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How Do We Use Essential Questions?

Now that you have a better sense of the characteristics of essential questions and ways of designing them, we turn to the question of implementation. How should essential questions be put into action to ensure meaningful student engagement, persistent inquiry, thoughtful deliberation, and the necessary rethinking to lead to understanding?

In this chapter, we explore practical tips and techniques for helping you get the most from your essential questions. And although in Chapter 6 we will engage in a detailed exploration of ways to establish a "culture of inquiry" in your classroom, we need to comment on its importance here as a key to successful implementation.

No initiative, practice, or policy is guaranteed to succeed. As with any seed to be planted, the soil must be ready and conducive to growth. The seedbed of education involves the beliefs, values, structures, routines, protocols, and climate that influence actions, shape attitudes, and affect learning. A healthy culture is one in which everyone shares aims and acts in concert to advance them.

The seed and seedbed analogy is important in another sense. Many of the best student comments in response to challenging questions are tentative, glib, or naïve. Thus every response is like a seedling with potential that needs nurturing and sometimes pruning. Similarly, the sharing and refinement of burgeoning ideas can happen only in a climate that supports intellectual risk taking. On the other hand, the culture has to be built on a commitment of sound evidence and reasoning in which any opinion without proper reasoning and supportive evidence becomes recognized as lacking. So if we value open yet disciplined inquiry, if we seek thoughtful, not thoughtless, responses to questions, then we must shape the environment accordingly. That shaping requires us to ensure a safe and inviting space for thinking out loud while also making clear that certain

habits, beliefs, actions, and contributions can undermine the aim of free thought and collaborative inquiry.

New Rules

The importance of thinking explicitly about a culture that supports inquiry comes from the fact that a focus on essential questions establishes new rules for the game called school. For the majority of learners, school is a place where the teacher has the answers and classroom questions are intended to find out who knows them. Ironically, many teachers signal that this is the game even when they don't intend to communicate it—for example, by posing questions that elicit only a yes/no or single right answer, by calling only on students with raised hands, and by answering their own questions after a brief pause.

We acknowledge that these can be difficult habits to break. Indeed, noteworthy research conducted in conjunction with the Trends in International Mathematics and Science Study (TIMSS) revealed how different approaches to questioning can take root and escape our notice. When the first TIMSS studies compared instructional practices in U.S. and Japanese classrooms, the authors noted an important difference in beliefs that played out in classroom behavior and lesson plans:

> Teachers ask questions for different reasons in the United States and in Japan. In the United States, the purpose of a question is to get an answer. In Japan, teachers pose questions to stimulate thought. A Japanese teacher considers a question to be a poor one if it elicits an immediate answer, for this indicates that students were not challenged to think. One teacher we interviewed told us of discussions she had with her fellow teachers on how to improve teaching practices. "What do you talk about?" we wondered. "A great deal of the time," she reported, "is spent talking about questions we can pose to the class—which wordings work best to get students involved in thinking and discussing the material. One good question can keep a whole class going for a long time; a bad one produces little more than a simple answer." (Stevenson & Stigler, 1992, p. 195)

All successful implementation starts with clear and explicit goals. And because the goal of EQs is different than the goal of content acquisition, this principle is all the more critical. It must therefore become clear that when essential questions are on the table, the aim is sustained inquiry and rich discussion increasingly facilitated by students, not a hunt for *the* answer that the teacher thinks is correct.

In addition to confronting deeply held (and often unexamined) beliefs and comfortable habits by teachers, the implementation of EQs requires a deliberate

effort to reorient students to the new rules of the game. We recommend discussing *explicitly* the purpose, associated practices, and changed roles that the use of essential questions entails. Here are some examples of key ideas to communicate that may prepare students for the changes:

- There's not a single correct answer for this question. Life is about the consideration of plausible and imperfect alternatives.
- Everyone is entitled to an opinion, but the best opinions are supported by valid evidence and sound reasons.
- Coming to understand important ideas is like attaining fitness: it takes work and practice over time.
- When a question is posted on the wall, it means that we are going to consider it again and again.
- Inquiry is not a spectator sport; each person needs to listen actively and participate.
- Everyone is fair game. I won't only call on people who raise their hands.
- If and when I or others challenge your comment, it doesn't mean we don't like you or don't value your contribution. We're testing the strength of the idea.
- Considering another point of view in an open-minded way might help you clarify and expand your thinking and understanding.
- Making mistakes is an expected part of learning. If you never risk making a mistake, you're not likely to improve. That's why we question answers—in order to improve them.
- You may find that you are reconsidering things that you thought you understood. That is normal—even desirable.

Like the care of seedlings, the new rules will require patience, careful nurturing, and constant reminders. Over time, the new rules will become the norms, allowing big ideas to take root and mature understandings to blossom.

A Four-Phase Process for Implementing Essential Questions

The most obvious way in which implementation of essential questions differs from conventional instruction is that the question is not just asked, discussed, and left behind as different content is covered. The whole point of the essential question specifically (and teaching for understanding more generally) is that the exploration is designed to be spiral-like or flow back and forth between the question and new sources of information, experience, or perspective. In other words, we need to repeatedly return to the question to probe further, think more deeply, and arrive at more insightful understandings.

We can describe what has to happen in any successful use of EQs, then, in terms of a four-phase process:

Phase 1: Introduce a question designed to cause inquiry.

Goal: Ensure that the EQ is thought-provoking, relevant to both students and the content of the current unit or course, and explorable via text, a research project, a lab, a problem, an issue, or a simulation in which the question comes to life.

Phase 2: Elicit varied responses and question those responses.

Goal: Use questioning techniques and protocols as necessary to elicit the widest possible array of different *plausible, yet imperfect* answers to the question. Also, probe the original question in light of the different takes on it that are implied in the varied student answers and due to inherent ambiguity in the words of the question.

