

Session 6 Questioning for learning

Setting the context

In Section 3: *Learning by doing* (pages 3.57 to 3.58) you will find reference to questioning as a strategy for formative assessment.

This session complements the above by exploring questioning techniques to promote learning at the higher levels of Bloom's taxonomy of task difficulty. You can prepare for this session by reading Section 3: *Learning by doing* (pages 3.17 to 3.20).

Purpose

- To introduce the concepts of surface and deep learning.
- To relate these concepts to Bloom's taxonomy of task difficulty.
- To explore the use of questioning techniques to encourage deep learning.

Materials needed

- Sheet 2.21 *Mun falls out of flee.*
- Sheet 2.22 *Surface versus deep learning: the differences.*
- Sheet 2.23 *Bloom's taxonomy of task difficulty.*
- Sheet 2.24 *Illustrating Bloom's taxonomy in engineering.*
- Sheet 2.25 *Randomised list of questions.*
- Sheet 2.26 *Master list of questions related to Bloom's taxonomy.*
- Sheet 2.27 *Questioning techniques: Instructions.*
- Sheet 2.28 *What are these techniques good for?*
- Red, orange and green marker pens
- Flipchart paper and pens.

Preparation for session on questioning

The session will be about the power and purpose of questioning. Participants will get the most out of the session if they prepare by thinking about the questioning techniques they currently use. Ask them to do this in the following way.

Instructions

Ask participants to prepare for the session by spending a few minutes during and after at least two or three sessions noting down examples of:

- the questions they asked their learners
- the purpose of each of these questions
- the questions their learners asked.

Activities

Nonsense text

The piece of nonsense text in Sheet 2.21 *Mun falls out of flee* is a neat way of illustrating the difference between factual recall and understanding.

Questions 1 and 2 are at the lowest level of Bloom's taxonomy and can be answered without understanding of the content. Questions 3 and 4 are higher up Bloom's taxonomy. They do require understanding of the content.

This exercise illustrates that it is possible to give accurate answers to certain types of question even when the subject matter is nonsensical. The significance of this is that a learner might be able to give a correct answer without understanding the concept. For example, a learner who can quote accurately the formula in Ohm's Law does not necessarily know how to use it.

There is a potential pitfall for teachers and trainers. When they hear the answer they anticipate, they also expect the learners' understanding to match their own.

Instructions

Distribute a copy of Sheet 2.21 *Mun falls out of flee* to each participant. Ask them to read it and then pose the questions below.

Mun falls out of flee

On Saturdays Ted goes culping. Last Saturday he took Dof with him. The mun clizzed and the firz shad. When they arrived, Ted sulted Dof.

Dof said, “Thank Spult,” then sulted Ted. Eventually they culped until the mun fell out of the flee.

1. What did Ted do last Saturday?
2. What can you say about the mun and the firz?
3. How effective were the mun’s actions?
4. Why should culping be encouraged?
5. Which questions can you answer? Why?
6. What is the significance of this for the way you question your learners?

Surface and deep-level learning

For many learners, learning means increasing their knowledge and committing to memory the facts and procedures that the course syllabus requires them to know. This approach has been described as ‘surface learning’.¹ Learners who adopted this approach tend to remember the information for a short time only and do not learn how to work with it.

The activities in this resource encourage a different approach to learning. They are designed to promote what Marton and Saljo called ‘deep learning’. The characteristics of this include a desire to understand and extract meaning. Adopting this approach is likely to lead to better exam results and longer-term recall.

Learners tend to adopt the ‘surface’ approach if they believe that this is what the assessment process requires

¹ Marton, F. and Saljo, R. (1976) On qualitative differences in learning. *British Journal of Educational Psychology*, 46, 4–11.

of them. However, if the learning context requires something different of them, they are able to change their strategy. So questioning and assessment strategies adopted by teachers and trainers can make a significant difference to the way learners learn.

Some more characteristics² of deep and surface learning are listed on Sheet 2.22 *Surface versus deep learning: the differences* (page 5.50).

Bloom's taxonomy of task difficulty

Bloom's taxonomy³ of cognitive task difficulty is a useful concept to keep in mind when devising activities. If the activities require the skills at the lower end of the hierarchy, they will be less stretching and demanding than those at the upper end. Developing learners' ability to learn requires skills at all levels. You will find more about this in Sheet 2.23 *Bloom's taxonomy of task difficulty* (page 5.51).

The activity that follows ensures that participants understand the concept and can demonstrate their understanding by assigning given questions to the appropriate level. This prepares participants to analyse and evaluate the levels at which they engage their learners in sessions.

