CHAPTER 4

Developing Effective Questions

Student-generated questions are at the heart of inquiry learning. Not only do they drive the inquiry process, but they also provide evidence of students' understanding. Questions that are open, provocative, arguable, reflective in nature, and have no simple, singular answer will ultimately result in the creation of additional questions that will sustain inquiry. Educators can help students understand that their curiosity is an essential ingredient in fine-tuning their question.

Question Formulation Technique

The Question Formulation Technique (QFT) was developed by Dan Rothstein and Luz Santana, coauthors of *Make Just One Change: Teach Students to Ask Their Own Questions* (2011). The QFT assists students in learning how to develop and refine their own questions and create research or discussion strategies. Librarians and teachers can use this technique to engage students in a new unit, assess students' knowledge of topics discovered in class, or check for understanding. Teachers have used this technique at the end of a comprehensive unit to propel students into a new inquiry by asking, "What's next?"

Here are the basic steps of the QFT:

1. Teachers design a question focus.
2. Students use a protocol to produce questions without the teacher.
3. Students improve their questions (work with closed-ended and open-ended questions).
4. Students prioritize their questions.
5. Students and teachers decide on next steps to guide discussion.
6. Students reflect on what they have learned.

I watched a video of the QFT and was inspired to try it with my students. At the time, I was teaching a multimedia/web design course and used the technique to engage students in the impact of digital manipulation in today's society. I showed students a series of images and asked them to vote whether they believed the images had been digitally altered. Students were able to correctly identify several of the fabricated images but were surprised by some—specifically, a photo of students cheering at

a university football game. The photo had been digitally altered to include a black student so the crowd appeared more diverse. While discussing this controversy, students raised additional concerns about the ethics of digital manipulation.

I decided to use the QFT and have students work in small groups to brainstorm questions about digital manipulation and its use today. We used the four rules for producing questions: (1) Ask as many questions as you can; (2) Do not stop to judge, discuss, edit, or answer any question; (3) Write down every question exactly as it was asked; and (4) Change any statements into questions. After brainstorming, we reviewed whether their questions were closed or open-ended and discussed the advantages and disadvantages of both. Groups then edited their questions to be open-ended and considered if they should be reworked. Students then worked together to prioritize which questions they wanted to investigate.

The discussion and debate among students at this time was eye-opening, and most of the groups decided on different issues as their top priority. Groups shared their top questions with the whole class then once again evaluated their list to see if any of their opinions changed. Finally, each group settled on a specific question to drive their research. By the time the students had completed the QTF, previous background knowledge about the topic was revealed, but more importantly, students were eager to discover real answers to their questions. They were primed to begin research.

For an exit ticket activity, I asked students to think about the entire exercise and tell me what they learned by producing, improving, and prioritizing their questions. One student initially thought she understood why people digitally altered their photos, but after the brainstorming exercise, she realized she hadn't considered certain situations. This student was open

to new information as she began her research because the QFT exercise challenged her initial assumptions about a topic.

Students Ask the Questions

Students are in charge when they use the QFT. They ask the questions, they improve those questions through discussion and editing, prioritize the results, and make all the decisions. The teacher facilitates the process and does not drive it forward with her own predetermined set of questions. This can be challenging for teachers who are used to guiding class discussions or directing the path of research. The process can also be difficult for students at first, but the processing time will shorten as students become more comfortable with the procedures. We want students to ask questions to which they don't know the answers or that cannot be Googled. The time it takes to develop purposeful and authentic questions will pay off as they begin research.

Students will become more engaged in the inquiry process when they learn how to ask powerful questions, and the whole experience becomes transformational. Rothstein and Santana state, "When students know how to ask their own questions, they take greater ownership of their learning, deepen comprehension, and make new connections and discoveries on their own" (2011). Those new connections are the transfer of learning that is the basis of authentic, deep knowledge.