Phase 3: Introduce and explore new perspectives.

Goal: Bring new text, data, or phenomena to the inquiry, designed to deliberately extend inquiry or call into question tentative conclusions reached thus far. Elicit and compare new answers to previous answers, looking for possible connections and inconsistencies to probe.

Phase 4: Reach tentative closure.

Goal: Ask students to generalize their findings, new insights, and remaining (or newly raised) questions into provisional understandings about both content and process.

Note that this process is not restricted to a single unit. We can use this framework to string different units together so that Phase 3 could be the start of a new unit in which a novel perspective is introduced and explored using the same question or questions.

Here is a simple example from science using the question "What is science?" In many middle school and high school science courses, teachers often devote an *initial* unit or lesson to the question. Typically, though, after an early reading and discussion, the question is dropped, never to return that year as attention turns to acquiring specific knowledge and skill. (This pattern is aided and abetted by most textbooks.) Let's see how the framework helps us more clearly see an alternative approach in which the essential question becomes more prominent throughout the course.

Phase 1: Introduce a question designed to cause inquiry.

Example: *What is science? How does it relate to or differ from common sense and religious views on empirical issues?*

Phase 2: Elicit varied responses and question those responses.

Example: Students read three different short documents or excerpts that address the EQ, in which there is great disagreement about what science is, how it works, and how much stock we should put in its answers.

Phase 3: Introduce and explore new perspectives (in this case, several times during the year).

Example: Students are asked to perform two different experiments in which methods vary and margin of error is salient. They also read about a few controversies and false discoveries in the history of science (e.g., read work by Karl Popper on how science is inherently testable and tentative—"falsifiable"—where political, social, and religious ideology can always explain anything; read work by Richard Feynman on how most people misunderstand what science is; read work by David Hume on why we should be inherently skeptical about science as truth).

Phase 4: Reach tentative closure.

Example: Ask students to generalize their findings, new insights, and remaining (or newly raised) questions about the nature of science.

As the example suggests, proper treatment of the question would demand not only that the question be *constantly* revisited throughout the year—"Based on the previous two experiments and lively disagreements about the findings in the research on global warming, what would you *now* say science is?"—but also that the course must include a look at pseudo-science and the danger of confirmation bias. In addition, the course should consider the very *counterintuitive* aspects of modern scientific thinking (which often give rise to common and persistent student misconceptions in the sciences and about science itself).

The same failure to revisit a few key ideas around essential questions occurs far too frequently in mathematics. Arguably the most common and unfortunate mistake occurs when whatever is proposed as "givens"—the definitions, rules, axioms—is only briefly discussed in an introductory unit and then never revisited. The textbook proposes some assumptions, rarely argues for them, and then rushes off to prove things based on them. But why *those* assumptions? Why *can't* we define basic terms? What *is* a number? These questions naturally arise yet are quickly and subtly smothered by conventional texts and teaching.

To ignore these questions is an error of both pedagogy and mathematical understanding. In fact, it was only by constantly considering the essential question "What are we assuming and are we right to assume it?" that modern mathematics was born. For example, until Descartes, no one assumed that there could be numbers to the 4th power (e.g., x^4) because the exponents supposedly referred to spatial dimensions—which is why we call x^2 "x squared" and x^3 "x cubed"! Student-led inquiry into axioms and the development of one's own theory of space formed the basis of the most famous experiment in the teaching of geometry, developed by Harold Fawcett in the 1930s and found in his book *The Nature of Proof* (1938).

Indeed, the elegance and power of mathematics only really come to life when we engage learners in intellectually rich questions such as these: *Why can't you divide by zero when you can multiply by zero? Why would we have something so counterintuitive as negative or "imaginary" numbers? Why do we assume the parallel postulate when it is neither self-evident nor simple to state? Who introduced these ideas, and with what*

reasons? Modern arithmetic, geometry, algebra, and calculus all derive from such inquiries that compel us back to essential questions. For example, the introduction of zero into the number system came fairly late in the game and was viewed as highly controversial. (For a fascinating and readable account of the great historical controversies and innovations in math, read *Euclid's Window* by Leonard Mlodinow.) Thus a proper handling of the question of what can and cannot be accepted as axiomatic must involve a *constant* revisiting after milestones have been reached (e.g., the proof that the angles in any triangle equal 180 degrees, the Pythagorean theorem, pseudo-proofs such as 1 = 0 that rely on a zero divisor). For it was such a constant *rethinking* of givens that led to alternate geometries, calculus, probability theory, and Einstein's theory of relativity.

With younger children, an inquiry into "givens" can intriguingly begin by a close look at a simpler analogous case: the rules of familiar games. Here are some questions to consider: *Why assume* those *rules? Why can't two runners occupy the same base at the same time in baseball? Why is there a three-point shot in basketball, and how far should it be from the basket, and why have various rules committees changed the distance over the years? Can some rules be changed to* improve *the game without really* changing *it?* For example, in the case of the last question, why not change the current rule in baseball so that a fouled third strike bunt attempt would be treated as a foul ball (still at bat) instead of as it is now, as a third strike (out)? This can lead to in-depth consideration of why some axioms are developed *after the fact* to make the "game" work *the way we want it to*—a noteworthy and unobvious understanding that is important in the history of geometry and routinely ignored in textbook treatment of axioms.

Here's an example of how our four-phase EQ process could be used in an inquiry into "givens" in secondary mathematics:

Phase 1: Introduce a question designed to cause inquiry.

Example: In math, *given* what is given: What is essential and what is merely conventional? Why is it given? Who *gave* it and why do you think it wise to assume it? What distinguishes a vital foundation from a changeable convention? Look at other givens in our lives, such as the Bill of Rights, the meaning of essential words in dictionaries, or budget assumptions.

Phase 2: Elicit varied responses and question those responses.

