TRAINING SESSION OUTLINES

Block 8: How pupils learn – making it stick

Overview

- The ECF statements covered by the training sessions in this Block are shown in the table.
- These sessions are complemented by and draw on the self-directed study materials and mentor sessions.

In these training sessions, ECTs will:

Learn that
2.2 Prior knowledge plays an important role in how pupils learn; committing some key facts to their long-term memory is likely to help pupils learn more complex ideas
2.5 Long-term memory can be considered as a store of knowledge that changes as pupils learn by integrating new ideas with existing knowledge
2.7 Regular purposeful practice of what has previously been taught can help consolidate material and help pupils remember what they have learned
2.8 Requiring pupils to retrieve information from memory, and spacing practice so that pupils revisit ideas after a gap are also likely to strengthen recall

Learn how to
Increase likelihood of material being retained, by:
2h Balancing exposition, repetition, practice and retrieval of critical knowledge and skills
2i Planning regular review and practice of key ideas and concepts over time
2j Designing practice, generation and retrieval tasks that provide just enough support so that pupils experience a high success rate when attempting challenging work

Session summary

The training sessions for this Block are:

Session	Content	Duration	ECF statements covered
8.1	Balancing exposition, retrieval, repetition and practice	75 minutes	2.8, 2h
8.2	Retrieval practice techniques	75 minutes	2.2, 2.5, 2.7, 2.8, 2i, 2j

Training Session 8.1: Balancing exposition, repetition, practice and retrieval

The intended outcomes of this session are for Early Career Teachers to:

Learn that:

- 2.8 Requiring pupils to retrieve information from memory, and spacing practice so that pupils revisit ideas after a gap are also likely to strengthen recall

Learn how to:
Increase likelihood of material being retained, by:

- 2h Balancing exposition, repetition, practice and retrieval of critical knowledge and skills

Duration	75 minutes
Suggested pre-session activity for ECTs	ECTs should bring a scheme of work with them to refer to during the session.
To prepare for this session, trainers should:	• Read Block 2 self-directed study materials • Read Block 8 self-directed study materials • Read Deans for Impact, Practice with Purpose.

Activities	ECF statement(s)	Suggested materials
Activating prior knowledge (15 minutes) Guidance to trainers • ECTs have encountered many teaching and learning approaches across the Blocks. • This session is about *balancing* exposition, repetition, practice and retrieval of critical knowledge and skills. They need to do this keeping in mind the entirety of the curriculum which they need to cover. • Therefore identifying the critical knowledge and skills is important.	2h	

Introduce the main ideas of this session: *You have been teaching for over a year now and will have realised that there are some knowledge and skills that are critical for pupils to experience success in your subject/phase. For example, knowing how to use shadow and light to make objects look 3D in art is something that they need from basic drawing all the way up to expert. It is critical because it will be used many more times as they grow from novice to expert. Something else might be critical because without it pupils could not understand more complex ideas, such as basic number sense precedes understanding fractions and decimals.* Small group discussion (ideally in subject or phase groups): **What knowledge or skills have you identified as being critical in your subject/phase?**		
## Spacing practice strengthens recall (15 minutes) Share the quote below: A curious peculiarity of our memory is that things are impressed better by active than by passive repetition. I mean that in learning (by heart, for example), when we almost know the piece, it pays better to wait and recollect by an effort within, than to look at the book again. If we recover the words the former way, we shall probably know them the next time; if in the latter way, we shall likely need the book once more. William James as quoted in Roediger & Butler, 2013 Pose the question: **What do you understand as the aim when planning for exposition, repetition, practice and retrieval tasks in your lessons?** Draw out some key points: ● The aim is to help new learning stick so that pupils remember it for longer. ● We will need to present the new information carefully (exposition), repeat and practise it and then go back and retrieve it at various points after the initial encounter. ● To aid pupils' memory, we can draw on the evidence of techniques that will best support them to remember over time. ● This links back to how pupils learn in that we know that for new learning to stick in the long-term memory it needs to be seen more than once.	2.8	Scheme of work from ECTs

- The research has shown that when pupils practise and it is active they are more likely to remember in the long term.
- Expositions, repetition, practice and retrieval tasks can all be active tasks.

