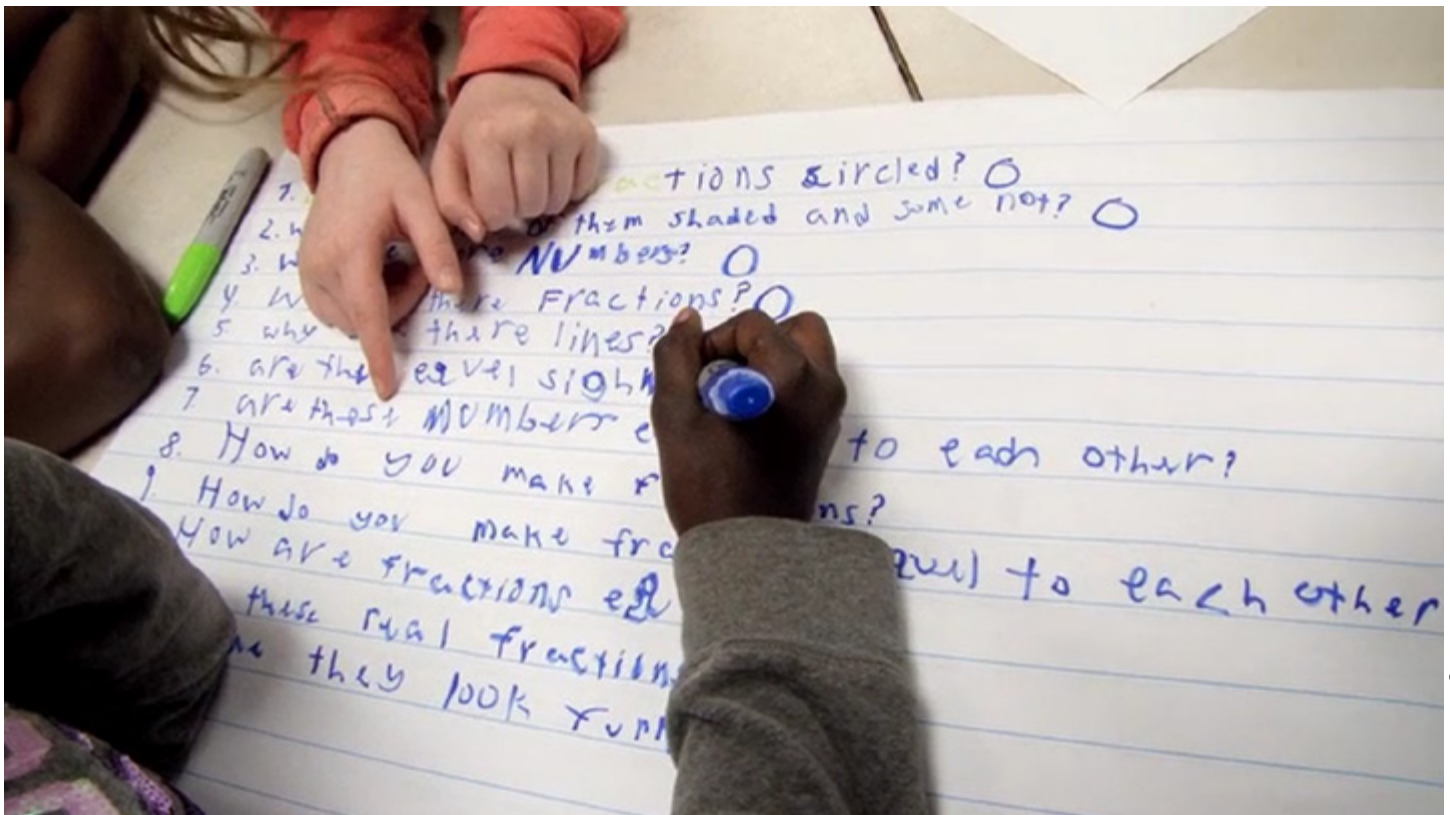


# SPOTLIGHT



—Right Question Institute.

4th grade students in Lucy Canotas' class in Manchester, NH using the Question Formulation Technique

## INQUIRY-BASED TEACHING AND LEARNING

### EDITOR'S NOTE

Educators are embracing inquiry-based learning to inspire curiosity in the classroom. In this Spotlight, learn how teachers are developing inquiry-based lessons plans, helping students formulate questions, and how schools are engaging their faculty in collaborative inquiry.

### CONTENTS

- 2** Induction Program for New Science Teachers Starts With Exploration
- 4** Study: Give Weak Teachers Good Lesson Plans, Not Professional Development
- 5** Common Standards Raise Questions on Questioning
- 6** **Commentary** Cultivating Curiosity by Deliberately Teaching Students How to Ask Questions
- 8** 3 Tips for Guided Inquiry Math Lessons: The Ikea Effect
- 9** Teaching Inquiry Through the Study of Endangered Cultures
- 10** Scaling Collaborative Inquiry: Professional Learning for Educators
- 12** How to Make Inquiry-Based Learning Work in Your Classroom

Published October 5, 2016, in *Education Week's Special Report: Helping New Teachers Thrive*

# Induction Program for New Science Teachers Starts With Exploration

By Kate Stoltzfus

**W**hen physicist Paul Doherty, a senior staff scientist at the Exploratorium in San Francisco, wants to help budding science teachers understand the material they'll impart to students, he shows them the light.

He takes them to one of the many exhibits at the Exploratorium museum that allow them to experience the wonder of physics for themselves, including the way a beam of light bends as it goes through glass. Then he asks them what they see.

Next, the teachers craft lesson plans, or classroom versions of exhibits called “snacks,” on light refraction that they can take back to their own students.

This inquiry-based, hands-on approach to science instruction is at the core of the Exploratorium's Teacher Induction Program, a training initiative offered by the museum's Teacher Institute for first- and second-year secondary science teachers.

“We show our teachers that what they should really do is start science class not with a list of words to memorize, but with an encounter of the phenomena itself,” said Doherty, a former university physics professor. “By listening to what teachers see, I know as an instructor where they are and where to start working with them. That's modeling what they can do for their own students.”

The Exploratorium, a public learning laboratory and museum that explores science, art, and human perception, has been a professional home for science teachers and scientists in the San Francisco Bay Area for decades—serving as a think tank of collaboration between those in the classroom and those in the lab.

The museum's teacher-induction program, which spans two years for each cohort, is likely the first and longest-running science-specific initiative of its kind, according to Julie Yu, a senior scientist and the director of the Teacher Institute.

