

Chapter Two—Teacher Modeling

Teacher Inquisitiveness: “I ask better questions than I thought.”

Flight 335 to Dallas

Recently, I was at LaGuardia airport ready to board a plane to Minneapolis. It was 11 September, 2008. I hoped this would be a routine flight.

But what caught my attention was the gate attendant for a flight to Dallas who announced a limitation on the number of passengers able to fly.

“Flight 335 from New York to Dallas will be limited to 130 passengers. All those who can delay their flight plans will be provided with a coupon worth \$300 anywhere in the United States. Please see me at the counter.”

Now, that’s odd, I thought. Why are they limiting the flight to a certain number of passengers? Does it have to do with excess baggage? with the weight of passengers?

“What could be causing this restriction,” I asked myself.

When the gate attendant had finished his commentary, I approached him.

“Excuse me,” I said, “I’m just wondering why you’re limiting capacity on this flight?”

He replied, “Hurricane Ike is in the Gulf and we must fully load the plane with fuel in case we have to take evasive maneuvers.”

Upon hearing this explanation, what might have been your follow-up comments or questions?

My next question: “You mean to tell me that planes leave here and elsewhere without a full tank of gas?”

“Yes,” he replied.

More oddities. More assumptions questioned.

“How many passengers does the plane carry?” This was an MD-80 and its capacity was 140. So they were going to reduce their passenger load by 10 in order carry the extra fuel.

My journal for this day recorded the following reflection on this event:

“Possible reasons for reduction [in passenger capacity]:

1. Too much luggage
2. Cost of fuel
3. Storage capacity?”

None of these explanations seemed adequate, so I later asked another desk attendant who said, “All flights must balance fuel and passengers.”

This was a revelation, not being too aware of just how airlines calculate relationships of fuel, baggage and passengers.

The next entry: “I wonder if WWII B-17s always took off with full load of bombs and fuel” for flights into Germany or in the Pacific.

I relate this story because of the importance of modeling whatever behaviors we wish students and children to engage in.

If we want them to grow up curious, we model asking good questions about the world, about people and their relationships.

If we want them to work cooperatively, we are always looking for opportunities to engage in sharing of ideas, and solutions to problems. “Let’s see if we can figure this out together.”

So, when I do workshops on fostering inquisitiveness within schools, I always begin by sharing my own inquisitiveness.

My Inquiry Journal

The above story and journal entry are typical of what I share with educators.

And then I began looking over some of my entries during the course of one or two years, all kept in various notebooks I always have with me.

What I learned recently was that my journal entries often look for causes by asking, “Why?”

Why can the plane only carry 130 passengers when its capacity is 140?

Why did security in a different country allow a man to avoid placing his bag through the x-ray machine? (“Diplomat,” I was told, except that the briefcase had no markings on it so designated such a mission).

Why did we fall into the deep financial abyss in 2008, leading to the worst recession since the Great Depression?

How could we have missed the Christmas 2009 bomber with explosives in his underwear so many years after 9/11?

I’m very intrigued by how things come about, what causes things to happen.

So, in workshops I’m always providing participants with opportunities to ask questions about artifacts I share with them.

Observe, Think and Question

These exercises work best if students are examining stuff related to their current studies, be they sea shells, pictures of various topographical features, different hats, original documents and the like.

An exercise like this could also be the prelude to a larger unit of study, say on habitats, change, predator/prey and growth.

Participants examine these artifacts using a framework Observe, Think and Question (Fig. 2.1, End of Chapter). What do you see, feel, hear, taste (well, not so often) and feel? What do these observations remind you of in your prior knowledge? What concepts, ideas, facts and feelings do you have that relate to what you're observing? Then, what questions do you have?

And, yes, sometimes we pose questions immediately. Where are they from? Who found them? What are they made of? And that's fine. Note questions whenever you experience them. But I'll want to know what observations led to the questions.

This is also an excellent opportunity to school folks in the differences between observations—that which we can all agree upon, that are verifiable—and those thoughts that are clearly inferences: “Something lived inside. . .they're very old. . . lived in shallow tropical waters. . .” These thoughts reflect tentative conclusions based on the direct observation of evidence on the shells themselves.

