USING QUESTIONS EFFECTIVELY

This job aid describes the educational value of asking questions and explains how you can enhance learning through the use of questioning.

This job aid will help you to:

- select the appropriate types of questions for particular teaching situations
- design a sequence of questions to deepen learning on a particular topic
- manage question and answer exchanges to encourage participation

net Includes techniques for online courses.

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Why bother asking questions?

Whether in a physical environment (classroom) or a virtual environment (online), 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 brains, thereby strengthening their learning.

Reasons for asking students questions

Ask students questions to:

- get them thinking
- motivate learners
- improve lesson effectiveness
- foster rapport between you and your students
- enhance learning through communication among learners
- assess prior knowledge
- assess learning
- assess teaching effectiveness
- guide those having difficulties back to the task
- 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 your educational themes and plan.

At the start of the lesson, questions can be used to:

1. Engage learners in the topic.
2. Assess prior knowledge.

During the lesson, questions can be used to:

1. Ensure learning has occurred at lower levels before moving to higher levels.

   Ask questions to assess knowledge of terminology and concepts, before asking questions on application.
2. Serve as a means to focus activity (they can be used to drive the process and outcomes for the entire learning episode).
   - Ask questions to get learners to explore problems in the context of learning.
   - Ask questions to get learners to predict outcomes.
   - Ask questions to get learners to argue opinions.

At the end of the lesson, questions can be used to:

1. Summarize the lesson experience.
2. Contextualize the learning within a wider frame of reference; engage the topic at a higher level.
3. Explore the class’s reaction.
4. Synthesize class concepts with other material.

At any time during the lesson, questions can be used to:

1. Help learners examine their own learning.
2. Help learners reflect on:
   - content
   - process
   - the future

Types of questions

Questions can be classified in a variety of ways. Some question styles are described below. A question can also be a blend of any of these types of questions.

Closed

Closed questions have a short, definite answer. They may require simple recall or restatement of given information, or the learner only has to agree or disagree. They require the learner to demonstrate knowledge or comprehension.

Examples: *What are the four "Ps" of marketing?*
State the three components of impedance.
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?

Convergent

The convergent question restricts the responses to predetermined answers, or those that are accurate within a limited range. They may require the learner to demonstrate comprehension, or be used to stimulate a higher level of thinking, for example, to describe an application, analyze, infer, or persuade.

Examples: *According to the author, what are the possible reasons that…?*
What are the factors controlling the speed of a motor?
How was the stethoscope campaign affected by the change in corporate leadership?
How does the variable capacitor influence the tuning of a radio?
What would happen if the capacitor in the circuit shorted out?

Divergent (open-ended)

The divergent question allows a multitude of correct responses. This style is an excellent choice for situations where learners are required to be creative or to look for alternatives beyond their experience. The instructor evaluates these responses subjectively, based on their likelihood (probability or possibility). It is possible that they might have no right answer.

Examples: *What other factors should the analysis have considered?*
What are the possible responses to her complaint?
What do you predict would have happened if.....?
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?

Evaluative

Evaluative questions require learners to analyze and synthesize information, make sophisticated judgements, and form new conclusions.

Examples: *What are the similarities and differences between X and Y?*
Which of these belong together?
How might X and Y be related to Z, and is this important to consider in relation to ABC?
What would be an appropriate name for this group of activities?
What is important about…? or What are important aspects of…?

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. Respond to all answers with enthusiasm, warmth, and encouragement.

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.

Examples: *Yes, that is the correct technique; and what would be the common errors made in applying it by novice users?*
What would you add to the comments on the study to expand or generalize the ideas to other settings?

Clarifying

Clarifying questions can be used to encourage students to be more specific or clear. They are mainly used to ensure understanding.

Examples: *Can you tell me a bit more about…?*
You said that, "Heating the object had no effect." Did I understand that correctly?
I'm not sure I understand your response. Could you phrase it another way?

Sequencing questions

Sequencing questions is a valuable technique that can lead learners to new learning. For example, structuring an easy-to-hard 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-1950s 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)?
   - How does the proposed question relate to the readings and study aids?
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.

   Tip: *Alternatively, you can ask the question first, then wait and direct it to one person. This way, all learners have to think of the answer, in anticipation of having their names called.*
5. **Wait**
   Make sure you hold out for a least a count of 5–10 seconds.
6. **Re-ask or rephrase question**
   If necessary, rephrase the *same* question.
7. **Respond to answer**
   Respond with enthusiasm, warmth and encouragement.
8. **Ask the next question**
   Pose the next question to shape understanding, to move on, or to ask for rationale.

Note: *The most important aspect of this sequence is what happens immediately after learners give their answers. How their effort and answers 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.

Use 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.

Use small groups

Small groups can be used to increase involvement in a number of ways. 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 who don't normally respond to answer. Then move on to more difficult questions.

Direct questions to encourage everyone's involvement

Sometimes direct your questions to those other than the most eager learners. This allows you to draw out the quieter students. Questions can also be directed:

- to the group reporter
- to other individuals (e.g., someone not paying attention, to draw them back in)
- 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.

An alternative to “Are there any questions?”

The most common question asked by instructors in classrooms, shops and labs is, “Are there any questions?” This rarely results in useful interaction, and 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.

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 their answers down and hand them 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.

net Asking questions in online courses

The process of learning involves asking good questions in a virtual environment (online), as much as it does in a physical environment (classroom).

Use the following sequence to guide you in planning your online question postings.

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)?
   - How does the proposed question relate to the readings and study aids?
3. **Direct the question**
   Who do you want to answer the question: anyone, everyone, groups?
4. **Ask the question**
   As clearly as you can pose the question, make it a single sentence. Make sure that your discussion thread title relates directly to the question/topic/outcome.
5. **Wait**
   Provide learners with a "turn-around" time on a response if this question is only meant to encourage further discussion or follow-up questions. Allow enough time for students in different time zones to reflect and then respond.
6. **Re-ask or rephrase question**
   If necessary, if students are not replying to the discussion thread, rephrase the *same* question. If some learners have replied but you feel they might have misunderstood the question, refer to the section "Follow-up questions: Getting to a better response" for guidance.
7. **Respond to answer**
   Respond with enthusiasm, warmth and encouragement.
8. **Ask the next question**
   If you feel that the students need to investigate the topic further or be more clear, refer to the sections "Follow-up questions: Probing" and "Clarifying" for guidance in motivating the students to investigate further or explain what they mean.

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