# PD6 • Using formative assessment

## Purpose

To encourage participants to reflect on:

- the reasons for assessment;
- the differences between formative and summative assessment;
- some difficulties commonly experienced with formative assessment;
- alternative methods for formative assessment;
- the type and quality of feedback given to learners;
- the implications that assessment has for teaching.

## Materials required

For each participant you will need:

- Sheet PD6.1 – *Difficulties in formative assessment*;
- Sheet PD6.2 – *Improving formative assessment*;
- Sheet PD6.3 – *Divergent assessment strategies*;
- Sheet PD6.4 – *Providing useful feedback*;
- Sheet PD6.5 – *Meeting the needs of all learners*;
- examples of learners' work (optional for Activity 5);

and for Activity 6

- copies of two sessions from the resource:

  **A2 Creating and solving equations**

  **SS4 Evaluating length and area statements**

## Supporting materials

To support this session, you may wish to use:

- extracts from the DVD-ROM *Thinking about learning/Thinking about assessment*;
- extracts from the DVD-ROM *Thinking about learning/Meeting the needs of all learners*;
- PowerPoint presentation in *Materials/Professional development* on the DVD-ROM. This will be useful when running the session and includes slides of the aims, and of appropriate handouts and tasks.

## Time needed

At least 1 hour.

## Suggested activities

### 1. Why do we assess learners?

Ask participants to identify some reasons why we assess learners. List these on the board.

For example:

- to **diagnose** difficulties and so inform teaching;
- to **celebrate** achievement, rewarding effort and success;
- to **motivate** learners, showing them what we value and what they still need to learn;
- to **select** learners for groups, courses, careers;
- to **maintain records**, so that teachers or parents can be informed of progress;
- to **assess teaching methods**, to see which work more effectively;

…and so on.

There are two main purposes of assessment:

- **Summative** assessment – to summarise and record overall achievement at the end of a course, for promotion and certification. Most 'high stakes' tests and external examinations are designed for this purpose. Summative assessment is also used to evaluate the effectiveness of a particular course, teaching method, or even an institution. It may, however, be possible to do this using a sample of learners rather than by assessing them all.
- **Formative** assessment – to recognise achievements and difficulties at the beginning or during a course, so that teachers and learners can plan appropriate action. This type of assessment forms an integral part of all learning.

The focus of this session is on planning for formative assessment.

### 2. How do teachers assess formatively?

Ask participants to think of a recent session with their learners and of two particular learners, one who is finding the topic straightforward and one who is finding the topic difficult.

Ask participants to work in pairs. Each participant should try to describe the learners' strengths and difficulties to his or her colleague, in as much detail as possible.

Invite participants to explain how they became aware of these strengths and difficulties. On what evidence do they base their judgement?

- Test results?
- Memories of spoken responses during teaching sessions?
- Observations of the learners working?
- The learners' written work?

In what ways do these assessments affect the planning of teaching sessions?

## 3. What are the difficulties in formative assessment?

Give each participant a copy of Sheet PD6.1 – *Difficulties with formative assessment*. Discuss how far the criticisms levelled here are valid in the context in which participants are working. If any are, then what can be done about them?

## 4. Using a variety of assessment practices

Give each participant a copy of Sheet PD6.2 – *Improving formative assessment*. Discuss the ideas presented and ask participants to suggest their own ideas.

Give each participant a copy of Sheet PD 6.3 – *Divergent assessment strategies* and ask for their reactions to these strategies. Ask them to choose two strategies to try with their learners and to report on at a follow-up meeting.

## 5. Providing useful feedback

Explain that research evidence strongly suggests that the best type of feedback to promote learning is a meaningful comment (not a numerical score) on the quality of the work, and constructive advice on how it should be improved (Black and Wiliam, 1998).

Give each participant a copy of Sheet PD 6.4 – *Providing useful feedback* and discuss the consequences of taking this advice seriously. It would mean that teachers should stop giving marks or grades and, instead, concentrate on giving detailed constructive feedback to learners.

If possible, bring some learners' work to the session and share this with participants. Ask them to discuss the type of feedback that might benefit each learner. Some suitable examples of learners' work are included in session PD2 – *Learning from mistakes and misconceptions*.

## 6. Changing teaching to take account of assessment

Assessment always makes the teacher's life more complicated. It forces us to recognise that each learner is an individual with different learning needs, and to adapt the pace and content of our teaching accordingly. Some learners will show us that they already understand the ideas and need to be challenged further. Some will need to revisit ideas and discuss these more thoroughly. How can all this be accommodated?

