

Using Classroom Questions Effectively



This handout is designed to help you enhance learning through the use of questioning. It will assist your ability to:

- state the educational value of asking questions in your class
- select appropriate types of questions for particular teaching situations
- design a sequence of questions to deepen learning on a particular topic
- ask questions that help learners learn to think like a professional
- ask questions that help learners become better learners
- manage question and answer exchanges to encourage participation





Why bother asking questions?

The process of learning involves the brains of the learners. What we know about brains and learning is that the more interconnections between parts of the brain associated with a particular learning, the stronger the learning. Asking good questions enables learners to work with the knowledge using different functional parts of their brain, thereby strengthening their learning.

Reasons for asking students questions

- To get learners thinking
- To motivate learners
- To improve the lesson effectiveness
- To foster rapport between instructor and learner
- To enhance learning through communication among learners
- To assess prior knowledge
- To assess learning
- To assess teaching effectiveness
- To guide learners having difficulties back to the task.
- To encourage personal connections to the content.



Timing of questions

The answer to “When should we ask questions?” is anytime, as long as they are consistent with our educational themes and plan.

At the start of the lesson they can be used to:

1. Engage learners in the topic
2. Assess prior knowledge
3. Recognize existing knowledge or learning to that point.

During the lesson they can be used to:

1. Ensure learning has occurred at lower levels before moving to higher levels
 - a. Questions to assess knowledge of terminology and concepts before questions on application
2. Serve as a means to focus activity
 - a. Questions to help individuals deal with learning blocks
 - b. Questions to enhance theory learning beyond the basic outcomes of the course
 - c. Questions to get learners to predict outcomes
 - d. Questions to get learners to argue opinions

At the end of the lesson they can be used to:

1. Celebrate the learning achieved relative to the learning outcomes (build confidence)
2. Summarize the lesson experience
3. Contextualize the learning within a wider frame of reference
4. Explore the class’s reaction
5. Synthesize class concepts with other material
6. Engage the topic at a higher level.

Ongoing throughout the lesson they can be used to:

1. Help learners examine their own learning
2. Help learners reflect on:
 - a. content
 - b. process
 - c. personal skills
 - d. the future

As the major focus of the learning they can be used to:

1. Drive the process and outcomes for the entire learning episode
2. Explore problems in the context of the learning.



Types of questions

Questions can be organized in a variety of ways. Some question styles are listed below.

Closed vs. Open

The most common question style relates to the learner response. If the correct answer is in the question, or there is only one correct answer, or the learner only has to agree or disagree, then it is usually considered a **closed question**.

Example: The common rafter requires only 4 saw cuts. Agree or disagree?

Closed questions can be used to review or establish a rhythm.

Examples: What is the reason the suspension is created first?

What is the first step in the process?

What is the next step?

Etc.

The more favoured approach is to use a question that requires learners to generate an answer of their own. This style is referred to as an **open question**.

Example: What saw cuts are required to make a common rafter?

Convergent vs. Divergent

The Convergent question restricts the responses to predetermined answers.

Examples: According to the author, what are the possible reasons that ?

What are the factors controlling the speed of a motor?

The Divergent question allows a multitude of correct responses. This style is an excellent choice for situations where learners are being required to be creative or look for alternatives beyond their experience.

Examples: What other factors should the analysis have considered?

What are the possible responses to her complaint?



Simple vs. Difficult

The **simple** question requires simple recall or restatement of given information.

Examples: What are the four “Ps” of marketing?

State the three components of impedance.

The **difficult** question is used at the application level of learning, which is usually where college level courses are aimed.

Examples: In the example of Whithers and Associates, which of the four “Ps” was the most inadequately addressed in their stethoscope campaign?

If a resonant circuit has the capacitor replaced with one of double the capacity, what will happen to the impedance?

The **higher level** question is used for the mastery of various concepts. It is used to stimulate a higher level of thinking, for example, to evaluate, make predictions, argue, and draw inferences,

Examples: How was the stethoscope campaign affected by the change in corporate leadership? What might have alleviated the impact of this transition?

How does the variable capacitor influence the tuning of a radio?



Other types of questions

Hypothetical

Hypothetical questions are useful for forcing learners to move beyond what has been dealt with into the anticipated, and even unanticipated, area of “what ifs.”

Examples: Given what we know about what happened, what do you predict would have happened if there had been a mid-course correction of the stethoscope campaign with a doubling of the advertising budget for trade journals?

What would happen if the capacitor in the circuit shorted out?

Reflective

Reflective questions require learners to look back with a future perspective. They can be used to focus on both the application of the content and the process used to learn or solve problems.

