

Keynote With Peter Liljedahl

Build Math Minds Virtual Summit

What is a thinking classroom?

- It's a set of teaching practices that emerged out of 15 years of research. It's based on the idea that we need to get our students thinking, so we need to give students something to think about.
- Students work on non-curricular and curricular thinking tasks:
 - 5% of the time on non-curricular tasks (primarily at the beginning)
 - 95% of the time on curriculum out of the resources we have
- Students are working in random groups on vertical erasable surfaces.
 - Risk is a barrier to thinking. Erasable surfaces reduce risk.
 - Everyone is looking at the work in the same orientation
 - Knowledge mobility is promoted
 - The teacher can be a better teacher.
 - It's not that standing is so good. It's that sitting is so bad because sitting students feel anonymous. They then disengage. They stop thinking and learning.
- There is no front to the classroom. The space is owned by all the learners equally in the classroom.
- The class is more verbal than textual.
- Students are thinking within the first five minutes. Postponing this is detrimental to the amount of time students will think. This helps transition them from being passive receivers of knowledge to active learners.
- How we give the task makes a difference.
- Students take on leadership roles and find ways to help each other, help themselves, mobilize knowledge, and access the next question.
- The teacher guides the students to bring order to thinking through consolidation.

What inspired a thinking classroom?

- By and large students are not doing a lot of thinking. If they are not thinking, they are not learning.
- 80% of students are not thinking. 20% are thinking but only 20% of the time.
- Students are slacking, faking, and stalling. Most students are mimicking.
- Mimicking - We show students how to do something and the students copy. This practice emerged out of classroom routines that have existed for a very long time - I do, we do, you do.
- I do, we do, you do is part of a set of institutional norms that have been in place for over 170 years. Teaching has been defined as such. It's how we have been taught to teach. It's what the parents of our students expect us to be doing.
- There is a connection between institutional norms and students not thinking. One feeds the other.

- Break the institutional normative structures and get more students thinking and thinking for longer.
- Every time a norm is broken, students start thinking. This doesn't teach students to think. It liberates students to think. We can eliminate the barriers.

What happens in a thinking classroom?

- Students think. They think deeply.
- When students aren't thinking everything is difficult. When students are thinking, anything is possible.
- Students take care of themselves and each other.
- The boundaries between groups erode. Knowledge moves between groups.
- Students take pride in the thinking they've done and results of it.
- Empathy - students have a tremendous capacity for empathy. We don't give them enough credit for that.
- Students start to care for each other. Community forms.
- Real collaboration doesn't begin until students start caring about each other's learning, as much as their own learning. Until then, it's patience and tolerance.
- There's greater enjoyment. Students enjoy being in these classrooms. Parents report more enjoyment. Teachers enjoy their craft and feel more effective and greater impact at their own hands. They reap the benefits of their own efforts.
- Equity is a goal and an outcome. Low floor and high ceilings tasks, thin slicing, mobilizing knowledge, creating empathy all create greater access for more students.
- Identity changes. Students feel like they can be mathematical. Mathematics is part of who they are. Math is achievable. It shifts their future trajectories.
- Greater attendance is a byproduct of a thinking classroom.

What's new in a thinking classroom?

- Self-efficacy is a student's belief in their own ability. Students with low self-efficacy perform poorly. Students with high self-efficacy tend to perform better.
- The student has to meet a teacher who believes in them. There's a huge difference between a teacher who believes in a student and a teacher where a student knows that a teacher believes in them.
- Random groups show students that we believe in them.
 - Especially in elementary grades, students get labeled and then labels are used to group them. Random groups remove this.
- The way we answer questions shows that we believe in them.
 - Avoid answering questions that shut down thinking.
 - Smile and walk away but not with K-2 students who don't understand irony and sarcasm. "I know if you think about this, you'll figure out the answer."

- Before they believe in themselves, they start to believe in the teacher's belief in them. This is called trust. They trust that if the teacher asks them to do this task, they can do it.
 - Choosing low floor, carefully sequenced tasks is so important.
- Actions are greater than words. Students don't listen to what we say. They listen to what we do.
 - Overly organized classrooms send the message to students that perfection is expected.
 - Teachers say that they are not a fan of mimicking. Students say that teachers want them to mimic. If all we do is I do, We do, You do, students think that we expect mimicking.
 - Ask yourself not what you're verbally saying, but what are your actions saying?
- Perseverance is the boundary between flow and frustration. It's the degree to which students are willing to work on something where the challenge exceeds ability.
 - It's a state instead of a trait.
 - Even the most persistent student will give up under the right circumstances. Even the most vulnerable student will persevere under the right circumstances.
 - Optimistic struggle is productive struggle.
 - When students meet challenge on the heels of success they're more likely to rise to the occasion than give up. When they meet challenge immediately, they're more likely to give up.
 - There is no such thing as a floor that's too low. Make sure that the first encounter is going to be met with success. Success begets success.
 - Math contest tasks are ineffective at building a thinking classroom
- Mild, medium, and spicy labels radically changes how students engage with CYU or assessment tasks.
 - Use different levels to label the math and not the learner.
- Building thinking classrooms is a pedagogy, but it doesn't immediately change the perception of mathematics outside of this environment.
 - The textbook is a trigger. It triggers mimicking. It asks students to do something after they've been told how to do it.

How do we build a thinking classroom?

- The sequence matters.
- First toolkit:
 - Thinking tasks, random groups, vertical surfaces should be implemented at once.
 - It radically transforms the environment so students can be different.
- Second toolkit:
 - Implement one at a time and the order doesn't matter.

- Third toolkit:
 - Implement one at a time and order matters.
- Fourth toolkit:
 - Assessment
 - Assessment should reflect practice.
- Initially, small change is no change. There's no way to ease into it. When a small change is implemented, a system defends itself. The system needs to be overwhelmed.
- Building student individual and collective responsibility takes time. There are three responsibility practices spread out throughout the toolkits.
 - Check your understanding questions instead of traditional homework
 - Writing meaningful notes
 - Formative assessment that informs learning instead of accountability
- Teachers' abilities grow over time. When new students come with each new year, the students are unfamiliar with a thinking classroom but the teacher's abilities have grown. The toolkits look different in the second year.