



Module 2:

Managing classrooms to elicit evidence of learning

(Effective questioning and learner interaction)

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Brief Overview

The primary purpose of assessment is to obtain evidence on the knowledge, skills and attitudes of learners for use by teachers and learners to improve learning. Research evidence demonstrates that applying the AfL approach in the classroom can attain this objective. This approach comprises of six stages:

- i. Clarify and share learning intentions and criteria for assessment with their learners;
- ii. Manage classroom discussions, tasks, and activities that provides evidence of learning;
- iii. Provide relevant feedback to learners to improve their learning;
- iv. Support learners as to serve learning resources for each other (peer assessment);
- v. Support learners as take more ownership of their own learning (self assessment); and
- vi. Further teacher and learning

In module 1, we covered stage 1. This module focuses on Stage 2

Managing effective classroom discussions, tasks, and activities that elicit evidence of learning.

This condition is evident when teachers utilize a range of tasks and activities to obtain information about learning **during** the lesson. Activities include open/closed questions, learner report back, group discussion and short written exercises. These activities provide a basis for later feedback to learners.

In practice AfL can be implemented by focussing on three key issues: (see Table 1).

- Where is the learning going?
- Where is the learner right now?
- How to get there?

	Where the learner is going?	Where the learner is right now?	How to get there?
Teacher	Clarifying learning intentions and criteria for success	Engineering effective classroom discussions, questions, and learning tasks that elicit evidence of learning	Providing feedback that moves learners forward
Peer	Understanding learning intentions and criteria for success	Activating learners as instructional resources for one another	
Learner	Understanding learning intentions and criteria for success	Activating learners as the owners of their own learning	

Table 1: The five key strategies of formative assessment

One of the key strategies employed by teachers to obtain evidence on what their learners know and can do is through the use of effective questions.

Why is questioning important?

Questioning is reported to being the second most widely use teaching method, after explanation. Research on questioning indicates that teacher use a third (30%) of class time on questions (Criticos, Long, May, Moletsane, Mtiyane, Grosser & de Jager 2012). Black, Harrison, Lee and Wiliam (2003) identify questioning as an important aspect of *assessment for learning*. As noted in Module 1, *assessment for learning* is a powerful approach for improving learners' learning and teaching practices (Black & Wiliam, 1998). *Assessment for learning* differs from *assessment of learning* in that the information gathered is used for the specific purpose of helping learners improve *while they are still gaining knowledge and practising skills*, that is **we assist learners improve learning at the time learning occurs**.

Wiliam and Thompson (2007) note that when teachers use assessment to promote learner learning, they:

- ensure a shared understanding of **learning goals and success criteria**
- use effective **questioning** strategies
- provide descriptive **feedback to moves learning forward**
- model and provide opportunities for peer- and **self-assessment** skills.

What are the problems with the current use of questions?

The key problems regarding the current use of questions among teachers, noted by Criticos et al (2012) include:

- only 10% of teachers report using questions to “encourage learners to think” as a reason for asking questions
- only 7% of questions are used to increase learner involvement in learning
- approximately 15% of all questions are concerned with class routine and management
- more than 60% of questions require simple routine and recall responses
- only 15% of questions asked required learners to engage in complete though

How to improve your questioning techniques?

There are a number of steps that teachers should apply to improve the techniques they use for asking questions:

- Plan your questions carefully
- Link questions to the learning intentions and success criteria
 - Write question down in your lesson plan
- Use a range of different types of questions
- Involve learners in the process of developing questions

Planning your questions

Effective questioning requires that questions be planned with a clear purpose (NI DoE, 2010). In practice, this planning should comprise part of the lesson preparation process. In the Mathematics Assessment Project at the University of Nottingham, the following suggestions are listed for teachers to consider when planning for questioning:

- Plan how you will arrange the room and the resources needed
- Plan how you will introduce the questioning session
- Plan how you will establish the ground rules
- Plan the first question that you will use
- Plan how you will give thinking time
- Plan how and when you will intervene