Example: Start with the rules of games, laws, or language, and then bridge to mathematics. Ask students to look at questionable givens. For example, we can't define a line or point, but we still draw them a certain way; we can't divide by zero, but we can multiply by zero; we use a base 10 system but we often use the binary system; we use PEMDAS in algebra to unpack statements, but couldn't we use another convention? Is the commutative property equally conventional?

Phase 3: Introduce and explore new perspectives.

Example: Briefly consider other geometries (e.g., "taxicab" geometry, the geometry of city grids) to illustrate why it is valuable to make different assumptions about spatial relationships, depending on context. Look at false proofs that play

off some of these givens, or consider other assumptions to see why they might or might not be wise. For example, have students look at what happens if we assume that all lines are curved, as in spherical geometry and modern physics.

Phase 4. Reach tentative closure.

Example: Ask students to look back at the arithmetic, algebra, or geometry axioms proposed in the textbook and generalize their findings, new insights, and remaining (or newly raised) questions about what we should and should not assume without proof; and which givens are foundational and which are conventional.

Here is another example of these four phases applied to an elementary social studies unit on regions. Notice how the unit plan reflects a similar kind and flow of inquiry as in the mathematics example. These EQs are introduced: *Why are North, South, East, and West and the like accepted as givens when talking about regions? Are other regional distinctions perhaps as helpful?*

Phase 1: Introduce a question designed to cause inquiry.

Example: After a cursory lesson on the typical names and characteristics of U.S. regions, ask these questions: *Could we carve up the map differently? What kinds of regions might be just as useful for us to define? What regions might we also be said to live in? How many regions do we live in?*

Phase 2: Elicit varied responses and question those responses.

Example: *To what extent is defining an area as a "region" useful?* Compare and contrast the benefits and weaknesses of various regional maps and categories for school, town, and state; and alternate regions of the United States, based on cultural aspects (such as regional sports affiliations).

Phase 3: Introduce and explore new perspectives.

Example: Pursue the idea of regions based on cultural aspects (food, leisure, jobs) and thus the extent to which talking about regions like "the South" or "the Northwest" may be unhelpful because it can cause us to stereotype and overlook uniqueness or diversity in every region. Related questions can then be explored: *To what extent do we usefully define ourselves in "regional" terms—for example, Southerner, coastal, West Tennessee, upstate New York, Northern California—as opposed to by state or nation? When is it useful to define a region by physical characteristics and when is it useful to define it by sociological characteristics?*

Phase 4: Reach tentative closure.

Example: Ask students to generalize their findings, new insights, and remaining (or newly raised) questions about regions and the usefulness of the idea.

Let's now look at an expanded version of the framework, beginning with a consideration of how content and inquiry will be blended, and what resources (beyond the textbook) may be needed to shape the inquiry. And, of course, we will want to conclude with some formal assessment of student understanding during and after

the inquiry—the kind of assessment that is almost never called for in textbook chapter tests.

An Eight-Phase Process for Implementing Essential Questions

A finer-grained implementation of EQs can be described in eight phases: (1) pre-instructional planning and design, (2) initial posing of the question, (3) eliciting of varied student responses, (4) probing of those responses (and of the question itself), (5) introduction of new information and perspectives on the question, (6) in-depth and sustained inquiry culminating in products or performance, (7) tentative closure, and (8) assessment of individual student inquiry and answers.

Phase 1: Pre-instructional planning and design.

Goal: Given the EQ, assemble relevant but diverse texts, problems, or experiences to be used to extend and deepen inquiry.

Phase 2: Initial posing of the question.

Goal: Propose the EQ either at the start or after an initial investigation relevant to the question.

Phase 3: Eliciting of varied student responses.

Goal: Ensure that the students understand that multiple plausible answers are likely and that the selected resources are highly likely to give rise to such differences of opinion.

Phase 4: Probing of those responses (and the question itself).

Goal: Question student responses; point out inconsistencies or disagreements when all responses are considered; invite students to propose directions or methods of further inquiry. Ensure that the question itself is reconsidered and analyzed in light of the responses.

Phase 5: Introduction of new information and perspectives on the question.

Goal: Bring new text, data, or phenomena to the inquiry, designed to deliberately further open up inquiry or call into question tentative conclusions reached thus far.

Phase 6: In-depth and sustained inquiry culminating in products or performance.

Goal: Students are expected, whether individually, in small groups, or as a class, to explore the EQ and the most promising responses via an in-depth investigation and discussion that is shared and analyzed.

Phase 7: Tentative closure.

Goal: The class summarizes its findings, new insights, and remaining (or new) questions—about both content and process.

Phase 8: Assessment of individual student inquiry and answers.

Goal: Students individually must formally explain their current answer to the question, supported by evidence and logic while also addressing counterevidence and counterargument.

Let's return to the example in Chapter 2 from Grant's English teaching to see how these phases play out. The unit essential question was "Who sees and who is blind?" The preselected readings for this EQ were Hans Christian Andersen's "The Emperor's New Clothes," "Winnie the Pooh and Piglet Hunt Woozles" (a chapter from *Winnie the Pooh*), *Oedipus the King,* and Plato's "Allegory of the Cave" from *The Republic* (though, obviously, any readings could be used that are appropriate for both reading level and the issues related to the question).

Students are given the essential question on the first day of the unit. They are strongly encouraged to take notes around the EQ and related questions that will arise as inquiry unfolds. They know that the readings relate to the questions. And they know that the EQ will appear as an essay on the final assessment. In short, the unit design, framed around the essential question, clearly presents the challenge, and the work throughout the unit is focused accordingly. Here is how the unit unfolds in terms of the eight phases:

Phase 1: Pre-instructional planning and design.

Example: Choose four texts of varied difficulty that bear on the EQ and provide different perspectives on it.

Phase 2: Initial posing of the question.

