

Research on the Impact of Student Questions on Learning

What happens when students are taught to ask better questions?

The Right Question Institute (RQI) is a nonprofit organization with a mission to democratize access to the skill of asking questions. For 30 years we have been observing the effects of our evidence-based method, the Question Formulation Technique (QFT), on student learning across subject areas.

There is a strong body of research demonstrating the power of question-asking as a learning skill for life. Research indicates that students generating questions in the classroom facilitates engagement, comprehension, and discovery. Ultimately, it contributes to raising more motivated lifelong learners.

The following is a brief summary of recent studies that explore topics related to student questioning, including studies that attest to the specific effectiveness of the QFT for a variety of significant learning outcomes.

Students asking their own questions leads to:

Increased engagement

Working intentionally to generate questions draws students into a process of deepening engagement in learning, on a behavioral level (asking questions) as well as a cognitive (deeper thinking) and affective (positive feelings for learning) level (Pedrosa de Jesus et al., 2007; Chin & Osborne, 2008; Hofstein et al., 2005; Teixeira-Dias et al., 2005).

Students participate more actively in class when asking self-formulated questions developed during group projects. Asking questions allows all students to claim their space in the classroom (Pedrosa de Jesus et al., 2007; Hinson et al., 2004; Teixeira-Dias et al., 2005).

Elementary students express enhanced satisfaction, positive attitude, enthusiasm, and excitement in learning resulting from generating questions (Hinson et al., 2004).

Question-asking can increase motivation and interest. Three-quarters of sixth graders in a study by Chin and Kayalvizhi (2005) preferred investigating questions that they themselves posed compared with simply answering investigative questions given in their textbooks. These students reported feeling "happy," "excited," or "proud" about generating their own questions and described the experience of investigating the questions as "thrilling," "fun," and "interesting."

Deeper comprehension

Asking one's own questions stimulates both cognitive and metacognitive activity that contributes to deeper understanding. Asking one's own questions stimulates both cognitive and metacognitive processes that contribute to deeper comprehension and understanding. In many studies, such improvements to comprehension are demonstrated through higher academic performance, as measured by memory retention, test scores, and effective problem solving (Bangert-Drowns et al., 2004; Taboada & Guthrie, 2006; Yu, 2009; Song, 2016).

Asking questions allows students to articulate their understanding of the topic being learned, tap into prior knowledge, and make connections with other ideas (Chin & Brown, 2000; Kidman & Casinader, 2017).

Question generation leads to significant gains in reading comprehension among fourth- through sixth-grade students with learning disabilities or reading problems, increasing memory recall and the identification and integration of main ideas. This is based on a meta-analysis of 13 studies on question generation (Therrien & Hughes, 2008).

Generating questions increased students' test performance, regardless of the quality of the questions students raised. Instructing learners to generate questions based on the learning material also yielded medium to large effects on comprehension, recall, and

problem solving (Ebersbach et al., 2020).

Discovery

Asking questions can provoke new ideas and lead to open exploration. By asking questions, students exercise high-level thinking, such as challenging assumptions, hypothesizing, and investigating possibilities (Chin and Brown, 2002; Hofstein et al., 2004; Ruggeri et al., 2021).

Asking questions is creative thinking. Asking questions encourages diverse perspectives and flexible thinking (Yu, 2009; King, 2002). Bowker (2010) stated, "Questions are designed to probe, to find something that is not already there, to discover relationships and possibilities that are not given."

Question asking is a way to expand one's own knowledge. It promotes cognitive skills that lead to discovery, including articulating and finding problems, making predictions, developing hypotheses, noticing and challenging assumptions, and generating new ideas (Honomichi & Chen, 2012; Schickore, 2022).

Improved metacognition

Self-questioning is one of the most effective metacognitive strategies, and engaging in pre-lesson self-questioning improved students' learning rate by nearly 50% (Hattie, 2008).

Through asking questions, learners become aware of their comprehension processes, implement self-monitoring and evaluation, and reflect on their understanding of what is being learned (King, 2007; Chin and Osborne, 2008; Kaberman & Dori, 2009).

Question-asking plays an important role in developing self-directed and reflective learners. The metacognitive feature of asking questions promotes the asker's ability to foster, monitor, and evaluate their own comprehension and learning (Chin, 2006).

Enhanced problem solving

Asking questions accelerates and improves information search strategies and, subsequently, leads to more effective problem-solving (Hofstein et al., 2005; Dori & Herscovitz, 2005; Chouinard et al., 2007; Martinho et al., 2012; Ruggeri et al., 2021).

Better science learning

Teaching students questioning skills can significantly deepen their understanding of science subjects, increase engagement, and stimulate active learning.

A summary of nine research studies on questioning in science showcases the important role the teacher plays in supporting students' ability to build questioning skills that increase science learning (Chin & Osborne, 2008).

Better peer-to-peer and student-teacher interactions

Group question-asking encourages students to co-construct knowledge, leading to productive discussions. Chin & Brown (2002) observed a group of eighth-grade students asking questions in a science classroom. They found that student questions in one group also stimulated members of another group, with all students using key thinking strategies like hypothesizing, predicting, and explaining in their search for an answer (Chin & Brown, 2002).

Asking questions in groups has a significant positive effect on learning communities. Hinson et al. (2004) investigated the effect of generating interviewing questions in a fourth-grade classroom. While expressing their thinking in the form of questions, students listened to others more than usual, and they took more ownership in learning.

Student-generated questions in chemistry class contributed to an increase in the quantity and quality of interactions between teacher and students, and students became trusting and more confident in asking questions (Pedrosa de Jesus et al., 2005).

Research on the impact of the Question Formulation Technique

The QFT engages learners of all ages, levels, and disciplines in a step-by-step process that teaches students how to produce and improve questions, strategize on how to use them, and reflect on what has been learned. It equips students with skills that they can use in all areas of learning throughout their lives.

Using the Question Formulation Technique (QFT) with early learners leads them to generate more and better questions, and it supports acquisition of key pre-literacy skills. A mixed-methods pilot study by Causey and Spencer (2024), followed 33 4-10 year olds from under-resourced areas who used the QFT regularly over the course of an early childhood summer program. By the end of the summer program, these young learners exhibited a substantial increase in the number of questions posed, a qualitative improvement in the type of questions posed (more wonderment questions), and improved average scores for all measures of oral language and emergent literacy areas. In another study on the program, the QFT was shown to increase

student engagement and deep thinking as well as create an inquisitive community (Causey & Spencer, 2025).

The QFT led to improved achievement for a group of fourth graders in connection to open-ended mathematical problems. Mannion (2019) found that, after implementation of the QFT across multiple units, four fourth graders with learning or health disabilities increased their average scores for written responses to open-ended math problems.

High school students who used the QFT in a writing program achieved higher scores in persuasive writing than their counterparts in the comparison group in a randomized controlled study (Fernand, 2016).

The QFT contributed to increasing adolescent students' curiosity. The results of a randomized controlled trial done with 3,173 individual students demonstrated that high adherence to the QFT steps and dosage has a positive impact on adolescent students' curiosity and curiosity growth. (Clark et al., 2019).

Repeated use of the QFT with undergraduate students in an upper-division biology class supported them to ask more questions related to course themes by the end of the term. Analysis of student reflections revealed that students enjoyed the process, were excited by their own questions, and that the process helped them to explore biology topics creatively and collaboratively (Summers et al., 2024).

Full citations

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