² Entwistle, N. *Understanding Classroom Learning*. London: Hodder and Stoughton, 1987.

³ Bloom, B.S. *Taxonomy of Educational Objectives. Handbook 1: Cognitive Domain*. London: Longman, 1956.

Instructions

Invite participants to work in threes.

Distribute:

- Sheet 2.23 *Bloom's taxonomy of task difficulty*
- Sheet 2.24 *Illustrating Bloom's taxonomy in engineering.*

Talk through the six levels and the type of mental activity associated with each.

Ask participants to choose their own topic and to create a hierarchy of knowledge similar to the example given on Sheet 2.24.

Ask them to write up their examples on flipcharts and to display them on the wall.

Review and discuss participants' results. Manage the discussion to draw out the following points:

- it is essential to plan to include lower and higher level tasks in the hands on activities devised for learners
- staying with tasks at the bottom of Bloom's taxonomy can lead to surface learning, that is learning without understanding
- the full spectrum of Bloom's taxonomy should appear at every academic level. This includes Entry level learners who can, and must, extend their skills in order to analyse, compare and contrast, make suggestions and solve problems.

Which questioning techniques are good for what?

The next two activities look at two different aspects of effective questioning:

- pitching the question at a level that challenges learners to think
- involving as many learners as possible in finding answers.

Instructions

Distribute Sheet 2.25 *Randomised list of questions*. Ask participants to assign the questions to the appropriate level of Bloom's taxonomy.

Point out that some of the questions cannot be definitively assigned to a particular level. The context may be important in deciding where to place a question.

Distribute Sheet 2.26 *Master list of questions relating to Bloom's taxonomy* and discuss the classification.

Follow this up with a discussion of:

- the questions participants habitually use
- the implications of this for the depth and effectiveness of learning.

Instructions

Divide the participants into groups of three. Give each small group a copy of Sheet 2.27 *Questioning techniques*. Talk through the instructions.

When they have completed the first part of the activity, debrief in the whole group before moving on to the second part on Sheet 2.28 *What are these techniques good for?*

One-to-one coaching

If you are working with one colleague, you may like to work through the activity item by item, discussing, probing, sharing ideas and experiences. Emphasise that you are not looking for the right answer. Rather, you are there to help your colleague raise their awareness of the possibilities, and to relate them to their own practice.

Reflection, sense making and planning

Invite participants to reflect on the activities so far, in terms of how they were structured to support learning, and how similar approaches might be used in their own teaching.

What is modelled in this session?

The questions in Sheet 2.25 are pitched at the comprehension, application and analysis levels of the hierarchy in Bloom's taxonomy. Incorporating the questioning techniques into participants' own sessions and assessing the effectiveness would involve the top two levels.

Transfer of learning

Ask participants to:

- identify specific sessions that they will teach in the near future
- commit themselves to experimenting with at least one new questioning technique in these sessions
- at the next CPD session, report on what happened and what they learned from the experience.

Sheet 2.21

Mun falls out of flee

On Saturdays Ted goes culping. Last Saturday he took Dof with him. The mun clizzed and the firz shad. When they arrived, Ted sulted Dof.

Dof said, "Thank Spult," then sulted Ted. Eventually they culped until the mun fell out of the flee.

Sheet 2.22

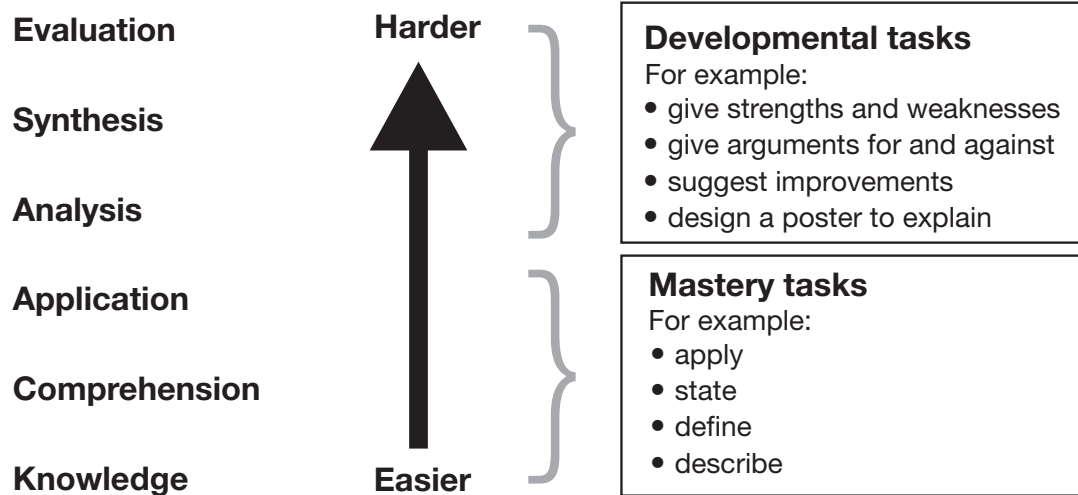
Surface versus deep learning: the differences