It was created in 1998 out of a desire to help new science teachers thrive and stay in the classroom. Most participants in each 25-member cohort teach locally, many in high-needs schools.

The 50 teachers in the program at any one time have access to a rare mix of pedagogical and subject-area expertise: Half the teaching staff at the museum's Teacher Institute are Ph.D. scientists, while the other half are veteran teachers with 10 to 30 years of classroom experience.



**We show our teachers that what they should really do is start science class not with a list of words to memorize, but with an encounter of the phenomena itself.”**

**PAUL DOHERTY**

SENIOR STAFF SCIENTIST, THE EXPLORATORIUM,  
SAN FRANCISCO

“We are modeling—not necessarily intentionally—the kind of teaching and excitement for science that we hope we would see in classrooms,” said Yu, who also started out as a new teacher in the program. “The program is founded on the philosophy of meeting teachers where they are and giving them what they need.”

To apply to the Exploratorium's induction program, teachers must be in their first or second year of teaching in a local secondary science classroom and be willing to adopt an inquiry-based instruc-

tional approach. But the program turns away as many as 40 applicants for the 25 available spots each fall, using an analysis of instructional-support needs to select candidates.

## Responding to a Need

Funding for the program began with a grant from the National Science Foundation, but its reputation has since expanded to contributions from public and private sources to the extent that every teacher in the program not only attends for free but also receives a stipend.

Teachers in the program attend at least four pedagogy and content workshops at the museum each semester, as well as a three-week summer institute and elective courses for specific subjects. The program covers all areas of grades 6-12 science—including how to adapt teaching to the Next Generation Science Standards.

That part wasn't a far leap, said Doherty, because the standards' engagement with science through activity rather than memorization “encapsulates the way we've been teaching for 32 years.”

As the push for better STEM learning continues in K-12 schools and careers, support programs for math and science educators have been growing. The American Association of Colleges for Teacher Education estimates that more than 4,000 science-specific teacher-induction and teacher-training programs are operating nationwide, according to its analysis of 2015 data from the U.S. Department of Education. Programs such as the Knowles Science Teaching Foundation's Teaching Fellows Program, Math for America's Early Career Teacher Fellowship, and the New Teacher Center's e-Mentoring for Student Success help early-career science, technology, engineering, and math educators.

The Exploratorium's participants are drawn from a state grappling with the highest student-teacher ratio in the country—24-to-1 compared to the national 16-to-1 average—according to a report this year from the Learning Policy Institute, a California-based think tank. The report also says that California's supply of teachers is at a 12-year low, and enrollment in teacher-preparation programs has dipped by more than 70 percent in the last 10 years.

The demand for teachers is particularly high in STEM education fields. In the past four years, according to the Learning Policy Institute's report, the number of preliminary credentials given to new and prepared science teachers in Califor-





# Bring Inquiry-Based Learning to Your Classroom

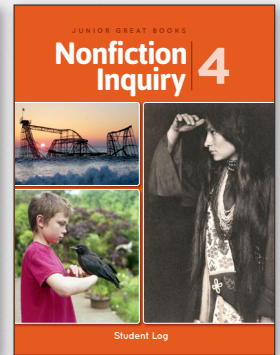
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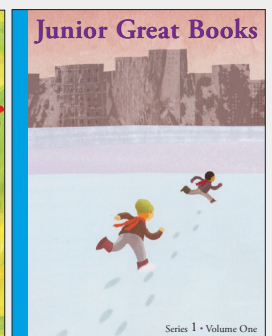
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Published July 12, 2016, in Education Week's Curriculum Matters Blog

# Study: Give Weak Teachers Good Lesson Plans, Not Professional Development

By Liana Heitin

A recent study found that giving middle school math teachers access to inquiry-based lesson plans and on-line support significantly improved student achievement—and benefited weaker teachers the most.

The effect on learning was about the same as moving from an average-performing teacher to one at the 80th percentile.

The authors, C. Kirabo Jackson, an associate professor of human development and social policy at Northwestern University, and Alexey Makarin, a Ph.D. student in economics at the university, conducted the study with about 360 teachers in three Virginia school districts. Teachers were randomly assigned to one of three groups: a control group that maintained business as usual, a group that received a login for the on-line curriculum, and a group that received both a login and some online supports for using the lesson plans.

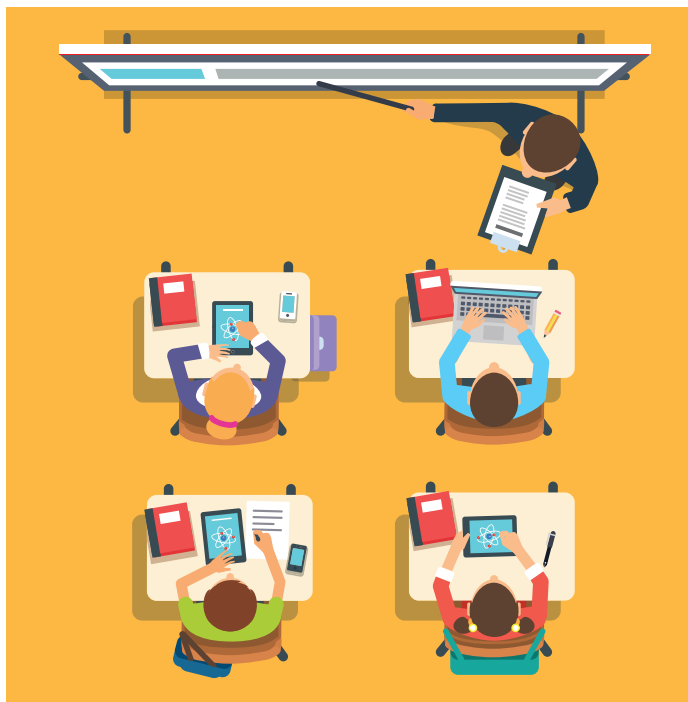
The teachers had access to seven lesson plans, which revolved around real-world situations and were intended to be used over two to five class periods. “The lessons directly talk about things like the Xbox, McDonald’s, the NBA—students are interested in those topics,” said Kirabo in a phone interview. In these inquiry-based lessons, “the teacher is really more of a facilitator,” he added. “She’s certainly guiding them toward a goal but not telling them what to do.”

## Least Effective Teachers See Most Benefit

Use of the lesson plans, all created by the company Mathalicious, was voluntary.

On average, teachers taught about two or three of the lesson plans.

