LSA INCLUSIVE TEACHING
UNIVERSITY OF MICHIGAN

Question Formulation Technique

Overview	This page introduces the Question Formulation Technique (QFT), including background, goals, challenges, and ways to implement it in college classes. The QFT is premised on the idea that question formulation is a skill not widely taught, but vitally important for students in every discipline, particularly those from underserved communities. The QFT originated in the early 1980s in a dropout prevention program in a small Massachusetts community. Social workers in the program noticed that parents were not engaged, even though it was clear they cared about their children's success in school. One parent explained that they did not attend school meetings because they did not even know "what questions to ask" about the program or their children's progress there. To address this problem, social workers began providing parents with common questions to ask in school meetings. However, this approach did not help parents address their unique situations. Once the social workers realized this problem, they started to approach that situation differently, coaching parents through the process of identifying their concerns and then developing questions to address them. In short order, teachers and social workers began to notice a dramatic change in parents' participation in the program. Parents who had not attended any school meetings now showed up with their own questions in hand. The QFT was then applied to students. Instead of operating on a traditional model where the teacher formulated questions and posed them to students, instructors taught students how to formulate questions that were meaningful to them. Again, teachers saw substantial improvements in students' engagement, learning, and retention. Students who had shown little interest in school were now excited and gaining confidence in their abilities. Many students commented that learning the QFT made them "feel smart" in school for the first time. This change may be the result of the self-guided nature of the QFT. When students are in charge of coming up with questions, they have to engage more deeply in the course content, and they are allowed to think about this material in their own way. In many cases, they ask questions that the instructor did not expect, and instructors report that students using the GFT take lessons deeper or wider than expected. Thus, students advance through material more quickly and/or with greater understanding and retention. Importantly, the QFT also cultivates inclusivity by creating a student-centered classroom. This technique shifts the onus of posing questions away from teachers and, instead, invites all students to ask questions that are interesting and useful to them, regardless of their expertise or experience. The process requires that each question is equally valued. Students create questions without judgment and without considering possible answers until the question formulation process is complete (see steps below). This technique also encourages creativity, problem-solving, and reflection. Once students have learned has to use it, they can apply it to their work in other college courses, their careers, and even in public or political contexts.

Goals	1) The overarching goal of the QFT is to teach students to develop and ask questions that facilitate their learning and help them take ownership of their education. 2) To help students develop three different kinds of thinking: a. Divergent Thinking – activating their creativity b. Convergent Thinking – enabling their analytical abilities c. Metacognition – becoming aware of and reflective about their own thinking 3) Encourage "micro-democracy," or the practice of raising one's voice in small contexts like a college classroom, an academic conference, or a public meeting. 4) To improve debate skills and advance the understanding of the topics to which it is applied.
Implementation	The QFT can be implemented in any discipline and can be shortened or expanded to suit the learning needs and time constraints of the course. The QFT begins with a prompt from the instructor, then students work in groups to come up with as many questions as they can about the prompt. The prompt should be concise, narrow in scope, and not give away an instructor's bias or perspective on a given topic. They are given time to categorize, revise, and prioritize their questions. Then the instructor provides the application step (step 6). The QFT includes seven steps: 1) Establishing a "QFocus" or topic on which students can focus their questions 2) Using four guidelines for question formulation: a. Ask lots of questions b. Do not discuss, judge, or answer questions c. Record questions precisely as initially stated d. Change statements into questions 3) Differentiating between open- and close-ended questions 4) Revising questions 5) Prioritizing questions 6) Applying questions to an assigned task (research, experiment, lab work, discussion, debate) 7) Reflecting on learning content and process Most of the steps take only 4-8 minutes and steps 1-5 can be completed in 45 minutes or less (much less if QFT is used as a regular practice). The time for question application (step 6) depends on what the instructor asks students to do with the questions. For example, students could use their questions as a starting point to: 1) Develop a lab experiment 2) Design a product or process 3) Write a research paper 4) Deliver a presentation 5) Prepare for an in-class discussion or debate

Challenges	1) Developing a suitable QFocus or prompt to start the questioning process may be challenging. 2) Students who are unfamiliar with the QFT might encounter some initial frustration because the process may seem like busywork. 3) Until they have completed the first three to four steps, some students may not see the value of the QFT. 4) The QFT may be an uncomfortable process because students are typically conditioned to answer questions posed by an instructor. 5) The idea of coming up with and relying on their own questions may be unfamiliar and may make some students feel easy.
Examples of QFT	In a first-and second-year engineering course at the University of St. Thomas (LeBlanc et al.), instructors used the QFT to facilitate students' research about core concepts. Students were given four research prompts or QFocuses over the course of the semester. With each prompt, they worked in teams to develop questions, choose the best questions to direct their research, and then conduct a literature search to find relevant sources. Students were then asked to write a paper detailing this process, including detailed answers to their research questions. Sample QFocuses include the following: "Ohm's Law is a Lie" and "y=mx+b is not linearity." (LeBlanc et al., 2017). Instructors reported that students in this class progressed faster and further than expected with much more enthusiasm and ability to connect content with other disciplines and contexts. In a high school biology class, students studying eutrophication were preparing to develop lab experiments related to this topic. They were given the QFocus of "Pollution harms Boston Residents" and asked to generate questions as a way to shape their lab experiments. Sample student questions include the following: "Where does eutrophication happen?" "What impact does eutrophication have on marine animals?" "What happens when eutrophication occurs?" "What causes eutrophication?" "What has been done to stop eutrophication?" "Who lives in marine areas when eutrophication occurs?" "Is the process of deeutrophication possible?" (Rothstein and Santana, 2017, p. 65). In this case, the questioning process allowed students to think deeply about the relationship between scientific work and social life and then design meaningful experiments informed by this thinking. In a high school mathematics class at a boarding school for students at high risk of not graduating, a math instructor used the QFT to improve engagement. At the beginning of the semester, students were given a simple problem to solve. They shared the answer together in class, then used that answer as a QFocus to develop a new math problem. Students worked on this new problem and then shared their answers in class. Again, the instructor used the answer to that problem as a prompt for students to ask questions that would develop into yet another problem to solve. According to the instructor, the students were quickly invested in the process, and the energy in the class was high. Also, the students began to "think like mathematicians" and ask classic questions in mathematics. In one instance, they nearly replicated an important theorem, the Chinese

	Remainder Theorem (Rothstein and Santana, 2017, p. 110).
Additional Resources	LeBlanc, H.J.; Nepal, K.; Mowry, G.S. (2017). "Stimulating curiosity and the ability to formulate technical questions in an electric circuits course using the question formulation technique (QFT)." *2017 IEEE Frontiers in Education Conference*. IEEE. The Right Question Institute's website: Rightquestion.org Rothstein, D. and Santana, L. (2017). *Make Just One Change: Teach Students to Ask Their Own Questions.* Harvard Education Press. Santana, L. (2015). "Learning to Ask Questions: A Pathway to and Through College for Students in Low-Income Communities."