

*Originally used as a template for a module on effective teaching, these files are intended to be used and adapted as required (as long as acknowledgement is featured where material is reproduced). Everyone will have their own style of presenting and organising material, so the outlines provided below are presentation guidelines only.*

## **Accompanying notes to the lecturer's resource**

### **Effective teaching presentation**

PRESENTATION 1: Fundamentals of effective learning

PRESENTATION 2: Fundamentals of effective teaching

PRESENTATION 3: Evaluating effective teaching

PRESENTATION 4: Brain-based education and active learning: breaking the culture of the textbook

PRESENTATION 5: Motivation and learning

PRESENTATION 6: Deep and superficial and deep learning, and higher order thinking

PRESENTATION 7: Developing higher order thinking and collaborative learning

PRESENTATION 8: Planning and implementing collaboration

## Assessment

The assessment task is straightforward: the students, in groups, must plan a 45-minute lesson that incorporates features of:

- (a) brain-based education;
- (b) motivation and learning;
- (c) deep learning;
- (d) higher order thinking;
- (e) collaborative learning.

These are areas that are covered in presentations 4 to 7. During presentations 4 to 7 time will be set by to address these features and incorporate them into the lesson plan.

The assessment of this module could be organised by a 25-minute presentation of the lesson plan to the rest of the group, any supplementary handout material that is prepared for the presentation. Grades can be awarded to each group, and individual grades for each member of the small group will be the same as the grade for that small group. The grading will be entirely for the group product, not on the time spent, the amount of effort put into it by individuals, or which individuals have done more or less than others. The grades could be awarded on the following criteria:

- 1 The contents and coverage of (a) to (e) above, including a balance between too little and too much coverage, i.e. the ability to separate the significant from the trivial factors.
- 2 The indication (in a bullet-pointed handout) of which features of (a) to (e) are addressed at each stage of the presentation.
- 3 The quality of the presentation: the ability to keep to time in the presentation; the relevance of, and reference to, handout material; the ability of the presenters to hold the audience's attention and interest, and to communicate effectively.
- 4 Students may find it helpful to use some of the lesson planning sheets handed out in a previous presentation, as a way of organising their planning.

The presentations would take place in the final part of the module; the sequence of the groups will be random (drawn out of a box). Each group presentation should be interrupted and stopped immediately if it reaches 30 minutes. Presentations of less than 20 minutes should be penalised.

## **PRESENTATION 1: Fundamentals of effective learning**

Tell the students the aims of the presentation and what the presentation will comprise – what they will be looking at and what they will be doing, and what you hope are the outcomes.

### **Aims**

- 1 To introduce the module.
- 2 To introduce some key principles of effective learning.
- 3 To introduce recent practices from research in learning.

Introduce the overall course: the course is designed to draw on best practice on teaching and learning, to use a range of sources and evidence to indicate how effective teaching and learning can be planned, implemented, evaluated and developed. The module commences with learning, because this indicates a major shift that has taken place between the former practices on laying emphasis on teaching, and the more recent emphasis, which is being placed on learning rather than teaching.

Before we go very far in considering effective learning there are some principles on which recent work on effective learning is built. These are addressed in this first presentation. Then we consider teaching as a response to what we know about effective learning – so that teachers are planning their most effective forms of teaching *in response to* the most effective forms of learning.

Some recent developments in learning are based on work undertaken in the field of brain-based education, and this is addressed in presentation four. A key factor in effective teaching and learning is the development and incorporation of student motivation into learning, and this is addressed in presentation five. It is argued that many worn-out practice of teaching are based on discredited models of motivation, and that, if we are able to improve student motivation, through using different models and practices of motivation, then we may be able to improve student achievement. Indeed, it is suggested that many of the current practices in some schools contribute to the very problems that they find in students through the use of negative motivational strategies.

Several of the problems in teaching and learning in schools derive from a superficial view of teaching and learning, and a superficial view of knowledge. The issue of deep and superficial learning is addressed in Presentation 6.

If we are to improve teaching and learning then this requires attention not only to motivation and self-worth, not only to deep learning, but also to the development of higher order thinking.

The development of effective learning, not least of higher order thinking, is achieved in large part through interaction, interactive teaching and cooperative and collaborative learning. By the end of the module it is intended that a range of significant issues to make for effective classroom teaching and learning in the UK will have been addressed.

The first presentation will be heavier than all the others in being instructor-led. This is deliberate, so that a rapid introduction to, and coverage of, principles underpinning effective learning will be completed quickly, so that the remainder of the module can move forwards from this starting point.

### **Activity 1: Characterising some aspects of learning in the UK**

Split the group into small groups. First of all ask each individual person to characterise a typical lesson that they experienced at school in the following subjects: (a) mathematics; (b) English language; (c) science – what sticks in their minds about these presentations! Ask them to note down the main teaching, learning and assessment strategies that were used. They must do this on their own, individually, with reference to the set of prepared questions on the handout sheet. Then ask them to share their responses with the others in the group so that they agree a set of common responses *across* the three subjects and across all the members of the group. So, *for each group* there will be a set of common, agreed responses to the questions, regardless of the members of the group and regardless of the subjects to which each group has been referring. The answers are to the questions on the handout sheet.

Bring the students together in a complete group, and hear the results – enter the results of the voting onto an overhead transparency of the results, and calculate the results for each item where possible, (7), (8), (9), (11), (12).

Share the results of the 13 questions: what do the results tell us? What are the *main* results (and note that the questions asked for *main* results only)?

Draw attention to the following, if applicable:

- Question 1: the purpose was to please the teacher; to avoid trouble, to pass the test;
- Question 2: the teacher spoke, used the textbook, and was didactic/lecturing, and used punishment, homework, testing and listening;
- Question 3: the students read, recited, memorised, repeated, and prepared for the test by learning their notes and the textbook;
- Question 4: the learning was mainly assessed through tests and quizzes;
- Question 5: the students didn't do anything with the knowledge; they didn't apply it in anything, and not in real-life situations;
- Question 6: the students were mainly motivated by tests and exams, and fear of the teacher's scolding;
- Question 7: the learning was largely *not* active (whatever that means!);
- Question 8: the learning as very largely passive;
- Question 9: there was little or no student choice; where there was student choice it was about comparatively trivial matters;
- Question 10: those students who had difficulty were scolded and told to work harder; they went to private lessons. No special arrangements were made for them in school;
- Question 11: there was very little or no discovery learning;
- Question 12: most, if not all, of the learning was of facts;
- Question 13: the feedback to the student was mostly a test mark (score).