Even so, the authors saw some noteworthy effects. Giving teachers both the lesson plans and support had a positive, significant effect on students’ end-of-year math test scores, according to the study, which was published as a working paper by the National Bureau of Economic Research. (These teachers increased their students’ test scores by about 10 percent of a standard deviation relative to the control group.) Only giving teachers access to the lesson plans also had a positive effect, though it was not statistically significant.



The weaker teachers, those who were generally less effective at improving student performance, saw the greatest benefits from being given the “off-the-shelf” lessons. “For these teachers who are not that strong, it’s allowing them to use that lesson instead of their efforts at teaching these topics and [giving stu-

dents a] deep understanding,” said Jackson. “They also don’t have to spend time coming up with lessons so it frees them up to do other things.”

## ‘A Much Better Investment’

Jackson noted that the intervention is also very low cost—only about \$430 per teacher.

“A bunch of studies that look at professional development find the effect is zero,” he said. “This is a much better investment than a lot of the PD that’s currently being implemented by schools.”

(A 2014 review of 600 studies on math professional development for K-12 teachers found just two studies showing positive effects on students’ math proficiency, as we’ve written.)

Giving teachers lesson plans is also cheaper and easier to scale than other interventions aimed at improving student achievement, such as removing ineffective teachers and giving teachers incentives to put in greater effort, the study notes.

The results of the study are likely somewhat generalizable, said Jackson, but a key takeaway is that the lesson plans given to teachers must be well-designed and promote deep understanding. “The difference here would be the quality of the lessons, not that you have a lesson per se,” he said.

However, it’s important to note that determinations about which instructional materials are “high quality” have caused many a feud. Recently, such debates have centered around whether both textbooks and materials that are freely available on the Internet are aligned to the Common Core State Standards. ■

Published September 30, 2015, in Education Week's Special Report: Teacher PD in the Common-Core Era

# Common Standards Raise Questions on Questioning

## New PD initiatives aim to help teachers elicit deeper responses and interpretations from students

By Sarah D. Sparks

**T**here are no stupid questions. But when it comes to the common core, teachers are finding that their questions could be asking a lot more of students.

Educators have called the focus on “close reading” one of the most critical shifts in the Common Core State Standards’ approach to literacy, and one that many teachers need practice to perfect.

Using questioning techniques, teachers can guide students to think critically about complex literary and informational texts and to construct evidence-based arguments based on them. But getting students to dig into deeper meaning requires going beyond simply asking them to cite an example or find an answer in the text. It means encouraging them to build interpretations and analyses from what they’ve read.

To that end, a number of new district and researcher-led programs are being developed to help teachers learn to ask better questions in connection with reading assignments or activities.

“What’s hard for teachers is forming these questions,” said Lindsay C. Matsumura, an associate education dean at the University of Pittsburgh who studies inquiry. Questioning “really requires a lot of planning to do it effectively.”

For example, in discussing E.B. White’s classic children’s novel *Charlotte’s Web*, typically a teacher might ask a student what Templeton the rat does to help Wilbur the pig. But a deeper question, Matsumura said, might be: “Is Templeton the rat a good friend? He really helps Wilbur, in the text, but you could argue his help always comes at a cost. What’s critical [in close reading] is you need to reasonably be able to take different perspectives on

the text. That is getting to the heart of common-core standards.”

### No ‘Right’ Answers

In a 2009 meta-analysis of class discussions led by Pennsylvania State University psychologist P. Karen Murphy, a team of researchers found that most teacher questions ask students to identify surface features of the text, like grammar, plot, characters, and climax.

learned in one text to another.

By contrast, the questions that improved students’ critical thinking and deeper understanding did not have a “right” answer. Rather, they asked students to speculate on how actions might unfold or to draw on other texts to inform their understanding of the passage being discussed.

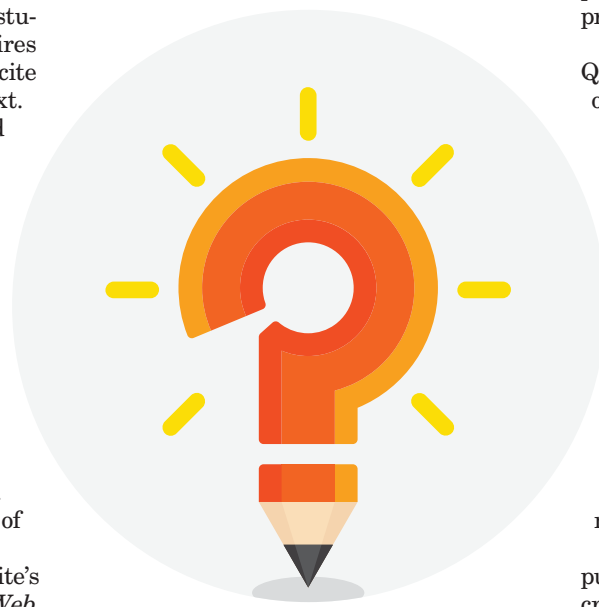
Murphy and Matsumura each have been awarded \$1.5 million in federal grants to develop some of the first professional-development programs to help teachers improve discussions during close reading as prescribed under the common core.

Murphy’s training initiative, dubbed Quality Talk, grew out of early research on question types. She and Jeffrey Greene of the University of North Carolina at Chapel Hill are crafting a set of videotaped model lessons and an assessment tool for teachers to analyze their own inquiry techniques.

Matsumura and her colleagues at Pittsburgh’s Learning Research and Development Center, meanwhile, have developed a PD program that uses an eight-week online course and individual coaching. The training includes how to select meaty texts and conceive questions that help students understand multiple perspectives.

Close reading is intended not only to push students to think more deeply and critically about what they read, but also to put students with less background knowledge on more equal footing with classmates during class discussions, according to Matsumura.

“There are real problems in society we want kids to be reading about—water quality, investing in space exploration—these are complex problems. But those texts are by and large not available



“I initiate a question, the student responds, I evaluate,” Murphy said in describing a typical exchange. Students answering those questions became adept in basic story structure, but the skills did not translate to deeper understanding of the material or the ability to apply what they

to kids,” she said. “You have to do a lot of background building, mini-lectures on the subject, and teachers sometimes feel insecure about their own knowledge.”

Claire Borge and Audrey Jakes, teachers in the Fairfield-Suisun district in Northern California, see that discomfort a lot.

Both are on special assignment in the district’s Teacher Support Center, working to help some 1,000 teachers in preschool through adult education classes improve their classroom discourse. Using workshops and ongoing lesson modeling and coaching, the pair helps teachers learn to ask questions that spur discussions about not only text, but also photos, charts, and even political cartoons.