(See Appendix B for more information)

Additional steps that teachers should also engage in include:

- accessing prior knowledge and understanding on the topic;
- gathering information about what learners know and maybe thinking; and
- talking to other teachers regarding the questions you plan to ask

Link questions to the learning intentions and success criteria

Wiggins and McTighe, (2005) propose the use of an approach known as Backward Design (also known as “design down” and “planning with the end in mind”) for developing effective questions. Teachers begin this process by identifying what they want learners to learn by listing key learning outcomes and success criteria (Module 1). Teachers then list a number of key questions that will allow them to determine whether learners understood the learning intentions and success criteria. A good idea is to write down the questions in the lesson plan. It is also important that teachers use a range of different questions, depending on the lessons content and purpose.

Developing different types of questions

One way to ensure an appropriate variety of question types is to build a progression of questions using a taxonomy or framework to determine the level of thinking addressed by the question. Based on Blooms taxonomy, different types of questions have been identified for obtaining information at different levels of thinking. Figure 1 provides an overview of the revised Blooms taxonomy.

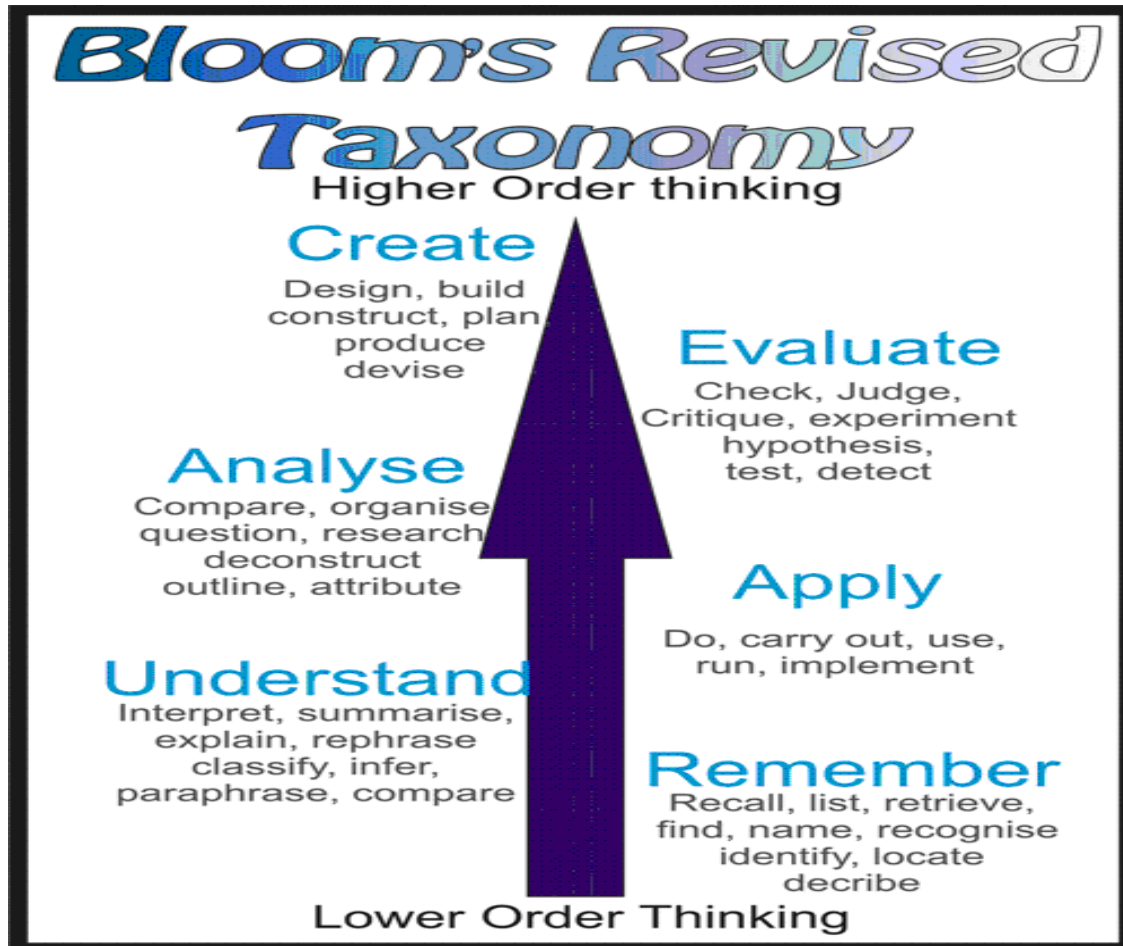


Figure 1: Revised Bloom's taxonomy¹

Questions that teacher pose are also categorized into two types: Close and open questions (Blosser, 2000). **Closed questions** have a limited number of acceptable responses and can be used to check understanding and recall of facts, while **Open questions** allow for a wide range of acceptable response and often require learners to demonstrate higher-order thinking skills such as analysis, synthesis, and evaluation (Blosser, 2000). Open questions have no single correct answer, and are useful for encouraging learners to explore their thinking on a topic or issue.

¹ Obtained from <http://teachershelper.wikispaces.com/Bloom%27s+Taxonomy>
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Lower-order questions	
Type of question	Example
Recall (Knowledge) questions: Can learners remember what they have learnt?	What is the capital of Angola?
Comprehension questions: Do learners understand what they recall?	How many brothers did the little boy have? Why did the dam burst?
Application questions: <ul style="list-style-type: none"> Can learners summarise what they have learnt? Can learners find examples of an idea or concept under discussion? Can learners apply generic rules and techniques to solve problems? 	<ul style="list-style-type: none"> What are the main terms of the Treaty of Versailles? Where can you find an everyday example of the balance between supply and demand? If R90,00 has to be shared in the ratio of 2:1, how much would each party get?

Table 2: Lower order questions and examples²

