

How Making Thinking Visible Helps Teachers and Students

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One category of digital tools, making thinking visible, can give students a higher level of confidence to ask questions when they need help, or share their opinions and ideas with the rest of the class — leading to more thoughtful discussions. These same tools inform educators about how to plan for much more meaningful lessons.

In the 1980s coming of age movie, *Ferris Bueller's Day Off*, one of the funniest scenes I remember (perhaps because I was a social studies teacher at the time) is the high school economics class with Ben Stein as the teacher. His famous monotone repetitive question to the entire class of “Anyone?” yields zero interest in response. He tries to explain the Hawley Smoot Tariff Bill, “which, anyone? Raised or lowered tariffs? Did it work? Anyone? Anyone know the effects?”

Of course, the comedic effect is that not one student was willing to acknowledge what teacher Stein was conveying about the Hawley Smoot Tariff Bill. He seems to accept his fate of a complete lack of student response without any concern or worry. Undeterred by blank glassy-eyed student stares, he seamlessly moves on to his endless unenthusiastic nod for class participation, “Anyone?” One student is drooling on his desk while he sleeps through Stein’s monotone. Stein’s character remains oblivious.

While that scene is an extreme caricature of a classroom, a friend of mine who was teaching physics at an Ivy League School in the 1980s only had about 10% of student engagement when he would ask students in his lecture classes of more than 150 for their input. Similar to the movie, he used to see his job as conveying his knowledge to his students as he tried to hold their attention. Today, he is still teaching — but in a very different culture supported by digital tools and new processes. It is not an exaggeration to say that all of his students are engaged almost all of the time. Students are actively defending their views of the application of physics, they are writing application questions, they are explaining concepts to peers in a new model of assessment.

Throughout all of this energy and excitement, this professor is learning more about how his students think and reason and learn. He has greater insights into their misconceptions and their ability to use their imaginations to extend beyond his expectations. He talks less and listens more. Acquisition of knowledge has improved. Enjoyment for student and educator is up. Use of time, the most precious commodity of learning and teaching, is much more efficient.

What the country needs is a high-tech version of *Ferris Bueller's Day Off* to show the power of how technology can transform the culture of learning to be the exact opposite of the boring impact of Stein's response to "Anyone?" In the original movie, the teacher owned the learning. In the new high-tech version, there has been a shift to students owning their learning. That is the revolution — a change in the culture and control of information in the classroom. The new high-tech version of the movie will not be a comedy. It will be an adventure story of how exciting learning is. The pathetic Ben Stein character will be replaced by a romantic hero who seamlessly ignites students' passion for learning.

In reality, transforming the culture of the classroom can be complicated and hard work and can take many steps. Pioneering schools and universities are moving to support a vision that students can tap their native creativity and curiosity, and their proclivity to social engagement with peers, to manage more of their own learning. One of the most difficult aspects of creating a culture of high-performing engagement is managing the shift of control from the educator to the learner. Another level of potential resistance is creating a team-based classroom culture from individual students working for their own grades to teams of students working to help one another.

Frankly, letting go of control can be very scary for professors and teachers who traditionally have been highly valued for their conductor-like ability to control the flow of knowledge in a classroom where every student receives the same content at the same time. The trick is to strike a balance between empowering students to own more of their own learning while the teacher directs the flow of learning. In this new balance, the role of the educators is more important than ever. All educators do not agree that technology has made their lives easier. What we need is to give them tools that can ease the workload while improving results.

Where to begin? I have selected two powerful digital tools that are very easy to use. Each one reveals how students are thinking with different patterns. Both are free — and both can support student engagement while better providing educators with insights into patterns of student thinking.

The first example is [Prism](#), developed by a team of students at the University of Virginia. When you see Prism in action, it becomes immediately clear why it's so effective with inviting students to engage in debate. Very little technical staff development is needed; all you have to know is how to cut and paste text and fill out a form. It is based on a design concept of digitally overlaying the interpretation of how an entire class interprets text onto three screens. Each screen turns the text into a different color. Each color represents a concept the teacher has chosen for interpretation. It is formative assessment at its very best, leading to a deeper understanding of how a whole class is thinking. The feedback is immediate.

Let me tell you about the details of the first time I watched a class come alive because of the creative use of Prism by an English teacher. The teacher was giving a lesson on Shakespeare. Before she introduced her students to a Prism exercise, she was asking the class questions about the play they were reading, such as which parts they thought were hardest to understand, most insightful, or most open to interpretation. Only a few students raised their hands to answer — and it was always the same few students who did.

Then, the teacher had her students break into groups of two. Each group was asked to read the same section of the play that was uploaded to [Prism](#). Within Prism, the students had to reach agreement about which passages to highlight with the three digital colored highlighters according to the code filled in by the teacher. Red was for the most difficult words, green represented open to interpretation, and blue indicated major insights. (The teacher could have chosen any concept to be coded to a color, such as use of evidence or best use of inference.) As students began to highlight, the pattern of the whole class' thinking began to be revealed as the font size of each word in the text changed as a function of how many teams highlighted various sections of the text. It was like watching a faded blurry map come into clear sharp focus! When the class was finished reading and highlighting the teacher simply clicked on one digital color at a time to reveal the patterns. It was easy and the impact on student engagement was immediate.

