Metacognition and self-regulated learning

Introduction and background

The Education Endowment Foundation Teaching and Learning kit was launched in 2011. It was designed to bridge the gap between research and classroom practice, showing 'what works' in an accessible way. One of the topics rated in the Toolkit as 'high impact for very low cost, based on extensive evidence' was 'metacognition and self-regulation'. Metacognition, at a basic level, involves pupils' ability to monitor, direct and review their learning. Effective metacognitive strategies encourage learners to think more explicitly about their own learning, setting goals and monitoring their academic progress. Self-regulation is linked in many ways to metacognition. Zimmerman sums up the concept, describing a successful self-regulated learner as follows: 'These learners are proactive in their efforts to learn because they are aware of their strengths and limitations and because they are guided by personally set goals and task-related strategies. These learners monitor their behaviour in terms of their goals and self-reflect on their increasing effectiveness. This enhances their self-satisfaction and motivation to continue to improve their methods of learning'.

It is clear that teachers want to know more about these concepts. Since the Teaching and Learning Toolkit was launched, the strand on metacognition and self-regulation has consistently been one of the most commonly accessed.

This report is therefore a response to teachers' wish to better understand how the metacognition and self-regulation can be successfully introduced into the classroom. It offers 7 practical, evidence-based recommendations to support teachers to develop these skills in their pupils. The guidance is relevant to early years practitioners, teachers, and senior leaders in primary and secondary schools, as well as those in post-16 settings. The recommendations are summarised below.

Key points

Recommendation 1

- Teachers should acquire the professional knowledge and skills which they will need to develop their pupils' metacognitive knowledge, since developing pupils' knowledge of how they learn is an effective way of improving pupil outcomes. The should be aware of the key points outlined below.
- We approach any learning task with some metacognitive knowledge about: our own abilities, i.e. knowledge of ourselves as a learner; knowledge about which strategies are available and effective; and knowledge about the particular type of activity or task.
- When undertaking a learning task, we start with this knowledge, then apply and adapt it. This is metacognitive regulation. It is about planning how to undertake a task, working on it while monitoring the strategy to check progress, then evaluating the overall success.
- The **cycle of plan, monitor, evaluate** and the different aspects of metacognitive knowledge **(learner, strategies, task)** are recurrent themes throughout this guidance. In expert learners, these processes are automatic, but in novice learners they need to be made more explicit.

- It is commonly thought that metacognition can only be developed in mature young adults. However, research has shown that children as young as 3 have been able to engage with metacognitive strategies such as setting goals and checking understanding.

Recommendation 2

- Explicitly teach pupils metacognitive strategies, including how to plan, monitor and evaluate their learning.
- Most pupils will not spontaneously develop all the metacognitive strategies they need or would find useful. They therefore require explicit instruction. There is some evidence to suggest that disadvantaged pupils are less likely to use such strategies and are, therefore, most likely to benefit from the whole range of approaches to supporting metacognitive and self-regulatory skills.
- Explicit instruction combines teacher input with questioning and feedback. At the planning stage, pupils should be encouraged to activate prior knowledge about the task. For example, the task may involve planning a short presentation on a given topic and they may decide to start by using their textbook. The planning stage will also involve selection of appropriate strategies. Once pupils have started on the task, teachers will need to emphasise the

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need for them to monitor their work, i.e. to assess the progress they are making. This will include self-testing, self-questioning and making changes to their chosen strategies if necessary. Evaluating will involve pupils appraising the effectiveness of their plan and its implementation.

- Effective questioning is one way for teachers to develop these skills in their learners. If, for example, pupils are required to paint a self-portrait, the following questions could help them at the planning stage: Have I done a self-portrait before and was it successful? What have I learned from the examples we looked at earlier? Do I need a line guide to keep my features in proportion? Monitoring questions may include: Do I need any specific techniques to improve my self-portrait? Is there anything I need to stop and change to improve my self-portrait? Are all of my facial features in proportion? Evaluation questions may include: Are there other viewpoints or techniques I would like to try? or How would I do a better self-portrait next time?

