Early Career Framework

Core Induction Programme

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- UCL Early Career Teacher Consortium (https://www.early-career-framework.education.gov.uk/ucl/)
- Self-directed study materials (https://www.early-career-framework.education.gov.uk/ucl/ucl/2-understanding-teachers-as-role-models/)
- Module 2: Engaging pupils in learning (https://www.early-career-framework.education.gov.uk/ucl/ucl/2-understanding-teachers-as-role-models/2-engaging-pupils-in-learning/)
- Week 4: Consolidation of learning

Week

4: Consolidation of learning

Session Elements

- reflection
- independent planning
- practical exercise

Learning Intentions for this session

You will learn that:
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.

You will learn that:

2.9 Worked examples that take pupils through each step of a new process are also likely to support pupils to learn.

3.3 Ensuring pupils master foundational concepts and knowledge before moving on is likely to build pupils' confidence and help them succeed.

Introduction

In the training session from Week 2 and follow-up meeting with your mentor, you looked at the impact of pupils' prior knowledge on their learning and how knowledge changes through the cooperation of working and long-term memory. These link information related to a current activity to what pupils already know. As part of this, you examined how weak prior knowledge and misconceptions can have a negative effect on subsequent learning. You also looked at how you can take into account pupils' prior knowledge when planning how much new information to introduce.

Using techniques such as breaking complex material into smaller steps and reducing distractions, you saw how you can design lessons so that working memory is not overloaded, i.e. avoiding cognitive overload. This means that your pupils can focus their attention on what is relevant in the lesson. You discussed with your mentor how to identify misconceptions and sequence lesson content to provide a more secure base for future learning.

In this self-study session, you will extend your knowledge of how memory works, focusing on consolidation processes in long-term memory in particular (2.5, 2.7). You will consider how new memories are formed (i.e. learning) and how these new memories integrate with existing knowledge (3.3). You will use an illustrative exercise to understand how learning strategies, such as retrieval practice, spacing and worked examples, can lead to more robust storage of new memories, making for easier retrieval (2.8, 2.9).

You should apply insights from these exercises to examples from your own past experience with pupils and to future lesson plans.

Research and Practice Summary

This reading will help you understand some of the theory behind this week's topic. We will start by introducing some of the key concepts (these are in bold). You will

also see some suggestions of how to put these concepts into practice. **When using these concepts in your own practice, you will need to take account of your pupils' characteristics, the context of your classroom and the nature of the material that you are teaching.**

Consolidation, coding, retrieval and spaced practice

Do you remember that two weeks ago you met Bob, who was learning about cells in his biology lessons? After initially introducing cells and tackling problems linked to specialised cells, Bob's teacher waited a couple of weeks before returning to the topic and giving Bob's class a quick quiz on the topic.

Why did Bob's teacher do this? As you read this Research and Practice Summary, try to work out why.

Consolidation refers to the process of strengthening or stabilising new memories by transferring new learning from short- to long-term memory storage. When a memory is created (or 'encoded'), many aspects of that memory (including the context within which the learning occurred) are also stored. Teachers can draw upon this 'coding' to help their pupils consolidate new learning as well as to recall learning stored in their long-term memory.

To help your pupils to consolidate their learning, you should:

- give concrete worked examples and elaboration (e.g. explaining the new learning to someone else or showing models of 'what good looks like')
- give plenty of opportunity for them to retrieve knowledge that they might have begun to forget (e.g. by spacing your initial teaching and revision and doing recall activities, such as low-stakes questioning)
- establish 'talk-partners' within your class so that pupils establish the good habit of explaining things to one another

Encoding is defined as the initial learning of information, storage refers to maintaining information over time and retrieval is the ability to access information when you need it. **Retrieval practice** is any strategy that requires pupils to reconstruct knowledge by 'calling it to mind' from their long-term memory, so that it can be recalled, manipulated or used in the present. Retrieval practice is highly effective in helping pupils consolidate material that has been recently learned and is more effective than simply re-reading material. The more easily pupils can retrieve information from their long-term memory, the smaller the load placed on their

working memory. This, in turn, allows them to solve problems in front of them more easily or to solve more challenging problems.