Examples: Based on what you learned about the process, what caution would you keep in mind the next time you approach a similar situation?

If you had the problem to do over again, what would you do differently?

What would you have liked to have known before starting on the project?

Predicative

Predicative questions ask learners to declare what they feel will happen. The technique can be made stronger by asking learners to commit to their answers by writing them down or by saying them aloud, to a partner, a group, or the whole class.

Examples: Based on what you know now, what do you think is likely to happen when ?

At this point in the procedure water enters the system. What will happen with respect to the time for the procedure to be completed?

Organization and valuing

Organization and valuing questions ask learners to:

1. Contrast (How are X and Y different?)
2. Compare (What are the similarities and differences between X and Y?)
3. Order (What is the appropriate sequence of operations that should be used in situation?)
4. Prioritize (Which of these two steps is important to do first?)
5. Cluster (Which of these belong together?)
6. Label (What would be an appropriate name for this group of activities?)
7. Hypothesize (Based on what happened, what would you infer about ?)
8. Predict (If the process runs for another X months, what do you anticipate will occur?)
9. Value (What is important about are important aspects of . . . ?)



Clarifying

Clarifying questions are used to make the content more specific or clearer. They are often used as follow up questions, and can vary in tone from warm and encouraging to direct and rigorous.

Examples: Can you tell me a bit more about ?

What were the limitations on their data set?

How would you describe to a 12 year old (i.e., to client with no background in the subject)?

Elaborating

Elaborating questions can be used to engage the learners by allowing them to expand the concept beyond what has been given.

Example: What would you add to the comments on the study to expand or generalize the ideas to other settings?

Summarizing

Summarizing questions are often useful at the end of a lesson or section. Rather than the instructor summarizing, the idea is to get the learners to pull together the concepts and cull the experience to the most important elements. This approach requires a higher order of thinking by the learners because of the necessary judgement they are required to do. As well, it can be used as an ending group activity.

Examples: Based on your experience what are the most important elements in the process?

With respect to the replacement of a xxx, what are the key cautions for the person doing the installation.

Socratic

Socratic questioning is a fairly intensive questioning methodology, in which the instructor feigns ignorance and entices understanding out of the learner(s). It relies on a rigorous sequence of questions, and is powerful in that each question is spontaneously driven by the previous answer.

Socratic questioning is especially useful with individuals, and, while beyond the scope of this document, is something that could be pursued as a way of working with individuals or teams in labs, shops and work settings.



Follow-up questions

No matter what type of questions are asked, the process becomes more powerful if good follow-up questions are used. These can be of several types: some to clarify, others to lead the learner(s) through a process to understanding, and some to sort out incomplete or incorrect responses to previous questions.

Getting to a better response

The shaping of understanding through follow-up questions in response to incorrect responses is one of the most important parts in the process of classroom questioning. It is in these types of questions that learner attitudes about responding to questions are developed and maintained. The art of questioning lies in the ability to get learners to participate in the interaction, even when they may not have the answer totally correct.

The instructor's role is to keep learners participating by responding openly to EVERY response, even those that indicate inattention, poor work habits, etc. Responding with criticism, sarcasm or other caustic rejoinders will reduce the motivation of the learner to respond to other questions or participate in the future, and similarly dissuade other learners.

Examples: That is close, Ernie. Is there another . . . ?

You've almost got it. Can you think of anything else?

Probing

When a learner responds to a question, it is often useful to probe beyond their response and sometimes even beyond the original question.

Example: Yes, that is the correct technique; and what would be the common errors made in applying it by novice users?



Sequencing questions

Sequencing questions is a valuable technique that can lead learners to new learning. For example, structuring an easy to difficult sequence through a class or through a course can build confidence and maintain momentum.

Easy to hard

An easy to hard sequence is one of the common sequencing approaches.

Early in the process, focus on recall and understanding.

Examples: What is the sequence of operations?

What are the requirements of a sound marketing plan?

Later in the process, focus on the ability to apply the information.

Examples: What are some signs that indicate it is OK to engage the clutch?

In a highly competitive consumer market, what is a key medium for advertising ...?

At the end of the process, focus on the ability to analyze performance and synthesize with other concepts and techniques.

Examples: How does increased speed influence the engagement of a clutch?

What was the main flaw with Acme's campaign strategy?

General to specific

This is the basic technique of asking questions about a particular idea and then honing down to its application in a specific instance.

Examples: Summarize the factors influencing current flow in an AC circuit.

What would happen to current flow through the load in circuit B when frequency was doubled?

What would happen to the current flow though the same point when frequency is halved and the inductor G opens?