Very recently, I've used sea shells I've picked up on our beaches in Southampton, NY. Nancy and I have collected many over the years to the point that all of our window sills were covered. But then some years ago, the shells disappeared from our beaches.

Why?

Participants ask questions using the Observe, Think and Question format. Then they select their best questions.

Next we ask, “What do we do with all these questions?” Teachers suggest that we classify, find similarities and differences, prioritize, conduct research.

Workshop participants then read several paragraphs about these shells to see what questions are answered, and to generate new ones.

Then we move into unexplored territory by consulting the 3 Story Intellect (See Fig. 2.2) and ask questions we haven’t asked. “I see that we have no comparison questions, as in Level II. We have no What if/speculative questions as in Level III.

“Let’s ask a question, in our groups, that we haven’t asked before.”

Then, of course, we share all our findings.

During the whole process we have been writing in our Inquiry Journals. Recent research from Singapore (Townbrow, 2008) indicates that when students regularly write questions in their journals and discuss them, they improve. After just six weeks of this recent study, researchers found that students’ questions became “more bold and adventuresome.” They also discovered that inquiry led to understanding the scientific content, the nature of matter.

What Have We Learned About our own Thinking?

As a final exercise, I ask participants to respond to this question: “What have you learned about your own questioning processes here?” This is, for me, an essential question, one stemming from many years of personal reflection but also one mindful of what Socrates is supposed to have said, “The unexamined life is not worth living.” It also stems from what John Dewey described as having “an experience,” that is what we learn by reflecting on what we’ve done, searching for causal links, patterns, connections, emerging feelings and the like.

Reflection of this kind is what puts us in control of our ship of state, because we learn what we're doing and not doing, what we're good at and what we might want to get better at.

Here are some of their responses:

"I work best when listening to others' questions.

Questioning isn't one of my strengths. Don't do it enough.

We found that one question led to another. Building upon each others' thoughts. [Participants work in observational groups.]

I usually ask Level I questions and then proceed to more complex as we discuss them.

I'm not comfortable working this way in a group. Too distracting. I can't concentrate.

We get a lot of different perspectives this way.

Having time to ask questions is great, but where in the day do we find the time?

I don't care about shells and didn't find this interesting.

Wasn't very interested initially, but as we listened, bounced ideas off each other I found myself becoming more intrigued by these shells.

I start off with Level I questions and often move to more complex ones.

Sometimes, if I'm not interested, I'm not very good at asking questions.

I hesitate to ask questions in public thinking they might be stupid."

As you can see there are several issues raised by these observations.

Familiarity with inquiry.

“Questioning isn’t one of my strengths.” We might make this observation as an adult without realizing that growing up, for most of us, was a continual process of inquiry, from our first days of looking at mobiles suspended above our cribs, or seeing something very strange and trotting off to explore it—a fish tank with tropical black mollies and silver-tinted angel fish inside.

Some of us lead lives so full of having to get things accomplished—teach classes, raise children and drive them hither and yon, and working full time in an office—that we do not pause to reflect on what we’ve been doing with a quizzical bent.

I mentioned above that I usually keep notes in a journal. In fact, I keep more than one journal going, one for daily notes and reflections and one for a particular project.

These provide me with a reminder to take some time to ask:

“What happened today that I think is important and why?

What might I want to do about it?

What am I noticing that is strange, perplexing, different, problematic and what action do I want to take?

What did I learn today?

What are my projects and where do I wish to take each one of them?

Did I ask a good question, today?”

The latter question, of course, comes from Sheindel Rabi. Every day upon her son’s returning from school (at a young age) she would ask him, “Izzy, did you ask a

good question today? That difference—asking good questions—made me become a scientist.” And, asking good questions could transform how we conduct our lives in classrooms and at home.

Asking Level I Questions

This is the most logical place to start when we’re investigating something that is new, different, something that challenges our assumptions about life, that is just intriguing:

“What is it? Where does it come from? How does it work?”

At the Museum of Natural History there is a film on the fourth floor where all the dinosaur fossils are (TRex, Barosaurus and others) about the evolution of life on earth narrated by Meryl Streep.

In an early sequence we see very strange animals that lived hundreds of millions of years ago (strange whale and fish-like creatures in the oceans), and then we see fossils emerging from the sandy soils, perhaps in the Gobi desert where so many dinosaur bones have been found.

