Cost	Evidence strength	Impact (months)	Effect size
£ £ £ £ £		+7	0.58

What is it?

Metacognition and self-regulation approaches to teaching support pupils to think about their own learning more explicitly, often by teaching them specific strategies for planning, monitoring, and evaluating their learning.

Interventions are usually designed to give pupils a repertoire of strategies to choose from and the skills to select the most suitable strategy for a given learning task.

Self-regulated learning can be broken into three essential components:

- cognition - the mental process involved in knowing, understanding, and learning
- metacognition - often defined as ‘learning to learn’; and
- motivation - willingness to engage our metacognitive and cognitive skills.

Key Findings

1. The potential impact of metacognition and self-regulation approaches is high (+7 months additional progress), although it can be difficult to realise this impact in practice as such methods require pupils to take greater responsibility for their learning and develop their understanding of what is required to succeed.

2. The evidence indicates that explicitly teaching strategies to help plan, monitor and evaluate specific aspects of their learning can be effective.

3. These approaches are more effective when they are applied to challenging tasks rooted in the usual curriculum content.

4. Teachers can demonstrate effective use of metacognitive and self-regulatory strategies by

modelling their own thought processes. For example, teachers might explain their thinking when interpreting a text or solving a mathematical task, alongside promoting and developing metacognitive talk related to lesson objectives.

5. Professional development can be used to develop a mental model of metacognition and self-regulation, alongside an understanding of teaching metacognitive strategies.

How effective is the approach?

The average impact of metacognition and self-regulation strategies is an additional seven months' progress over the course of a year.

Metacognition and self-regulation strategies can be effective when taught in collaborative groups so that learners can support each other and make their thinking explicit through discussion.

A number of studies in the Arab world have noted the significance of meta-cognitive skills on students' academic outcomes. In 2017, a study of students in Saudi Arabia found that pupils in the experimental group performed better on the posttest when taught using the metacognitive strategies comparing with the control group.

Arab world-based research on the topic suggests that students can benefit from exercising self-regulated learning skills. In order for students to learn how to effectively and autonomously apply these skills, studies in the Arab world suggest that teachers use more open-ended questions and implement activities that encourage students collaborative learning.

Further research is recommended to investigate other meta-cognitive and self-regulation strategies impact on students' achievement particularly among primary grades. Researchers are invited to look at teachers' understanding about these strategies and how and in what ways they can best integrate them in the curriculum. Having this evidence-based data would be helpful for the design of professional development programs for teachers.

Behind the average

Studies involving primary school pupils have typically been more effective (+ 8 months) than those with secondary school pupils (+ 7 months).

Metacognitive and self-regulation strategies have been used across the curriculum, with approaches in mathematics and science particularly successful.

Studies that use digital technology, for example, intelligent tutoring systems that scaffold learning show particularly high impacts on pupil outcomes.

Closing the disadvantage gap

There is some evidence to suggest that disadvantaged pupils are less likely to use metacognitive and self-regulatory strategies without being explicitly taught these strategies. Explicit teaching of metacognitive and self-regulatory strategies could therefore encourage such pupils to practise and use these skills more frequently in the future. With explicit teaching and feedback, pupils are more likely to use these strategies independently and habitually, enabling them to manage their own learning and overcome challenges themselves in the future.

How could you implement in your setting?

Self-regulation and metacognition strategies work through learners monitoring and evaluating their own learning strategies. Some necessary components for successful metacognitive strategies might include:

- Explicit teaching of metacognitive strategies
- Teachers modelling their own thinking to demonstrate metacognitive strategies
- Opportunities for pupils to reflect on and monitor their strengths and areas of improvement, and plan how to overcome current difficulties.
- Providing enough challenge for learners to develop effective strategies, but not so difficult that they struggle to apply a strategy.

Metacognition and self-regulation strategies are most effective when embedded in a school's curriculum and a specific subject lesson. For example, teaching metacognitive strategies to self-evaluate an essay in history will prove different to a pupil evaluating their methods for mathematical problem solving.

When introducing new approaches, schools should consider implementation. For more information see **Putting Evidence to Work – A School's Guide to Implementation.**

What does it cost?

Overall, the median costs of implementing metacognition and self-regulation strategies are estimated as very low. The costs associated with metacognition and self-regulation mostly arise

from professional development training for staff, which is most commonly a start-up cost for embedding the approach into the school's curriculum. Whilst the median cost estimate for metacognition and self-regulation strategies is very low, the range in cost of professional development training, and the option to purchase additional materials and provide ongoing training and support, means that costs can range from very low to low. Evidence suggests that the effectiveness of metacognition and self-regulation strategies is influenced by teachers' understanding of how to develop pupils' metacognitive knowledge.

These cost estimates assume that schools are already paying for staff salaries, materials and equipment for teaching, and facilities to host lessons. These are all pre-requisite costs of implementing metacognition and self-regulation strategies, without which the cost is likely to be higher.

Implementing metacognition and self-regulation strategies will also require a small amount of staff time, compared with other approaches, as staff need to develop their own understanding of metacognitive and self-regulatory processes to model effective use of these strategies and skills to pupils.

Alongside time and cost, school leaders should consider how to maximise explicit teaching of metacognitive strategies by supporting teachers to use these approaches in their practice. At the same time, school leaders should be careful to avoid the alienating teachers who do not feel confident in their knowledge of or implementation of these strategies.

How secure is the evidence?

The security of the evidence around metacognition and self-regulation strategies is rated as high. 246 studies were identified. Overall, the topic lost a padlock because a large percentage of the studies were not independently evaluated. Evaluations conducted by organisations connected with the approach – for example, commercial providers, typically have larger impacts, which may influence the overall impact of the strand.

As with any evidence review, the Toolkit summarises the average impact of approaches when researched in academic studies. It is important to consider your context and apply your professional judgement when implementing an approach in your setting.