

The meta-cognition and self-regulation chimera

Submitted Abstract

One important strand of the Education Endowment Foundation's (EEF) Teaching and Learning Toolkit is known as 'meta-cognition and self-regulation'. The Toolkit claims that for very low cost, the implementation of a meta-cognition and self-regulation strategy will deliver 8 months of additional progress for students. How should teachers interpret these claims and what do they imply for the classroom? On examination, the category of meta-cognition and self-regulation seems to have been stitched together from a range of different beasts, much like the mythical chimera. Whereas some of the interventions that have been allocated to this category have a proven record of success, such as explicit writing instruction, others are more speculative, have mysterious mechanisms of action and the EEF's own research provides little support for their adoption. Of the randomised controlled trials conducted by the EEF, only two out of seven (or perhaps eight) trials present a clearly statistically significant result in favour of the tested intervention. Practitioners should therefore be wary of any simplistic claims made for this category of intervention and, if interested, should explore the underlying research before committing to one of these approaches.

Text of article (1080 words including references)

If you are a teacher or a school leader and you visit the Education Endowment Foundation's (EEF) online toolkit, you will notice one 'strand' that stands out from the rest. Implement 'meta-cognition and self-regulation' in your school and you can expect your students to make an additional eight months of progress. But wait, it doesn't stop there. Implementation is low cost. And there's more. The evidence for its effectiveness is even stronger than the evidence supporting the use of feedback. It's a no-brainer then. Off you go and do it!

What is that, you say? You are not sure what 'meta-cognition and self-regulation' is? Perhaps Kevan Collins, Chief Executive of the EEF, can help. According to Collins, 'Meta-cognition is getting beyond – above the actual thing – to have a better sense of it.' (Collins, 2017). Does that help?

I was not entirely clear and so I decided to look at the studies that sit behind the EEF figures. What I discovered caused me to question the headline claims. It seems as if, like the mythical chimera, the category has been stitched together from a range of different beasts. Moreover, the outcomes we should expect vary greatly, depending on what kind of approach we select.

The EEF produce a 'technical appendix' for each of their toolkit strands and so I consulted the technical appendix prepared for meta-cognition and self-regulation (Education Endowment Foundation, 2016). It lays out two sources of evidence. The first is a range of meta-analyses conducted by different education researchers that seek to draw together and synthesise the findings from many different studies. The second is a set of individual studies, mostly conducted as randomised controlled trials by the EEF itself.

An 'effect size' is calculated for each of the meta-analyses and studies and these are combined by the EEF, in a further layer of meta-analysis, to produce an overall effect size which is then used to generate the headline figure of eight months of additional progress. Combining effect sizes through meta-analysis is controversial because the conditions of a study can influence the effect size. For instance, the age of the subjects and whether the outcome measure is designed by the researchers can both influence effect sizes (Wiliam, 2016). In the case of meta-cognition and self-regulation, this issue is compounded by the fact that the outcome measures vary widely from reading to maths to critical thinking.

Moreover, we might expect effect sizes to be influenced by the quality of the study design and the technical appendix seems to support this conclusion because the effect sizes of the more rigorous EEF randomised controlled trials are generally lower than for the meta-analyses.

Such problems have led Dylan Wiliam, Emeritus Professor of Educational Assessment at the UCL Institute of Education, to conclude that, ‘...right now meta-analysis is simply not a suitable technique for summarizing the relative effectiveness of different approaches to improving student learning...’ (Wiliam, 2016).

If we just focus on the studies conducted by the EEF, the case for meta-cognition and self-regulation seems weak at best. Of the seven studies, only two appear to have statistically significant results. In three of the other studies, the results are not significant and in two more, significance was not even calculated. This matters because a test of statistical significance tells us how likely we would be to collect this particular set of data if there really was no effect from the intervention. If results are not statistically significant then they could well have arisen by chance.

Furthermore, the diversity of approaches sitting under the label of meta-cognition and self-regulation is astonishing. In *Philosophy for Children*, for instance, teachers use stimulus material to initiate class discussions around concepts such as truth. This supposedly has an impact on their maths performance (Gorard et al., 2015) although the way that this is meant to happen seems spookily mysterious and the lack of a test of statistical significance does not fill me with confidence.

In contrast, *Improving Writing Quality* is an intervention where students are explicitly taught how to plan, draft, edit and revise their writing. This was one of the two EEF studies with a statistically significant result and it was the one with the largest effect size. This is hardly surprising because explicit writing interventions have repeatedly been shown to be effective at improving students’ writing (Torgerson et al., 2014). Moreover, in contrast to *Philosophy for Children*, the way that it works is highly plausible.

What do these approaches have in common and what do they have in common with a science intervention such as *Thinking Talking Doing Science* or a growth mindset intervention? True, they all involve students in thinking, but then so does every other educational activity.

One intervention, *Let’s Think Secondary Science*, has not yet made it into the data pool for meta-cognition and self-regulation and I’m not clear as to why, although it may just be due to the timing of the study. It is based on the Cognitive Acceleration in Science Education projects of the late 1980s and early 1990s, has similarities to *Thinking Talking Doing Science*, but when tested by the EEF was found to have no effect on learning (Hanley et al., 2016).

It therefore matters greatly what type of intervention we select and what outcomes we are intending to improve by selecting it. By stitching together explicit writing interventions with philosophical discussions, the EEF have created a monster; a chimera that hinders our ability to understand what works best in schools. Teachers and school leaders would be wise to read the underlying studies in the meta-cognition and self-regulation strand and draw their own conclusions. For its part, the EEF should get, ‘beyond – above the actual thing – to have a better sense of it,’ and then break it apart.

References

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