

Ultimate Guide to Thinking Teaching Practices

FEATURING

3 'BIG IDEAS' TO MOVE STUDENTS FROM A MINDSET OF 'DOING' TO COLLABORATION & THOUGHT IN K-12 CLASSROOMS



By now you know the numbers.



Percentage points in **mathematics**



Percentage points in **reading**

Source: The National Assessment of Education Progress, 2022

The National Assessment of Education Progress, eponymously known as “the Nation’s Report Card,” reports that from 2020 through 2022, during the throes of the pandemic, average standardized test scores for age nine students dropped five points in reading and seven points in mathematics.

While research suggests those numbers have started to climb, the data offered a window into an otherwise unprecedented crater in core academic achievement, particularly in mathematics, which had never before experienced such a precipitous drop.

The news sent school leaders and other education advocates scurrying to close reported “learning gaps” and catch students up after years of upheaval to the traditional classroom model. The federal government funneled billions into “academic recovery.” By any admission, even as indicators trend upward – and federal pandemic relief runs out – there is still much ground to cover.

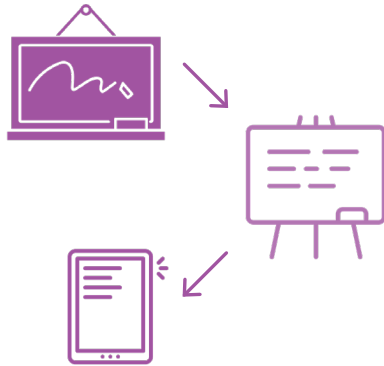
Across the board education advocates and policymakers, who rarely agree on anything, can agree on this: The key to students’ academic success lies not in how they learned in the years before COVID, but in how they will learn heading into the future.

Where most schools have gotten good at traditional “learning” (e.g. teaching to standards), students still struggle to master so-called 21st-century skills. Things like critical thinking, creativity, information literacy, and collaboration. There are others, but you get the gist.

Across the board, experts say it comes down to changing not just what activities we ask students to do, but in how we teach them to collaborate and to think.

Dr. Peter Liljedahl is a professor and researcher at Simon Fraser University and author of the hugely popular Building Thinking Classrooms series, including Building Thinking Classrooms for Mathematics K-12. His research-based method for teaching skills like thinking and collaboration as a precursor to learning features 14 distinct practices that teachers can use in their classrooms.





"In 170 years, what has really changed in a traditional classroom," asked Liljedahl on a recent episode of [The RocketPD Podcast](#). "We've gone from blackboards to greenboards to whiteboards to smartboards and the chair's not always attached to the desk. But, what has really changed? Our goals have changed. We're not talking about conformity and compliance. We're talking about 21st-century learning skills. We're talking about critical and creative thinking. We're talking about equity. We're talking about a whole bunch of different goals."

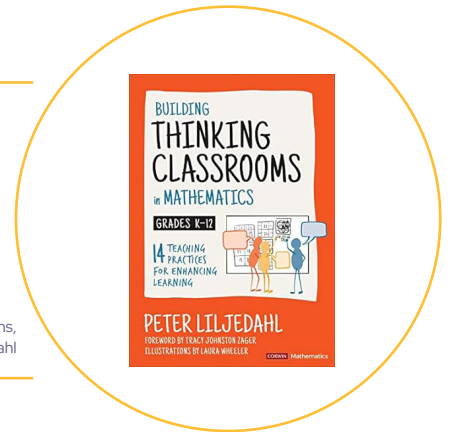
Liljedahl's conclusion: "There's no way we can achieve those goals in a setting that was designed for conformity and compliance. We need to change the environment."

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Peter Liljedahl, professor and author of the Building Thinking Classrooms series

Building Thinking Classrooms,
Peter Liljedahl



If you're a teacher, instructional coach or administrator

and you're interested in ways to promote thinking in mathematics or other academic disciplines, this guide features research and practical ideas from Liljedahl and other experts that you can use to start shifting your mindset (and teaching practices) today.

READ-ON TO CONSIDER

- 1 Normative teaching practices vs. thinking teaching practices
- 2 How to change your mindset and thinking as an educator
- 3 The power of collaboration and conversation in the classroom

Ready to get started? Let's get into it.

1 The difference between normative and thinking practices

As Liljedahl points out, for more than 170 years, classrooms have largely been a place where students are challenged to perform a series of rote tasks, usually in an effort to meet a certain standard or testing baseline.

These activities often masquerade as "learning." But are students learning, or are they doing something else, say, mimicking, or memorizing, to get by?

These are the questions at the center of Liljedahl's research. Though his Thinking Classrooms series is perhaps the most well-known, he's hardly the first or the only educator to consider the role of collaborative or critical thinking in the classroom.