Higher-order questions	
Type of question	Example
Analysis questions: Can learners analyse the relationship between things? Can learners recognise different viewpoints and give an account of these?	How might poverty influence attitudes of family planning? What are the differences between a modernisation and a dependency view of imperialism?
Synthesis questions: Can learners combine various bits of knowledge for the purpose of making judgements or predictions? Can learners reflect on their own thought processes while solving a problem? Can they think metacognitively? Can learners identify which bits of knowledge are relevant and which are not relevant to an issue? Can learners apply knowledge in order to solve problems or develop an action plan?	Based on your experiment, which chemical would be most effective for the task? How did you decide on that answer? Which do you think are the three most important reasons? Why do you say this? What other information do you need to make this decision? How can we use our understanding of sustainability to create a vegetable garden at school?

Table 3: Higher order questions and examples³

In practice, it's a good idea to begin with lower cognitive questions, (e.g., questions that check understanding or recall of facts) and then, progress to more cognitively complex questions (e.g., questions that require learners to analyse, infer, predict, generate).

² Criticos et al, 2012, p. 243

³ Criticos et al, 2012, p. 243

What strategies can I use to improve my use of questioning?

For the purpose of this program, we will use the approach developed by Clark (2005) to improve the use of questioning within the AfL approach. Specifically, Clark (2005) advocates the following five strategies to changing recall questions into questions that improve learners' engagement with the lesson content.

Strategy 1: Give a range of answers

Providing learners with a range of different answers require that learners give some thought to the option presented, and thus improving their level of engagement with the content. Clark (2005) notes that when planning a range of answers, it's a good idea to "provide two things which are definitely right answers, two that are clearly wrong, two that will promote discussions" (p. 69).

Original 'recall' question	Reframed question with range of answers
What does a plant need to grow?	Which of the following is needed for plants to grow? Explain your answer.
What is 5 squared?	Which of the following answer is correct if we multiply 5 by it self (i.e. 5 squared). Give reasons why for the wrong answers

Strategy 2: Convert question into statements for learners to respond

Turning questions into statements and asking learners to provide their view on the statement is a strategy to convert a recall question into one that provides learners with an opportunity to further engage with the content area. In this context, learners have an opportunity to take a position, and to defend or explain that position, thus expressing their own views and thinking about the content being discussed.