Example: Start with a brief discussion of personal "blindness" in one's life—examples and brief discussion of causes for not "seeing" what was clearly there to be "seen." Teacher then introduces EQ and first reading: "Winnie the Pooh and Piglet Hunt Woozles."

Phase 3: Eliciting of varied student responses.

Example: Who sees and who is blind in the story segment? Are some more blind than others here (e.g., Piglet versus Pooh, Pooh versus Christopher Robin in the tree above)? Why?

Phase 4: Probing of those responses (and the question itself).

Example: How do these ideas relate to your personal accounts from the previous activity? What does *blind* really mean? What does *see* really mean here? What is the moral of the story in terms of blindness, then? Can we make some initial generalizations about blindness and vision to be further explored in later readings?

Phase 5: Introduction of new information and perspectives on the question.

Example: Read "The Emperor's New Clothes," *Oedipus the King,* or "The Allegory of the Cave." Watch clips from *The Matrix, Twilight Zone,* or the scene in *The Miracle Worker* in which Helen Keller links water to the sign for water. Other possibilities include nonfiction accounts of sight/blindness, perceptual bias, the research on cognitive bias and error, and other related topics.

Phase 6: In-depth and sustained inquiry culminating in products or performance.

Example: Use the same or similar questions to explore each text or a real-world case study in greater depth, getting at the paradoxes in the answer. (Note that in "The

Emperor's New Clothes," the *child* sees, not the *expert*; the blind man sees in *Oedipus;* the experts and academically successful are blind in the cave; and so on.)

Phase 7: Tentative closure.

Example: Create a comprehensive diagram to compare and contrast the answers to the question suggested by the texts and by students.

Phase 8: Assessment of individual student inquiry and answers.

Example: Write an essay on "Who sees and who is blind?" in which you weave together what we have read with your own ideas and experience, to make a compelling and interesting argument. Also, propose a museum exhibit for inclusion in a show devoted to the essential question.

Note that in this case, the EQ can also naturally transcend the boundaries of English to encompass history (*Why is there mass hysteria, self-destructive fascism, patriotic blindness?*), science (*Why is Darwinian evolution or global warming viewed as dangerous by otherwise reasonable people?*), the arts (*Why does art threaten? Why do some people view modern art as a fraud?*), and athletics (*How do pitchers deceive batters, and players deceive referees? What do the great players "see" in the midst of a game that other players do not see, and why?)*.

In other words, understanding by *design,* not mere teacher questioning, makes an EQ come to life and go into depth. The texts, prompts, rules of engagement, and final assessments provide the key elements needed for the learning design to succeed, in light of the just-noted criteria: an intriguing question (especially to adolescents who are often painfully aware of wisdom, folly, and blindness in their midst, if only in the adults and in peers!), inherent ambiguity, clearly different points of view, and many shades of gray that will require careful questioning of ideas and close reading of the text.

Are you thinking that this approach is too sophisticated for younger students? If so, consider this example using the same framework for elementary students on the essential question "Who is a true friend?"

Phase 1: Pre-instructional planning and design.

Example: Choose three texts of varied difficulty that bear on the EQ and provide different perspectives on it (e.g., *Frog and Toad Are Friends* or *Charlotte's Web*).

Phase 2: Initial posing of the question.

Example: Start with a brief discussion of friendship in one's life—examples and reasons: Who are your friends? What makes them your friends?

Phase 3: Eliciting of varied student responses.

Example: Ask, "What can we say in general makes someone a friend or not a friend?" Prepare a T-chart to summarize answers.

Phase 4: Probing of those responses (and the question itself).

Example: Is a friend only someone you just hang with or see every day? What does "best friend forever" (BFF) really mean?

Phase 5: Introduction of new information and perspectives on the question.

Example: Read the "Spring" section of *Frog and Toad Are Friends* and discuss friendship and lying. For example, Does a true friend lie to a friend? Are there other things that Frog and Toad each do to one another that seem "unfriendly"? Does it still make sense to call them friends? Is there a difference between a normal friend and a *true* friend?

Phase 6: In-depth and sustained inquiry culminating in products or performance.

Example: Use the same or similar questions to explore *Charlotte's Web.*

Phase 7: Tentative closure.

Example: So, who is a true friend and why? Create a Venn diagram to compare and contrast the answers to the question suggested by the text and by students.

Phase 8: Assessment of individual student inquiry and answers.

Example: Choose one of the following:

- Make a booklet to teach others how to know if someone is a true friend.
- Pretend to "order" a true friend from a friendship website.
- Create a "want ad" for a true friend. What characteristics do you want?

Such a framework, then, can help us think through the needed elements and sequence in unit design that advance in-depth inquiry. This "thinking through" is vital because typical lesson plans that derive from the textbook or coverage rarely include the kind of shifts of perspective and deepening of discourse so central to true inquiry. (Note: Do not fixate on the number of phases or every detail of the indicators proposed; the framework is simply a device for helping you work through instructional design more thoughtfully.)

Response Strategies

Such frameworks for working with EQs, although necessary, are not sufficient. The key to getting the most from your EQs rests in the use of follow-up questions and subsequent learning activities. Here is a set of practical and proven techniques for engaging more learners and extending their thinking and meaning-making. Although these methods may be employed with most types of classroom questions, they are especially effective when used in conjunction with open-ended questions that do not have a "correct" or expected answer.

Wait Time

"Wait time" refers to the period of teacher silence that follows the posing of a question (Wait Time I), as well as that following an initial student response (Wait Time II). Extensive research on wait time has confirmed several benefits of using this simple technique (Rowe, 1974; Tobin & Capie, 1980; Tobin, 1984):

- The length of student responses increased.
- More frequent, unsolicited contributions (relevant to the discussion) were made.

- An increase in the logical consistency of students' explanations occurred.
- Students voluntarily increased the use of evidence to support inferences.
- The incidence of speculative responses increased.
- The number of questions asked by students increased.
- Greater participation by "slower" learners occurred.

