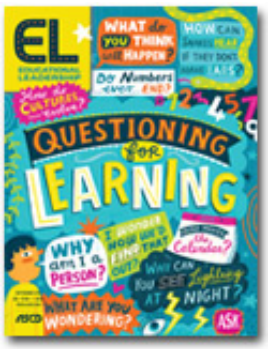
EDUCATIONAL LEADERSHIP



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Making Questions Flow

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The Question Formulation Technique helps students move from passive receivers of information to active seekers of knowledge.

Are questioners born or made? What happens to the "born questioners" when they enter school at 5 years old? Do they become "unmade questioners"? Or maybe we should be asking this: What can we do to ensure that by the time all students leave high school, they're proficient at asking questions?

The problem is, as one teacher told us, "getting students to ask questions feels like pulling teeth." So how can teachers transform that feeling and create classrooms that come alive with questions? It requires two simple changes.

First, teachers need to give students both a structure and the opportunity to practice generating and working with their own questions. The very act of producing questions, however, can be a challenge for many students. We have, therefore, made it the very first step in our Question Formulation Technique, a deceptively simple process we created for teaching all people, no matter their level of education, how to ask better questions. By going through the steps of the process, students learn to think divergently, convergently, and metacognitively.

We've found that by beginning with the following four rules for producing questions, we can create the space and structure that allows all people to start asking questions:

1. Ask as many questions as you can.
2. Don't stop to judge, discuss, or answer any question.
3. Write down every question exactly as stated.
4. Change any statements into questions.

It would be great if the first rule would suffice. But the three rules that follow are necessary to jump-start question asking because they make it safe to pose questions, ensure rigor in paying careful attention to the actual wording of the questions, and promote the divergent thinking that's required to produce a wide range of questions.

The second change needed to get students asking more questions relates to the teacher's role. Teachers shouldn't communicate a judgment too quickly about the quality of the students' initial questions. This is harder than it may appear. It's in the constitution of many teachers to enthusiastically solicit, encourage, and celebrate questions, especially from those who rarely ask them. But there are troubling consequences when a question from one student is honored with the response, "Great question!" and a question from a second student is met with a quizzical or even negative signal. Students will perceive the differences in teacher responses as a cue to try to figure out the questions that will please the teacher or, even worse, to never venture a question again.

Some teachers, hoping to help reluctant questioners get going, will also provide specific wording for students to use as they begin to ask questions. Good intentions notwithstanding, if the teacher gives too much guidance about the kinds of questions to ask—for example, demanding higher-order questions immediately from all students—students won't learn how to think divergently.

Connecting Questioning to Instructional Goals

Although teachers should refrain from too quickly judging students' questions, teachers do play an active and essential role in planning how student-generated questions will influence and become part of their lessons. In our work, we've seen teachers at all levels, from kindergarten to higher education, use the Question Formulation Technique for a range of instructional purposes. Here are a few examples.

To Increase Student Engagement

In Rob Evans's high school class near Los Angeles, California, his students were deep into a unit on African history. They had been studying Somalia and the appearance of pirates in Somalian society,[1] and they were about to read an article about Somalia that offered multiple perspectives.

Evans wrote a Question Focus—*Somali Perspectives on Somalia*—on the board for the whole class to see. Having a "focus" for students' questions, rather than a question from the teacher to the students, is a key element of the Question Formulation Technique. Evans had students go through the process together as a class, but it can also be done with students working in small groups and, as they become more practiced, as an individual activity.

The whole-class setting can sometimes inhibit student questions, and Evans's students did appear hesitant to start asking questions. So Evans reminded them of the second rule for producing questions—"do not stop to answer, discuss, or judge the questions"—and they felt reassured that he would not be criticizing their questions. And, following the third rule, he would be writing the questions down exactly as the students stated them.

Creating this safe space opened the floodgates. Quickly, they asked, *Why are there pirates in Somalia? What causes someone to become a pirate?*

Questions then moved to the roles and responsibilities of people beyond the country's borders (*Should the international community do something about Somalia*?) and to natural and economic influences (*What role does geography play in Somalia's situation? How much of the piracy is associated with economics?*).