In 2023, a group of researchers published a paper, "The effectiveness of collaborative problem solving in promoting students' critical thinking," in the journal *Nature*, examining the effects of collaborative problem-solving on critical-thinking skills.

EXCERPT:

"Critical thinking should be the core of curriculum reform based on key competencies in the field of education (Peng and Deng, 2017) because students with critical thinking can not only understand the meaning of knowledge but also effectively solve practical problems in real life even after knowledge is forgotten." Kek and Huijser, 2011

So, what does a classroom that promotes thinking actually look like? How do you know when you're sitting or standing in one?

Liljedahl described these visual queues in an interview with RocketPD:

Students on their feet.

You know you're in a classroom that promotes thinking when students are the ones moving around the classroom.



Students in small groups.

You know you're in a classroom that promotes thinking when students are organized in small groups.



Students talking more.

You know you're in a classroom that promotes thinking when students are the ones doing the most of the talking.



Teachers moving around.

You know you're in a classroom that promotes thinking when teachers are moving from group to group.



Teachers talking less.

You know you're in a classroom that promotes thinking when teachers are answering fewer questions.



1 The difference between normative and thinking practices (cont'd)

In his research, Liljedahl boils the ability to teach “thinking” as opposed to simply “doing” in K-12 classrooms down to a set of 14 distinct teaching practices. We’ve paraphrased the descriptions below.

[For a full view, visit Building Thinking Classrooms.](#)

14 TEACHING PRACTICES

| | | |
|----|---------------------------------------------|------------------------------------------------------------------------------------|
| 1 | Choose Our Task Types | Start with non-curricular tasks and transition to curricular tasks. |
| 2 | Form Collaborative Groups | Don't let students choose their groups. Visibly random groups are key. |
| 3 | Think About Where Work Happens | Not at desks with notebooks. Vertical & erasable boards work best. |
| 4 | Rearrange the Furniture | Fronted classrooms are passive. De-fronted classrooms promote collaboration. |
| 5 | Consider How We Answer Questions | Resist the urge to answer questions that might stop students from thinking. |
| 6 | Think About How We Assign Tasks | Write it on a board. Give the task early. Do it while kids are standing in groups. |
| 7 | Change What Homework Looks Like | Turn homework from a requirement into a check for understanding. |
| 8 | Foster Student Autonomy | Help students collaborate and make use of knowledge “in the room.” |
| 9 | Differentiate Hints & Extensions | Meet students where they are with more asynchronous activities. |
| 10 | Consolidate Traditional Lessons | Use a foundational concept and build up with a common set of tasks. |
| 11 | Reimagine Student Note-Taking | Ask students to take only the note that their future selves will need. |
| 12 | Choose What We Evaluate | Evaluate students’ competencies beyond simple understanding of the curriculum. |
| 13 | Change Formative Assessment | Develop assessments that actively inform both teaching and learning. |
| 14 | Change How We Grade Students | Continue shift from events-based grading to outcomes-based grading. |

Source: BuildingThinkingClassrooms.com

2 How to change your thinking & mindset as an educator

It might sound counterintuitive, but promoting thinking in classrooms isn't something most educators are taught in traditional professional or degree-granting programs.

A significant amount of modern teacher training focuses on normative classroom behavior (e.g. standing in front of students in rows, lecturing in front of a board and talking and/or answering questions.)

When it comes to promoting thinking, Liljedahl and other researchers contend that classroom educators (and the professionals whose job it is to prepare them) must first change their mindset. That starts with resisting the urge to answer each and every question students lob their way. Why? As it turns out, most questions and answers actually impede the thinking process.

The good news?

Change tends to come naturally, once you experience the results.



It starts with understanding the basic types of questions that students ask, of which Liljedahl says there are three:

Proximity questions

the questions students tend to ask for no other reason than the fact that you're standing there.

Stop-thinking questions

essentially, "this is hard and I want permission from the teacher to stop thinking about it."

Keep-thinking questions

questions that prompt further exploration and problem-solving.

The latter being the best type of question and the one that teachers should make time to answer. Other questions should be acknowledged, but not necessarily answered. Math instructor, instructional coach and blogger Robert Kaplinsky offers a nice summation of this idea on his [blog](#).

2 How to change your thinking & mindset as an educator (cont'd)

In an [Edutopia](#) article, veteran middle school math teacher Crystal Frommert describes her experience with Liljedahl's approach. When students ask questions that would ordinarily stop them from thinking, Frommert recommends responding not with answers, but with prompts:



Other suggestions include encouraging students to frame questions as a team, using words like "we" instead of "I," stalling on providing direct answers and circling back after students have a chance to collaborate and answer questions on their own, and setting boundaries by acknowledging questions and redirecting their effort. You might say, for example, "That's a great question, but I don't want to rob you of an opportunity to think."