“We are coming out of a time period in public education where the questions have all been prewritten for us, the curriculum has all been written for us, and now we are being given the opportunity to write our own questions within the curriculum,” said Borge, a 30-year veteran teacher. “At first, everyone is really afraid to really look at these question stems and think.”

### Hitting the Stopping Points

In one school, the coaches came to help a teacher with one lesson and ended up working for eight weeks with all the

teachers in that grade. Teachers learned from and built on each others’ questions to devise lessons integrating science and social studies with reading.

“It’s been a gradual release,” Borge said. “The first year was very general—what is the common core, how does a standard progress from kindergarten through 12th grade—but that’s not going to translate to classroom practice. [In workshops] teachers see the strategies and go, ‘Yeah, yeah, yeah,’ but when they see them layered in their classrooms, it’s really transformative.”

As teachers use more open-ended questions, Jakes said, they also begin to step back and encourage students to ask most of the questions of one another.

The first time Borge and Jakes modeled close reading for an 11th grade history teacher’s students, “you could hear crickets,” Jakes said. “It’s not that [the students] thought nothing, but they were scared. ... You could see they were thinking, ‘You’re not supposed to ask me, you’re supposed to tell me the answer is C.’”

Well-timed questions can be critical to getting students to open up, Matsumura said. She found teachers often read through a chapter or text selection completely before starting a discussion.

As part of the training course, they are learning to plan stopping points where

the text is ambiguous and launch questions that get students thinking about what is going on. “We want to teach kids to not just start at the beginning and read all the way through,” Matsumura said. “A good reader is thinking about what they are reading as they are going through.”

In a pilot study of the Pittsburgh Learning Research and Development Center training, Matsumura found these more open and in-depth class conversations were particularly helpful to English-language learners. She is still studying exactly why such students showed bigger comprehension improvements than other students, but she speculated that more-integrated discussions of academic vocabulary and connection among different texts and visuals might have made the difference.

It’s easy for teachers to get overwhelmed trying to implement all the changes in the common core at once.

“Start small,” Jakes advised. “Common core is about shifts, not leaps. If you change one small thing in your practice, and then another thing, over the course of the year, you have changed.”

That approach has proved popular; Borge’s and Jakes’ latest workshop had 50 teachers signed up, with a waiting list for 18 more. ■

## COMMENTARY

Published October 7, 2016, in *Education Week’s Global Learning Blog*

# Cultivating Curiosity by Deliberately Teaching Students How to Ask Questions

By Andrew P. Minigan

Children are agents of curiosity and they are able to actively seek and gather information through the formulation and use of their own questions. The skill of question formulation is fundamental for learning, for working in the 21st century, and for participating in decision-making processes on all levels of a democracy. Question formulation is fundamental to cognitive development and how we learn from others, and yet it is a skill that is rarely developed in classrooms.

In his book *Trusting What You’re Told: How Children Learn from Others*, Harvard Professor Paul Harris estimates that children might ask about 10,000 questions per year before they enter school. Yet, as soon as children enter preschool they ask fewer questions in the classroom than at home, and the rate of student question-asking declines precipitously over the course of their education. Research has found that educators ask substantially more questions than students. There is an important role for teachers’ questions in the classroom, but there is also a need to nurture student

curiosity and to develop students’ ability to ask their own questions.

When students do not develop the skill of question formulation they feel uncomfortable and unwilling to ask questions, which also results in some students asking more questions than others. Barbara Tizard, Martin Hughes, and their colleagues researched children’s question-asking habits across socioeconomic groups and found that children from middle-class families asked a higher proportion of questions at school and at home than their low-income counterparts. Students from low-income



families who hear and use less questions at home are the same students who are not asking questions and engaging in inquiry in the classroom.

The absence of students' questions spans K-12 and permeates into higher education. In fact, Alison Head of Project Information Literacy found that only 27 percent of college graduates believe that they have developed the skill of formulating and asking their own questions. It is evident that the fundamental skill of question-asking is overlooked, so how can it be deliberately taught to all students as a part of their formal schooling?

### Deliberately Teaching and Developing the Skill of Question Formulation

Teaching strategies and pedagogy that deliberately teach students how to generate, improve, and use their own questions can help build students' capacity to inquire. The Question Formulation Technique, developed by The Right Question Institute, helps create an equitable learning culture where all students can ask questions. As a part of the strategy, students do not stop to judge, discuss, or answer questions. Every question is written down exactly as it is stated. Students, including those who do not usually participate, are able to engage in collaborative question-asking knowing that their questions will not be deemed "stupid" or met with a response that, "we already know the answer." When students see their own questions written down as they stated them, rather than reworked or rephrased, it can have a profound impact on student learning. Students take initiative to find the answer to their questions and it can increase student engagement and ownership.

When students work with their questions, they are able to hone three sophisticated thinking abilities, which can improve student learning. First, students generate as many questions as they can, which promotes divergent thinking and unleashes student curiosity. Then, students improve and prioritize their questions, which promotes convergent thinking as students compare and contrast their questions and think critically about which questions best suit the learning objectives. Finally, students reflect on the process and the questions they produced, which promotes metacognition and thinking about the value of asking questions.

There are many other strategies, frameworks, and resources that educators may use to help stimulate classrooms filled with questions. Bloom's Taxonomy may be a useful resource for categorizing questions. The book, *Cultivating Curiosity in K-12 Classrooms: How to Promote and Sustain Deep Learning*, by Wendy L. Ostroff, is a rich text with resources and ideas for promoting student inquiry and student-centered learning. Project-based learning practitioners from organizations such as TeachThought and the Buck Institute for Education infuse strategies that encourage students to ask questions. Educators are now beginning to shift practice and realize that teaching students how to ask questions can be a shortcut, not a detour, to deeper and more meaningful learning.

### The Role of Questions in the Learning Process

Question formulation is an essential skill for a time when there is an abundance of information available at your fingertips. Being able to develop good questions helps individuals target and access the information they are seeking. Dr. Stuart Firestein, Chair of the Department of Biological Sciences at

Columbia University, argues that ignorance—or being aware of what you do not know—is just as valuable as knowing. In his book *Ignorance: How it Drives Science*, Firestein says, "Questions are bigger than answers. One good question can give rise to several layers of answers..." Acquiring new information should reveal areas of ignorance, and this necessitates the ability to ask questions as a means for driving the learning process.

Questions can have a profound influence on one's ability to think originally and creatively. Dr. Adam Grant, Professor at the Wharton School of the University of Pennsylvania, believes that students should have more opportunities to produce original pieces of work and that this may encourage educators to foster creative thinking early on in children's education. Grant attests to the importance of teaching students how to ask questions in order to nurture creative and original thinkers.