The whole class could see the pattern of thinking of their peers. When the teacher asked the class again: "Who would like to explain which passages they thought were the most insightful, and why?" This time, hands shot up everywhere. The difference in the students' response was like night and day.

At that point, nearly every student was engaged in the lesson, and there was a high degree of enthusiasm. It was fascinating to watch. The bell rang, and the students didn't want to leave. They were still debating with each other — and these were the same students who, moments earlier, wouldn't talk or raise their hand.

What had changed in such a short amount of time to create the kind of rich discussion and engaged learning environment that many teachers only dream about?

When I asked the students to explain why they had become much more engaged, one girl noted that at the beginning of class she was reluctant to raise her hand, because she didn't know what the other students were thinking. She didn't feel safe in responding; because she might be mocked for saying something stupid — *or* something really smart. But once the class used Prism, she knew what other students were thinking, and she could see that she wasn't alone in thinking the way she did — and that made it safe for her to participate in the class discussion. I need to mention that all of the students' highlights are anonymous. It is this anonymity that gives the students the confidence to take risks.

The teacher was listening to this debriefing, and she was nodding. She understood the power of a tool like Prism to transform her class into a much more engaging, risk-taking, and intellectually curious environment.

We often think of making students' thinking visible as a strategy to help *teachers*: When teachers have more insight into what their students know (or don't know), they can adjust their lessons to make sure everyone understands the material. But making the thinking visible also helps *students*. When students can see how their ideas fit in with the rest of the group, they feel more comfortable in sharing those ideas — which leads to better and more open conversations. As one student commented, "For the first time, I realized that I was not the only one who had difficulty understanding one aspect of the reading. That gave me the confidence to ask the teacher for help."

Teachers also can use Prism as a self-assessment tool. Students can upload their writing to the platform and highlight certain elements the teacher might request, such as inferences, supporting evidence, or places

they could use help. The teacher benefits from seeing whether students understand these concepts, and the student's benefit from reflecting on the quality of their work before they turn it in.

Research clearly supports the value of self-assessment, because it helps students become independent learners. For instance, researcher John Hattie has pored over nearly 1,200 educational studies from around the world to identify the factors that most strongly correlate with student success. Of the 195 independent variables he has identified, [self-assessment ranks third on his list](#) in terms of importance—and it's the single most effective learning strategy that students can use for themselves.

Prism is just one example of a category of tools, of making thinking visible, that can help teachers, professors, and students to understand patterns of understanding that would not be possible in a world limited to paper. In the hands of a thoughtful educator, the patterns revealed by these tools can lead to richer debate and a deeper understanding of concepts. Educators can immediately see where there is a complete absence of highlights. These tools can help inform educators with much finer detail of what to cover next.

Another tool, [Verso](#), is not limited to text but provides the educator to send out any content, photo, video, or text. It helps teachers encourage their students to think more deeply by asking open-ended, thought-provoking questions that students can answer either during class time or on their own. Only the teacher can see who left each comment, and this anonymity allows students to feel comfortable responding freely to the teacher's questions and their peers' responses.

One of the challenges with online discussion boards is eliciting original thinking from all students. If someone is the 10th student adding to the discussion, it's hard to know how much he or she has been influenced by the first nine commenters. Or, students might be discouraged from giving an authentic response by what they've read from the first nine. With Verso, students don't see each other's responses until they submit their own — which solves this problem nicely.

Here's how it works: Teachers create an activity by linking to a video or a document they want students to reflect on, then ask them a question about it — something that will provoke a good discussion. There's a space in the assignment for teachers to model the kinds of responses they'd like to see from students, to make sure students understand the depth of thought that is required of them. Then, teachers assign the activity to their class.

Students can reply to and build on each other's ideas, and they can reward others' responses with "likes." Teachers also can group students based on their responses and encourage them to probe each other's ideas further, thereby taking the learning deeper.

In a traditional class discussion, pursuing a line of inquiry with one student means you have to ignore the other students. You can only get to one or two levels of discussion. But with Verso, you can put kids in groups and then have them respond to each other — which can be quite powerful. For example, you can challenge a subgroup of three students to try to convince the other two that their initial response is the most logical.

Verso is a great tool for helping students learn to ask more insightful questions and dealing with more difficult material. For instance, you could have students in history read this primary source such as this [letter to President Kennedy](#) where the author expresses deep disappointment in the new president's position on civil rights. Without telling students anything else about the letter, you could ask them to submit whatever questions they have about it through Verso.

Many students start out by asking basic factual questions, such as: "Who wrote the letter?" But those are closed questions; they don't lead to any deeper thinking or debate. As the teacher encourages the class to ask hypothetical questions or divergent questions you can see an explosion of creativity as the questions become more complex. As a teacher, you can use Verso to teach students to develop a deeper line of enquiry. The anonymity provides the safety for the students to take a risk and the teacher mode allows the teachers to see what each student is thinking. It is the very best of both worlds.

These learning tools represent a small part of what can happen when powerful technologies are put in the hands of skilled teachers and are used to transform instruction. However, enabling the flow of critical information generated by learning tools isn't made possible solely by the educators. The learning tools and technologies used to engage students are also extremely dependent on having a robust network. These web and application-based tools are being used by all students who are bringing their own devices onto the campus. As more educators realize how easy it is to tap the power of apps that make thinking visible, to save time and to add value to academic achievement, demand for access points and bandwidth will increase.