging them in substantive learning, the students' response should be equally substantive. But that isn't always the case.

What can educators do to differentiate between the illusion of engagement and actual learning? And what would it take to create the instructional conditions for engagement-as-learning to occur?

Student Thinking vs. Student Engagement

To address this question, we'd like to posit an alternative to the term *student engagement*. A guiding term that might not sound as, well … engaging, but might offer a more accurate description of what we should be paying attention to, which is *student thinking*.

There are a few ways to consider student thinking, each of which is supported by the best research we know about how students learn:

- Students make sense of new information through reference to their existing knowledge.
- Students are more likely to durably retain information that they think about deeply or "effortfully."

- Therefore, the choices teachers make around how students will encounter and process information are fundamental to the success of the learning that takes place.

A Blend of "Known" and "Unknown"

Many students struggle to pay attention to new information—or if they *do* pay attention, the information still might not stick. One effective way to counter this is for teachers to prime students for new learning by tapping into and cueing up their existing knowledge.

Cognitive science shows that students make sense of new information in relation to what they already know—and what we often put down to "curiosity" on the part of learners is actually them recognizing how something new fits into, alters, or exposes a gap in their existing knowledge and conception of the world (Bransford, Brown, & Cocking, 2000).

> **Learning is most effective when students draw ideas together into an evolving network, or schema, of understanding.**

Learning is most effective when students draw ideas together into an evolving network, or schema, of understanding (Nokes, Schunn, & Chi, 2010). In other words, even if students successfully store a single piece of information in their long-term memory, that single pathway is often inadequate for them to retrieve the information later because they have too few "hooks" or neural paths for retrieving it (Bjork & Bjork, 1992). Fortunately, research points to ways we can activate students' prior knowledge by acknowledging the blend of "known" and "unknown" components informing their learning.

Here are a few practical strategies teachers can use.

Help students "mind the gap."

Since we know that students encounter new information by bringing existing knowledge to bear upon it, teachers can focus student attention on pertinent concepts by framing the new ideas alongside students' existing understanding.

You might use the following structure when introducing new information: *We know* ___, *but did you know* ___? *Why do you think that is*? For example:

> We know from our last unit that it's colder at the top of a mountain than it is at the bottom, but did you know that when wind blows down from mountaintops, it warms the valleys below? Why do you think that is?

Acknowledge that not all prior knowledge is created equal.

Students almost always will have *something* to say when it comes to their prior knowledge of a topic. The question is whether their prior knowledge is relevant to the content you want them to remember. Teachers should invite students to surface prior *content* knowledge as opposed to prior *personal* knowledge when making those connections.

For example, it would be more important for a student's learning if they responded to the prompt in the prior example by saying, "I know that the air is thin at the top of mountains … is that significant?" than if they said, "I climbed to the top of a mountain on vacation once!" Design tasks and questions that prompt for one type of connection over the other.

Show how the parts fit into the whole.

Teachers can invite students to make more connections by leveraging key vocabulary, visual representations, or models as throughlines to the ideas spanning the course of a unit or multiple units. Such models can illustrate how a particular piece of information fits into the broader concept. It also helps students understand how ideas are interrelated and makes it more likely that the new idea will stick.

Over the course of the unit on mountains, wind currents, and valleys, for example, students could sketch a visual model of how air heats and rises (or cools and falls), which they can refer to and build out over the span of lessons on the topic.

Encouraging "Effortful" Thinking

Beyond simply priming students to learn, the way students think about new ideas also plays a significant part in the learning process.

For instance, we know that the more deeply students think about content, the more likely they will be to learn and retain it (Craik, 2002). We also know that the depth of attention students exert should be taxing in some way for it to be effective—something cognitive scientists refer to as "effortful thinking."

> **Effortful thinking is less common than one might think, and the opportunity to think effortfully is often distributed inequitably in classrooms.**

The problem is that effortful thinking is less common than one might think, and the opportunity to think effortfully is often distributed inequitably in classrooms—a phenomenon underpinned by the fact that, according to classroom studies, only about one in five lessons appear to engage students in cognitively challenging learning (Mehta & Fine, 2019). Moreover, studies have found that without proactive efforts to engage all students in class discussions, low-achieving students participate less in classroom discussions, which can lead to a vicious cycle of further low achievement and disengagement from learning (Kelly, 2008).