To help your pupils to improve their recall, you should:

- require them to retrieve information from memory (this can take the form of frequent, low-stakes testing or quizzing, or you could ask them to demonstrate a previously taught skill so you can see what they have retained)
- try revisiting material from 'last lesson, last week, last term': lengthening the spacing increases the challenge and can strengthen recall, that is, spacing the practice

Spaced practice is a learning strategy whereby areas of the curriculum are broken up into short sessions, which are repeated over a longer period of time. This can be contrasted with 'blocking', whereby learning material is visited in large blocks which are not repeated. Spaced practice provides pupils with the time to form connections between the ideas and concepts so that knowledge can be built upon and easily recalled later. By allowing a memory to be almost forgotten before it is next recalled, Ebbinghaus found the reactivation of the memory is more effortful, which strengthens neural pathways in the brain. When this process is repeated several times, the memory becomes stronger and much easier to remember.

To help with your pupils' progress using spacing, you should:

- discuss with a colleague how your curriculum is arranged and where the opportunities may be to introduce more spacing
- make sure you enable your pupils to master foundational concepts first
- combine with retrieval practice activities, such as low-stakes testing, to improve their recall

What did Bob's teacher do?

Sarah, who teaches Bob biology, carefully considered how she would teach Bob's class about the structure and function of cells. This is foundational knowledge that Bob and his peers need to have a secure understanding of to succeed in biology.

Sarah began with careful exposition and opportunities for pupils to initially learn about cells. During their next lesson, they took this further to consolidate their learning by tackling a series of questions. After this second lesson, Sarah checked to ensure that all pupils understood what she had taught them and was pleased that they had.

However, Sarah knew that this would not be enough to consolidate this key knowledge into their long-term memory. Therefore, she planned opportunities to revisit this content using retrieval practice after

appropriate intervals (spacing). Sarah did this using some quick questions at the start of her lessons linked to what pupils had learnt in the previous week. By adopting this approach, Sarah will support her pupils to learn about this foundational topic.

Self-Study Activities

Review: 10 mins

Read the Research and Practice Summary on this week's topic. As you read, reflect on:

1. the practices that you are already doing well
2. the practices you are doing some of the time, but could do more of/more consistently
3. the practices you don't use in your teaching yet

Plan and Theory to Practice: 30 mins

1. Practical exercise

Think back to the cell biology scenario you considered in your first self-directed learning session of this module, where Bob had to learn about cell structures. Use that scenario as a model (see the Research and Practice Summary). For the subject, phase or setting you teach in, you will develop a similar exercise that you could use with one pupil or group of pupils to test the practices of retrieval and spaced practice.

2. Independent planning

Consider your lesson plans for the forthcoming week and identify one context where you can try to use these learning strategies to aid consolidation of new information, as illustrated by the scenario with Bob.

- identify the lesson or part of a lesson that you will focus on
- write a simple plan for how you will make use of your learning about retrieval practice and spaced practice in this lesson or part of a lesson – and think about whether starting with a worked example might be helpful
- annotate your plan to show why you have designed it in this way and discuss your thoughts with your mentor when you show them your plan

Next Steps: 5 mins

Bring your planning from this session to your next mentor meeting. Be ready to discuss this activity with your mentor, including raising any questions that have come to mind while completing this task.

Previous Week — 3: Literacy and learning (https://www.early-career-framework.education.gov.uk/ucl/ucl/2-understanding-teachers-as-role-models/2-engaging-pupils-in-learning/3-literacy-and-learning/)

Next Week — 5: Curriculum and subject knowledge (https://www.early-career-framework.education.gov.uk/ucl/ucl/2-understanding-teachers-as-role-models/2-engaging-pupils-in-learning/5-curriculum-and-subject-knowledge/)

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