Read the following summary:

> The distributed-practice effect is robust. Cepeda et al. (2006) reviewed 254 studies involving more than 14,000 participants altogether; overall, students recalled more after spaced study (47%) than after massed study (37%).
>
> Dunlosky et al., 2013

Discuss, either in small groups or in pairs (ideally in the same subjects or phase): **What does this tell us about how practice should be planned for?**

Ask the ECTs to share their scheme of work for the year with each other. They might be in varying levels of detail. Ask the ECTs to explain where in the scheme of work pupils have the opportunity to practise previously learnt material at spaced intervals.

The general rule is that pupils should have at least two opportunities to encounter new material, and more if it is particularly important. The gaps should be at least a few days – and perhaps weeks – as this will actually help pupils to remember the material better in the long term rather than just on two successive days.

Balancing expositions, repetition, retrieval and practice (25 minutes)

2h

This generation task could be done using big pieces of paper and post-it notes, which ECTs add to. At the end of the session the trainer could take a photo or type up all of the ideas to share with ECTs so they have a record of them.

Exposition

Read the summary below:

> An exposition is more than just a brief explanation: it is a coherent and well-thought out presentation of an idea, which may be communicated through multiple learning experiences and over a sequence of lessons or activities.
>
> When designing expositions, our aim is to communicate a concept or idea in the most efficient way, and support our pupils to develop a secure understanding of the content.
>
> Some important things to consider when planning an exposition. It should:
> - Support pupils to develop conceptual understanding and build strong mental models
> - Take steps to manage cognitive load
> - Ensure that pupils have the opportunity to actively process and think about the material.

Pose the question: **What are the characteristics of good expositions (thinking about the research in this area)?**

The trainer should add to the ECTs' list with some of their own examples or these below:

- Provide carefully constructed, clear explanations utilising multimedia where appropriate
- Provide opportunity to build conceptual understanding through first-hand experiences, or by making use of examples, non-examples, metaphors or analogies, making the underlying meaning explicit
- Present only small amounts of information at one time
- Take into account pupils' prior knowledge when planning how much content to introduce
- Minimise distractions so pupils can focus attention on the material to be learnt
- Eliminate unnecessary information, ensuring material is relevant and helpful for learning
- Use high-quality talk to articulate key ideas/apply vocabulary
- Ask questions to check understanding and encourage elaboration.

Repetition

Read the quote below:

> "Repetition is great for learning but terrible for motivation." Willingham 2009

Pose the question: **What are the implications of this?**

- We need to think of ways to vary repetition and keep it interesting for pupils

Pose the question: **What examples of repetition activities can ECTs think of?**

The trainer should add to the ECTs' list with some of their own examples or these below:

- Low stakes quizzes – these can be fun opportunities for repetition at the start or end of lessons
- Mastery problems – problems that use the same content but in different ways (e.g. how many ways can you find a shape with a perimeter of 24cm)
- Flash cards
- Matching activities
- Verbal recall – get the class to repeat together in a chorus

Practice

Read the quote below:

> "Practice is essential to learning new facts, but not all practice is equivalent." Deans for Impact 2015

The trainer may want to share the Deans for Impact, Practice with Purpose, document. Although this is related to professional development for teachers, it is equally relevant for pupils practicing too.

There are five principles, which are highlighted to make practice purposeful:

1. Push beyond – challenges help novices to move beyond their comfort zones
2. Work towards well-defined, specific goals – these should be sequenced from basic to more sophisticated skills
3. Focus intently on the practice activity – this should be low stakes

4. Receive and respond to high-quality feedback – after feedback is given there should be time to respond to it
5. Develop a mental model of expertise – pupils should know what 'excellent' looks like e.g. through models or worked examples

Pose the question: **What examples of practice activities can the ECT think of?**

The trainer should add to the ECTs' list with some of their own examples or these below:

- Start each day with a daily review or practice task e.g. vocabulary, events or learning from the day or week before
- A weekly or half-termly quiz, which pulls a mixture of questions from previously learnt material as well as newly learnt material
- Present new material in small steps, providing opportunities to practise after each new step
- Guide the practice, asking questions and giving additional explanations and examples, checking that pupils understand each step as you move along
- Ask questions to allow pupils to practise their answers.