Though this might be a caricature, caricatures always contain important messages!

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Draw from this the paucity, ineffectiveness, negative consequences of the experiences they had, and ask them to suggest what can be done about this (as a whole class discussion).

### Break

After the break, indicate that it is important for teaching and learning to move away from this deadening routine, but that new developments should be based on sound principles. Indicate that the rest of the presentation will be to go through these principles and to suggest some key issues in making for effective learning. Go through the slides.

#### *Slide 1: Title*

#### *Slides 2 to 5*

These set out the principles of the move from instruction to construction and constructivism, on which some of the essential of effective practice are based. Slide 2 sets out key principles from studies of effective learning, whilst slides 3 to 5 set out the consequences of this view for teaching and learning.

#### *Slides 6 and 7*

These two slides mark the shift in emphasis from instruction (teacher-centred) to construction (student-centred), looking at learning through the students' rather than the teachers' eyes.

#### *Slides 8 to 9*

These provide a simple summary of effective learning: do-review-learn-apply. The point is that learning is active and requires knowledge not to remain inert but to be used (which resonates with a future presentation where, on brain-based research, the lesson is to use the brain or else it dies). Slide 9 summarises some key principles of learning so far: it is active, makes connection (builds on past experience) and is a process.

#### *Slide 10*

Learning does not take place in isolation; it is related to context and learning. The context/environment has a very significant effect on learning (discussed in a future presentation on motivation), and effective learning needs to have a direction – it needs to know its goals.

#### *Slides 11 and 12*

Learning is an ambiguous word; it comprises both the *content* and the *processes* of learning, i.e. it is focused on outcomes as well as the process of learning. If we look at the set of outcomes we can see that they are not only cognitive, but entail motivation, self-esteem, different kinds and levels of thinking, and a willingness to

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learn even more. So, the outcome of learning content is not only the content but a lot of other factors as well (on the slide).

Slide 12 indicates some of the processes of learning. It can be seen that learning is not an isolated, individual activity but a social activity, and this point is met again in the presentations on motivation and higher order thinking. Further, it involves *metacognition*, students reflecting on their own learning and how they learn, i.e. looking at their own learning strategies.

### *Slide 13*

This is a very brief summary of some key factors of learning in terms of process: it is active, collaborative, involves learners exercising responsibility for their own learning, concerns metacognition (learning about learning) and applying knowledge, not leaving it inert. Contrast this with the results of the first task, in which the opposite was largely the case in the UK, i.e. there was ineffective learning taking place.

### *Slides 14 to 16*

These provide a summary of key criteria that can be used to judge effective learning. They can be used to see how far they apply and operate in UK schools, and what can be learned about practices in UK schools by referring to these. In addition, the extent of learning can be judged using a distillation of criteria from inspection reports and frameworks (handout).

### *Slide 17*

Learning and teaching are two sides of a coin. Judging the effectiveness of learning can be in both quantitative and qualitative terms, and the relationships of these two conceptions can be seen in the slide. If we adopt a quantitative view then teaching remains at the level of largely transmission teaching (the old style, as indicated in the opening activity of the evening). If we adopt a qualitative view of learning and teaching, then the points made about effective learning through the presentation apply very powerfully.

### *Slide 18*

The outcome of effective teaching is effective learning. Looking at the slide we can see that the outcomes of learning are wide-ranging, not simply the accumulation of facts and knowledge, but the development of knowledge, concepts, skills, attitudes, personal reflection, application, motivation and an enquiring mind.

*Slide 19*

Given the wide-ranging field of learning, if we want to plan for effective learning then this means that a range of areas have to be considered, not only the learning strategies, but the curriculum, assessment, roles of the teacher, the overall setting of the school, and so on. These areas are addressed in subsequent presentations.

*Slide 20*

All of us learn in different ways:

*Focusers* concentrate on one aspect of a problem at a time and proceed in a step-by-step manner through the problem, as opposed to *scanners*, who tackle several aspects of a problem at the same time and allow ideas to crystallise slowly. *Divergent* thinkers are creative and open-ended in their thinking, whilst *convergent* thinkers focus on the solution to a specific issue. Visual learners learn by looking and seeing, auditory learners by listening, kinaesthetic learners by moving and feeling, tactile learners by touching, concrete learners by direct practical experience, analytical learners by examining a situation in detail for its component elements, communicative learners prefer discussion and interaction, whilst authority-oriented learners prefer simply to believe what those in authority tell them. The point here is that there is no single style of learner, so it is the task of the teacher to ascertain the students' preferences. If this cannot be done (e.g. in large classes) then it means that the teacher must ensure a balanced, broad diet of learning styles and strategies in order to accommodate different students' preferred ways of learning.

Planning for learning shifts the emphasis away from planning for teaching, and, in this, it is important to understand that the teacher's task is to promote and maximise learning and achievement. This presentation has suggested some considerations in this process. The rest of the presentations unpack the several elements of this in more detail, starting with teaching, in the next presentation.

*Handouts*

- (a) Slides of PowerPoint presentation
- (b) Initial activity
- (c) Sheet on the quality of learning.

## **PRESENTATION 2: Fundamentals of effective teaching**

Tell the students the aims of the presentation and what the presentation will comprise – what they will be looking at and what they will be doing, and what you hope are the outcomes.

### **Aims**

- 1 To introduce some key principles of effective teaching;
- 2 To introduce key practices from research in teaching.

The components of effective teaching are several. This presentation tries to set out some key elements of effective teaching, whilst the next presentation examines some recent attempts that have been made to evaluate teaching practices, using some of the criteria from this presentation.

### **Activity 1: Identifying some characteristics of effective teaching**

Individual task: Think of two very different teachers whom you think have been outstanding. Identify the factors that made them outstanding.

Move into small groups. Share your own views of the factors that make for outstanding teachers and effective teaching. Through discussion, group them into a series of key areas, giving each key area a title.

Bring everyone back to the plenary to share the key areas – the titles. Look to see what they have in common, and note that (probably!) there will be a very wide range of key areas, i.e. effective teaching covers a huge field of factors, some of them personal and interpersonal, some professional, some pedagogical, some curricular, and so on – try to group the key areas.

Put these onto the whiteboard and keep them there for the evening, as reference points.