These results have been validated at the elementary, middle, high school, and college levels. In terms of teacher behavior, the following changes resulted from the regular use of the wait time technique:

- The use of higher-level, evaluative questions increased.
- The percentage of "teacher talk" decreased.
- Teachers demonstrated greater response flexibility.
- Teachers' expectations for the performance of students rated as "slow learners" improved.

In terms of Wait Time II (waiting after a student responds), when teachers do not respond immediately to a student's response, the student is more likely to elaborate or support the answer given (or change it), and other students are implicitly invited to chime in.

Think-Pair-Share

One practical and effective means of implementing wait time in the classroom has been developed by Dr. Frank Lyman (1981) and his colleagues. This strategy, known as Think-Pair-Share (TPS), structures time to think into a multimode cycle. In this cycle, students *listen* to a question or presentation, which is followed by individual quiet *think* time. During this period students are not permitted to converse or to raise their hands to respond. However, they are encouraged to write down or diagram their thoughts. At a designated time, signaled by the teacher, students form *pairs* and exchange thoughts with their partner. The pairing period is then followed by a *sharing* session, often in the form of a class discussion. Think-Pair-Share combines the well-documented effects of wait time with the cognitive and affective benefits of cooperative learning, all within an easily managed classroom routine. TPS enables each student to actively engage with the question, while allowing shy or less confident students an opportunity to rehearse their response in a safe space before responding in front of the entire class and the teacher.

Random Calling

We strongly recommend that teachers abandon the habit of calling only on students who raise their hands to respond to a question. (In fact, over time you will want students to stop raising their hands at all, as in normal human discourse.) The

alternatives are random calling, whereby every pupil has an equal chance of being invited to respond (e.g., via drawing names from a fishbowl), or targeted calling, where you make clear that everyone is expected to be ready to say something, and those who regularly speak will sometimes be overlooked for a period of time. Although the procedure of calling on students randomly or purposefully in these ways might seem rather simple and straightforward, it goes against long-standing classroom habits and familiar roles—for both learners and their instructors. (A particularly clear and practical account of this technique can be found in Lemov, 2010.) Researcher Dylan Wiliam (2007/2008), an advocate of random calling, tells an illustrative story about the challenge of changing comfortable instructional practices, especially for veterans:

> A few months ago, an elementary school teacher . . . was telling me about her efforts to change her questioning techniques. She wanted to use popsicle sticks with students' names on them as a way of choosing students to answer her questions at random—a technique that increases student engagement and elicits answers from a broad range of students instead of just the usual suspects. However, she was having difficulty calling on specific students because she automatically started most questions with phrases like, "Does anyone know . . . ?" Frustrated, she wondered why she was finding this simple change so difficult. This teacher has been teaching for 25 years, and we worked out that, over her career, she has probably asked around half a million questions. When you've done something one way half a million times, doing it another way is going to be pretty difficult! (p. 38)

A switch to "cold calling" can be challenging for students as well as for teachers. You may initially experience pushback from students as familiar and comfortable pedagogical norms are altered. Nonetheless, persistence in the face of objections will establish the "new rules" of your classroom; that is, everyone is fair game and expected to be attentive and participate.

A variation of this technique is "student calling," whereby the teacher asks a student to select another student to respond ("Marion, will you please call on someone else to reply?"). In our experience, students will often call on their friends—or sometimes their enemies! Either way, this method stirs the pot and keeps everyone on their toes. More important, it sets the stage for greater autonomy by learners in initiating and executing a collaborative inquiry.

Yet another method to promote active listening among students is to periodically ask students to summarize what has been said, as in, "Justin, could you please summarize Maria's point?" Then check back with the originator: "Maria, did Justin accurately capture your idea?" Regular use of this technique sets up a desirable outcome related to autonomy; that is, students begin to take ownership of clarifying

and restating contributions. (These ideas are explored more fully in the upcoming section on Socratic seminars, p. 61.)

Class Survey

By using several methods for all-pupil response, teachers can involve an entire class in responding to questions. Perhaps the simplest way is to have students use hand signals, such as thumbs up, thumbs down. For example, "Do you agree with the author's contention that . . . ?" The responses open the door for further probing ("Why do you think that?"), debate ("Roberto, tell us why you disagree with Alexis"), and paired discussion of opposite-minded people ("Pick someone who had the opposite view and explain your position").

Some teachers ask students to use small whiteboards to record brief responses to questions and prompts. Although this method tends to be more commonly used to check for knowledge, sometimes the boards can work with more open-ended questions. For example, a college history professor asks, "Which 20th century U.S. president will have the most disappointing legacy? Be prepared to say why." Imagine a class full of students holding up their varied answers—and the ensuing debates!

As in most walks of life these days, inexpensive technology is available to assist. In this case, wireless polling of students can be easily managed using student-response systems, informally known as clickers. These small devices allow teachers to get an immediate response from all class members and display the results immediately on a computer or tablet. Cell phones can now be used for the same purpose. Whether high- or low-tech, the regular use of these survey techniques changes classroom dynamics by counteracting student passivity as well as dominance by those who happily talk in class all the time.

More Than One Answer

As we have noted, effective essential questions are inherently open—designed to spark discussion and, often, debate. Accordingly, teachers should be careful not to stop once a thoughtful inference or seemingly solid conclusion is attained. We encourage teachers to push for at least two or three *different* answers, as suggested in Phase 2 of the four-part framework previously described. Then probe to invite comparisons and testing of the various ideas on the table. The absence of different plausible responses or perspectives can be a telltale sign that your EQ is too narrow or so abstract or vague that students are unable to offer differing points of view.