Retrieval

Read the summary below:

> Learning is usually thought to occur during episodes of studying, whereas retrieval of information on testing simply serves to assess what was learned. We review research that contradicts this traditional view by demonstrating that retrieval practice is actually a powerful mnemonic enhancer, often producing large gains in long-term retention relative to repeated studying. Retrieval practice is often effective even without feedback (i.e. giving the correct answer), but feedback enhances the benefits of testing. In addition, retrieval practice promotes the acquisition of knowledge that can be flexibly retrieved and transferred to different contexts. The power of retrieval practice in consolidating memories has important implications for both the study of memory and its application to educational practice.
>
> Roedinger & Butler, 2011

Pose the question: **What examples of retrieval activities can the ECTs think of?**

As ECTs come up with examples, they could check them against the quote above to ensure that it really is a retrieval task. The trainer should add to the ECTs' list with some of their own examples or these below: ● Think-pair-share – get pupils to think first of their response, share it with a partner before contributing to the rest of the class ● Low-stakes quizzes – include content from previous lessons ● Brain dumps – get pupils to put everything they know about a topic or a theme onto one piece of paper. Compare them after to see what they missed. ● Flashcards – either create them for your class or support your pupils to create their own set.		
## Planning for action (15 minutes) Ask the ECTs to identify a critical knowledge or skill that they want pupils to remember over time. Using the scheme of work that they brought, they should identify spaced gaps when they can use one or more of the activities discussed above to practise over the year, including a balance of exposition, repetition, practice and retrieval tasks. They can work in pairs or small groups to design the tasks they will ask pupils to do. ECTs should commit to when they will do this.		
## Review and next steps (5 minutes) Ask ECTs to share what they will do as a result of today's training session.		

Training Session 8.2: Retrieval practice techniques

The intended outcomes of this session are for Early Career Teachers to:

Learn that:

- 2.2 Prior knowledge plays an important role in how pupils learn; committing some key facts to their long-term memory is likely to help pupils learn more complex ideas
- 2.5 Long-term memory can be considered as a store of knowledge that changes as pupils learn by integrating new ideas with existing knowledge
- 2.7 Regular purposeful practice of what has previously been taught can help consolidate material and help pupils remember what they have learned
- 2.8 Requiring pupils to retrieve information from memory, and spacing practice so that pupils revisit ideas after a gap are also likely to strengthen recall

Learn how to:
Increase likelihood of material being retained, by:

- 2i Planning regular review and practice of key ideas and concepts over time
- 2j Designing practice, generation and retrieval tasks that provide just enough support so that pupils experience a high success rate when attempting challenging work

Duration	75 minutes
Suggested pre-session activity for ECTs	None
To prepare for this session, trainers should:	• Read the self-directed study materials for Block 2 on How pupils learn • Read the self-directed study materials for Block 3 on Effective classroom practice – teaching and adapting

Activities	ECF statements	Suggested materials
Introduction to the session (5 minutes) Explain to participants that they are going to focus on the following ECF statements: ● 2.2 Prior knowledge plays an important role in how pupils learn; committing some key facts to their long-term memory is likely to help pupils learn more complex ideas ● 2.5 Long-term memory can be considered as a store of knowledge that changes as pupils learn by integrating new ideas with existing knowledge ● 2.7 Regular purposeful practice of what has previously been taught can help consolidate material and help pupils remember what they have learned ● 2.8 Requiring pupils to retrieve information from memory, and spacing practice so that pupils revisit ideas after a gap are also likely to strengthen recall. The session also touches on: ● 2i Planning regular review and practice of key ideas and concepts over time ● 2j Designing practice, generation and retrieval tasks that provide just enough support so that pupils experience a high success rate when attempting challenging work ● 4g Combining a verbal explanation with a relevant graphical representation of the same concept or process, where appropriate. Explain that ECTs will be returning to the idea of practice in later Blocks. The purpose of this session will be to: ● Develop an understanding of how retrieval practice can be used to consolidate and develop knowledge, both within lessons and over time ● Recap on the roles of memory and schemas in learning (knowledge developed in Block 2) and how retrieval practice can support both ● Be able to identify a range of approaches that can be used within lessons.		

Activating prior knowledge (15 mins)

2.2, 2.5, 2.7, 2.8, 2i

Ask the ECTs: **Based on your prior learning from Block 2, please complete the following from memory:**

a) According to Willingham's 'Simple Memory Model', what are the three components of memory?	b) What is the difference between long-term and working memory?	c) Name three ways a teacher can reduce the cognitive load to help pupils learn.