Then indicate that the evening will be to examine a range of issues in effective teaching, so that comparisons can be made between what they have indicated to be key characteristics and what the findings from a range of research and documents have indicated to be the factors for effective teaching.

Then you will be presenting three main sets of findings for effective teaching:

- 1 The Hay-McBer study on teacher effectiveness 2000 (Slides 2 to 5 and handout).
- 2 The findings from school inspection documents in the UK (handout).
- 3 The statement from the Teacher Training Agency in the UK (handout).

*Slide 2*

In 2000 a major study on teacher effectiveness found ‘three main factors within teachers’ control that significantly influence pupil progress’ and which can predict well over 30 per cent of the variance in pupil progress, i.e. teachers really do make a difference:

- Teaching skills.
- Professional characteristics.
- Classroom climate.

The professional characteristics and teaching skills are ‘what teachers bring to the job’; the classroom climate is an output measure, and is related to nine characteristics created by the teacher that influence their motivation to learn.

*Slide 3*

For the *teaching skills* the study divided them into seven main areas, contributing to the time on task and lesson flow. For each of the seven areas they provided a series of questions that could be used to evaluate the effectiveness of the teacher (handout).

*Slide 4*

For the *professional characteristics* these were divided into five main areas; these will not be addressed further in this presentation.

*Slide 5*

For the *classroom climate*, this was divided into nine areas, and it was indicated that the classroom climate has a significant effect on learning and achievement.

A second example of identifying effective teaching is taken from a distillation of the framework for school inspection in the United Kingdom. It takes the key characteristics (handout) that are found in the inspection documents and turns them into statements for rating scales. These statements will *not* be found in the documents themselves; rather they are a distillation of the framework.

*Slide 6*

A third example is taken from the Teacher Training Agency in the United Kingdom, and concerns the statements of competence that teachers are expected to demonstrate. It can be seen that these are in three fields: professional values and practice; knowledge and understanding; teaching. It can be seen also that these are similar, though not identical to, the study from Hay-McBer. Each of these areas is broken down into a range of components (handout).

From these documents, and others, a range of different characteristics of effective teaching can be identified. Some of them concern teacher preparation and background (professional characteristics and background, e.g. their own knowledge of

subject matter and their own pedagogical knowledge), some of them concern classroom processes, and some of them concern follow-up to classroom work (e.g. homework, assessment).

*Slide 7*

This summarises some of the areas of effective teaching set out so far.

**Activity 2: Organising a schedule for evaluating the quality of teaching.**

In groups: take the handout sheet *Quality of teaching* and set the 34 characteristics into sets/groupings, with a title to each set/group. The idea is to be able to devise a set of criteria by which to judge effective teaching, and to have these arranged into groups of items.

Then, in groups, indicate the range and kind of evidence from which judgements can be made.

In a plenary, list all the titles of the groups/sets of characteristics used to group the 34 items, and list the range of evidence to be used. Ask for a scribe to write down the list of kinds of evidence to be used, so that it can be photocopied and returned to each participant. Compare the list to the prepared list (handout) to see additions, extensions, similarities, differences etc.

Break

Then move to the remainder of the slides

*Slide 8*

Effective teachers use a range of strategies in the classroom. Many of these are verbal and communicative strategies; many of these suggest that teachers have to use a variety of strategies to meet the criterion of fitness for purpose. Some of the areas of effectiveness concern planning and preparation, others take place in the classroom; others take place away from the classroom.

*Slide 9*

If we are to judge effective teaching then a range of sources of evidence have to be used, for example, evidence of teaching styles and learning outcomes (which underlines the importance of planning for specific learning outcomes), students' responses and levels of attainment (against pre-specified outcomes).

For teaching to be effective it has to be planned. What are the characteristics of an effective lesson plan?

Elicit these from the students before moving onto Slide 10. Write their suggestions onto the whiteboard, so that they can be compared to Slide 10. Also indicate examples of a lesson plan from handouts.

*Slide 10*

These characteristics derive from a range of research evidence on effective planning.

*Slide 11*

Effective teaching has significant effects on achievement, attainment, behaviour, attitude, and learning development, i.e. effective teaching works on more than simply academic knowledge transmission and learning.

*Slides 12 and 13*

If we are to improve teaching then we need information on whether students are achieving their optimum level compared to wider standards of other reference groups. Therefore there is a need to gather a range of data, for example by age, ability, gender, and also to keep details of the individual student, so that the student's rate of progress can be judged. We have to be careful not to place all the responsibility for student achievement onto the individual teacher, as the individual teacher is not in control of all the processes and factors – many of them lie outside the teacher.

*Slide 14*

Evaluation of effectiveness is not only a matter of an external observer observing a teacher in the classroom. It is also a matter of a teacher examining and evaluating how well she/he is operating herself/himself. A teacher can undertake some simple self-evaluation, as on the slide and as on the self-evaluation checklist (handout).

*Slide 15*

If students are to show their abilities and learning then they need *opportunities* to show their learning. Assessment of learning and teaching, which does not provide opportunities for students to demonstrate their learning and abilities, is incomplete.

This presentation has introduced some key elements of effective teaching. These will be developed in the next presentation as well.

*Handouts*

- (a) Slides of PowerPoint presentation
- (b) Summary of the Hay-McBer questions for teaching effectiveness
- (c) Summary of the Teacher Training Agency Standards for Qualified Teachers
- (d) Sheet of inspection criteria for judging the quality of teaching
- (e) Sheets of evidence to be used in judging teachers
- (f) Examples of elements of effective lesson planning
- (g) Self-evaluation sheets for teachers.

### **PRESENTATION 3: Evaluating effective teaching**

Tell the students the aims of the presentation and what it will comprise – what they will be looking at and what they will be doing, and what you hope are the outcomes.

This presentation builds on the previous one on aspects of effective teaching. In this session direct instruction is introduced, and then some further examples of evaluation of teaching are provided.

#### **Aims**

- 1 To explore aspects of direct instruction and interactive teaching.
- 2 To develop an evaluation pro-forma for evaluating teaching.
- 3 To examine examples of lesson observation schedules.

This presentation divides into two. First, a key method of effective teaching is explored: direct instruction and its sub-component: interactive teaching. Communication is essential for effective teaching, and this first part identifies key characteristics of direct instruction.

Second, the presentation explores some key components of effective teaching presentations and how they can be evaluated through worked examples.