Streep asks “When did they appear? Where have these animals come from? How are they like others?”

Then she says, “These are the questions paleontologists ask.” Very introductory, fact-finding questions that require us to gather a lot of information and then engage in the more complex Level II process (Fig. 2.2) of analysis to determine age, relationships and, perhaps times of extinction.

So, as with all new phenomena, we need the facts. Just as we are taught in writing a lead for a news article we must answer the questions suggested by Rudyard Kipling in

the Just So Stories

*I keep six honest serving-men
 (They taught me all I knew);
 Their names are What and Why and When
 And How and Where and Who. (1902)*

(http://www.kipling.org.uk/poems_serving.htm, accessed 25 July, 2011)

Sometimes we can answer these questions immediately, as with reading a news story.

But for interpreting the origins and nature of fossils from the Gobi, it will take more complex thinking to arrive at reasonable conclusions. Here, for example, is a fossil found very close to the South Pole. It's this long, wide with these colors and textures. But we aren't immediately certain what this one bone is related to in terms of the animal's overall bone structure. We aren't sure to what others it might be related.

With some more complex thinking we can determine that this Antarctic fossil is related to other dinosaurs from 200 million years ago.

What conclusions might we draw beyond this identification?

That finding a fossil in Antarctica leads us to conclude that dinosaurs lived on several different continents, North America, Asia and Antarctica. And that Antarctica's climate was once hospitable to warm weather animals like dinosaurs. That Antarctica was once located way north nearer to the equator (about 700 million years ago).

So, facts are important. We cannot reason without them, although you will certainly be able to find those adults (perhaps in media and politics) who seem to violate this rule daily. As former Senator from New York Daniel Patrick Moynihan said, "You have a right to your own opinion, but not to your own facts."

But if we stop here at Level I, gathering information, then we have short-circuited our mind's desire and ability to use this information to reason toward conclusions.

For example, the other day I was guiding two of my friends through the Hall of Planet Earth at the American Museum of Natural History. We were in that section given to how the earth creates mountain ranges and changes. On either side of us were models of the different plate boundaries, showing subduction of one plate beneath another (as in the Chilean earthquake of 2010), divergent, where they spread away from each other as in the Mid-Atlantic Ridge and transform boundaries, where they grind past one another perhaps at the rate of one inch a year. The latter boundary is exemplified by the terrible 2010 earthquakes in Haiti.

In this area there were three high school students from one of the city's more prestigious private schools. Suddenly one asked me, "What's convection?"

Before I could ask them questions in return, my friend read the definition from a nearby plaque, one explaining how plates move by convection currents generated by heat at the center of the planet, just like what happens when water boils.

Then I asked what they were going to do with all the information on the fill-in-the-blank forms attached to their clipboards.

"We'll turn it in then go on to doing a project on something we're interested in," said one of the young men. Like investigating various kinds of volcanoes or the sulfide chimneys where, in total darkness, over 200 species of animals thrive.

The pattern to note here is gathering information at an exhibit (or from a book, newspaper), and handing in the papers for the teacher to grade without any analysis of what convection is, how it operates, why it's important and how it might affect other

aspects of life on the planet. In this case, getting the facts needs to lead to more thoughtful engagement with the content. Allowing students to gather information and just hand it in without engaging in Level II Processing of data could lead to quick forgetfulness and lack of deeper understanding.

Sometimes Kipling's How and Why questions require lots of thought and do not necessarily appear in the first paragraphs of the news story because they take time to figure out: Why did we suffer such a colossal economic meltdown in 2008?

Group Process Fosters Inquiry

When we engage in inquiry as I've described above, collectively examining artifacts, generating questions, asking different ones and reflecting, we will often note how our questioning and thinking have been modified by the group.

Different Perspectives

One of the most important observations from those I've cited is the one referring to different points of view: "I get a lot of different perspectives this way."

What we know about working in groups is that we want them to be heterogeneous for problem solving for this very reason. We want to hear different points of view on the same topic. We know from research on creativity that better solutions come from flexibility of thinking, that is, taking and offering varied perspectives on a problematic situation. We learn from others' unique backgrounds and insights.