Correct answers:

a. 1. Environment
   2. Working memory
   3. Long term memory

b. Long-term memory is the vast store for all of your knowledge and facts about the world. It has no known capacity. Working memory is where you actively process new information. It has a limited capacity and can become overloaded.

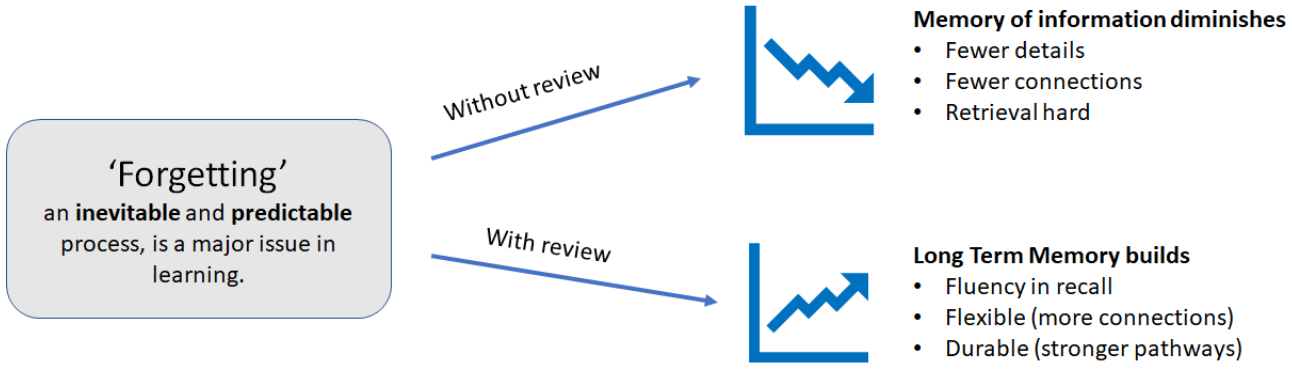
c. ECTs could name any of the following or any other appropriate answer:

- Take into account pupils' prior knowledge when introducing new content
- Directly link new learning to prior knowledge
- Introduce new or complex material in smaller, accessible steps
- Use aids to reduce the burden on cognitive load such as writing steps on the whiteboard
- Use partially completed examples
- Minimise distractions, such as complexity of tasks, to keep the focus on the content
- Sequence lessons so pupils secure foundational knowledge first before encountering more complex content
- Help pupils to commit some key facts to the long-term memory to free up working memory space.

Share the following with ECTs – this could be on a slide or by reading: Long term memory is now viewed as the central, dominant structure of human cognition. Everything we see, hear, and think about is dependent on and influenced by our long term memory. Clark, Kirschner and Sweller, 2012 ECTs need to remember that: ● A schema is an interconnected web of items and knowledge ● Our long-term memory contains many schemas ● Learning is the development of an increasingly robust and detailed schema ● Retrieval practice supports the development of the complexity of ideas, so develops schemas ● As experts we have robust and detailed schemas so we are able to spot patterns that pupils (novices) do not ● Novices need to transfer new knowledge to their long-term memory – this is learning.		
## Supporting pupils to transfer knowledge to long-term memory through practice (5 mins) One way that we can support pupils to transfer knowledge to long-term memory is through using retrieval practice. Share the following with ECTs: Retrieval means bringing information to mind – we are retrieving information from our long-term memory into our working memory. Retrieval *practice* is about engaging pupils in activities (for example asking them questions) with the intention of purposefully *retrieving* information from long-term memory. It helps us connect new knowledge to old, so it develops our schema. Rosenshine refers to it as a daily, weekly and monthly review.	2.5, 2,7, 2.8	

We often talk about 'getting information into students' heads' but it is better if we think about how we get it out! It is NOT re-teaching a topic or recapping. Effective retrieval practice is done with the memory in mind.		
## Using retrieval practice as part of your practice (30 mins) Facilitate a discussion: *It is very likely that you are already using retrieval practice of some kind! You might:* ● *Ask questions* ● *Use quizzes* ● *Provide homework and independent 'practice' activities.* *Any activity that requires pupils to bring information to mind is a retrieval activity.* Pose the question: **How much does this resonate with your own practice – do you currently use it or see how it could be used?** Depending on the session, this could be done as a think-pair-share or in small groups/with a partner or in a breakout room if delivered remotely.	2i, 2j	