#### **Activity 1: To explore some key characteristics of direct instruction**

*Introduction:* Direct instruction takes place with a whole class rather than with individuals. Whole class learning enables the teacher to monitor the whole class effectively, and to intervene if she/thinks that children are not attentive or able to follow. Direct instruction does not mean simply telling or lecturing; it involves understanding how well students are engaged in the activity and acting on the understanding gained. It is interactive, and involves questioning and two-way communication. Direct instruction is ‘heavy’ on the teacher, as it places the responsibility for much of the lesson on the teacher. Nevertheless it has been shown to be an effective strategy when handled properly. Direct instruction can take place in a lecture, a seminar, a demonstration lesson, in lessons where the teacher is presenting instructional materials to students in a way in which the teacher intends them to understand and follow the material closely. A sub-component of direct instruction is interactive teaching.

Put the students into six groups. They are going to identify characteristics of three common teaching situations in which direct instruction takes place, so that we can identify some key characteristics of effective direct instruction.

Groups one and two are to think of the most effective *lecture* that they have attended recently, and identify what made it so effective – what are the key characteristics or components of an effective lecture. Write down some of these components/characteristics.

Groups three and four are to think of the most effective *seminar* that they have attended recently, and identify what made it so effective – what are the key

characteristics or components of an effective seminar. Write down some of these components/characteristics.

It may be that participants from the DSEJ are best placed in groups one, two, three or four.

Groups five and six are to think of the most effective *demonstration lesson* (e.g. science experiment, mathematics lesson) that they have seen or given recently, and identify what made it so effective – what are the key characteristics or components of an effective lecture. Write down some of these components/ characteristics.

Then bring the groups together. They have been looking at three types of direct instruction: lecture, seminar and demonstration. Ask the groups, one at a time, to indicate (in very short form only) the key characteristics, and list them, in columns, one column for lecture, one for seminar, and one for demonstration. Then look to identify common characteristics *across* the three types; the intention is to find some common characteristics. Note that direct instruction is not just lecturing and delivery of content in a transmission mode; it is much more complex than that, and involves some interaction.

Compare the list generated on the whiteboard with Slide 2.

#### *Slide 2*

Compare their results to the results of the analysis performed by Muijs and Reynolds in 2001. Look for similarities and differences between the two and note the common characteristics for planning and evaluating effective direct instruction.

Within direct instruction lies interactive teaching. Interaction and interactive teaching are key strategies for effective teaching, both within direct instruction and outside it. At the heart of much interactive teaching is a considerable amount of questioning and the use of students' responses to provide immediate feedback to the teacher on how well the teaching is being understood, so that she/he can modify the teaching immediately to ensure complete understanding. In the same study Muijs and Reynolds identified key components of interactive teaching:

#### *Slide 3*

Muijs and Reynolds focus heavily on the issue of questioning in their analysis, and on the teacher eliciting information and feedback from the students. It also involves the teacher giving sufficient time for students to think about the answers to their questions and in the teacher handling sensitively hesitations and incorrect replies. For the teacher an incorrect response is a key piece of information, for it tells her/him that the student has not understood; the teacher needs to go over again, explain again, and maybe in a different way, perhaps by an example, the piece of the lesson in which the student has failed to understand the material. Effective questioning is vital for effective teaching, and this is explored in the handout (the handout is very long, so it will be better to use a summary and explain the key points from Slide 4).

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Different issues in effective questioning.

*Slide 5*

In evaluating teaching sessions what has emerged is a series of issues for evaluation. These are summarised in Slide 5. Some of these will be used after the break.

Break

**Activity 2:** The task is to generate an observation schedule for evaluating the effectiveness of several aspects of a lesson, assuming that the observer is an external educator or peer (e.g. a teacher) with a sound knowledge of teaching and learning.

Put students into small groups of three or four to do the following activities:

*Group one:* to work out an observation schedule to evaluate the effectiveness of questioning in the lesson.

*Group two:* to work out an observation schedule to evaluate the effectiveness of resources and their use in the lesson.

*Group three:* to work out an observation schedule to evaluate the effectiveness of outcomes of the lesson.

*Group four:* to work out an observation schedule to evaluate the effectiveness of outcomes of the lesson and the achievement of the learning objectives for the lesson.

*Group five:* to work out an observation schedule to evaluate the effectiveness of classroom management/discipline/relationships in the lesson.

*Group six:* to work out an observation schedule to evaluate the effectiveness of the instructional activity of the lesson.

*Group seven:* to work out an observation schedule to evaluate the effectiveness of the assessment during and after the lesson.

*Group eight:* to work out an observation schedule to evaluate the effectiveness of the teaching styles the lesson: direct instruction; whole class; group work, individual work.

This is quite a large task and will take most of the rest of the presentation. Inform the students that you will collect their work to photocopy, so that everyone has a copy, so they will need to appoint a scribe for each group.

Plenary session: ask the students to identify problems that they encountered during the preparation of the observation schedule; try to elicit the following (if they are not forthcoming then you suggest them):

- (i) The problem of measuring effectiveness (you haven't told them how to measure this, deliberately, to see how, or whether, they have addressed this at all).
- (ii) The problem of scope: each are is so large.
- (iii) The problem of context: the context of the activity exerts a significant effect on the interpretation of the issue in question.
- (iv) The problem of evidence: what is to count as appropriate evidence.
- (v) The problem of judgement: whose interpretation counts.
- (vi) Other matters that arise!

Collect the schedules for photocopying.

Give out examples of lesson observation schedules (handouts) from inspection and evaluation studies:

*Handouts*

- (a) Slides from PowerPoint presentation
- (b) Summary of effective questions and questioning
- (c) Observation schedules from the UK.

## **PRESENTATION 4: Brain-based education and active learning: breaking the culture of the textbook**

Tell the students the aims of the presentation and what the session will comprise – what they will be looking at and what they will be doing, and what you hope are the outcomes.

### **Aims**

- 1 To introduce key findings from brain-based research and their implications for teaching and active learning.
- 2 To consider ways of planning to break the culture of the slavery to the textbook in schools.

The field of brain-based research has developed rapidly and hugely. What is being suggested in brain-based research is that physiological, brain-based factors make a difference to learning, and that teaching has to take account of this.