Give each participant a copy of Sheet PD6.5 – *Meeting the needs of all learners* and discuss the issues that arise. When preparing for this discussion, you will find it helpful to re-read Section 5.6 of the book *Improving learning in mathematics: challenges and strategies* which is included in this resource.

The materials in this resource aim to differentiate by level of support and by outcome. Show participants sessions **A2 Creating and solving equations** and **SS4 Evaluating statements about length and area** as examples of how this can be done.

## Sheet PD6.1 – *Difficulties in formative assessment*

Research suggests that formative assessment practices are beset with problems and difficulties. These are summarised by Black and Wiliam (1998) as follows:

### Effectiveness of learning

- Teachers' tests encourage rote and superficial learning.
- The questions and methods used to assess are not shared between teachers and they are not critically reviewed in relation to what they actually assess.
- There is a tendency to emphasise quantity of work and to neglect its quality in relation to learning.

### Impact of assessment

- The giving of marks and the grading function are overemphasised, while the giving of useful advice and the learning function are underemphasised.
- Approaches are used in which learners are compared with one another, the prime purpose of which seems to them to be competition rather than personal improvement. As a result, assessment feedback teaches learners who are finding the topic difficult that they lack 'ability', causing them to come to believe that they are not able to learn.

### Managerial role of assessment

- Teachers' feedback to learners seems to serve social and managerial functions, often at the expense of the learning function.
- Teachers are often able to predict learners' results on external tests because their own tests imitate them, but at the same time teachers know too little about their learners' needs.
- Collecting marks to fill in records is given higher priority than the analysis of learners' work to discern their learning needs. Furthermore, some teachers pay no attention to the records of their learners' previous assessments.

Black P. and Wiliam D. *Inside the black box: raising standards through classroom assessment*, London, 1998, King's College London School of Education.

## Sheet PD6.2 – *Improving formative assessment*

Discuss the following suggestions and add some more of your own.

### Watch and listen before intervening

Before intervening in a group discussion, wait and listen. Try to follow the line of reasoning that learners are taking. When you do intervene, begin by asking them to explain something. If they are unsuccessful, ask another learner to help. You might like to watch the short video sequence *Thinking about learning/Thinking about assessment/Example 1* on the DVD-ROM where you will be able to explore these issues.

### Assess groups as well as individual learners

Group activities such as making posters allow many opportunities to observe, listen, and question learners. They make thinking visible and allow the teacher to see quickly where difficulties have arisen.

### Use divergent assessment methods

Convergent assessment strategies are characterised by tick lists and can-do statements. The teacher asks closed questions in order to find out whether or not the learner knows, understands or can do a predetermined thing. This is the type of assessment most used in written tests.

Divergent assessment, in contrast, involves asking open questions (e.g. 'Show me what you know about…') that give learners opportunities to describe and explain what they know, understand or can do. These questions allow learners to surprise us – the outcome is not predetermined. Many of the activities in this resource are of this type.

### Share objectives, encourage self- and peer-assessment

For example, 'Make up an example to show me that you know and understand Pythagoras' theorem.'

Share learning objectives with learners and ask them to produce evidence that they can achieve these objectives. When they get stuck, help them to work out what they need to do next. Also, make time for learners to read through each other's work and to comment on how it may be improved.

You might like to watch the short video sequence *Thinking about learning/Thinking about assessment/Example 2* on the DVD-ROM.

### Give useful and constructive feedback

Don't use unhelpful global marks or grades that detract from the task. Instead, use helpful and constructive oral and written comments to help learners recognise what they can do, what they need to be able to do, and how they might narrow the gap between these.

### Change teaching to take account of assessment

As well as providing feedback to learners, good assessment feeds forward into teaching. Be flexible and prepared to change your teaching plans as a result of what you discover.

> You may like to look at the section on assessment on the DVD-ROM to see some of these strategies in action.

## Sheet PD6.3 – *Divergent assessment strategies*

### 1. Questioning with mini-whiteboards

One difficulty with group questioning is that some learners dominate while others are too afraid to participate. When mini-whiteboards are used, every learner presents their response at the same time. When open questions are asked, learners can give different responses from those around them. The teacher is able to immediately assess which learners understand the ideas and which are struggling with the topic. You might like to watch the short video sequence *Thinking about learning/Thinking about questioning/ Example 2* on the DVD-ROM.