### The Role of Questions in the 21st Century Workforce

Individuals entering the workforce benefit from learning how to ask and use questions to solve problems. In his book, *A More Beautiful Question*, Warren





Berger makes an argument that the ability to ask questions can help lead to innovation in business and the workplace. Similarly, in *The Global Achievement Gap*, Tony Wagner mentions a conversation he had with the president of the Chemical Management Division of BOC Edwards, who said, “For employees to solve problems or learn new things, they have to know what questions to ask...The ability to ask the right questions is the single most important skill.” Some members of organizations, such as Kristi Schaffner, an executive at Microsoft, deliberately teach employees and colleagues how to ask questions, which can help spark ideas and lead to innovation. Many businesses now expect employees to be able to think nimbly and to ask questions to problem solve. Using discrete strategies to teach the skill of question formulation helps address these needs.

### The Role of Questions in the Decision-Making Process and Democracy

The ability to ask questions makes it possible to participate more effectively in key decisions. When individuals learn to ask questions it helps them gain confidence in their ability to act on their own behalf, which can lead to democratic action and participation. Being able to ask and use questions can help individuals participate in decision-making on all levels of our democracy.

### The Gift of Student Curiosity

In his 2016 address to graduates, Dean James Ryan of the Harvard Graduate School of Education stated, “There is no greater gift to bestow on students than the gift of curiosity.” Questions are vehicles for lifelong learning, for innovating in the workplace, and for participating in democracy. Question-asking is a fundamental skill, and strategies that deliberately teach all students how to ask questions can transform teaching, learning, and education. Through teaching inquiry, educators can cultivate classrooms filled with curious and inquisitive students—a much-needed gift for students and one that can provide joy to educators who work in a very demanding profession. ■

## COMMENTARY

*Published May 4, 2016, in Education Week Teacher’s Prove It: Math and Education Policy Blog*

# 3 Tips for Guided Inquiry Math Lessons: The Ikea Effect

By John T. McCrann

**M**y wife and I just bought our first home this winter. We have spent a lot of time this spring acquiring the furniture that we need to transition from a 400 square foot apartment to a three bedroom townhouse.

We’ve gotten furniture from family, yard sales, and we have bought a handful of new things. Of all these, some of my favorite items are ones that we got from Ikea. I look at them and smile thinking of how I transformed them from slabs and screws into functioning furniture (insert the Tim “the Toolman” Taylor grunt here).

Social scientists have named the psychological phenomenon that creates my sense of pride. The “Ikea Effect,” explains that “people attach greater value to things they built than if the very same product was built by someone else.”

Math teachers can leverage this same psychological phenomenon through inquiry experiences in class.

My students show more and learn more from experiences in which they feel like they have been a part of the construction of the knowledge, and not simply a passive recipient.

This idea is, of course, not something I came up with. Dewey and Friere are my two favorite scholars on the value of inquiry to the educational process. One way to start a genuine inquiry cycle for those who are unfamiliar with the process might be to check out the work of “The Right Question Institute” (where you can find this step-by-step “how to”).

True inquiry and authentic knowledge construction are great and should happen at times in every class; however, something I love about this “Ikea Effect” idea is that we don’t need to experience “start-from-scratch” inquiry to realize its benefits. Guided or bounded inquiry has value as a means to engage students in owning material and developing deep ideas about it.

I’m not a carpenter. I did not actually build anything in my house. It would be impractical for me to try create a shoe cabinet from a few two by fours.

And it would be equally ridiculous and impractical for me to ask my ninth grade students to construct some mathematical ideas. My students cannot and should not reconstruct Euclid’s *Elements* from a single postulate. Yet, this doesn’t mean the ideas should simply be presented as “facts to be learned” either.

Ikea does a few things so that non-carpenters like myself can “construct” their furniture. They pre-drill holes in the wood, they provide would-be constructors with correctly sized tools which they’ll need, and they write instructions for assembly which highlight the moves we should make as well as trouble spots where we are likely to go astray.

Math teachers can create analogous scaffolds to empower our students in the process of “constructing” knowledge.

**Pre-drill holes:** In the classroom, this means providing systems and structures that support students in the process of knowledge construction. Handouts should prompt students to observe a mathematical phenomenon with question like “What do you notice...?” Students should have plenty of room to express their understanding in different ways: drawing pictures, writing sentences, explaining verbally to the teacher or peers. Students should be set up in a way that will maximize their ability to engage with the problem and each other (for me this is usually, but not always, heterogeneous groups of four) and teachers should use tools like group roles and turn-and-talk strategies to create a context in which all students participate.

**Provide the correct tools:** The right “tool” for mathematical knowledge construction could be a compass or ruler, but it might also mean giving students a crutch to support them as they move

through a difficult part of the process (ex: a pre-scaled graph might help students graphing data in order to gain an understanding of amplitude changes in a sine curve). This is a delicate balancing act: I often struggle to select the “tools” which will give my students the help they are likely to need without providing so much that I destroy their opportunity to think and make sense. Teachers can set up students with online resources as tools to explore a phenomenon or relationship (National Library of Virtual Manipulatives, Geogebra, Desmos).

**Create an instruction manual:** Even with the right context and tools, students may need support putting things together in the right order (Quick note here: this is an important distinction between what I’m calling “true inquiry” and “guided/bounded inquiry.” In the former I would not provide this kind of manual, in the latter I am guiding students toward a desired understanding so there needs to be more structure). In creating this “instructional manual,” I try to anticipate where students will go wrong and head them off at the pass. This could be accomplished in the handout I give them or may be through moves in my facilitation of the group. My “instruction manual” might include collecting all students together to bring out misconceptions or sending ambassadors from one group that has gotten through a sticking point to another when they reach a similar spot.

Of course, Ikea furniture takes time to construct. Just as we couldn’t fill every inch of our home with Ikea furniture, teachers (especially high school teachers who are required to march students through a curriculum which still does not emphasize depth of knowledge) cannot be expected to design this kind of inquiry experience every day.

Math policymakers should be working to solve this problem through curriculum reform. In the meantime, I will keep thinking about my shoe cabinet as I design lessons/curriculum, finding ways to give students the satisfaction of putting together mathematical knowledge. ■

*Andrew P. Minigan is the Education Project and Research Coordinator at The Right Question Institute.*

## COMMENTARY

*Published February 8, 2016, in Education Week’s Global Learning Blog*

# Teaching Inquiry Through the Study of Endangered Cultures

By Cleary Vaughan-Lee

**C**ultures around the world are vanishing at a rapid rate. Unique forms of cultural knowledge—language, myths and stories, rituals, music, artifacts, traditional dress, and unique agricultural methods—are at risk. According to UNESCO, half of the languages spoken today will disappear if nothing is done to preserve them.