Writes Frommert, "When you set boundaries of what questions will be answered, the students begin to more carefully craft their questions."

She provides an example of this from a group of students in one her own classes:

"We have tried solving this system by substitution, but we are getting an unreasonable solution. Can you look at our steps?' Yes!"

Her conclusion: "Shifting the focus to students doing the thinking not only enhances their learning but can also have the effect of less frustration and fatigue for the teacher. As the class becomes student-centered, the teacher role shifts to guide or facilitator and away from 'sage on the stage.'"

Says Liljedahl, "If you just stand back for a moment and look at what's happening, it starts to feel very natural very quickly because you're seeing the things that you've always wanted to try to create as an educator, but have never really been able to. How often do we hear teachers talking about, 'kids don't care,' 'they're not curious,' 'they're not even thinking through the stuff.' How many times do we hear teachers talk about students being passive? All of a sudden, they're seeing them being active and it's like, 'Okay, I want more of this.'"

"When you set boundaries of what questions will be answered, the students begin to more carefully craft their questions."

Crystal Frommert,
veteran middle school
math instructor,
[Edutopia](#), 2022

3 The power of collaboration and conversation in the classroom

At the end of the day, the research suggests that thinking in classrooms is best nurtured through two intentional acts: conversation and collaboration.

An [article on constructive classrooms](#) from the Stanford Center for Professional Development puts it this way: "Constructive conversation encourages each student to freely share their thoughts with another. They are actively engaged and using the language skills they have to communicate their ideas and building upon that foundation as they go."



"What collaboration forces students to do is talk to each other," explains Liljedahl. "And why do we want students talking to each other? Because externalization of thought is a way of organizing and structuring our thoughts. And it makes our thinking better. That's what collaboration is about."

In that context, the big question might not be, how do we teach thinking, but simpler: How do we get kids talking?

On her popular instructional blog, [Cult of Pedagogy](#), veteran educator and writer Jennifer Gonzalez says the research is clear: "When students work together, they make greater academic and social gains than when they compete against one another or when they work individually."

That doesn't mean simply putting kids into groups though.

5 Components of Cooperative Work

1. **Positive independence** – students must work to achieve a common goal
2. **Individual accountability** – each student has a specific role or part to play
3. **Promotive interaction** – students encouraged to help & support each other
4. **Effective interpersonal skills** – students taught to communicate & resolve conflict
5. **Group processing** – students encouraged to reflect & make plans for improvement

Source: [Cult of Pedagogy](#)

The five components mirror much of what Liljedahl describes as part of the group-think he promotes in his book.

In all cases, students are placed into visibly random groups. They are handed a single marker and challenged to solve a problem, using a vertical and erasable board.

Why a single marker?

It forces students to talk to one another, explains Liljedahl. "One marker is what we call a forcing function. It forces collaboration." Liljedahl will often add another wrinkle: Students can only write the ideas of others. "Which means if you have an idea, you've got to pass the marker." This creates yet more opportunities for talking.

Classrooms look and feel different when students stop doing & start thinking

OK, so you're bought in, or at least leaning in. Thinking is something you teach.

But, how do you know you've been successful? Because you can feel it, says Liljedahl.

"It's that student who comes to you and says, 'this is my favorite subject.' Or the students who come into class today and ask, 'Are we doing the whiteboards?' Or the parent who sits down in front of you at parent-teacher interviews and goes, 'I don't know what you're doing in class, but my child can't stop talking about math or whatever it is you're teaching.' And you're starting to realize that you're having that impact on students."

Isn't that part of the reason you became a teacher or an educator in the first place?

Ready for more on how to get students thinking in classrooms?

Catch Peter Liljedahl on The RocketPD Podcast

Don't miss Corey Murray's interview with Peter Liljedahl on The RocketPD Podcast. Listen to the full episode:

[Building Your Thinking Classroom](#)

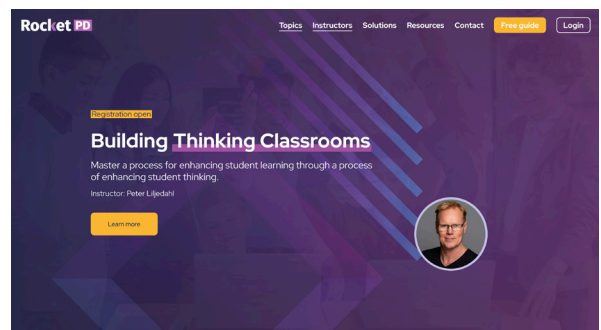
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