### 2. Learners producing posters

Ask each small group of learners to work together to produce a poster:

- summarising what they know about a given topic; or
- showing two different ways to solve a given problem; or
- showing the connections between a mathematical idea and other related ideas.

### 3. Learners assessing work

Collect learners' responses to a given task. Look through their work, noting down common difficulties. Produce some new responses to the task that contain a selection of the most common errors. Photocopy these and give them to learners with the following instructions.

Imagine you are a teacher and mark this work. If you think that a mistake has been made:

- underline the mistake;
- write the correct answer by the side;
- try to understand the thinking that led to the mistake and write advice to the person who made it.

Learners who have done this activity often become more critical of the quality of explanations and the presentation of work.

### 4. Learners producing a mathematical dictionary for a topic

Give each pair of learners a list of words or phrases that are important in a particular topic. For probability, for example, you could give them the words: probability, equally likely events, random events, mutually exclusive events, independent events, possibility space, tree diagram.

Ask learners to:

- write down a full explanation of the meaning of each word or phrase;
- create an example showing how the word or phrase should be used.

Some teachers have asked learners to do this activity before and after meeting or revisiting a topic. This reveals how their interpretation of words changes and gives a measure of the growth of understanding. This strategy can be used regularly, so that learners gradually build up their own mathematical dictionary.

## Sheet PD6.3 – *Divergent assessment strategies* (continued)

### 5. Learners making up their own tests

Towards the end of a topic, ask learners to put reference books away and work together in pairs on the following tasks.

- Write down the two most important ideas in this topic.
- Make up a question that would test whether or not someone understands each idea. Make your questions challenging, but make sure you can answer them correctly.
- Produce a perfect answer to your question, and a mark scheme.

Collect in learners' questions and answers and assemble the best ones into a test for the following session. Make sure that learners know that the test is made up of 'their' questions.

### 6. Learners producing a short revision guide for a topic

Tell learners to imagine that someone has been absent for a topic they have recently completed. Ask them to produce a revision guide for that person. Learners should work together on this task in pairs or small groups, sharing the knowledge they have acquired. They should not refer to textbooks or other resources (at least to start with). This will mean that learners will write the guide in their own words. After a while, you may decide to let them look at a textbook for a few minutes– but then make them put it away again.

Their revision guide should:

- explain key terms and words;
- provide worked examples of problems and questions for the reader to try;
- show examples of where the ideas are used in everyday life;
- provide full answers at the back.

These guides can be exchanged and checked by other learners.

### 7. Learners interviewing each other.

Ask learners to form pairs and take it in turns to interview their partner about the work they are or have been doing and to write down their partner's replies. It is helpful to give learners a few questions to guide the discussion, such as the following:

> What do you think you are expected to learn in this activity?
> What have you learnt?
>
> What are the most important ideas?
> Try to explain one of them to me.
>
> What did you feel you understood well?
> Give me one example.
>
> What did you find hard to understand?
> Is there still something you are confused by?
>
> What mistakes did you make?
> Why did you make these mistakes?

You may like to look at the section on assessment on the DVD-ROM to see some of these strategies in action.

## Sheet PD6.4 Providing useful feedback

The research shows that learners benefit most from feedback that:

- focuses on the task, not on marks or grades;
- is detailed rather than general;
- explains why something is right or wrong;
- is related to objectives;
- makes clear what has been achieved and what has not;
- suggests what the learner might do next;
- describes strategies for improvement.

What are the implications of this for your own practice?

## Sheet PD6.5 Meeting the needs of all learners

- One teacher said:

  'When we try to meet the needs of learners, we may find that we need to be more relaxed about covering the syllabus.'

  How do you respond to this statement?

- Assessment shows that each learner has different learning needs.
  How do you respond to this? Do you:
  - Differentiate by **quantity**?
    When learners appear successful, do you just give them extra work?
  - Differentiate by **task**?
    Do you give each learner a different activity, matched to their individual needs?
    Do you allow learners to choose which activities they undertake?
  - Differentiate by **level of support**?
    Do you give all learners the same task, but then offer different levels of support, depending on the needs that become apparent?
  - Differentiate by **outcome**?
    Do you use open activities that encourage a variety of possible outcomes and offer learners the opportunity to set themselves appropriate challenges?

Discuss the advantages and disadvantages of each approach.

If there is time you might like to watch the short video sequence *Thinking about learning/ Meeting the needs of all learners* on the DVD-ROM to see some of these strategies being used.