### *Slide 1: Title*

### *Slide 2*

The brain grows and increases, and intelligence increases, through being used. Strengthening brainpower, which is physiologically rooted in stimulating and reinforcing the synapses, strengthens learning. The brain loves to learn. Further, the brain is not a passive store of information; it thrives on activity, and actively seeks out information. The brain deliberately seeks out, proactively, information from the environment in order to learn. There are more neural connections *from* the brain to the ear than from the ear *to* the brain, and some 10 per cent of the fibres in the optic nerve go ‘the wrong way’. The brain, through sense organs, does not passively receive information, it deliberately goes fishing for it. The phrase that is often cited is ‘use it or lose it’: use the brain or it withers and dies. The brain thrives on feedback, and learning relies of effective and rich feedback.

### *Slide 3*

In a study by Sousa it was shown that the brain works in ‘prime times’ and ‘down times’: prime times are when it is learning at its optimum, but it needs to rest, hence it has ‘down times’. In a session of 20 minutes, 90 per cent of the time (18 minutes) is prime time, the optimum time for learning, and 10 per cent of the time (2 minutes) is ‘down time, when concentration lapses. In a session of 40 minutes the proportion of down time increases: only 75 per cent of a 40-minute session (30 minutes) is prime time, and 25 per cent of the time (10 minutes) is down time. In an 80-minute session the proportion of down time increases even more: only 62 per cent of the lesson (50 minutes) is prime time and 38 per cent of the session (30 minutes) is down time. The message is very clear – the longer the session, the more the brain (and people!) switch off! Keep sessions short and focused, or, in a longer session, change the activity during the session, so that it is like starting afresh.

Prime time does not simply occupy the first few minutes of a session, followed by gradual sinking/lowering of brain activity, running down to the end of the lesson. Rather, the brain is stimulated at first, in the first period of prime time, then it relaxes (down time), and then picks up again (prime time 2). So, in a 20-minute session the first 10 minutes are prime time, followed by a 2-minute down time, and then an 8-minute prime time 2. In a 40-minute session the first 20 minutes are prime time, followed by a 10-minute down time, followed by a 10-minute prime time 2. In an 80-minute session, the first 25 minutes is prime time, followed by an even longer down time of 30 minutes, and a 25-minute prime time 2. The message is clear again: split up the longer sessions into smaller blocks of time for maximum effect; be prepared to change the activity.

Though there are clearly variations between people, and we have not explored age/ability and a whole range of factors which might cause difference in prime time and down time, nevertheless the message is clearly spelt out in the primacy-recency effect: the best learning occurs first; the second best learning occurs last, and the least learning takes place in the middle part of a session.

Not only does brain-based research tell us about the need for active learning, prime times and down times, and the best parts of a lesson in which to learn the most important matters, it also indicates the most suitable *kinds* or *strategies* of learning in terms of retention rates. Passive learning and one-way transmission, as in the lecture, is the least successful strategy. Reading is also a comparatively poor way of learning. This has significant implications for practice in which these two strategies – listening and reading the textbook – are widely used. It is important to note that the lecture method essentially involves one sensory input: listening. Similarly, reading uses one main sensory input: vision. What we can notice is that the more sensory inputs are used, the greater is the retention. So, you move to audio-visual learning (two sensory input channels: listening and seeing), retention improves (to 20 per cent, i.e. more than simply 10 per cent plus 5 per cent; there is ‘added value’). When there is active demonstration, which, as the previous session indicated, relies on two-way communication as well as vision and listening, the retention rate climbs to 30 per cent. When the learning becomes less teacher-directed, and involves a range of sensory inputs (listening, seeing, speaking), the retention rate jumps: a 30 per cent difference (to 50 per cent) in the case of discussion groups. When the learning involves application and doing, rather than receiving, the rate jumps even more – exponentially – to 75 per cent. When learning involves teaching others the rate of retention is very large indeed – only a 10 per cent retention loss. This has significant implications for learning.

Ask the students what they see as the implications of learning retention:

- Reduce passive learning.
- Reduce lectures.
- Reduce the reliance on reading.
- Increase the channels of communication and learning.
- Increase multi-sensory learning.
- Increase active learning.
- Increase collaborative, cooperative and peer group learning.

- Have learners teach each other.
- Increase activities that apply the learning.
- Increase student talk and interaction.

#### *Slide 4*

Brain-based research also indicates an important relationship between levels of concern and learning. In the early stages, just as with stress, a rising level of concern improves learning, just as a little bit of stress improves our concentration. However, if the level of concern increases too much then the learning start to reduce. The relationship is curvilinear. The message is very clear: too much pressure and too great a level of concern are counter-productive.

Brain-based research also has much wider implications in terms of ‘windows of opportunity’. It suggests that:

- motor development is at its optimum for the first six years of life;
- emotional control starts at a very early age and that many emotional characteristics of later life are in place by the time the child has reached 3 years of age;
- a child starved of emotional activity in very early childhood has missed the window of opportunity for later life;
- vocabulary learning is securely in place by the age of four;
- young children deprived of vocabulary learning in their early life could experience long-lasting problems;
- second language learning can start at birth and is well advanced by the age of 10;
- mathematics and logic should develop powerfully between the ages of 1 and 4;
- musical ability is in its prime formation stage by the time the child has completed primary school.

This has significant implications for the development of multiple intelligences from Gardner. The overwhelming message here is of the critical importance of effective early childhood education.

#### *Slide 5*

Finally, Slide 5 suggests that there are important differences in the daily bodily rhythms of young and middle teenaged children.

Ask the students what they see as the implications of the circadian cycles, making sure that they include:

More specifically:

- Young children take up to one hour from waking before their brain is at its optimum level for learning.
- Adolescent children can take up to 3 hours from waking before their brain is at its optimum level for learning.
- At midday the learning level drops dramatically.

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- Young children's drop in learning around midday is more rapid than older children.
- Performance in the afternoon is never as strong as performance in the morning.
- Performance in the afternoon tails off during the course of the afternoon.

### Break

Introduce the assessment for this module. The task is straightforward: the students must plan a 45-minute lesson that incorporates features of:

- (a) brain-based education;
- (b) motivation and learning;
- (c) deep learning;
- (d) higher order thinking;
- (e) collaborative learning.

These are areas that are covered in the current and forthcoming presentations. During Presentations 4 to 7 time will be set by to address these features and incorporate them into the lesson plan.

