

How Better Questioning Leads to Improved Learning

Questions from students and from teachers are natural in all classrooms. Questions from students indicate their interest and curiosity. Questions from teachers are designed to stimulate interest, focus attention, evaluate knowledge, and make students think. There are some deliberate questioning techniques that improve their effectiveness.

Research Highlights

Classroom questioning practice has been the focus of numerous education researchers for over 100 years. Although it is widely assumed that classroom questioning promotes student thinking and learning, research in actual classrooms indicates that current practice falls far short. Consider the following: over 40 percent of classroom instructional time is spent asking questions, and as many as 40 to 50 questions are posed in a typical 50-minute class segment. Most of these classroom questions are not well prepared and do not serve the purpose of prompting students to think. Usually questions serve the purpose of having students verbalize what has been taught. In fact, teachers do not give students time for true thinking.

Classroom studies have also shown that lower-achieving students receive fewer opportunities to answer questions than other students. On the average, teachers wait less than 1 second for a student response. This is in contrast to the findings that when teachers wait 3 to 5 seconds after asking a question, students give longer, higher-level responses; answer with more certainty in their own responses; make more inferences; and ask more questions.

Question-asking indicates that someone is curious, puzzled, and uncertain; it is a sign of being engaged in thinking about a topic. And, yet, very few students ask questions; rarely is even one student question posed in a typical class. Consistently, classroom research finds a large gap, with both students and teachers, between typical questioning and effective questioning that can affect student achievement. Here are some examples of the findings.

- **Wait Time I.** On average, a teacher waits less than one second after asking a question. However, when teachers wait three to five seconds, students tend to give longer and richer responses, answer at higher intellectual levels, demonstrate more confidence in their answers, and even ask more questions to clarify understanding.
- **Wait Time II.** Usually, a teacher reacts immediately to a student's answer, sometimes interrupting the response. When teachers wait three to five seconds, students answer more completely and correctly, consider responses and draw more conclusions, ask more questions, increase interactions with other students, and demonstrate more confidence in their responses.
- **Asking questions at all intellectual levels.** Research shows that 75 to 80 percent of questions are posed at the recall level—the lowest intellectual level. When students answer higher-level questions, they begin to analyze, summarize, and evaluate; when tested, they demonstrate better understanding of the material.
- **Redirecting questions.** If students don't answer immediately, teachers typically answer their own questions. Asking other students instead makes the whole class accountable for answering every question.
- **Calling on a student.** Selecting a student to respond before posing a question means the other students never formulate an answer. Asking the question first makes all students more likely to pay attention and think of a response.
- **Repeating students' answers.** Teachers typically repeat students' answers. However, when they do not, students pay greater attention to and show increased respect for their classmates' responses.

WAIT TIME

Mary Budd Rowe, a science educator at the University of Florida, studied teacher-student interactions over a six-year period and reported some interesting findings. Rowe found that the average time teachers wait between asking a question and taking further action to elicit a response is only one second. When a student responds, teachers wait, on the average, less than a second before reacting to the response. Rowe calls these two time periods--the period between asking the question and acting further, and the period between the student's response and the teacher's reaction--wait time. By manipulating wait time, specifically extending it to 3-5 seconds, she observed some amazing changes in both student and teacher behaviors. In one study, Rowe reported an increase of 300% in the length of students' explanations. Think about it. Students' science-related language production increased 300% when teachers waited 3-5 seconds after asking a question.

What happens when you ask a question?