Why does this matter? Anthropologist Wade Davis, in an interview with National Geographic explains, “As cultures disappear and life becomes more uniform, we as a people and a species, and Earth itself, will be deeply impoverished.” Learning what is at risk is essential.

A deeper look at these cultures provides students with an ever-widening window of inquiry. Students discover remote geographical places and cultural artifacts local to various regions, learn about the wisdom and ways of life of indigenous people, and examine the global issues threatening these people and places. Students find themselves in an expanding world where they are witnessing history and can become inspired to examine their own cultural values and heritage.

Asia Society recognizes the following outcomes—investigating the world, recognizing perspectives, and taking action—as indicators of global competence. These strategies, along with resources, offer ways to integrate the study of endangered cultures into the global learning classroom.

### Investigating the World

Cultural museum exhibitions, either in-person or online, provide important opportunities for students to investigate the world. Exhibitions today bridge media with traditional art forms, such as painting and photography, and offer inquiry-based tours for schools and classrooms.

Jane Baldwin, photographer of Kara Women Speak, recently said to me, “As a photographer, I believe art can inform and focus our attention in powerful and insightful ways. Through engagement and conversation, art can inspire empathy and evoke our humanity by raising awareness of political issues and be a catalyst for change.”

Kara Women Speak explores the indigenous women and culture of the Omo River Valley and Lake Turkana watershed in Southwestern Ethiopia. The indigenous communities of the region are threatened by upriver hydroelectric power projects and international land grabs. For an interactive exhibit at the Sonoma Valley Art Museum in Northern California, Baldwin produced life-sized portraits, audio recordings of the Kara women, and ambient sounds from the Omo River to provide visitors with a visceral experience.

Brandon Spars, humanities teacher from Sonoma Academy High School, took his freshmen students to the exhibit to gain an understanding of complex projects that have damaging impacts. This fits with the freshmen curriculum, which explores the question, “How does geography shape culture?” The exhibit, Spars explained, was a valuable experience. His students were able to witness an important story, meet the artist, and ask questions.

Can’t take a field trip to a museum with your students? Consider visiting online museums, such as the Smithsonian’s Center for Folklife and Cultural Heritage, which is dedicated to the exploration and documentation of traditional knowledge with cultural communities around the world.

### Recognizing Perspectives

A globally competent student needs to be provided with critical questions—ways to research and uncover how an is-

sue in one part of the world affects the rest of the world.

For example, students can be exposed to specific challenges facing an endangered culture that is under threat due to modernization, globalization, climate change, or regional and national development. By asking humanistic questions students can reflect on their own lives and culture, empathize with others, and recognize the interconnectivity of the global community.

I've had great conversations over the years with teachers, technology specialists, and administrators at the International Society for Technology in Education conference (ISTE) about the importance of global education. I spoke with Holly Jobe, former board president of ISTE, who described some of the international places she has lived and worked throughout her life. "Learning about endangered cultures can help us understand diversity, our own culture, and our own humanness," Jobe said.

As the education director for the Global Oneness Project (GOP), I've witnessed how cultural stories affect students' perspectives. Students and teachers can explore these multimedia stories on the GOP website: a photo essay documenting Mongolian nomads, a film about the Gamo people of the Ethiopian Rift Valley, and a film about the last speaker of the Native American language Wukchumni and the dictionary she created to keep the language alive. The accompanying lessons to these stories challenge students to consider their own perspectives in the

context of the story's wider implications, such as the underlying notions of progress and the impact on specific cultures.

### Taking Action

Student-driven projects provide opportunities for research and collaboration that can draw students into real-world issues related to cultural preservation.

Native high school students in rural Idaho, Utah, and Nevada are working to revive Shoshone, an endangered Native American language. The teens, documented in an NPR story, are creating word lists with elders in order to produce a dictionary. They are also creating children's storybooks derived from oral stories from the 1960s and '70s for the schools on the reservation. Lyle Campbell, Director of the Center of American Indian Languages, explains that "most of the wisdom of the world is encoded in languages, and when we lose a language with no documentation, all of that knowledge and wisdom is simply gone."

Additional resources that document endangered languages throughout the world include National Geographic's Enduring Voices project and UNESCO's Atlas of the World's Languages in Danger. Take a look at the Enduring Voices interactive global map. They document language hotspots by color-coding the countries where languages are near extinction. Students can also explore the project's Talking Dictionaries, a resource with audio files that capture endangered

languages, including Tuva, a Turkish language spoken in south-central Siberia, and Siletz Dee-Ni, an Oregon Athabaskan language spoken by Siletz tribes once local to northern California.

VIF International Education partners with districts and schools to build global education programs for students and teachers. Fabiana Casella, a former international and cultural exchange teacher with VIF, teaches high school in Buenos Aires.

Casella's students conduct research about the associations that defend and protect the indigenous groups in the provinces in Argentina. Students also read novels and legends that include indigenous vocabulary from the region. Casella describes that the intention with these projects is to "narrow the cultural gap among teenagers living in the same country." She says that her school "tries to promote a feeling of compassion, understanding, and appreciation of those cultures that have inhabited our lands for centuries and nowadays are represented by their heirs, who somehow carry in their DNA part of the customs and traditions of their ancestors."

Exposure to endangered cultures, combined with unique learning opportunities, enhance students' perceptions of themselves and the world, making them stronger global citizens. ■

*Cleary Vaughan-Lee is Education Director for Global Oneness Project.*

## COMMENTARY

*Published February 7, 2016, in Education Week's Finding Common Ground Blog*

# Scaling Collaborative Inquiry: Professional Learning for Educators

By Jenni Donohoo  
and Moses Velasco

Every teacher deserves access to high quality professional learning. Collaborative inquiry is a high quality design that is based on the premise that teachers are essential leaders in school improvement efforts. For decades, the most respected educational thought

leaders and researchers have promoted professional learning designs that enable teachers to lead and learn in practice - about practice (Ball & Cohen, 1999; Darling-Hammond, 1998; Hargreaves & Fullan, 2012; Hattie, 2012; Lieberman & Miller, 2004; Little, 1990; and Timperley, Kaser, & Halbert, 2014).