The assessment of this module is by the 20-minute presentation of the lesson plan to the rest of the group, any supplementary handout material that is prepared for the presentation; that is all. The grades will be awarded to each group, and individual grades for each member of the small group will be the same as the grade for that small group. The grading will be entirely for the group product, not on the time spent, the amount of effort put into it by individuals, or which individuals have done more or less than others. The grades will be awarded on the following criteria:

- 1 The contents and coverage of (a) to (e) above, including a balance between too little and too much coverage, i.e. the ability to separate the significant from the trivial factors.
- 2 The indication (in a bullet-pointed handout) of which features of (a) to (e) are addressed at each stage of the presentation.
- 3 The quality of the presentation: the ability to keep to time in the presentation; the relevance of, and reference to, handout material; the ability of the presenters to hold the audience's attention and interest, and to communicate effectively.
- 4 Students may find it helpful to use some of the lesson planning sheets handed out in a previous presentation, as a way of organising their planning.

The presentations will take place in the final part of the module; the sequence of the groups will be random (drawn out of a box).

### Activity

The issues raised so far have serious implications for the didactic, textbook based model of learning found in many schools.

Move the students into (no more than) six small groups, each group to start the planning of a lesson which incorporates as many implications as possible from the

material on brain-based education; the other items (b) to (e) can be added in during the subsequent sessions. Ask the students to include in their lesson plan some recommendations that break the slavery to the textbook that characterises much teaching and learning in some schools. The lesson plan can be in any subject, and for any age group. The lesson must be to for last 45 minutes.

Ask the students to make sure that they have listed, in bullet points, the main implications of brain-based education that they have incorporated into their planning, so that everyone can understand at a glance what aspects of brain-based education they have addressed.

At the end of the presentation, make the point that this session itself has applied many of the principles of brain-based learning:

- The emphasis on variety to increase prime-time.
- The reduction of passive learning.
- The reduction of the lecture presentation time.
- The reduction of the reliance on reading.
- The increase in the channels of communication and learning.
- The use of multi-sensory learning.
- The use of active learning.
- The extended use of collaborative, cooperative and peer group learning.
- The use of learners to teach, and learn from, each other.
- The use of activities that apply the learning.
- The considerable amount of student talk and interaction.

#### *Handouts*

(a) PowerPoint slides of the presentation

(b) Case study material for the next session (Catherine's Chemistry).

N.B. At the end of this presentation give out reading to be prepared for the next session: a case study called 'Catherine's Chemistry'. The students must bring this to the next session, having prepared to discuss the questions at the end of the case study.

## **PRESENTATION 5: Motivation and learning**

Tell the students the aims of the presentation and what the session will comprise – what they will be looking at and what they will be doing, and what you hope are the outcomes.

### **Aims**

- 1 To introduce some key views of motivation.
- 2 To apply features of motivation theories to the teaching and learning context.
- 3 To work on a case study of motivation and demotivation.

It is commonplace to hear that students are lazy, unmotivated to learn, and unwilling to apply themselves. This may be true in some cases. However, it is important to understand why this might be the case: it might be a factor to do with the students themselves, or it may be a factor to do with the situation in which they have been placed. Before one can talk about motivation and learning it is important to understand what one means by motivation. So, this presentation will look at different views of motivation.

### **Activity 1: In six groups, a very short activity: brainstorming five minutes per item below.**

Groups one and two:

- 1 List some pedagogical strategies used in school which motivate students positively to learn and to enjoy learning.

Groups three and four

- 2 List some pedagogical strategies used in school, which may motivate students to learn, but which damage their overall enjoyment of learning and desire to learn.

Groups five and six

- 3 List some pedagogical strategies in school that damage motivation to learn.

Bring the whole group together and quickly hear the responses of the six groups to the three items. This is just to raise the issue that many current practices in the UK are damaging to motivation and that few of the pedagogical practices take motivation very seriously.

Then proceed to the slides.

*Slide 1*

*Slide 2*

There are several different views of motivation. They do not necessarily conflict with each other, but, rather, they complement each other because very often they focus on different things.

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*Slide 3*

Behaviourism, sometimes known as the stimulus-response theory, has several characteristics (see the bullet points on the slide). It lays emphasis on external rewards, e.g. grades and test scores, working to avoid being scolded and working to please the teacher/parents. Motivation is extrinsic and instrumental – for an end beyond personal satisfaction and gain. The theory is one of external reward for the learning and demonstration of particular desired behaviours. As the slide says, it can become very mechanistic learning, dehumanised and reward-oriented – we only learn to pass the test, to gain the marks. It is robotic. It leads to rote, repetition and mechanical jumping-through-hoops. Much of this view of motivation has been discredited, yet it is still very powerful in many schools.

*Slide 4*

Expectancy theory suggests that the learner is motivated by both the anticipated gain/benefit, the likelihood of achieving the gain/benefit and the importance of the gain to the learner. In this sense it involves some intrinsic motivation as well as some extrinsic motivation. If we are using expectancy theory in motivating students then we have to work on their expectancies and the values that they attribute to the learning – to make the learning clearly worthwhile in the learners' eyes.

*Slides 5 and 6*

Needs theories regard motivation for learning as rooted in a humanistic, whole-person view of learning. Learning motivation is intrinsic, and cognitive, affective and physical needs are all interlinked in this theory. A prominent version of needs theory is stated in the well-known hierarchy of needs from Maslow (we cannot expect people to learn well if they are hungry or cold!). It is important to note that understanding and knowledge are at the top of the hierarchy, and require self-esteem and a sense of autonomy (self-actualisation) if they are to be successful. This is important if we reconsider activity one, where many of the pedagogical practices damaged self-esteem. We progress through the hierarchy, from lower to higher order.

*Slide 7*

What we are saying is that if motivation is to be successful then it must draw on the whole person and develop their self-esteem and self-worth. It is important to note that self-esteem is related to control over learning. In many schools the teachers tell the students what to think, when to think it, and, through testing, how well they have thought; a very impoverished view of learning that damages self-esteem. Rather, needs theories, through Maslow and issues of self-worth and self-esteem, emphasise the importance of students experience control over their learning, of experiencing success and a sense of achievement, and being given rich and positive feedback. Learning motivation must be intrinsic, not just extrinsic.

*Slide 8*

Many pedagogical practices in schools promote learned helplessness. If we look at the bullet points on the slide then we see that many of the characteristics in them apply very powerfully. Teaching practices sometimes employed can be counter-productive, and can be caused, in part, by teachers. It is a significant problem, which, if we want powerful learning to occur, must be broken. Some students are taught to be obedient, compliant, docile and passive, often through negative behaviourist motivational strategies. They are taught not to challenge or object, however creatively.