When discussing how their Writing 121 students chose their topics for a nine-week research essay, English teachers Rebecca Larson and Tara Slaughter highlighted the need to create time and space for interesting topics and questions to be fully realized. Using techniques found in *The Curious Researcher: A Guide to Writing Research Papers* (Ballinger, 2012), the teachers

pushed student curiosity and questioning with brainstorming activities. Students described found objects using a technique called "The Myth of the Boring Topic," and they collaborated on extensive interest surveys. The students laughed, debated topics, and tested the teachers to see if *any* topic was open for discussion. Slaughter reported that some students were nervous about choosing the right topic. She reassured her students that it was more about asking the right questions about a topic—and then to *keep* asking questions until they hit upon one that appealed to them. Larson and Slaughter had students look at their initial research questions through different lenses. For example, the inquiry question might focus on an explanation (sense-making questions), testing assumptions (hypothesis testing), or whether there is a cause and effect (relationship/analyzing focus) for a topic. Once the students focused their research, the teachers reassured them that research questions shift and change as new evidence and ideas lead them down different paths of inquiry.

Develop a Culture of Thinking Using Visible Thinking

It can be challenging for students to process all of their thoughts, ideas and emotions throughout the inquiry process. They may have developed better questions, but how do they now internalize what they are reading and discussing? The central idea of Visible Thinking from Harvard's Project Zero (2017) is very simple: making thinking visible. The goals are to develop students' thinking skills and to deepen subject-area content learning through documentation. Thinking dispositions refers to "being curious, having concern for truth and understanding, and having a creative mindset." Librarians and teachers should consider using Visible Thinking routines for connecting prior knowledge or organizing ideas through concept mapping. These

protocols help students develop patterns of thinking. Here are a few core thinking routines (available at goo.gl/cu4Wrl):

- *What Makes You Say That?* Interpretation with justification routine.
- *Think Puzzle Explore.* A routine that sets the stage for deeper inquiry.
- *Think Pair Share.* A routine for active reasoning and explanation.
- *Circle of Viewpoints.* A routine for exploring diverse perspectives.
- *I used to Think … Now I think …* A routine for reflecting on how and why our thinking has changed.
- *See Think Wonder.* A routine for exploring works of art and other interesting things.
- *Compass Points.* A routine for examining propositions.

Other thinking routines from Visible Thinking focus on understanding, fairness, truth, and creativity. As a librarian, I especially like the routine "I used to think … but now, I think …" because it explores how or why a student's idea has changed over time. This routine could be used as students reflect on how their own learning changed after conducting research.

The creative routine called "Step Inside: Perceive, Know, Care About" helps students explore different perspectives and viewpoints as they imagine things, events, problems, or issues differently. This routine is useful to engage students' creative thinking as they immerse themselves in characters and look at a situation from different points of view.

When students develop their own research questions and document their thinking in a creative manner, they take agency of

their own learning. Inquiry learning that incorporates student choice provides pathways for students to genuinely invest themselves in quality work that matters. Choice assists students in finding their own passion, developing an authentic voice, and refining their personal learning style.

Genius Hour

Genius Hour is an inquiry-driven, passion-based strategy designed to engage and empower students. Dedicated time is scheduled weekly, and students are able to learn about and create whatever they want. Genius Hour, often used in middle schools, allows students to develop their own inquiry stance based on their interests, passions, or even things that they are just wondering about. Personalized learning and personal choice is at its central core.

Two librarians from two different states organized GeniusCon, a virtual conference inspired by Genius Hour (Michaelson, 2014). They wanted to celebrate solutions kids find to the problems faced in today's schools. Librarians Sherry Gick and Matthew Winner presented their students with the following prompt: "If you could change one thing about your school, what would you do?" This project attracted first graders through college students from across the nation; they suggested ways to end bullying, improvements to dress code and cell phone policies, changes to lunch menus, plans for after-school clubs, proposals for school-based gardens, and extensions of library book checkout times. Gick and Winner coordinated Google Hangouts for the GeniusCon as a way to connect classrooms and hear kids of all ages using their "genius" to make the world a better place.

In his blog post, "The Research Behind Genius Hour and Choice in the Classroom," A. J. Juliani offers a fantastic list of research supporting the benefits of Genius Hour. His post also includes books to read, links to other teachers' Genius Hour work, and connections to Common Core State Standards (2017b). Thousands of librarians and teachers around the world are conducting Genius Hour successfully; find examples by searching #GeniusHour on Twitter and by checking out The Global Genius Hour Project wiki (theglobalgeniushourproject.wikispaces.com) and the Genius Hour LiveBinder (www.livebinders.com/play/play/829279).