Original 'recall' question	Reframed question by turning into statement for learners to agree or disagree
Which drugs are bad for you?	All drugs are bad for you. Do you agree or disagree and state why?
When is friction useful?	Friction is always useful. Do you agree or disagree and state why?

Strategy 3: Present opposite options and ask for reasons

Presenting learners with two opposite sides of an issue and asking them to decide which is right and which is wrong is another strategy to promote greater thinking and cognitive engagement on the part of learners. Clark (2005) notes that this strategy is best applied in the context of pairs or small group discussions.

Original 'recall' question	Reframed question showing examples of opposites
Why do plants need to grow?	Explain why this plant is healthy and this plant is dying?
How do you solve this problem?	Why is this problem correct and this problem wrong? Can you identify the error in the incorrect problem?

Strategy 4: Give the answer for learners to explain how it was obtained

Providing learners with answers and asking them to explain how the answer(s) were arrived at is another good way to convert recall questions into questions that go beyond mere recall of knowledge and facts.

Original 'recall' question	Reframed question giving answer first
$7 + 3 + 2 =$	$7 + 3 + 2 = 12$. Explain how you solved this problem?
What are the properties of plastic?	Plastic is a good material for modern toys. Explain why?

Strategy 5: Ask questions from an opposing viewpoint

Asking questions from an opposing viewpoint is a good way of challenging learners to consider different options for themselves. Clark (2005) notes that this strategy is a good way to discuss potential controversial issues in society as it often forces learners to think of unconventional views.

Original 'recall' question	Reframed question taking an alternative stance
What are the hazards of smoking?	Should all smoking be banned? Explain why?
Why is it wrong to steal?	What would a mother whose children are starving think about stealing food?

Strategies for improving thinking and reasoning skills

The effective use of questioning can also enhance learner's ability to improve their thinking and reasoning skills. To this end, the MARS project proposed that teachers should sequence their questions to build on and extend learners' thinking. However, teachers should be flexible and allow for different follow up questions as well. The proposed sequence of questions is:

1. Beginning an inquiry
2. Progressing with an inquiry
3. Interpreting and evaluating the results of an inquiry
4. Communicating conclusions and reflecting

(See Appendix C for more details)

Other techniques for improving learner interactions⁴

Make questioning more focused

Stop using the rhetorical questions often used to manage behaviour, such as 'Is everyone sitting down yet?' or 'Has everyone brought their homework?' These are frequently used to soften instructions, but they really teach learners to ignore many of our questions. Deliver courteous instructions instead, such as 'Sit down now please, everyone

Ask fewer questions

Avoid using questions to bridge transitions in lessons when their only real purpose is to fill time or re-establish your presence. Ask yourself, 'Would the learners be any worse off if I didn't ask this question?' Consider the purpose of your questions. If you want to know what the learners' knowledge is, ask a closed question (a question with one right answer). However, if you want to probe their understanding, ask an open question (one that prompts learners to keep talking, like 'What more can you tell me?' or 'What do you mean by...?').

Think about staging your questions. Some teachers use closed questions first to put learners into a context for thinking. They then use open questions to probe and deepen the learners' understanding in that context. For example, start with 'When was the last major flood in South Africa?' and follow up with "In what ways was this flood similar to the recent floods in Limpopo?"

⁴ Obtained from Wiliam (2010)
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Give learners time to think

This is often called 'wait time' or 'thinking time'. Although in some ways this strategy aims to enhance the quality of answers rather than questions, increasing learners' thinking time also gives you an opportunity to ask different kinds of questions. Research suggests that teachers typically restrict their 'wait time' to 1–3 seconds. The problem is that this only really gives learners time to recall old learning, not to construct new learning. Allowing around five seconds of wait time means that you can ask more probing questions.