Probes for Thinking and Support

The value of probing questions has long been recognized as the key element of a Socratic dialogue, and research confirms their value (Krupa, Selman, & Jaquette, 1985). However, research also points out that the use of probing questions is an

infrequent practice in many classrooms (Newmann, 1988). Teachers can use probing questions, such as "Why?" "Can you elaborate?" and "What evidence can you present to support your answer?" to press students to consider and weigh diverse evidence, to examine the validity of their deductions and inductions, to consider opposing points of view, and to encourage "unpacking" of their thinking to reveal how they have reached particular conclusions. Probing questions ask students to extend their knowledge beyond factual recall and parroting of learned answers, to apply what is known to what is unknown, and to elaborate on what is known to deepen their understanding of this knowledge.

Probing follow-up questions are "essential" when using EQs and other open-ended queries to push students' thinking and meaning-making. Here are examples of familiar probes:

- What do you mean by _____?
- Why?
- Can you elaborate? Tell me more.
- Could you rephrase that? I don't understand your point.
- Could you give me an example or an analogy to explain that?
- How does this relate to (what we said before; what we read last week)?
- Can we come up with another perspective on this?
- What are you assuming when you say that?
- Do I understand you to be saying _____?

A related follow-up technique involves asking for support and justification for responses. Here are examples:

- Why do you think that?
- What's your evidence?
- What's your reasoning?
- Can you find support in the text/data?
- How do the data support your conclusion?
- But earlier, didn't we say that _____, which seems to be at odds with what you're saying now? Can you clarify?
- How does that square with what the text says on page ___?

The regular request for support makes it clear that answers and opinions are necessary but not sufficient. As with the doctoral dissertation, students must be able to *defend* a position, not just have one.

Devil's Advocate

Another well-established technique for pushing student thinking is for teachers (and eventually students) to assume the role of devil's advocate. By deliberately

challenging students' interpretations or conclusions, or presenting an alternative viewpoint, we press for clarification and justification. Here are samples of devil's advocate follow-ups:

- I disagree. Convince me.
- How would you respond to those who say _____?
- Have you considered another perspective?
- Who has a completely different idea or reason?
- Is it really either/or? Might there be different "right" answers or ways of thinking about this?

It is important that you explain this role that you are playing so that learners do not take your stance personally. (One teacher we know puts on Halloween-costume devil's horns to humorously signal a serious point—that she will challenge their thinking!) Over time, we would hope that students would (respectfully) take on a devil's advocate role with each other, especially during debates and Socratic seminars. By extension, we can ask students to argue for the view that is the opposite of the one they believe, a strategy common in training for forensics or debate class.

Handling Inaccurate or Inappropriate Responses

Predictably, some students will respond to classroom questions, including essential questions, with comments that are inaccurate, thoughtless, silly, and off topic. Sometimes kids will simply try to test the teacher or amuse the class with an inappropriate remark. How one handles these responses early in the school year can set the climate for the remaining days. The art of facilitating inquiry is to understand how to listen, dignify student responses, and make it clear that opinions are necessary but not sufficient: the goal is greater understanding—of both the subject at hand and the answers proposed by students.

Of course, willfully hurtful or obscene statements should not be tolerated. A simple stare-down may be enough to make the point; or you might simply say something such as this: "Kelly, I know you know that such a comment is out of bounds." However, when students are honestly trying, sensitivity to "wrong" or impulsive answers is in order. Our advice here is straightforward: respond to student answers in a nonevaluative, depersonalized fashion as much as possible. Avoid put-downs—any comment or tone of voice that will make a student look foolish or feel stupid—particularly when students make errors in factual information or reasoning. In some cases you can help learners clarify their thinking by using the various probes already described. In other cases, you can quickly correct the fact cited but underscore the importance of the question. Alternately, it may be best to redirect the question and involve other learners.

A general rule of thumb is to acknowledge any appropriate, albeit flawed, response as a contribution, and to set the tone that mistakes are a necessary and expected part of learning. Indeed, the common phrase "coming to an understanding" suggests a process over time. Few of us attain deep insight instantaneously, which is why revisiting an essential question over time is . . . essential.

All these tips and response techniques for using essential questions can be reduced to a simple rule of thumb: the teacher's role is to invite thoughtful responses and questions, serve as an unobtrusive referee, and be a careful listener.

Inviting Students' Questions

No doubt you're wondering about the relationship between essential questions developed by teachers and questions generated by students. If student inquiry is the aim, why not allow instruction to be driven by student questions? More generally, then: What is the role of student questions when planning and teaching via essential questions?

A recent book makes the point clearly in its title: *Make Just One Change: Teach Students to Ask Their Own Questions* (Rothstein & Santana, 2011). The authors make an elegant case for the importance of developing student questioning, and they provide a practical framework to accomplish it. Their argument echoes that of John Dewey, made a century earlier; that is, democracy depends upon active participation by citizens, and a most empowering form of participation is to be able to ask the questions, not merely respond to the questions of others.

A related case for student questioning comes from research in reading. Researchers Annemarie Palincsar and Ann Brown found that when readers frame their own questions, they are engaged more actively in processing of text and meaning-making. In addition, students who ask their own questions can check their own comprehension rather than relying only on teacher questions and feedback (Palincsar & Brown, 1984; Raphael, 1986).

Although we fully support the end goal of autonomous and proactive student questioning, we offer a caution. If teachers merely elicit and run with student questions without framing overarching curricular goals and essential questions to support them, then there can be no guaranteed and viable curriculum. In fact, there is little likelihood of students coming up with questions that serve to open doors to deep understanding (as the subtitle of this book suggests) in science, literature, math, art, and other subject areas because often the big ideas are abstract and counterintuitive. Put more bluntly, although children are amazingly curious and inquisitive, some of their questions lead to intellectual dead ends or tangential, though fun, meanderings. (Those of us who went to

school or taught in the 1960s and 1970s will likely recall the "go with the flow" looseness of that era, which had its charms but was often insufficiently purposeful or productive.)