*Slide 9*

If we look at the symptoms of learned helplessness in classroom (on this slide) we can see how many of them apply in schools.

*Slide 10*

Social theories of learning emphasise the social learning environment. People are powerful teachers of each other and learners from each other, and, recalling the work on brain-based education from the previous session, learning collaboratively is one of the most powerful ways of guaranteeing effective learning. Indeed the Russian psychologist Vygotsky suggested that it is *only* (note this!) in social groups that higher order thinking is learned and transmitted. Group work, for example, is not an arbitrary learning strategy, perhaps used for the sake of variety; rather it is a *necessary* learning strategy. So, the message is simple: use collaborative learning if you want to develop learning and higher order thinking. Indeed the later session examines group work. Social learning theories

*Slide 11*

Significant learning stresses intrinsic motivation. It requires personal commitment and involvement. This is not just a cool cognitive matter; it is an emotional and personal matter – it is wrong to think that learning is simply a cognitive matter. As the presentation on brain-based learning suggested, emotions and cognition are closely linked. Indeed the theory of self-perception and self-worth earlier in this presentation suggested that personal, meaningful, person-developing learning is significant. The more we accord significance to learning and learners, the more meaningful it is, and the more it is learned successfully. The requirement, then, is to make learning meaningful, real world learning for real-world people. Teachers have to work on making the learning meaningful to learners, not simply in terms of being understood, but seen as personally meaningful, making a contribution to themselves as people. Real world learning is important here, making learning relevant to the world outside school as well as to the world inside school.

Break

**Activity 2: The case study**

Put the students into groups to read, discuss, and work out the answers to, the case study and the questions attached to it.

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Plenary: Hear the answers, and relate them to the theories of motivation outlined in the presentation, to see what the motivation problems are in the case study, and what needs to be done to improve teaching and learning through improving motivation. What motivation theories need to be addressed in order to improve the learning?

*Slide 12*

Summarise the key points of the presentation:

- 1 Motivation is a central feature of effective teaching and learning.
- 2 Motivation is neglected in many schools and needs to be addressed a lot more.
- 3 Motivation is intrinsic; extrinsic motivation risks killing longer-term and deeper, intrinsic motivation.
- 4 Motivation increases when significant, real-world, social and collaborative learning takes place.
- 5 Reduce behaviourism, increase self-worth, self-esteem and collaborative learning.
- 6 Increase student autonomy.
- 7 Break learned helplessness.

Point out that, in the following session, time will be given to preparing the student presentation for assessment, and that the lesson that they are preparing will need to address issues of motivation.

*Handouts*

- (a) PowerPoint slides of presentation
- (b) Case study.

## **PRESENTATION 6: Deep and superficial learning, and higher order thinking**

Tell the students the aims of the presentation and what the session will comprise – what they will be looking at and what they will be doing, and what you hope are the outcomes.

### **Aims**

- 1 To introduce the concept of deep and superficial learning (from the work of Biggs).
- 2 To enable students to spend further time on the preparation of the lesson for the assessment presentation.
- 3 To introduce some characteristics of higher order thinking and to relate it to deep learning.

Point out that a simple way of classifying learning is to consider whether it is superficial or deep. The evidence from a range of research into superficial and deep learning suggests that effective learning is deep learning, and that focusing too much on superficial learning is counter-productive.

The presentation is split into two main parts: the first part introduces deep and superficial learning and its relationship to higher order thinking, and the second part provides more time for them to prepare their lesson presentation, to incorporate the material on motivation from the previous presentation, and the material on deep learning from this session.

Go through the handouts to introduce the constituent elements of deep learning (meaning making, application) and superficial learning (learning of facts). Draw the links between deep and superficial learning and Bloom's taxonomy from module one: superficial learning is lower order thinking and deep learning is higher order thinking.

Look at the handout 'Deep and surface approaches to learning' and see how deep and superficial learning are encouraged, and apply this to the UK context.

### *Slide 1*

### *Slide 2*

Go through the slide to indicate how, in many schools, the deep learning reduces as students go through school – school damages deep learning! Explain metacognition: students understanding their own learning, how they learn, how they learn best, how they learn less effectively, i.e. a process of self-evaluation of their learning strategies and successes. Make the point that the development of metacognition has been shown to be important for deep learning. Deep learning is often, and largely (though not exclusively) intrinsically motivated. Note the emphasis again on group work and collaborative learning for deep learning (higher order thinking) and metacognition to take place.

*Slide 3*

Go through the slide, asking the students, during this, to think how much this applies to the UK situation.

*Slides 4 to 6*

Superficial learning is built on behaviourist theories of motivation. A key factor in improving deep learning is motivation. This motivation, unlike behaviourism, is intrinsic, socially rooted, promotes autonomy and self-esteem, breaks learned helplessness, and is 'significant learning' (refer the students back to the previous presentation on motivation). This slide sets out some key criteria for improving deep learning, which may feature in the presentation of the lesson planning for the assessment.

Note that the application is on applying knowledge (Slide 5), not just leaving it inert. This echoes the point about brain-based learning and how the brain learns through activity and applying knowledge. Effective learning, as the brain-based learning presentation indicated, concerns the construction of knowledge rather than the reception of knowledge, which was the point of constructivism outlined in the very first part of the module.

Note also (Slide 6) that the emphasis is placed on flexibility rather than uniformity; this means that teachers have to 'let go' of students and give them freedom to learn and pursue knowledge. How this can be done is an issue that they will need to raise in their lesson preparation for the presentation.

*Slide 7*

Refer the students back to Bloom's taxonomy from the first module, and that this slide is just to remind them of the kinds of thinking that are being discussed. The slide provides a useful checklist of key kinds of higher order thinking. Not that higher order thinking concerns issues met in earlier sessions: metacognition, deep learning, intrinsic motivation.

*Slide 8*

Note that higher order thinking is appropriate for all ages, abilities and levels of student, and that it is not something that is addressed *after* the lower order skills have been learned, but is *simultaneous* with them. Point out that learning lower order skills and knowledge is achieved most effectively when it is in the context of learning and using higher order skills.

*Slides 9 and 10*

Critical thinking and problem solving are both characteristics of higher order thinking. Go through these slides to point out the key features of each. The slide on problem-solving follows the sequence of problem-solving, and it also underpins action research for educational development.