| Surface approach | Deep approach |
|---|--|
| Intention to complete task requirements | Intention to understand |
| Memorise information needed for assessments | Vigorous interaction with content |
| Failure to distinguish principles from examples | Relate new ideas to previous knowledge |
| Treat task as an external imposition | Relate concepts to everyday experience |
| Focus on discrete elements without integration | Relate evidence to conclusions |
| Unreflectiveness about purpose or strategies | Examine the logic of the argument |

Source: Entwistle, N. *Understanding Classroom Learning*. London: Hodder and Stoughton, 1987.

Sheet 2.23

Bloom's taxonomy of task difficulty



Source: Skills for Life Quality Initiative (2006).

In this hierarchy, content, knowledge and application are commonly defined as 'mastery' tasks. These are seen as 'easy' and most people can succeed within a specified time because their achievement is not dependent on prior learning in a specific topic.

Higher level 'developmental' tasks are not necessarily harder, but they challenge learners to use different, transferable thinking skills. They are more occupationally relevant, create deep learning and are more interesting, even to less expert learners.

Bloom suggested that, for any given topic, learners should be confident at all the levels in the taxonomy to have fully functional understanding. The lower levels are required for higher levels to be effective.

The implication for teachers and trainers is that, for our learners to achieve high level task outcomes, we should plan to set learning tasks at each level in the hierarchy. This must be regardless of our learners' academic level. This includes Entry level learners who can, and must, extend their skills in order to analyse, compare and contrast, make suggestions and solve problems.

We must also remember to make sure that learners reflect on what they have learned at each level of the task hierarchy and which learning skills they have found most effective. These are the transferable skills that can be used again, in new learning situations.

Sheet 2.24

Illustrating Bloom's taxonomy in engineering

Each step in the task hierarchy must be mastered in order to move up to the next step.

The problem

Determining the resistance in a DC circuit using Ohm's Law and to check results using a multi-meter.

Evaluation

To be able to check resistance in any given DC circuit using Ohm's Law and problem-solving strategies and to recognise errors and omissions.



Synthesis

To be able to recognise a question as an electrical and arithmetic problem, and decide how best to solve it by using Ohm's Law (for example, know where to connect a multi-meter into the circuit and which multi-meter ranges to use).



Analysis

To be able to define or express an electrical measurement in words and to be able to explain its derivation.



Application

To be able to successfully calculate using Ohm's Law, to check by measuring the resistance in a given DC circuit, then to apply this knowledge accurately to other similar circuits.



Comprehension

To be able to explain how to safely connect and measure resistance using an electrical multi-meter.



Knowledge

To understand Ohm's Law and its use in calculating resistance. To recognise and understand the function of the components and electrical characteristics of a simple DC circuit.

Sheet 2.25

Randomised list of questions to be allocated to the appropriate category in Bloom's taxonomy

Describe what happened at ...

Why do you think it happened like that?

Can you group by characteristics such as ... ?

Is it true that ... ?

What questions would you ask of ... ?

What is the function of that component?

What is Newton's third law of motion?

Give a definition of ...

What is the formula for ... ?

What is the problem with ... ?

What differences exist between ...?

Can you give me an example of what you mean ...?

From the information given, can you develop a set of instructions about ...?

Can you explain what must have happened when ...?

How does ... compare with ... ?

Why did ... changes occur?

How was this similar to ...?

How would you judge the value of ...

Would this information be useful if you had a ...?

How could you have done that more efficiently?

How would you justify your decision to ...?

Can you create new and unusual uses for ...?

How is ... similar to ...?

What are some of the problems of ...?

What would be your way of dealing with ...?

What changes to ... would you suggest?