"I'd never thought of it quite that way," is something I've heard before during the reflective experiences mentioned above.

Confirmation Bias

The other side of this coin, however, is what we call “confirmation bias,” or the tendency in many of us to prefer information or perspectives that agree with our own ideas. Thus, we might believe only evidence that confirms what we already believe in or seek company of those who agree with us. The latter is a most common human trait. We’d rather dine and converse with those who generally agree with us than with those whose point of view is quite different. We’d rather read editorials that support our general outlook on life.

The other comment that we hear very often is that the inquiry process is definitely fostered by working in groups where people hear others’ ideas, build upon them thus taking the thinking in new and unexpected directions.

“We were building upon each others’ ideas.”

This is the kind of inquiry process we wish to foster in all of our classrooms:

We listen. . . think and reflect. . .add on or build upon others’ ideas.

You will hear comments like these again from some of the Sandusky students reflecting on their STEM projects.

We might also provide ideas and evidence that contradict somebody else’s offerings. And we should be encouraged to offer the other side of the coin, a different angle on the same situation. You will learn about students’ becoming better at raising these kinds of questions in Kerry Faber’s classroom during crime scene investigations (Chapter Eight).

This is how we grow intellectually, by challenging our own well-developed ideas and perspectives, not by resting on what’s familiar.

It’s Time Consuming

Another comment heard very often during these hectic days of fulfilling all sorts of local, state and national mandates is “Where do we find the time to luxuriate in this kind of questioning?”

Yes, indeed, where do we find the time to allow students to examine artifacts closely, generate questions, share them and then, building upon each others’ ideas, go on to ask better questions that can then guide investigations toward a summative product?

The answer is in the planning. We must plan for excellence. They might take place during one forty minute segment of a day’s teaching, or stretch over the course of several days. But if we do not think of them beforehand, if we do not carefully map out time for these experiences, they likely will not occur. Additionally, we must identify those performance indicators (rubrics and frameworks) that give us guidelines for the qualities of achievement we wish our students to attain.

In Chapter Four we will describe a curriculum planning process that will take these comments into account. Suffice it to say here that during our curriculum planning meetings with team mates, or on our own, we must think of what we want students to be able to do by year’s end, by the end of a specific unit of instruction.

Once we have an idea of our intended outcomes, we plan how we will achieve these and access to resources (artifacts, for example) and time to inquiry, think and draw conclusions must be part of this.

One participant recently noted, “Questioning processes like these are *legitimately* time consuming.”

Yes, they are and we need to be diligent and mindful during planning in order to create opportunities to engage with stuff, artifacts and the like from which they can generate meaningful observations, reflections and questions.

In sum, the social processes we have described are excellent for students' beginning to feel comfortable posing questions, challenging each others' ideas and generating new perspectives on experiences. These are the kinds of experiences we can and should be working on at the beginning of each year so by the time we embark on a lengthy inquiry unit students know how to ask questions and feel comfortable sharing them and then working in groups to find answers and draw reasonable conclusions to share with others. (See Chapter Three).

Just before asking participants to share their inquiry journals about what they've learned about their own thinking, I refer to another reflection of long-standing:

Years ago I read an item about then-CEO of Microsoft, Bill Gates. He used to get all kinds of upbeat reports from various divisions of the company, from Word, Excel, PowerPoint, from sales, marketing, research and the like. They would often be very positive about productivity, how well Microsoft was doing.

But, and perhaps this is why his company has succeeded so phenomenally well, he pushed back from his computer and asked a question:

“What aren't they telling me?”

In other words, “What's the other side of the coin? What evidence contradicts what they're telling me? What are the challenges not mentioned? What are the areas where we need to improve?”

When I mentioned this during one workshop in Texas (at the convention for teachers of the Gifted and Talented), one gentleman reminded us all of how this comment reflected what one quarterback in the NFL said. “We may have a 14-0 record, but we need to look at the areas that need improvement,” said Drew Brees before leading the New Orleans Saints to victory in Super Bowl 44.

I recognize my own confirmation bias, especially when it comes to socializing with friends, and I sometimes struggle to see the other side of any story that reflects well on candidates and policies I favor. It’s hard work to look at both sides of an issue.