Avoid 'shotgun' questioning

Ask questions one at a time, rather than firing off a barrage of them in quick succession. Remember that a proportion of learners may suffer from slow speech processing, which means that it takes them longer to make sense of what we say. Barrages of questions may persuade them to tune out.

ABCD cards

Give each learner a set of lettered cards (you might want to include Y and N or T and F) and pose multiple-choice questions of the whole class. This is most useful when there is more than one correct answer, or when the answers depend on the assumptions the learners make – this can lead to good discussions.

Basketball discussion

Use a soft ball to throw to a learner to answer a question. The learner then passes the ball to another learner to see whether the second learner agrees with the first. The second learner then passes the ball to a third learner who comments on why the answer is correct or not. This can continue with questions like How? When? Who else was involved? What else could have happened?

Class vote

Ask all learners to vote on a question you put to the class with two or more possible answers.

Entrance ticket

Hand out a card to each learner as they walk into the room and ask them to write the answer to a question posed on the board. Glance through the learners' answers to help decide questions to ask the class, discussions, tasks to set, or how to seat learners.

No hands up – except to ask a question

Only let learners raise their hands if they have a question to ask. Do not let learners call out. Use a random method of choosing which learner answers a question, e.g. each learner's name is on a

stick, a small card or on a randomising program on the whiteboard.

Mini white boards

Each learner has a white board or paper and is asked to write the short answer to a question posed by the teacher. Learners hold their white boards up to show their answers to the teacher, who can then gauge how well learners understand the concept, and whether to continue to teach the concept, or if some learners should be moved to sit next to someone who understands.

Post-it notes on a continuum

Each learner has a post-it note with his or her name clearly written on it. The teacher draws a horizontal line on the board with, say, opposing statements at each end and asks learners to think about where they would place their post-it on the line to reflect their own view (e.g. caused entirely by humans versus an entirely natural phenomenon – where would you put Global Warming). Several learners are then randomly asked to come to the board and place their post-it notes, explaining why they have placed it in that position. The post-its can be used many times over and kept in a corner on the board between lessons.

Wait watchers

Because it is hard for teachers to wait for 3 seconds after asking a question to allow learners to think, it is often useful to have a learner volunteer with a stopwatch checking the teacher's wait time for a whole lesson.

Phone-a-friend

Sometimes when learners are chosen randomly to answer a question they really do not know the answer, and may feel awkward and embarrassed, and it may be useful to allow them to 'phone-a-friend', another learner in the class who may be able to help them answer the question.

Appendix A: Bloom's Taxonomy of Questioning

Bloom's Taxonomy			
Type	Competence & Skills Demonstrated	Question Cues	Examples
Closed	Knowledge Recalling facts, concepts, principles	Who, What, Where, When, List, Define, Tell, Describe, Identify, Show, Label, Collect, Examine, Tabulate, Quote, Name,	List the three safety principles. Recite the national anthem.
Closed	Comprehension Translating, interpreting, summarising, explaining	Why, What, Explain, Summarise, Describe, Interpret, Contrast, Predict, Associate, Distinguish, Estimate, Differentiate, Discuss, Extend	Summarise the main events in the story. Explain the difference between 'affect' and 'effect'.
Closed	Application Applying existing knowledge to new and unfamiliar situations.	Tell how, Select, Identify, Apply, Demonstrate, Calculate, Complete, Illustrate, Show, Solve, Examine, Modify, Relate, Change, Classify, Experiment, Discover	Convert 3 miles into kilometres
Closed	Analysis Examining, subdividing structures, probing motives	Analyze, Separate, Order, Explain, Connect, Classify, Arrange, Divide, Compare, Select, Explain, Infer	What evidence can you find? What are the features of...? What information will you need? What conclusions can you draw?
Closed	Synthesis Combining ideas to create a new idea, theory, plan	Combine, Integrate, Modify, Rearrange, Substitute, Plan, Create, Design, Invent, What if?, Compose, Formulate, Prepare, Generalise, Rewrite	How would we solve...? What do you think is likely to...? How would you test...? Suppose you could...what would you do?
Open	Evaluation Assessing, judging, appraising	Assess, Decide, Rank, Grade, Test, Measure, Recommend, Convince, Select, Judge, Explain, Discriminate, Support, Conclude, Compare, Summarise	How effective was...? Can you say which is better and why? How would you prove/disprove...? What is your opinion of...?