Sheet 2.26

Master list of questions related to Bloom's taxonomy

| | |
|----------------------|--|
| Knowledge | How many ... ? |
| | Can you name the ? |
| | Describe what happened at ... |
| | Is it true that ... ? |
| | Make a list of ... |
| | What is the function of that component? |
| | What is Newton's third law of motion? |
| | Give a definition of ... |
| | What is the formula for ... ? |
| Comprehension | Why do you think it happened like that? |
| | Can you distinguish between ... ? |
| | What differences exist between ... ? |
| | Can you give me an example of what you mean ... ? |
| | What do you predict will happen if you ... ? |
| | How does ... compare with ... ? |
| Application | Do you know another instance where ... ? |
| | Could this have happened in ... ? |
| | Can you group by characteristics such as ... ? |
| | What factors would you change if ... ? |
| | Can you apply the method used to some experience of your own ... ? |

| | |
|-------------------|---|
| | What questions would you ask of ... ? |
| | From the information given, can you develop a set of instructions about ... ? |
| | Would this information be useful if you had a ... ? |
| Analysis | Which events could have happened ... ? |
| | How was this similar to ... ? |
| | Why did ... changes occur? |
| | Can you explain what must have happened when ... ? |
| | How is ... similar to ... ? |
| | What are some of the problems of ... ? |
| | Can you distinguish between ... ? |
| | What is the problem with ... ? |
| Synthesis | Can you design a ... to ...? |
| | Can you see a possible solution to ... ? |
| | What would be your way of dealing with ... ? |
| | What would happen if ... ? |
| | How many ways can you ... ? |
| | Can you create new and unusual uses for ... ? |
| | Can you develop a proposal that would ... ? |
| Evaluation | Is there a better solution to ... ? |
| | How would you judge the value of ... ? |
| | How would you justify your decision to ... ? |
| | How could you have done that more efficiently? |
| | What changes to ... would you suggest? |
| | How would you feel if ... ? |

Sheet 2.27

Questioning techniques: Instructions

Part 1: What will be the effect of each technique?

As a group, select one strategy at a time from the list headed 'Questioning techniques'. Discuss how effective that questioning technique is in relation to the criteria set out along the top of the grid. For example, if the teacher targets one learner to provide the answer, the participation rate will probably be poor.

Fill in the grid with the following colour code:

Red = Poor Amber = OK Green = Good

Explanation of criteria on activity sheet

| | |
|---|---|
| Teacher gets feedback on how group is thinking | The teacher can find out the quality of learners' understanding, knowledge, thought processes and possible misconceptions |
| Learners get feedback on what they had been thinking | Learners get insight into their level of understanding, knowledge and thought processes |
| Encourages learner participation | A high proportion of learners engage in trying to answer the questions |
| Allows learners some thinking time | The questioning technique gives everyone a chance to consider the answer rather than just the quick thinkers |
| Stimulates thinking | It is clear to learners that they are expected to think, rather than merely recalling information. |

Part 2: When to use the technique

For each questioning technique, decide as a group how, when and where it is best used and record this information in the right hand column.

You might find the following headings useful as examples to support your decisions. You are free to add your own headings to the list, too.

Introducing a topic for the first time to a group
Imparting theory/information
Checking understanding
Encouraging analysis and evaluation
Sharing ideas

Developing understanding
Assessing progress
Revising a topic

Sheet 2.28 What are these techniques good for?

| Questioning techniques | Teacher gets feedback on how group is thinking | Learners get feedback on what they had been thinking | Encourages learner participation | Allows learners some thinking time | Stimulates thinking (not just recall) | When to use the technique |
|--|--|--|----------------------------------|------------------------------------|---------------------------------------|---------------------------|
| Teacher asks question. Learners volunteer to answer | | | | | | |
| Teacher nominates learner to answer question | | | | | | |
| Teacher asks thought provoking question. Learners discuss in small groups. Teacher asks volunteer from each group for part of the answer | | | | | | |

| Questioning techniques | Teacher gets feedback on how group is thinking | Learners get feedback on what they had been thinking | Encourages learner participation | Allows learners some thinking time | Stimulates thinking (not just recall) | When to use the technique |
|--|--|--|----------------------------------|------------------------------------|---------------------------------------|---------------------------|
| <p>Teacher asks thought provoking question. Learners discuss in small groups. Teacher asks learner from each group to give group's answer. Whole class discusses the new answer. Then teacher gives verdict.</p> | | | | | | |
| <p>Pair checking: teacher asks question; learners work alone to answer. In pairs, they compare answers, giving their partner one good point and one way their answer could be improved. Teacher observes.</p> | | | | | | |
| <p>Choice of answers: teacher poses a question and gives several answers, some correct, some not. Learners work in groups to identify correct answers. Teacher asks individuals to justify their answer.</p> | | | | | | |