Ball and Cohen (1999) suggested that if teaching and learning how to teach became the object of continuing and

thoughtful inquiry then "much of teachers' everyday work could become a source for constructive professional development." Collaborative inquiry situates teachers' everyday work as the central focus for their learning as teams identify student learning needs, investigate promising approaches, test new strategies in their classrooms, collect evidence, collectively examine results, and determine next steps.





# Unlocking the Power of Inquiry-Based Learning

**Training teachers to ask curiosity-driven questions that force students to search for meaning**

*By Bill Siegel*

The origin of the word “educate,” the Latin word *educare*, means to bring out or pull from, and develop from within.

Inquiry-based learning does just that. It has been shown to improve performance in all subjects: reading and language arts, social studies, math and science.

But to truly establish a culture of inquiry-based learning in your school, it is vital to train your teachers to move beyond merely asking questions. Instead, your teachers should be

mindful of the fact that every type of question they ask gives students a different kind of opportunity to demonstrate their learning.

Over the past 22 years, I’ve trained more than 10,000 teachers in 47 states in all types of schools—urban, suburban, rural, private, public, big and small—to use inquiry with literature in their classrooms. Having a rigorous, substantive discussion goes beyond asking students to simply connect to the text or imagine what might happen next.



It means asking questions that demand students use evidence from the text to support their thinking. It means challenging students to respond to the differing ideas of their classmates. And it means pushing students to further their own thinking.

### Self-reliant thinkers

While training in inquiry begins with moving teachers from lecturing to questioning, it also involves helping teachers move from using agenda-driven questions—where they are steering students to preconceived answers—and toward curiosity-driven questions, where teachers are genuinely searching for meaning right alongside their students.

That’s why I’ve come to think of inquiry training as “unteaching” in the sense that I’m helping teachers release themselves from telling their students what to think, and instead create opportunities for students to become self-reliant thinkers. Even if a student struggles to read, every student can think.

When teachers give students a genuine opportunity to share ideas through discussion, engagement increases right alongside achievement.



I once modeled a discussion for an eighth-grade teacher on “The Bat-Poet” by Randall Jarrell. Prior to discussion, the teacher pointed out “Michael” and told me that I shouldn’t call on him “because Michael can’t read.”

Nonetheless, during discussion, Michael raised his hand to read a passage aloud. He was indeed a slow reader, but when he began interpreting the passage, he was incandescent. He had original ideas, pulling examples from what he had read. He had astute observations that no one else in the room had considered.

Michael clearly felt like a superhero for having been given a chance to speak his mind. And the teacher learned that because she had equated reading ability with thinking ability, she had counted Michael out altogether.

### Seeing is believing

Many teachers might initially believe this kind of in-depth inquiry is too demanding for their students, so they deserve to see the process happen with their own eyes. The best professional development will include that opportunity as part of the service.

While training your teachers in asking challenging questions is a crucial step to implementing inquiry-based learning, it is only part of the process. It also involves training teachers to become active listeners, to be mindful of how to use follow-up questions, and to create a discussion with depth and focus—all this while ensuring every student has an opportunity to participate.

When teachers learn to lead inquiry-based discussions, the process clicks, the students thrive, and the sense

of achievement is palpable. Students love participating and expressing their thoughts, and when the bell rings, you can hear the discussion of great ideas continue on in the hallway.

With the guidance of their teachers, students can build the critical thinking, reading comprehension, empathic speaking, listening, and problem-solving skills they need to carry beyond the classroom and into the rest of their lives.



*Bill Siegel is an Academy Award-nominated and Emmy winning documentary filmmaker and vice president of School Programs for the Great Books Foundation, a Chicago-based nonprofit educational organization.*

This piece originally appeared in the October 2016 issue of *District Administration* magazine.

## Tips on Promoting Inquiry-Focused Classroom Discussions

Asking interpretive questions not only results in meaningful and engaging discussions, it also deepens students' critical thinking and comprehension.

Engage your students with interpretive questions that:

1. Address the underlying themes in a text.
2. Invite multiple interpretations or answers.
3. Require them to find supporting evidence.
4. Ask them to clarify, elaborate, and explain their ideas.
5. Promote respectful and collaborative conversations.

Collaborative inquiry as a scalable reform holds the potential to transform education systems. The process necessitates the reconstruction of beliefs about the nature of learning, leading, and teaching. During a collaborative inquiry cycle, participants examine explicit and implicit theories of action and reflect on the congruence between the two. When educators reflect on their theories, collaborate, and develop solutions to address their problems of practice, efficacy increases. John Hattie's research indicates that collective teacher efficacy is the number one factor that impacts student achievement.

Ensuring collaborative inquiry lives up to its potential will require a concerted effort as collaborative inquiry teams can either “work together to either reinvent and improve teaching practice or simply reinforce the status quo” (Stanley, 2011, p. 73). Emihovich and Battaglia (2000) noted that the creativity and knowledge to begin this work is not lacking and that much of the work has already been initiated. What they suggest is lacking however is, “the energy, discipline, and patience to study what is involved in the transformation and the courage to test our capacity for commitment to sustain such change” (p. 235).

Collaborative inquiry remains largely theoretical in many school districts. The ongoing challenge is bringing collaborative inquiry out of the realm of theory into the professional learning practices of teachers. While we believe that scale, as redefined by Coburn (2003), is attainable through the utilization of a collaborative inquiry approach to professional learning, some of the ways in which collaborative inquiry is being carried out directly prevent Coburn's notions of scale from coming to fruition.

Based on our work with collaborative inquiry teams in schools and districts in Ontario and Michigan, we have identified six lynchpins that are vital to ensuring collaborative inquiry will reach a critical mass or tipping point from which its breadth and depth can spread change in thinking and practice throughout school districts.

## Six Lynchpins Necessary to Bring Collaborative Inquiry to Scale

**Lynchpin #1—Voluntary Participation:** We have witnessed greater success in school districts where teachers have been invited to participate in the process. Where it's been introduced as a mandate, teachers approach it with skepticism and often associate it with past professional development experiences - which may have been inappropriate to address the daily challenges they face. Where it is voluntary, it is spreading more widely because the design honors the professionalism of the participants; they find it relevant, rewarding, and empowering; and enthusiasm quickly spreads throughout a system by teachers' word-of-mouth.



**Lynchpin #2—Shared Leadership:** Collaborative inquiry provides participants with the autonomy to make decisions as they test solutions related to their challenges of practice and formulate answers to the questions set out at the start of the cycle. Formal leaders are required to resist the temptation to solve problems and invest the time needed for others to discover what works best. When formal leaders provide opportunities for shared leadership by affording others the power to make decisions, everyone benefits.