Share the following:



Top tips for execution:

- Whenever possible it should be done from memory, i.e. closed book
- Involve everyone
- Make checking accurate and easy
    - It should be possible for all students to find out what they got right and wrong, what they know well and where they have gaps.
    - Every technique involves students testing their knowledge and then checking their work for accuracy and completeness.
- Specify the knowledge
    - Where appropriate, specify the knowledge in advance so pupils can study, prepare and self-check.
- Keep it generative
    - Students need to explore their memory to check what they know and understand; remove cue-cards, prompts, scaffolds; close books – they need to be thinking for themselves.
- Make it time-efficient
    - The idea of each technique is that they are quick and can be used repeatedly.
- Make it workload efficient

- None of these methods involve the teacher checking the students' answers, creating unsustainable workload.
- A teacher might choose to check the occasional test but that's no use for routine practice.

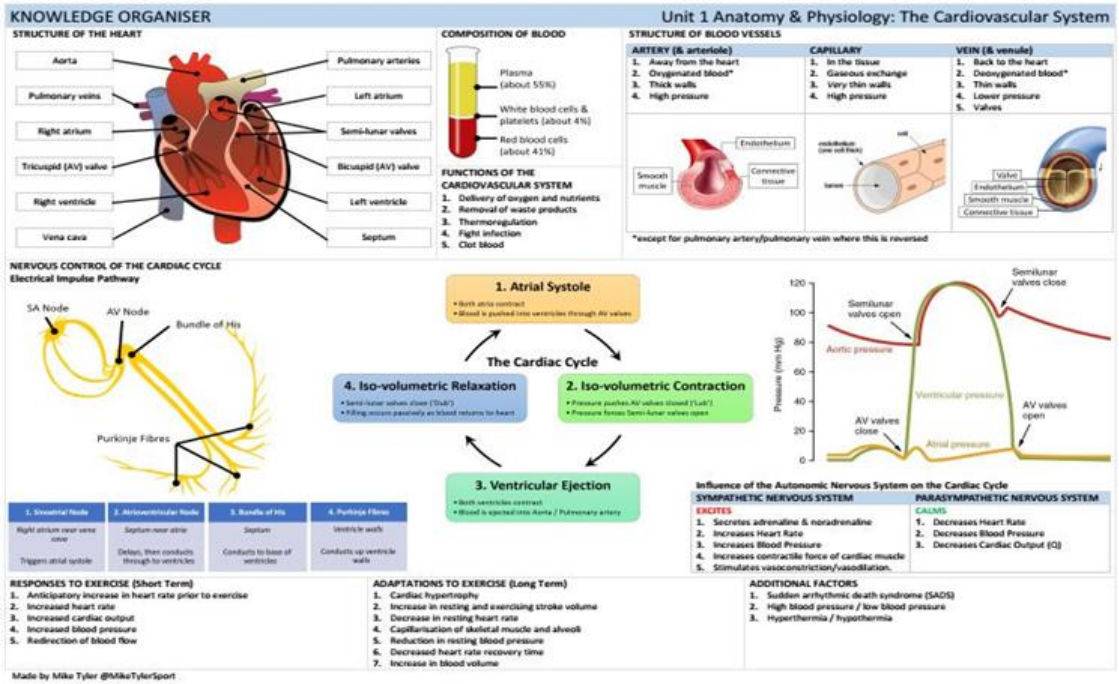
Sherrington, 2019

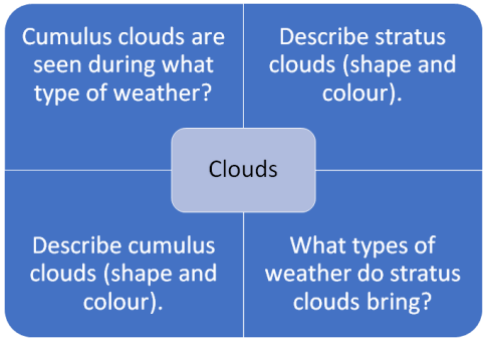
ECTs will now have an opportunity to look at a range of strategies that could be used for retrieval practice. ECTs should work in groups to discuss each one.

