

Peter Liljedahl Keynote

ICTM STEM Conference

Research says

- Our students are not thinking. They're busy, but the things that we're keeping them busy doing are not the kinds of things that get them to think.
- Thinking is a necessary precursor to learning.
- Institutional normative structures are not designed to invite our students to think. They were designed based on churches, factories, and prisons.
- What has changed in the last 170 years? Kids are still sitting. Teachers are still standing. Education has not fundamentally changed.
- Change the structure of the classroom to increase engagement.
- We have been praying at the altar of engaging tasks. We try to heighten engagement so kids can endure the math. Instead change the environment.
- Build engaged students and point them at any content.

Practices

- How can I find optimal practices that maximize student thinking?
- All students have gaps. Each student is like a slice of Swiss cheese. They all have holes. Put three students together and they start to compensate for each other's weaknesses. The group as a whole and every individual in that group is stronger. They're getting just in time support on things they don't understand.
- Greater transfer between collective knowing and doing to individual knowing and doing:
 - Consolidation
 - Meaningful notes
 - Check your understanding
 - Understanding where you are and where you are going
- When students are working in groups, they're working in informal, unstructured ways. They're trying and testing. They're finding their way forward. Loose ideas float away after students leave the classroom that day. How we close the lesson is how we turn informal, unstructured ways into formal, structured learning.
- Consolidation
 - Conversation - talk about what students learned
 - Teacher scribe - teacher is scribing what students tell them
 - Gallery walk - with guidance walk around the look at student work
- Notes - Teachers want students to have a record. It's through the act of writing notes that they produce learning.
 - I write. You write. - live notes; you are right there while they are being created
 - The student who is behind in the note taking is missing commentary, the order, they're missing connections. Anything useful in the act of writing notes is gone. Students have to be cognitively present. Otherwise they're recreating a photograph. These are dead notes.

- Notemaking is notes to your future forgetful self. Students must have choice in order to be cognitively present
 - Quadrant 1: Fill in the blank
 - Quadrant 2: Give them an example and they solve it
 - Quadrant 3: They choose the example
 - Quadrant 4: Things to remember
- Homework has been broken for over 50 years.
 - Teachers want homework to be a safe way for students to make mistakes and learn from mistakes, to see if they can do on their own what they did in class that day, and to check their understanding. The gap between what teachers think about homework and what students think about it is massive.
 - Mild, medium, and spicy offers preference and not judgment.
 - “Choose where you want to start.”
 - We don’t grade it, check it, collect it.
 - This is not their exit ticket, because students do one question and stop because it gets them out the door.
- Responsibility vs. accountability
 - Would you rather have students responsible for themselves or accountable to you?