Their questions set an expanded learning agenda: *What's good in Somalia? Are there other perspectives on Somalia? What did the author of the article omit?* This last question showed greater sophistication than earlier ones; it reflected an ability to think about the sources and ideas presented in the article as well as about those withheld.

By the end of the process, which took three or four minutes, the students had filled the entire whiteboard with questions they were genuinely interested in exploring. (When working in small groups, students need about five to seven minutes to produce questions.) Evans was pleased to see that many of the students' questions were actually ones he had wanted to explore with the class.

By asking the questions and prioritizing the ones they most wanted to answer, students were setting a learning agenda. They came to the class the next day excited about how the reading had helped them answer their questions and, according to Evans, they felt "empowered" and "were invested in their learning." They shared what they learned from their reading with fellow students and helped create a learning agenda for the whole class.

To Accelerate Knowledge Acquisition

In a geometry lesson he was teaching in a 5th grade class in Frederick County, Maryland, Jay Corrigan used student questions to explore quadrilaterals.[2] At the beginning of the geometry unit, he wanted students to think about what they already knew about shapes, but he also included novel information (the term *trapezium*) in the Question Focus (*Trapezium Trapezoid Parallelogram*) to pique students' curiosity and ensure every student that they would have something new to learn. This Question Focus helped provoke students' questions and drive inquiry as the students learned about quadrilaterals, geometric patterns, and relationships among geometric concepts. The use of arrows within the Question Focus offered a hint of the direction of the unit and could elicit more questions. Corrigan expected that by hearing a range of student questions and making their thinking visible, he would gain more insight into their understanding of quadrilaterals.

Student questions did indeed go in various directions, but they all related to gaining a deeper understanding of the content Corrigan needed to teach. Students asked such questions as, *Is a trapezium a 3-D figure? Do parallelograms and trapezoids have the same amount of sides? What do the arrows in the Question Focus mean?*

The questions began to lock in on the words themselves (*Why do* trapezium *and* trapezoid *have the same first six letters*?). As the students continued, Corrigan understood from their questions that some were ready to push ahead (*What do all three have in common?*) and that one student wanted basic information about the newly introduced term (*What is a trapezium?*).

When Corrigan reviewed the students' questions, he noticed that there were more questions about shapes than about the relationships between them. Because he knew that it was important for students to learn about the relationships, he emphasized that in ensuing lessons. He also honored students' questions by using several of them to open the next few lessons.

Corrigan also observed a district colleague using the process to kick off a unit. Jennifer Shaffer presented her

kindergarten class with a visually engaging Question Focus: A photograph of an adult alligator with two baby alligators riding on its head in a body of water surrounded by different kinds of vegetation.

The picture captivated the students, and they began to analyze it closely, as good scientists and investigators should, by asking, *Is the alligator camouflaged*? *Why do the babies have stripes? Is it a mom or dad alligator?* Additional questions about the color of the alligators' eyes—the babies' eyes were white and the adult's were black—and about the bumps on the back of the adult alligator sparked their curiosity.

The class then read a nonfiction text on alligators, and their questions were used to guide their thinking during the reading. They were excited to find answers to their questions in the book. The teacher and students pared down their questions to those that were open and therefore appropriate for a writing task. These kindergarten students then prioritized the questions, chose the ones they found most interesting, and wrote answers to them.

In each of these classrooms, students' questions helped the teachers understand both student interests and the content they needed to emphasize. Corrigan, for example, noted that "etymology is not something I would even have considered teaching students, but students wanted to know more about the terms themselves." So he helped them learn about the etymology of words like *poly* (many), *gon* (sides), *hedron* (faces), and *rectangle* (right angles).

To Formatively Assess Students

Megan Gretzinger, a high school math teacher from Appleton City, Missouri, used students' questions as a formative assessment (Gretzinger, personal communication, March 13, 2015). She chose just one word as her Question Focus, the topic she was covering—"Volume." Gretzinger was eager to hear students' questions to see how well they had understood the lesson on volume that she had just finished and what questions were percolating in their minds.