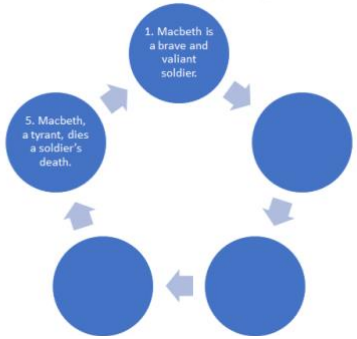
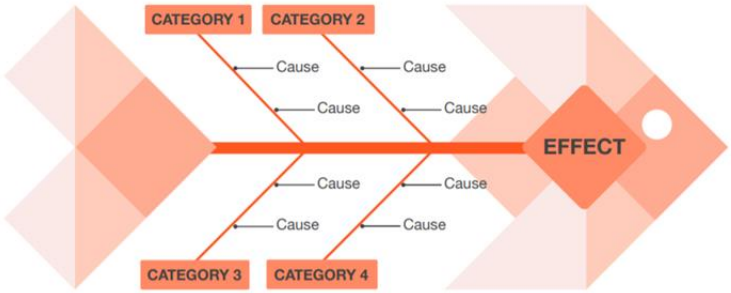
Pose the question: **Which of these activities do you think are the most useful?**

Strategy	**Explanation**
Frequent quick-fire quizzes	• Teacher reads out the question or presents them via slides/audio etc. • The questions can be spontaneously generated or prepared. • Questions can be simple factual recall, mental maths or multiple choice. • All students write down their answers. Teacher reveals the answers, one by one or all at once. Students check which they got right. • It's important that the teacher discusses common wrong answers – which is one of the main functions.
Gimme 5	List five things you remember about… 1. 2. 3. 4. 5.
Who? What? Where? When? Why?	Ask five questions that connect with prior learning or new learning. Each new question should begin with one of the five Ws. Who said...?

	What does…? Where was…? When did…? Why did…?		
3, 2, 1	List 3 facts about... List 2 features of... List 1 example of...		
10 for 10	Order 10 events in chronological order… List 10 features of… Rank 10 pivotal moments in… List 10 processes of… List 10 things about… List 10 things you remember about… Rank 10 things about… in order of…		
Brain dump	Timed activity: 5 minutes. *From memory*, write down the process of how we would convert a fraction to a percentage. OR Write down everything you know about World War II (only a blank piece of paper needed and can help assess prior knowledge).		

Knowledge organiser quiz	 **Top tips:** • Use as a quiz by **testing** students on certain sections. • Knowledge organisers have their **limitations** as they are just lists of facts, which do not show how those pieces of information are interconnected. • Always link the knowledge and make **patterns** explicit.		

Multiple choice questions (MCQ)	**1. Identify the correct present tense conjugation of the verb regarder:** a) Je regarde la télé b) Je regardé la télé c) Je regardons la télé **Top tips:** • Many prominent researchers in the testing effect have also carried out studies into the value of MCQ and have concluded that these are particularly effective ways to realise the benefits of 'the testing effect' (Bjork, Little and Storm 2014). • MCQ that only require the students to pick the familiar answers are less likely to be helpful: need plausible alternatives. • Use 'Evidence-Based Education's' designing great assessments guide to support MCQs.		
Quizzing with concept maps	 **Top tips:** • Help facilitate successful retrieval through **scaffolding: good for SEN and younger students**.		

	• Manages **cognitive load**. • Try using the map first, where students fill it out with notes in front of them. • Then, take notes away from them and have them partially completed ones. 'Go cold' with a blank concept map. Weinstein and Sumeracki: *Understanding How We Learn* (2019)		
Using graphic organisers	**Macbeth's character progression:**  **From memory, identify the causes of World War II.**  Top tips:		

	• More strategic as it forces students to organise knowledge • Can be done partially completed to scaffold or blank • Scaffolds younger or SEN students.		
Ask a few participants to share which they think would be the most useful and how they might use it. Note that the strategies they select might vary depending on their subject/phase and also the context of their pupils. They also might need to think about training their pupils – teaching them how and doing the activities regularly.			
### Adapting one resource for my pupils (10 minutes) Put ECTs into partners or small groups and ask them to choose one of the activities they looked at above. They should spend some time adapting it for a particular topic or concept that they have taught already or will be teaching.			
### Planning for action (10 minutes) Pose the question: **Following this session, what will you do differently in your practice? What will you put into action in your lessons?** This could be facilitated in a variety of ways, e.g. a think-pair-share, post-its or, if it is a virtual session, using the chat function.			