As professionals, it is *our* job to know which questions meet the two distinct sides of the coin: questions that both engender student interest and provide the greatest likelihood of depth and success in subject matter understanding. Yes, a great teacher can work with student questions to shape learning to hit academic targets, but putting the issue in the hands of students hides the key idea: teachers must know the key questions and ideas at the heart of what they teach and work tactfully yet firmly toward achieving academic goals while also working to develop interests and talents. This distinction is also as old as Dewey: we must not conflate "what the students are interested in" with learning that is "in the students' interest."

Thus the question "Who should pose the questions?" is a false dichotomy. It is an issue not of teacher questions versus student questions, but of how to blend both in a purposeful manner. The point of essential questions, in other words, is not merely to engender student curiosity, but also to help students inquire into the important ideas of the disciplines at the core of a good education. *Both* goals have to be attained: academic understanding and personal meaning via questions and the disciplined pursuit of them.

That said, effective use of essential questions inevitably leads to an increase in the number of student questions. It must be so. For as we have repeatedly said, the best essential questions need to be questioned, and all proposed answers must be treated as tentative, thus open to critical and imaginative questioning in response. Nor should our caution about overreliance on student questions as the basis for curriculum be understood as a rejection of student-generated projects, problems, or investigations. On the contrary, many of the best curricular units provide students with rich opportunities to explore ideas and issues on their own terms. An education for meaning and the development of autonomy demand such opportunities. We merely call attention to the required blend: teachers and students together use questions to develop needed understanding that is of interest to all as well as in everyone's interest.

Developing Questioning Autonomy

A long-term goal of using essential questions is that students eventually become the askers and pursuers of such questions without being directed by the teacher. How, then, is autonomous questioning best developed?

In the research on literacy, a common phrase used to describe the long-term aim of autonomous reading and comprehension by students is "the gradual

release of responsibility" by the teacher. Pearson and Gallagher (1983) coined this phrase to describe how teachers can gradually wean learners away from adult assistance so that they can eventually perform a task independently. Here is a succinct summary of the idea provided by researchers Annemarie Palincsar and Ann Brown (1984):

> Children first experience a particular set of cognitive activities in the presence of experts, and only gradually come to perform these functions by themselves. First, an expert (parent, teacher, master craftsman, etc.) guides the child's activity, doing most of the cognitive work herself. The child participates first as a spectator, then as a novice responsible for very little of the actual work. As the child becomes more experienced and capable of performing more complex aspects of the task, aspects that she has seen modeled by adults time and time again, the adult gradually cedes her greater responsibility. The adult and child come to share the cognitive work, with the child taking initiative and the adult correcting and guiding where she falters. Finally, the adult allows the child to take over the major thinking role and adopts the stance of a supportive and sympathetic audience. Initially, the supportive other acts as the model, critic, and interrogator, leading the child to use more powerful strategies and to apply them more widely. In time, the interrogative, critical role is adopted by the child, who becomes able to fulfill some of these functions for herself via self-regulation and self-interrogation. Mature learners are capable of providing the interrogative critical role for themselves. (p. 123)

Although originally developed for reading instruction, the *gradual release of teacher responsibility* model offers a general schema for the development of independent mastery in *any* subject, at *any* age, in *any* setting in or out of school. Here are two simple protocols for putting the progression from dependency to autonomy into operation:

- I do; you watch.
- I do; you help.
- You do; I help.
- You do; I watch.

- I model it; you do it.
- You do it; I give feedback and guidance.
- You practice and refine; you self-assess.
- You do it; I observe.

Here's a sample rubric for measuring the degree of student autonomy:

Level of Independence	Descriptor
Independent	Learner completes task effectively with complete autonomy.
Lightly scaffolded	Learner completes task with minimal assistance (e.g., 1–2 hints or reminding cues from teacher).
Scaffolded	Learner needs step-by-step instructions and scaffolding tools (e.g., a graphic organizer and a checklist) to complete the task.
Simplified task, with considerable support	Learner needs the task simplified; requires constant feedback and advice, review, and reteaching; needs constant encouragement to complete the task.
No independence	The learner cannot complete the task, even with considerable support.

Progressions of this sort can naturally apply to the use of essential questions. Whether we focus on the teacher (gradual release) or the student (increasing responsibility), the point is the same. Over time students need to become increasingly autonomous in advancing the inquiry and discussion, either by asking questions or by responding to them on their own. Your goal as teacher? Make yourself obsolete over time!

Socratic Seminar

A formal approach for the self-directed involvement of learners in the exploration of essential questions is known as the Socratic seminar. Mortimer Adler popularized this idea 30 years ago in *The Paideia Proposal* (1982), though it has old roots in the Great Books program at St. John's College and the seminar approach used at Columbia University and the University of Chicago. Adler argued for a system of three explicitly different educational goals—acquisition of organized knowledge, development of intellectual skills, and enlarged understanding of ideas and values—supported by three associated forms of pedagogy. According to Adler, the third goal, enlarged understanding,

> is neither didactic nor coaching. It cannot be teaching by telling and by using textbooks. It must be the Socratic mode of teaching because it helps the student bring ideas to birth. It is teaching by asking questions, by leading discussions, by helping students raise their minds up . . . to a state of understanding or appreciating. (p. 29)

The Socratic seminar provides a disciplined structure for using essential questions to explore and uncover important ideas from texts. Elfie Israel (2002) succinctly defines Socratic seminars and their rich benefits for participants:

> The Socratic seminar is a formal discussion, based on a text, in which the leader asks open-ended questions. Within the context of the discussion, students listen closely to the comments of others, thinking critically for themselves, and articulate their own thoughts and their responses to the thoughts of others. They learn to work cooperatively and to question intelligently and civilly. (p. 89)

As these accounts suggest, a seminar aims at *sustained* inquiry and meaning-making by students. The aim is not only attainment of an expert's understanding. The intent is for students to "play the game" of an expert inquirer—that is, to improve at asking and answering important questions, making defensible and systematic interpretations, supported by evidence and logic. Once underway, the aim of the seminar is to probe the points being made, to ensure that we understand what is being said and to balance it against what else has been said and cited as evidence previously. Thus, in a seminar, the essential question is not merely used to engage students in a conversation about content in order to acquire more knowledge. Its more fundamental purpose requires active meaning-making—attempts to frame an understanding and try that understanding out on others. This is the essence of constructivism: meaning is crafted not by teachers but by learners.