We get morning newspapers (yes, we still read real newspapers) and each represents a different political point of view. It’s important to know both sides, but I’m not here to say it’s at all easy to read ideas and gather information that tends to contradict one’s favorite point of view.

“I don’t like this!”

Sometimes I hear from folks who are uncomfortable with the exercise, with asking questions, sharing them in public or with colleagues. It is possible that more people have these feelings than share them with me during a school or large group session.

This may reflect their own discomfort with being inquisitive. They may have grown up in a culture that does not reward nor encourage questioning. I’ve heard as I’m sure you have of parents who want their children to be obedient, not to ask rude questions, especially of adults.

We know there are differences in how children are raised. Richard Nisbett has recently (2009) summarized some of the foundational research by Betty Hart and Todd

Risley, psychologists who conducted extensive observations in the homes of professional and working-class parents and their interactions with children. They found significant differences in the language used by different groups of parents.

For example, professional families “talk to their children more than working-class parents do. . .include the child in conversations. . .speak about 2,000 words per hour to the child,” whereas working class parents speak about 1,300. Professional families read to their children “much more than does the working-class parent. . . . From a very early age the middle-class child expects to be asked questions about books and knows how to answer them.”

In some families “the child is supposed to pay attention, and comments or questions are regarded as interruptions.” (Nisbett, 2009, pp. 86-89) In some families you hear questions, “What? Why? What if?” whereas in other families you hear more commands and directions.

Thus, some of us might grow up with encouragement to ask questions, to allow our imaginations to play with characters in stories, to engage in speculative questioning about possibilities. Kids love this kind of word play. But some parents do not encourage it. (I am reminded of stories from Richard Wright’s childhood in *Black Boy*. His questions about family, race and culture were seldom encouraged and often actively discouraged.)

Some of us grow up without the encouragement I received from my grandfather, a scientist who delighted in pointing out discrepancies, puzzles to me such as “Why do you suppose the sun appears larger while setting on the horizon than at its zenith?” We loved playing these question games together.

“My questions might be stupid”

Lindsay’s honest reflection leads us to consider how we feel about our questions. Some of us, myself included, have had feelings that a question we might have within a social group is interesting but that others might consider it “stupid.” So we maintain our silence.

I felt this way in graduate school at Columbia University. Sitting in a class full of New York City teachers all of whom were working toward masters or doctoral degrees, I would think of a question, my heart would immediately begin to pound and I shelved the question until after class for a one-on-one with Ann Lieberman or Gary Griffin.

After many weeks of small group work during which I could listen to others’ questions and respond to them, I realized that my questions were just as good as anybody else’s, so my apprehensions gradually waned and I spoke out more often.

We hope that we and our students will spend sufficient time in groups with others of like and different backgrounds and experiences such that we will learn that we can make very positive contributions.

Teachers who model inquiry in classroom

Here are the reflections of outstanding educators who have spent a long time modeling inquiry and their own curiosities for students. Each reflects the value of this required first step for herself as well as for students.

Kerry

Kerry Faber from Edmonton (Ekota School) recently shared with me the following about her own inquiry processes. She now teaches sixth graders:

I know I ask more questions – deeper ones. Ones that have to be mulled over for a while and then discussed with someone else or [that might] result in a

search in literature or an online source (like a newsletter/journal). I know I model more curiosity with the kids. I am also not afraid of their questions or intimidated by them if I haven't a clue as to what the answer could be OR if there is an answer. Our questions can take us on some wonderful 'rabbit trail' searches that open up doors to learning I hadn't planned on when starting out.

Notice also what Kerry says, "I am also not afraid of their questions or intimidated by them if I haven't a clue as to what the answer could OR if there *is* an answer." (emphasis added)

I vividly recall my days teaching *Othello* to freshmen at Montclair State University. One day a young lady asked a question about Desdamona. I hadn't a clue about how to answer her question and dodged it by saying something evasive like "Let's take that up tomorrow."

Obviously, I needed time to become much more familiar with the play.

That was a long time ago. Now, I hope that I'm probably more like Kerry and others and can say, "You know, I never thought of that."

At the time I thought I *should* know the answer to the question, but had only re-read the play twice prior to embarking on the unit in English 101. So, part of our growth is certainly due to comfort with the subject as well as with sharing our wonderings with our students.