Time related

It is possible to sequence questions based on expectations at different points on a timeline.

Examples: What do you hypothesize is happening at this point in the chamber?

What do you anticipate will be happening 48 hours from now?

or: What happened in the mid 1950's that stimulated a dramatic increase in scientific study and education in the US and Canada?

What other events have stimulated similar increases in interest in science and technology?

What do you feel will stimulate further scientific resurgences in the future?



The questioning exchange

There are a number of elements in the sequence of events in a classroom questioning exchange. Focusing on each will improve the value of the time spent and the quality and level of participation in the class over time.

Use the following sequence to guide you in planning a good question exchange.

1. Establish purpose/intent

Establish a focus for your question(s): what are you going to achieve with respect to the content and/or the process?

2. Formulate the question

What type of question will you pose?

- How difficult will it be?
- What would be a good follow-up question(s)?

3. Direct the question

Who do you want to answer the question: anyone, everyone, groups, then compare (e.g., Think-Pair-Share activity)?

4. Ask the question

As clearly as you can pose the question, make it a single sentence.

5. Wait

Breathe. Make sure you hold out for at least a count of 5-10 seconds.

6. Re-ask or rephrase question

If necessary, rephrase the same question.

7. Answer by learner

8. Respond to answer

Respond with enthusiasm, warmth and encouragement, as if receiving a gift.

9. Ask the next question

Pose the next question to shape understanding, to move on, or to ask for rationale.

10. Celebrate

Celebrate with the learners their effort and learning outcomes.

Note: The most important aspect of this sequence is what happens immediately after learners give their answer. How their effort and answer are treated by the instructor sets the tone for how they and, more importantly, other less vigorous learners will deal with your future questions. Openness, respect and support will encourage effort in the future by them and others in the class. Any perceived criticism by you or other learners will reduce the level of Q and A volunteerism.



Encouraging involvement

Early in a particular session or course it is good to use questioning to increase involvement.

Allow thinking time

Asking a question and enforcing a short pause before taking an answer allows slower learners to think, translate and not be overwhelmed by the quicker or smarter (not necessarily the same) learners.

Think-Pair-Share

Ask each learner to generate an answer and then share it with a partner. This allows a lower risk environment in which to develop an answer, which may or may not be shared with the whole group.

Small groups

Small groups can be used to increase involvement in a number of ways, such as using a "safer" type Q and A technique like Think- Pair-Share, and group deliberations on a particular question. They are good at the start of a lesson, as learners will have the ability to share their ideas in a less public setting and gain advice and confidence. Having each group formulate an answer, knowing that the group reporter will be chosen randomly, provides a safety net for developing ideas and can assist in building confidence in reporting answers.

Start easy early

Early in the course or in a specific lesson, use questions that a substantial number of learners will know. It is a good time to encourage learners to answer who don't normally respond. Then move on to more difficult questions.

Directing Questions

Use the instructor's prerogative to direct your questions to those other than the most eager learners. Successful responses by learners who don't usually participate encourages others to participate.

Questions can also be directed:

- to the group reporter
- to other individuals
- randomly (e.g., using cards or dice to select)

Try to encourage answers from all learners over a period of time. Make this expectation clear at the start.

Approach to using questions within a lesson

Having a good question that reviews, or gives learners the opportunity to use the topic just presented, will allow the learners to better ground the learning. Prep good questions for use at 2-3 points within each lesson.

1. Study the content and published outcomes for the class.
2. Select areas within your lesson that you feel can be enhanced with questioning.
3. For each targeted point, write a question that you expect will work for where you are in the lesson.

An alternative to “Are there any questions?”

The most common question asked by instructors in classrooms, shops and labs is, “Are there any questions?” While this sometimes results in useful interaction, it is usually received by learners as an invitation to be quiet and wait for dismissal. It is much better to close with a question to them that assesses their competence and attitude.

It is better to use a question that is more specific, or one that forces learners to “prove” their learning or reflect on their situation. You may ask learners to write the answer down and hand it in anonymously.

Examples: With respect to and the process of what questions remain for you?

What question(s) will you be focusing on as you work through your assignment?

What aspect of is still unclear at this point? What will you do between now and the next class meeting to clarify it?

List the four key aspects of ?

Where else would this approach be useful?

Learner-asked questions

A technique for involving learners at a different level is using the learner-asked question.

It is possible to have learners generate questions about the material they are studying. These questions require them to do a number of valuable things including: decide what is important, anticipate an application for the skill or knowledge, and reframe their learning verbally by creating a question. If this is done in writing, these questions are often valuable indicators of what learners see as significant and what they actually learned.