Librarian's Role

Instructional strategies like the QFT, Visible Thinking, or Genius Hour provide librarians with tools and resources to offer when collaborating with classroom teachers. Librarians should ask ourselves, "How can I be more involved in helping my students develop solid questions for inquiry and research?" School librarians can offer personalized learning for individual students who are struggling with their inquiry questions, or we can be a sounding board to help students broaden or narrow their ideas. Librarians can assist with identifying researchable topics for students. Not only do we know our own print collection in the library, we can also direct students to appropriate digital resources to spark topic ideas. I often encourage students to browse lists of controversial topics in the Gale Cengage database, Opposing Viewpoints in Context. Students can view a list of topics on various social issues, from capital punishment to immigration to marijuana. One advantage of doing this, I share with students, is that you know you have a starting place to begin your research.

Librarians can pull together a cart of books for students to browse when they are still in the exploratory stages. Librarians can give book talks and read segments to inspire curiosity. Consider creating displays in the library that spur students' questions about subjects they may have never previously considered. Too often, students know how to be recipients of learning, but they don't know how to contribute and be active learners. You can be another adult in a student's life who challenges them to think for themselves and examine topics that interest them. Librarians can encourage students to branch out and conduct interviews or visit museums to further research. I like to challenge my students by saying, "Don't think like a historian; be a historian!"

A student-centered school library helps students engage in inquiry-based learning by being an inclusive, community space that enables a variety of learning and equitable access to all kinds of resources. An effective library is continuously assessed and evaluated to make sure it meets the needs of the school community and has the resources and personnel to support inquiry-based learning. Here are some aspects you should consider and evaluate for your own library:

Physical resources. Evaluate the depth in your collection of printed materials and objects.

Digital resources. Promote and evaluate resources available through the library's online presence.

Local resources. Connect with references to sites, places, or events that can support inquiry.

People. Identify access to experts whose knowledge and insights can inspire or inform inquiry.

Mentor Groups

Inquiry circles are another effective instructional strategy where librarians can be involved in the inquiry process. Writing teachers Rebecca Larson and Tara Slaughter used "mentor groups" when their senior Writing 121 students were conducting a nine-week research investigation for a dual-credit writing course. Mentor groups are similar to inquiry circles, but they also include an outside adult who is interested in their topic. Students from different course sections were placed in mentor groups, based on common themes. As the school librarian, I was a mentor for a group of students whose topics had a historical connection. Other mentors from our school included interested teachers, administrators, parents, and district educators. The mentor groups met several times throughout the inquiry process.

Initially, I met with my mentor group to hear about their inquiry topic, why they chose it, and the direction of their research. I went with classes on a field trip to visit the local university library. While there, I directed group members to discuss their topic with the academic librarian, request interlibrary loans, or access the university databases. Later, our group met, and the students discussed challenges and successes with the research process. Students were preparing to create displays about their topics, and this gave me an opportunity to talk about their conclusions and review their two-minute speeches. After the presentations, the students were ready to synthesize their notes from sources and write the research essay. The mentor groups became a forum for sharing ideas, a sounding board for asking clarifying questions, and an avenue for sustaining motivation and excitement during the process. Not all mentor groups were as effective as ours, but conversations between interested adults and students can be a valuable experience.

In the Spotlight

In the Spotlight: Technology Tools for Inquiry

Give students ample time and space for unusual ideas to surface while they use brainstorming or organizing tools during the inquiry process. The goal when using technology is to stimulate creative thinking, provide access for collaboration, and make editing and revising easy.

Writing tools allow students to combine text and/or images, record thoughts, or organize information:

Google Keep (www.google.com/keep)

Microsoft OneNote (www.onenote.com)

Seesaw (web.seesaw.me)

Brainstorming tools capture ideas and thinking and provide space for collaboration:

Padlet (padlet.com)

Linoit (en.linoit.com)

Mindmeister (www.mindmeister.com/education-software)

Drawing apps work well for sketch noting, as interactive whiteboards, or for diagraming ideas:

Paper by 53 (www.fiftythree.com)

Explain Everything (explaineverything.com)

Notability (gingerlabs.com)

Notes and mind-mapping tools document creative thinking and decision making:

Popplet (popplet.com)

Post-it (www.post-it.com/3M/en_US/post-it/ideas/plus-app)

Lucid Chart (www.lucidchart.com)