**Lynchpin #3—Guided from Experience:** It is more difficult to guide something if you have not had the opportunity to experience it yourself.

You can muddle your way through but in the end, certain nuances can only be understood through genuine engagement in a process. This is true when it comes to collaborative inquiry. By engaging in the process, leaders not only come to understand, appreciate, and value it as a powerful professional learning design, it also enables richer and deeper conversations between system leaders and other educators.

**Lynchpin #4—Achieved Coherence:** For collaborative inquiry to reach scale teachers need to see that it is not another initiative; it is their important contribution to school improvement. However, in districts where the two processes are incoherent, system-wide professional learning days are usually devoted to topics prioritized and determined by central office staff and therefore disconnected from the learning related to the inquiry.

Teachers come to believe their collaborative inquiry work is an add-on. In districts where collaborative inquiry teams are provided time during system-wide professional learning days to engage in the cycle (rather than learn about something else), they come to see that their work is directly related to the school improvement planning process. Coherence is achieved through the process of shared and continuous improvement.

**Lynchpin #5—Learning is Recognized and Disseminated:** We have

noticed that when districts and schools do not put in place mechanisms for this sharing to take place then opportunities for collaborative inquiry to spread are limited. We have witnessed diminished enthusiasm for collaborative inquiry when teachers perceive that the reach of their learning is limited to their classrooms only.

**Lynchpin #6—Skilled Facilitation:** A final lynchpin critical to scaling collaborative inquiry is skilled facilitation. While collaborative inquiry is initiated, shaped, and driven by teachers, it must be guided by skilled teacher facilitators. Since collaborative inquiry is a process that surfaces the beliefs and



assumptions underlying current teaching practices to propose and attempt new approaches, a skilled facilitator is critical in ensuring that the process is faithful to its intended outcome.

Ultimately, we envision collaborative inquiry as an alternative to short-term, top-down, formulaic approaches to professional learning that do not hold enough rigor to realize self

sustaining cycles of improvement in schools. In order for education to remain relevant and responsive to the current and future learning needs of students, teachers and other educational leaders must have mechanisms and processes in place to collaboratively identify how schools should improve and how to meaningfully refine and sustain those changes. Collaborative

inquiry holds the potential to do that by calling each individual in education to raise within themselves a truer sense of leader and learner. ■

*Jenni Donohoo is a Provincial Literacy Lead in the Curriculum and Assessment Policy Branch in the Ontario Ministry of Education, and Moses Velasco, a Professional Learning Leader with Toronto District School Board.*

## COMMENTARY

*Published February 3, 2016, in Education Week's Education Futures: Emerging Trends in K-12 Blog*

# How to Make Inquiry-Based Learning Work in Your Classroom

By Ted Levine

**T**rendy approaches to teaching come and go, but some of them stick around. Inquiry-based learning, for example, is no longer a trend—it's the dominant mode of instruction for many educators around the country. Inquiry-based learning gives students a choice about what they will study, which leads to greater engagement. For educators who are new to this model, Terry Heck lays out the four phases of inquiry-based learning (interaction, clarification, questioning, and design) and also suggests several apps that support teachers and students each step of the way.

Speaking of apps, more and more of today's students have access to web-connected devices, which means that the information-gathering phase of research projects is easier and richer than it was in the days of the encyclopedia. The challenge for teachers now is to provide enough guidance to keep students on track, but not so much that they feel like they've lost ownership of the project.

Teachers used to be the gatekeepers of information, but these days conducting their own research is an important skill that students need to learn. Effective research includes sourcing information, weeding out what is not useful, and deciding what is. The best research projects—and research tools—reinforce these skills in addition to teaching the subject matter.

Different students have different levels of preparedness for this kind of project, both in terms of technological proficiency and in the judgment needed to find and order the most important pieces of information. So one way teachers can guide all students is to find reliable sources that are written at an appropriate reading level.

Before we built Kids Discover Online, we did half a year of research with students and teachers. One of our key findings was that teachers want to give students curated sources that they can use to do their own research. In speaking with teachers during this research phase, we started seeing that educators actually have to give a lot of direction to make inquiry-based learning work.

This was a big takeaway for us, and provided tremendous insight into how we could create a platform that put inquiry-based learning at the center of the learning experience. After much testing and feedback from several beta rounds, we're excited about how educators are taking advantage of these features. Here are some specific examples of how educators are incorporating inquiry-based activities into their lessons.

Kristine Scharaldi, an educator in New Jersey, incorporates inquiry-based learning into the study of world history. To develop understanding of ancient civilizations, students formulate questions, conduct research, interpret findings,

and create artifacts to demonstrate their learning.

Scharaldi posts and shares students' questions on a physical "wonder wall" in the classroom and also digitally online using Padlet. Students do their research using various sources, including Kids Discover Online, which gives her students access to leveled text and multimedia such as video clips, 360-degree panoramas, maps, and other visual resources that support dozens of topics.

Her students use Discover Map, a visual concept map that shows connections between different units and topics within the library, to explore categories and then find specific resources. She guides the class through peer instruction, group analysis, and collaboration. The unit culminates with the creation of 3D artifacts for a class museum exhibit.

Megan Kunkel, a fifth-grade teacher in Northern York County School District, PA, encourages students to pick topics that are of interest to them. She said, "They love having the freedom to explore and find their own connections among the content." She plans structured lessons in multiple academic areas based on the units the class is working on. For example, after learning about types of nonfiction text features in Reading, her class spent a day completing a scavenger hunt looking for examples of graphics, captions, maps, and other features in units of their choice. Many of the



students looked through topics related to content areas they cover in science and social studies. Kunkel concluded, “The kids love that they have ownership in what they’re learning, and I appreciate that they’re engaged and invested in nonfiction skill work.”

Shannon McClintock Miller, the district teacher librarian and technology specialist at Van Meter Community School (IA), said that for her, inquiry-based learning “creates a rich learning experience as students develop the path in which they will solve, answer, and create learning experiences—not just simply present facts. As a teacher librarian, I love seeing students dive into topics with curiosity and anticipation for what they are going to learn.”

Her students do their research by browsing through Discover Map as well. “This empowers learners to think about interests and questions in a variety of ways,” she said, “focusing their learning and often taking it to a totally different place from where they started. As they see the different categories moving around within Discover Map, learners just click on the category they would like to explore even more.”

Like many of her colleagues around the country, McClintock Miller believes that student-led research is here to stay. “Inquiry-based learning is making a difference for our young people in so many ways,” she said. ■

*Ted Levine is the President and CEO of Kids Discover.*

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