After students generated their questions in five groups of four or five students each, they came back together as a class and each group took a turn sharing one of their most important questions, cycling back through (so each group would then share its second most important question after all groups had their initial turn) until all the questions were shared.

Gretzinger noticed that some of the questions started off broadly, asking for proof of relevance to the real world: *Why is volume important?* and *When will we use it in our lives?* Then their curiosity took hold, and some of their priority questions zeroed in on the concept itself, its origins, and the steps they'd need to take to understand it further: *How is volume related to math? Who came up with all the different formulas? Is there more than one way to find volume? Who invented volume?* A couple of the groups concluded with practical, action-oriented questions about how to calculate volume.

Gretzinger used the students' questions to set topics for class review days. She noticed that some of the groups asked what she considered more "upper-level or abstract questions" that went above the level covered in class. She sent some of these students to Khan Academy to take on more challenging volume problems, and she gave individualized attention to groups that were asking more basic questions.

To Summatively Assess Students

The idea of using students' questions as a summative assessment completes the circle that began with stimulating student questions. Students discover that even after asking questions and learning a lot about a subject, there's always more to learn.

Joshua Beer, an 8th grade teacher in the rural town of Lempster, New Hampshire, effectively used students' questions for summative assessment purposes in his history class's examination of imperialism (Beer, personal communication, 2015). He explained to his students, who were already skilled in using the Question Formulation Technique, that at the end of the unit he would have them generate questions that would become part of a 10-question final test. He also told them that he reserved the right to add questions to the ones they generated if he deemed it necessary in order to properly assess their knowledge.

His Question Focus was *Questions that should be asked about American imperialism at the turn of the 20th century*. Charged with taking on a responsibility usually reserved for their teacher, the students diligently went to work trying to figure out which questions would best assess whether they had deep understanding of the issue.

One group of students started off with some baseline questions: *Who was the biggest imperialist? When did American imperialism start?* Then they plunged into details they had learned: *Why was Mark Twain so against imperialism in America? Which country rebelled the most? How did imperialism start in America? Who were the Rough Riders?*

At this point, some students revealed relevant knowledge about an intellectual argument for imperialism and put forth these questions: *How big of an impact did Alfred Thayer Mahan have during this time? Who was the most important imperialist?* This led students to consider what they had learned about opposition to imperialism, and they asked, *Who was the biggest anti-imperialist? Were any countries totally against imperialism?* Having asked a range of questions that did justice to all they had learned, the students added one obvious question, a fundamentally important one, that they believed should be on the test: *What is imperialism?*

Beer used their questions to show students that they could have a voice in his assessment of their work. Although he solicited their input, he also reminded them that he would make the final decision about which questions to include. Once they completed the process, he was so impressed by the quality of their questions that he only added one question of his own to the 10 that would appear on the test. The students' process for coming up with the questions

(captured on video) shows the enormous potential of students using questioning to go from initial engagement to deeper learning to thoughtful assessment. One of Beer's students explained how she felt her mental wheels turning as she went through the process:

> *You can ask one main question and then build questions off of that question, and it makes you think more. And, you have to pull stuff out of your brain, and when you do that you have to remember it again. And, the more you take it out and remember it again, the deeper it gets into your brain and the easier it is to remember it.*

A Shortcut, Not a Detour

Getting students to start producing questions can be the most difficult step in making questioning come alive in the classroom. It can be a shock to the system. But when students *do* start asking questions, the change is palpable.

With so much content to cover, teachers sometimes fear making a detour to commit class time to developing students' ability to ask questions. They soon discover, however, that having students create questions is a shortcut to deeper learning. As students become more curious and engaged and take on new ownership of their learning they will leave school as sophisticated questioners who can use the skill of question formulation in higher education, the workplace, their lives, and our democracy.

Endnotes

[1] *Evans, R. (2014, November 18). It's their class now! Building classrooms of curiosity [blog post]. Retrieved from the Right Question Institute at http://rightquestion.org/blog/class-building-classrooms-curiosity*

[2] *Corrigan, J. (2013, November 11). Increasing rigor in an elementary math classroom [blog post]. Retrieved from the Right Question Institute at http://rightquestion.org/teaching-strategy-elementary-math*

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