Recommendation 3

- Teachers should model their own thinking to help pupils develop their metacognitive skills. Modelling involves showing pupils the thought processes of an expert learner. Teachers need, first and foremost, to verbalise the thought processes which are needed for metacognition.
- One example given in the guidance is of how a teacher might teach pupils to perform a forward roll in PE. She would model by talking through her actions while demonstrating: 'I don't want to hurt my neck and want to do this neatly. So first, to protect my neck, I need to tuck my chin to chest like this. Then when I start to roll, I remember not to roll onto my head. Instead, look how I'm going to roll onto my back and shoulders. This also means my back is round, so I can smoothly roll like this. Now, who can remember what I did first to protect my neck?'
- To move from novice to expert, pupils need to know how an expert athlete, artist, historian, or scientist habitually thinks and acts. These implicit processes need to be made explicit to novice learners.
- The modelling process involves teachers gradually reducing the support or 'scaffolding' which pupils are given. This enables the pupils to move from guided practice to more independent practice. For example, a maths teacher might first share a completed worked example of adding fractions before looking more closely at the steps involved in working out the solution. After the step-by-step modelling, the teacher gradually removes the scaffold, getting pupils to undertake a partially completed equation.

Recommendation 4

- Teachers should set an appropriate level of challenge to develop pupils' self-regulation and metacognition. Paradoxically, if pupils have to undertake a task which makes them struggle and remember 'deliberate difficulties' they are more likely to recall information from these tasks from their long-term memory in the future.
- However, challenge needs to be set at an appropriate level. If it is not, the learner may not accept the challenge, believing that he/she does not have the ability to complete it.
- Alternatively, the learner may suffer from cognitive overload. Cognitive load is the amount of information which the working memory can hold at one time. The working memory is where information is processed. Tasks must not, therefore, overload the working memory, particularly where the pupils have to use new strategies.
- It is possible to help pupils to maximise their working

memory through a range of metacognitive strategies. We can, for example, suggest grouping information into more manageable 'chunks' or creating stories to be remembered.

Recommendation 5

- Teachers need to promote and develop metacognitive talk in the classroom. When teachers ask challenging questions - guiding pupils with oral feedback, prompting dialogue, and scaffolding exploratory talk, this enables pupils to develop their metacognitive strategies.
- 'Dialogic teaching' as devised by Robin Alexander, emphasises classroom dialogue which helps pupils to reason, discuss, argue and explain, thereby developing their metacognitive strategies. Dialogic talk goes beyond the sequence of a teacher question – pupil response – teacher feedback sequence.

Recommendation 6

- Teachers should explicitly teach pupils how to independently organise and manage their learning.
- The phrase 'independent learning' is commonly used, but perhaps not so commonly understood. In simple terms, it is when pupils exercise a degree of autonomy. They make active choices to organise and manage their learning, while deploying metacognitive strategies. One example is the way in which a pupil might tackle GCSE revision, setting out a plan for the evening, and recognising when he/she needs to take breaks in order to remain alert. However, this pupil will have needed previous modelling of approaches to revision.
- Independent learners use a range of strategies too help them to work effectively. These include: setting specific short-term goals (e.g. an evening's revision plan); adopting strategies for attaining the goals (e.g. self-testing using flashcards); or monitoring progress (e.g. completing exam practice questions).
- Teachers need to provide carefully designed guided practice, with support gradually withdrawn as the pupil becomes proficient. This allows pupils to develop skills and strategies before applying them in independent practice.

Recommendation 7

- Schools should support teachers to develop knowledge of these approaches and expect them to be applied appropriately. They need to develop teachers' knowledge and understanding through high quality professional development and resources. Senior leaders should provide teachers with time and support to make sure approaches are implemented consistently.
- Although reliable assessment of metacognition is a challenge, there are methods which can be used by teachers. For example, they can note when pupils are using observable strategies such as underlining a passage or making notes; or they can directly observe their use of metacognitive strategies when they are completing a task. Questionnaires or interviews may also be used.