Liz

To be curious, you have to notice things. Once I started becoming a better observer, the questions came. This did not come naturally for me. My family has always dubbed me as the one who never notices anything. As an adult learner and a teacher of inquiry, I have started to notice and observe my surroundings more. Simply by paying attention to my environment, I have come to take more of an interest in certain things that might not have interested me before. Examples are

placement and size of the white pines in the Superior National Forest by my cabin. Once I started noticing the density of the forest vs. the sparseness of the forest, I was able to ask questions of myself about fires that have ravaged the area and when maybe they had occurred in the past. I am then motivated to find answers to the questions that genuinely interest me.

As we have noted curiosity is often the result of very careful examination of our surroundings. Liz's observations and subsequent questions reflect what every scientist and reader of good literature and art lover realizes, that when we look very closely at stuff, we are likely to be struck by little or large oddities that will intrigue us.

STEM teachers—"The blind leading the blind!"

As you will discover in Chapter Nine, sometimes we as teachers are challenged to engage projects that are quite different from what we're used to. We do not bring a whole lot of experience to the task.

This past year teachers who supervised the STEM projects on building model roller coasters and habitats on Mars, and creating marketing plans for the Cleveland Indians baseball club found themselves out of their elements.

"The teachers were out of their comfort zone. This was a super learning experience—to work outside of our own comfort zones" one teacher told me in a telephone interview.

"It was the blind leading the blind! We worked through this with the students," another person said.

I find these shared reflections to be amazing and heart-warming.

Amazing because it isn't very often that we as educators are in the position of being out of our comfort zone. Several years ago I joined with

Outward Bound for a week's adventure in the Penobscot area of Maine. One of their mantras was to stretch us (we were all educators of various stripes) beyond our comfort zones.

And heart-warming because consider what these teachers are modeling for their students. I can just now hear several conversations in the team planning groups:

“Well, I don't know any more about designing a roller coaster that will draw a specific g force on the human body than you do, Tony! What do you think we should do here?”

“Let's dig into what might attract Teens and `Tweens to the ball park together. I'm no marketing expert” (an art/math/literature/PE teacher might say).

“We're in this together pal!”

Imagine how you would have felt had you been assigned to a team with your seventh grade teacher and you observed these behaviors and sentiments.

“Let's work it out together!”

“We're all in the same boat.”

Nice and, more importantly, very powerful. You would never forget that teacher, I bet.

Conclusion

When I ask teachers what is the purpose of modeling our own inquisitiveness, they invariably point to many good reasons:

1. Students model what we do

2. We want to reflect our own inquisitive
3. It's OK not to know everything. Nobody does
4. We are vulnerable
5. We are still very curious, wondering people.

Our wonderings are what make us vital and alive, capable to taking a question of interest and pursuing it into new unexplored territories.

And modeling our inquisitiveness is a *sine qua non* of establishing that open, invitational environment wherein students feel comfortable taking the risk to raise their hand to ask you or a classmate a question.

Some of my unanswered questions now are “How do I become more open to perspectives and ideas different from my own? How do I move beyond my own biases? When is it important to be open to others’ ideas?” and from a very successful hedge fund manager, “What am I missing?”¹

References

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Fig. 2.1

Observe, Think and Question

¹ John Cassidy, 2011 “Mastering the Machine” in *The New Yorker*, p. July 25, 2011.

Observe: Look closely at the artifact (whether it be a 3-dimensional physical object, a passage from a book or episode within a video). Note what you can verify as true for all observers, that which everybody can agree upon (e.g. “It’s round; green and has a lines encircling it.”) Be sure to distinguish between these verifiable observations and inferences.

Think/Feel: What do your observations remind you of? What connections are you making between the observations and that which is in prior knowledge? What feelings does the artifact engender?

Question: What curiosities do you have about the object? What questions would you ask an expert if you wanted to understand this object, its context, source, consequences and the like?

Fig. 2.2 The Three Story Intellect, See *Why Are School Buses Always Yellow*, p. 41 for model of this graphic. Copyright owned by Corwin. **For a better graphic of same**, see J. Barell *Problem Based Learning—An Inquiry Approach*, 2/e 2007, p. 18.