It's therefore important to provide opportunities for *all* students to think and articulate their thinking. Here are a few practical strategies teachers can use.

Provide explicit processing prompts for all students.

Unless all students are explicitly asked to process the idea behind a question, higher-performing students will end up getting more chances to think effortfully, while lower-performing students often recede into the background of the classroom, with the true nature of their thinking and learning often left to chance. So it's important to provide opportunities for *all* students to think—and to articulate their thinking.

One way to do this is to ask students to process high-level questions in small-group settings. One strategy found to be effective in lifting all learners is the "numbered heads together" approach (Maheady et al., 1991). Teachers pose high-level questions to students in teams of four, with each student numbered from one to four. Each group works together to develop a thoughtful, well-supported shared answer to the question; afterward, teachers guide a whole-class discussion by randomly selecting a number from one to four and cold-calling on students with that number from each group to respond to the question. Other tried-and-true options are "stop and jot," where students write a response to the prompt individually so that everyone gets a chance to process and answer the question, and "turn and talk," where students talk to a partner about the prompt so that everyone has a chance to describe their thinking to others.

Invite students to recognize the underlying structure of an idea, even when the "cover story" changes.

When students encounter the surface features of an idea, they can be forgiven for thinking that's all there is to know. Math is a good example of this, since students can often plug in algorithmic responses to problems without appreciating the underlying logic at play. Teachers can address this by responding to student thinking in ways that get at its underlying characteristics.

For example, a teacher might say: "You've shown me that air temperature reflects the average kinetic energy of air molecules. Now show me what it would look like if we compressed more molecules into the same volume of air."By asking the student to perform a similar task but alter a key feature, we challenge the student to break through the surface features of the problem and engage with the "why" that sits underneath the concept.

Get students to think aloud as they move through an idea or problem.

The inner workings of thought often are shrouded from students in ways that can be confusing. The result can feel like reading the opening and closing chapters of a book without knowing what went on in between. One way to make thinking more visible and deepen student understanding is to externalize your thought processes as they're occurring and encourage students to do the same.

If a student completes a visual model showing how air molecules behave in high- and low-pressure conditions, for example, the teacher might say, "Great, now talk me through the process you went through to arrive at your answer and refer to what we've been learning through this unit to explain each feature." This not only checks the student's understanding, but more important, it invites the student to deeply process and externalize the steps taken to build out the model in the first place—which helps the student encode the concept by breaking down the approach.

Thinking About the Thought Process

Designing classrooms to better reflect how the brain works is an opportune instructional approach. It's a low-cost, high-impact way to improve learning that doesn't require expensive technology, can be delivered within the regular school day and calendar, and ultimately, can be applied in any subject area or grade level.

Moreover, it addresses a concern that's on most educators' minds these days—re-engaging students who have become disengaged in their learning, which research suggests grows worse as students grow older (Calderon & Yu, 2017) and became exacerbated during the pandemic (Holquist et al., 2020).

> “ **To find ways to accelerate student learning while not burning out teachers, try providing students with classroom experiences underpinned by learning science.**

Our point here isn't to add one more thing to teachers' plates—nor to add to the complexity of teaching. Rather, it's to provide teachers with a lens through which to view (and re-examine) their current approach and pose a simple question at the heart of their practice: *What are the things my students need to know, and how can I ensure that they are thinking about those things in ways that will make that content stick?*

To find ways to accelerate student learning while not burning out teachers, try providing students with classroom experiences underpinned by learning science. After all, knowing how to teach should begin with an understanding of how students learn.

Reflect & Discuss

➛ How do you connect students' existing knowledge to new lesson material?

➛ Does the idea of focusing on student thinking as opposed to student engagement resonate with you? Why or why not?

➛ Which of the instructional strategies mentioned here have you used? Which might you try to implement?

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