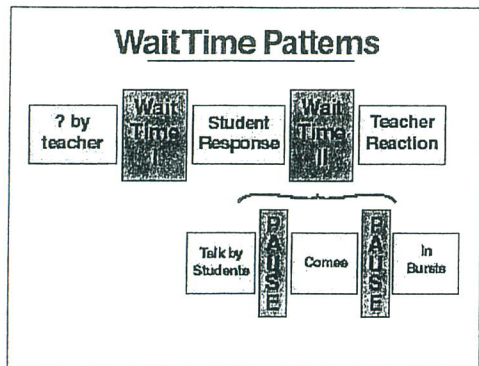
1. Students must attend to the question. They must be paying attention, they have to hear it--or they won't answer.
2. Secondly, students must understand the question. They need to figure out what the teacher is asking and what kind of answer the teacher is seeking. For more complex questions, this step may require more time.
3. Next, students must generate a covert response--answer the question to themselves.
4. Finally--and only after the three preceding steps--students generate an overt response, that is, they answer the question out loud.

How long does it take to move through these four steps?

How long do most teachers allow?

Mary Budd Rowe found that most students don't have a complete response in mind when they begin talking.

Rather, as this diagram depicts, student talk comes in bursts.



When allowed more time, students tend to add on to their initial response in ways that make it more complete and, most usually, at higher cognitive levels.

They have time to think about their answer. Sometimes they add to it; sometimes they self-correct;

sometimes they are prompted to ask a question about their answer. In other words, they think! They are thoughtful. Time allows for reflection and thoughtfulness.

So that you will have a fuller appreciation of the amount of time we're talking about, try this exercise. Close your eyes and count off five seconds. Five seconds is not very long. Or is it?

Interestingly, many teachers know about **wait time I**; fewer know about **wait time II**. But of those who know about it, most would be surprised to know how little they actually use it. Most teachers wait less than a second--less than 1 second--before they start talking after students answer a question.

What about you? How do you rate?

The only fair way to test your own practice is to tape your lesson. You can use audio or video. After class, when you listen to the tape, start counting as soon as you hear the end of a question (1001, 1002, 1003...) until you hear a student begin speaking. That is wait time I. Record your results.

Then, when that student has finished speaking, begin counting again. That is wait time II. Can you get to the end of "one thousand and one" without hearing your own voice? If so, congratulations! Now try to reach one thousand and three without hearing your own voice.

In your classroom, what happens when you don't wait long enough?

If you are like most teachers, you answered that when you don't wait a sufficient amount of time:

- low achievers don't often respond;
- student anxiety is high;
- students "guess" a lot, sometimes correctly but more often incorrectly;
- students give very short answers, looking mainly to "get off the hook";
- the same few students usually respond;
- students almost never ask questions themselves;
- the classroom climate is not conducive to "thoughtfulness."

So you call on a student and that student responds. (For now we'll assume it's correct--at least partially correct. If it's not, we suggest verbal prompts; but that's another story.)

- Most of us can't wait to jump on that student answer.
- Good! we say encouragingly. Nice try....
- Many times, we simply repeat the student's answer--either verbatim or in our own words.
- Yes. We've all been there. Done that.

One of the best results of using wait time II is that it takes the teacher out of every single interaction. The pause allows time for all the other students to hear the student's answer, to reflect upon it, and then to add to it, comment upon it, correct it, disagree, or pose a question of their own.

Extended wait time produced the following changes in students:

1. Response length increased.
2. Spontaneous, appropriate responses increased.
3. Fewer students failed to respond.
4. Students appeared to have more confidence.
5. Student-to-student exchanges increased; teacher-centered "show and tell" behavior decreased.
6. Students exhibited more speculative thinking; they made more inferences.

7. Students asked more questions.
8. Students proposed more investigations.
9. Lower achieving students contributed more.
10. Student achievement improved on cognitively more complex test items.
11. Classroom discipline improved.

Teachers' behavior changed, too.

1. Teachers showed more flexibility in accepting student responses.
2. Teachers asked fewer questions; they asked an average of two to three questions per minute instead of seven to ten.
3. Teachers asked more probing questions and fewer closed or informational questions.
4. Teachers expected higher levels of performance from lower achieving students.

Can you afford to give students an additional 2-4 seconds to respond to questions? Can you afford to wait a few seconds more when they have responded initially? Can you afford not to? Research shows that the benefits gained are well worth the investment.