*Slide 11*

When these issues from higher order thinking are translated into pedagogical terms a range of factors flow from them. Note the importance of the social aspect of higher order thinking – a feature that will be returned to in the next presentation. Social learning is dialogical – both communicative and the sharing, not the imposition, of ideas. Higher order thinking is seen to require the development of student autonomy, choice, responsibility (and for more than implementing the teachers’ agendas), with teachers providing the ‘scaffolding’ to support learning until such time that the scaffolding can be removed (as in a building construction). The role of teachers in scaffolding learning is significant.

Scaffolding is a necessary part of building, but the important feature is that, once the building is completed, the scaffolding is removed. In educational terms, this suggests that the teacher supports learning but also support the development of students as independent learners, capable of standing on their own and thinking for themselves.

Teachers can provide scaffolding in a variety of ways, for example, by asking questions, by prompting and probing, by providing reminders, by giving clear step-by-step instructions, by demonstrations. Scaffolding also requires the provision of rich feedback on learning to students.

Not only is scaffolding provided by the teacher, students can provide scaffolding for each other. This emphasises Vygotsky’s point that learning is a social as well as an individual activity. Peer-provided scaffolding is motivating and meaningful.

The slide provides a checklist that can be used to ascertain whether, and how far, the potential for higher order thinking is being provided. It can feature in the lesson preparation for the presentation.

*Slide 12*

Metacognition has already been stated as a significant element of effective learning, particularly of higher order thinking and deep learning. Metacognition can be deliberately developed through a variety of means, as set out in this slide. The slide provides a checklist that can be used to ascertain whether, and how far, the potential for metacognition is being provided. It can feature in the lesson preparation for the presentation. It can be seen that the development of metacognition is a social matter

**Break**

After the break the remainder of the evening is devoted to giving the students time to continue the preparation of the presentation of the lesson planning, to include material from the previous presentation on motivation and from this session on deep learning.

*Handouts*

- (a) Slides of PowerPoint presentations
- (b) Handouts (two sheets) of deep and superficial learning.

## PRESENTATION 7: Collaborative learning

Tell the students the aims of the presentation and what the session will comprise – what they will be looking at and what they will be doing, and what you hope are the outcomes.

### Aims

- 1 To introduce some characteristics of collaborative learning.
- 2 To introduce some ways of moving to group work with students who are not used to working in groups.
- 3 To provide the final opportunity for students to work on their lesson preparation for the assessment presentation.

The presentation is split into two parts. Firstly there is a short input on collaborative learning, followed by the final opportunity to plan the presentation for assessment.

### *Slide 1*

### *Slide 2*

Group work and collaborative learning, as mentioned earlier, is not only a possibility for variety in teaching and learning strategies; rather, as suggested in a previous module, it is a necessity for higher order learning to be effective, and, from the session on brain-based education, it is one of the most powerful learning strategies. It provides students with the opportunity to exercise responsibility and autonomy. In group work teachers have a different role to play, more as facilitators and enablers than simply being didactic.

### *Slide 3*

Group work, properly handled and properly prepared for (both in terms of the students and the teachers) can be very beneficial. In using group work it is important to consider a range of factors, for example:

- the permanency and the criteria of the grouping;
- the need for group and collaborative activity (i.e. it is important to construct activities which require collaboration rather than selecting an activity which could be better done individually);
- the size of the groups (and research in the early 1990s suggests that classroom groups of over six fragment into smaller sub-groups, so it is important to keep below this number if the group is to remain cohesive);
- the gender make-up of the group (having one girl in a group of boys can render the girl silent);
- having too many boys in a group can lead to time-wasting and off-task talk.

In moving to group work, then, it is important to consider a range of criteria on which to base the make-up of the group. Sometimes putting friends together can be productive; at other times it can lead to time-wasting. Sometimes the groups can be *ad hoc*, simply for the particular activity in hand; other times it can be on a longer-

lasting basis. There is an important point to be addressed: putting students of mixed ability together in a single group benefits all parties; for poorer children they can learn from their brighter peers; for brighter students having to articulate matters to poorer students, rather than holding them back, is a way of enabling them to learn themselves – having to verbalise matters is an important learning strategy.

**Activity 1:** Consider the management and behaviour issues in moving towards group work. In small groups identify three management/behaviour difficulties/ problems in using and moving towards group work, and, for each difficulty/ problem suggest a solution. Make this a short activity, followed by a short plenary to hear their feedback, putting the problem and the solutions on the whiteboard.

#### *Slide 4*

If a group of students is not used to working in groups then it will not work overnight; students do not know instinctively how to interact effectively with others. Social skills, like other skills, should be taught and reinforced. Students need to be prepared for working together, to understand turn-taking, mutual support, mutual responsibility, handling disagreement and conflict, interdependence, working to an agreed agenda, producing an outcome, keeping on task rather than collectively wasting time, giving each other a chance to participate, listening to each other, valuing everybody's contribution, organising the division of labour, and so on.

To address collaborative work, then, requires preparation and planning. There is no need for everybody in the class suddenly to move to group work. If the class is unused to group work and collaborative activity then it can be managed a little at a time, at a rate that the students can handle. What can be seen on the sequence of four stages here are that the variables in the move towards group work are identified and controlled, including:

- the *number* of groups working at a single time;
- the *number of different ways* of working on a single activity at a time;
- the *number of different activities* taking place at a single time;
- the *time span* for group work (starting with a little and making it longer).

A decision will need to be reached on:

- whether groups simply each replicate the same activity;
- whether groups work on different ways of tackling the same kind of work;
- whether each group does a different aspect of an overall matter (like a jigsaw, with each group's work being one part of the jigsaw);
- whether each group is doing something unrelated to other groups.

The issue here is that, in moving to group work, it is unwise to be too ambitious until the students, as well as the teacher, can handle the situation, so the process of moving to groups is relatively gradual.

#### *Slides 5 and 6*

In moving to group work there are some key practical considerations that have to be faced (on the slides). The issue here is to expect students to take some time to become familiarised with groups work and to expect there to be some setbacks. An important issue here is one of clarity: the group should know what is expected so that the outcome is clear to everybody.

*Slide 7*

The teacher's role in group work changes, often from direct instruction to facilitation, suggesting, prompting, indeed this echoes some key principles of constructivism from the first part of this module.

*Handouts*

- (a) Slides of the PowerPoint presentation
- (b) Sheet on cooperative learning.

**PRESENTATION 8: Planning and implementing collaboration**

This presentation outlines the best ways of planning and implementing collaboration, and picks up key themes to consider.