Appendix B: Planning for effective questioning ⁵

<p>Plan how you will arrange the room and the resources needed</p>	<p>Arrange students so that they can see and hear one another as well as the teacher. You may need to rearrange chairs in a U shape or the students could move and 'perch' closer together. Or maybe you will move to the back of the room so that the question is the focus of attention and not the teacher.</p>
<p>Plan how you will introduce the questioning session</p>	<p>Silence will be hard for you to bear in the classroom but the students may find it confusing or even threatening. Explain why there will be times of quiet.</p>
<p>Plan how you will establish the ground rules</p>	<p>If you are using 'No hands up' then you will need to explain this to the students. Some teachers have had to ask their students to sit on their hands so that they remember not to put their hands up. The students will be allowed to put their hands up to ask a question, so if a hand shoots up remember to ask them what question they would like to ask. The students may also be used to giving short answers so you could introduce a minimum length rule e.g. 'your answer must be five words in length as a minimum'.</p>
<p>Plan the first question that you will use</p>	<p>Plan the first question and think about how you will continue. You cannot plan this exactly as it will depend on the answers that the students give but you might, for example, plan</p> <ul style="list-style-type: none"> ▪ to take one answer and then ask others what they think about the reasoning given ▪ to take two or three answers without comment then ask the next person to say what is similar or different about those answers
<p>Plan how you will give thinking time</p>	<ul style="list-style-type: none"> ▪ Will you allow 3-5 seconds between asking a question and expecting an answer? ▪ Will you ask the students to think – pair – share, giving 30 seconds for talking to a partner before offering an idea in whole class discussion? ▪ Will you use another strategy that allows the students time to think?
<p>Plan how and when you will intervene</p>	<p>Will you need to intervene at some point to refocus students' attention or discuss different strategies they are using? Have one or two questions ready to ask part way through the lesson to check on their progress and their learning.</p>

Appendix C: Sequencing questions to encourage thinking and reasoning⁶

It is important to plan sequences of questions that build on and extend learners' thinking. However, teacher should be flexible and allow for different follow up questions as well

<p>1. Beginning an inquiry</p>	<ul style="list-style-type: none"> • What do you already know that might be useful here? • What sort of diagram might be helpful? • Can you invent a simple notation for this? • How can you simplify this problem? • What is known and what is unknown? • What assumptions might we make?
<p>2. Progressing with an inquiry</p>	<ul style="list-style-type: none"> • Where have you seen something like this before? • What is fixed here, and what can we change? • What is the same and what is different here? • What would happen if I changed this ... to this ... ? • Is this approach going anywhere? • What will you do when you get that answer? • This is just a special case of ... what? • Can you form any hypotheses? • Can you think of any counterexamples? • What mistakes have we made? • Can you suggest a different way of doing this? • What conclusions can you make from this data? • How can we check this calculation without doing it all again? • What is a sensible way to record this?
<p>3. Interpreting and evaluating the results of an inquiry</p>	<ul style="list-style-type: none"> • How can you best display your data? • Is it better to use this type of chart or that one? Why? • What patterns can you see in this data? • What reasons might there be for these patterns? • Can you give me a convincing argument for that statement? • Do you think that answer is reasonable? Why? • How can you be 100% sure that is true? Convince me! • What do you think of Anne's argument? Why? • Which method might be best to use here? Why?
<p>4. Communicating conclusions and reflecting</p>	<ul style="list-style-type: none"> • What method did you use? • What other methods have you considered? • Which of your methods was the best? Why? • Which method was the quickest? • Where have you seen a problem like this before? • What methods did you use last time? Would they have worked here? • What helpful strategies have you learned for next time?

⁶ 2012 MARS, Shell Centre, University of Nottingham

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