As the reference to "playing the game" also suggests, a seminar is more like what student athletes and artists do rather than what happens in a typical teacher-directed class. As on the field or the stage, the aim is for students to be autonomous, proactive, and strategic users of knowledge and skill. As in soccer or basketball, it is contrary to the very point of performance if students passively wait for the coach or teacher to direct every next "move"—whether on the field or in the classroom. Rather, the students must learn to take on teacher moves—asking questions of one another, pointing out inconsistencies in what has been said—and teachers must learn to be quiet and to listen carefully.

In a seminar, the teacher is a coach of student inquiry in another sense. She is a coach who, after brief instruction, retreats to the sideline to observe and listen as students play the game of collaborative and personal inquiry. Before and after the "playing," the teacher, like any coach, offers training in the skills and strategies of collaborative inquiry and discussion and provides specific feedback and needed remediation to the class and to individuals, based on their performance.

In short, the Socratic seminar is *not* a more conversational form of instruction. Rather, a seminar (and more generally the use of essential questions) offers stu-

dents the opportunity to get better at self-regulated inquiry, with increasing freedom from teacher cues, prompts, and other supports.

Whether one uses a formal structure such as the Socratic seminar or merely signals to students that collaborative inquiry is the goal of an activity or a unit, the implications for teaching should be clear: students need to know—by teacher actions and procedures—that in-depth inquiry is required, not optional.

FAQ

I like the idea of using a Socratic seminar, but I have no experience in this method. Can you recommend some ways of getting started?

A seminar requires five basic things: (1) a common source (a "text" in the broadest meaning of the term), (2) dedicated time and organization of space that support shared inquiry, (3) rules of engagement, (4) clear goals that make clear the point of the seminar and the criteria by which it will be judged (making clear how different it is from typical teacher-led instruction), and (5) a great question that opens the seminar and to which it continually returns.

The most important thing to do in getting started is to pick the basis of the seminar. You need a rich, thought-provoking, somewhat puzzling text, experience, or data along with a question that cannot be answered with a yes or no. In other words, there has to be a real problem or issue worth grappling with. Inquiry cannot begin until there is a source that raises questions that need probing and yields many plausible and diverse answers. That's why seminars have historically been established around "great books" or other rich texts (books, articles, movies, intractable problems).

Common and suitable texts for older students include the *Declaration of Independence,* Martin Luther King's *Letter from Birmingham Jail,* or Plato's *Apology.* For young students, any of the *Frog and Toad Are Friends* stories can be used to explore the question "Who is a true friend?" There are also developed programs—Junior Great Books, Paideia, Touchstones—that offer excellent sources of readings for seminars.

Math and science teachers can either choose an interesting reading on a key topic (such as *Flatland,* by E. A. Abbott, or an essay on the nature of science by Richard Feynman) or pose a problem or an experiment that is designed to raise as many (if not more) questions than it answers. False proofs are always interesting and revealing (e.g., the "proof" that 1 = 0), as are experiments with counterintuitive findings (light interfering with light equals dark).

Once you have chosen a suitably rich source, make clear the goal and the new rules of the game called "shared inquiry." Point out that as the "coach," you will be mostly on the sideline (though you reserve the right to ask questions or point out interesting problems), as the students are the players. Start small; perhaps hold a

seminar once a week, for 20 minutes. Allow time to process the experience: What happened? What worked—and what didn't? How might you improve?

Once students have been introduced to the process, you are now ready to pose an intriguing question that becomes the helpful lens for making meaning of the text. The question might initially be topical. For example, for the book *Catcher in the Rye,* the question might be "What's wrong with Holden?" or you might choose a broader essential question, such as "How well do we know ourselves?"

5

How Do We Address Implementation Challenges and Special Cases?

Musician John Lennon clearly knew something about education. His famous aphorism "Life is what happens when you're busy making other plans" resonates with every teacher who has seen a beautifully crafted lesson plan go out the window within five minutes of its confrontation with real kids in real classrooms. Working with EQs only increases the likelihood that something might go wrong, because teachers are not only trying out new and demanding approaches but also opening up instruction to a far less predictable set of outcomes as students take more ownership of classroom inquiry and discourse. Smart curriculum designers thus plan to adjust in the likelihood that things won't go as planned. It is wise to anticipate what may go awry in the use of EQs and be prepared to make changes when such unwanted outcomes occur.

In this chapter we consider some of the most common and important challenges that teachers are likely to encounter when working with essential questions and offer some tips on how to troubleshoot those rough spots. We'll also explore special cases of using EQs with young children and in particular subject areas.

The likely difficulties can be grouped under two general headings: (1) ineffective or inappropriate responses (by both teacher and students) to the demands of unscripted discussion, and (2) anxiety in the face of the inherent unpredictability of inquiry and the related fear of losing control (by teachers) or looking foolish (by students). New roles, skills, and norms need to be practiced and learned. As in learning to play a new game or musical instrument, there is a predictable learning curve in which error and frustration are inevitable. That likelihood leads to anxiety, for both teacher and students, because predictability is highly prized yet hard to come by when we are truly learning something new.

How, then, might we get beyond the unavoidable anxiety of in-depth inquiry into EQs? Once everyone is comfortable with collaborative inquiry and its rituals, the richness of discussion and subsequent insights are often self-reinforcing. But initially, teacher fear of giving students power to chart the course of inquiry and