**Metacognition – Recommendation 4**

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Put simply, and somewhat paradoxically, if pupils have to undertake a task that makes them struggle (remember ‘deliberate difficulties’ from email #5), they are more likely (in the future) to recall information from such tasks from their long-term memory. [1]   A successful pupil will regularly engage in metacognitive reflection, asking questions of themselves as they learn and take on challenging tasks, such as: | | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  |  |  |  | | --- | --- | --- | --- | |  | |  |  | | --- | --- | | |  | | --- | | ***Knowledge of task:***   * Is this task too challenging for me? * What are the most difficult aspects of this task? * How much time should I devote to this task? * Are there easy bits I can get ‘done’? | | | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  |  |  |  | | --- | --- | --- | --- | |  | |  |  | | --- | --- | | |  | | --- | | **Knowledge of self:**   * Is this task asking for subject knowledge I can remember? * Do I understand the concept(s) that underpins this task? * Am I motivated to stick at this tricky task? * What can I do to keep myself focused? | | | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  |  |  |  | | --- | --- | --- | --- | |  | |  |  | | --- | --- | | |  | | --- | | **Knowledge of strategies:**   * Are my notes effective for understanding this task? * Do I need to ask the teacher for help? * What strategies can I deploy if I am stuck? * What can I do to ensure I remember what I’ve learned? | | | |  |  |  |  | | --- | --- | --- | | |  |  | | --- | --- | | |  | | --- | | A successful metacognitive learner will ask such questions, either consciously or as an unconscious process, and typically exhibit an awareness of the degree of challenge in what they are learning.  However, challenge needs to be set at an appropriate level, otherwise one or both of the following may occur:   * the learner will not accept the challenge; or * the learner will suffer cognitive overload. | | |  |  |  |  | | --- | --- | --- | | |  |  | | --- | --- | | |  | | --- | | **Accepted challenge and motivation**  As we know, motivation is one of the essential components of self-regulated learning. Pupils, and even animals, opt out of difficult trials; they avoid tests they are unlikely to answer correctly. [2] Where learners are being challenged it is important to ensure they feel emotionally supported as well as being motivated to persevere.  Metacognition, then, is of special importance when pupils make decisions about how to study and how to maintain effort and motivation until the task is complete. [3]  Take homework, for example—an ever-present challenge to pupils, teachers, and parents alike. It is paramount to pitch homework at the right level of challenge, especially as the control and monitoring offered by the teacher in the classroom is absent. Metacognitive strategies are required to preserve self-motivation in this undertaking.  First, pupils will make a judgement on how challenging the homework is to them. If a given homework is clearly difficult, then a pupil will need **self-efficacy** [4]—or self-confidence in their ability to complete a given task—which is shown to predict the deployment of metacognitive strategies.  In motivating pupils to persevere at challenging tasks, it is important to reward effort rather than absolute levels of achievement; to give feedback about personal progress, and to avoid social comparison.  One obvious factor that has been found to relate to more effective use of metacognitive strategies, and sticking to tasks like homework, is the ability to delay gratification. Pupils who are better able to delay gratification in favour of studying, or undertaking homework, are also better at planning and regulating their learning, and vice versa. [5]  In Walter Mischel’s famous **‘marshmallow test’**, young children were given the challenge of delaying their gratification by being offered the choice of one small reward—the marshmallow—or wait for 15 minutes to gain a larger reward of two marshmallows. [6] In this experiment, the children deployed a range of metacognitive strategies such as not looking at the marshmallow, or closing their eyes and thinking of something completely different.  It is such strategies that teachers can support children to deploy in a range of contexts, such as the aforementioned homework example.  **Helping pupils reduce cognitive overload**   What is an appropriate level of challenge? This question requires expert knowledge both of a given subject, and of pupils in the classroom.  **‘Cognitive load’ theory**, [7] developed by John Sweller out of the study of problem solving, offers a handy model to understand the ‘Goldilocks degree of challenge’: not too hard, not too easy, but just right.   Put simply, ‘cognitive load’ is the amount of information our working memory can hold at any one time. The working memory is where we process information and is key to learning.  The capacity of the **working memory** is limited. We can, however, support pupils to maximise their working memory with a range of apt metacognitive strategies.  For example, we can rehearse the components of a complex task (such as the worked examples already mentioned) so that it becomes automated, thus freeing up working memory capacity. Or we might suggest creating stories from information to be remembered, [8] or grouping information into more memorable categories or more accessible **‘chunks’**. [9]  Understanding cognitive load in relation to self-regulation and metacognition has a number of consequences.  First, where we can draw on existing knowledge from the long-term memory, we increase capacity; this is one reason why knowledge matters and why learners need to be taught to first try and activate prior knowledge.  Second, we need to make sure that learning activities don’t overburden working memory; we need to teach strategies to cope with demanding tasks—for example, using diagrams, notes, and other external aids, talking through the problem out loud, or breaking the task down into simpler steps.   In terms of developing self-regulated learning and metacognition, this means we need to make sure that we don’t give too much information at the same time (when delivering explicit instruction), and do not expect the learner to take on too much challenge when doing guided practice and independent work.  The use of **structured planning templates**, **teacher modelling**, **worked examples**, and **breaking down activities into steps** can help achieve this.   It also means that any metacognitive teaching tasks—like asking pupils to reflect on their learning—should be carefully placed so as not to distract from the learning at hand. Teachers shouldn’t expect pupils to develop new cognitive and metacognitive skills at the same time. | | |  |  |  | | --- | --- | | |  | | --- | |  | |  |  |  |  | | --- | --- | --- | | |  |  | | --- | --- | | |  | | --- | | **Further resources...**  If this email has whetted your appetite to find out more about metacognition and self-regulation, you can:   1. Find out more about working memory from the experts, Professor Susan Gathercole and Dr Tracey Packiam Alloway, in this accessible **'Understanding Working Memory: A Classroom Guide'**. [Click here to view](https://educationendowmentfoundation.us8.list-manage.com/track/click?u=cb569f99caaaedff117cdc74c&id=618cf430dc&e=ab6bf9c839). 2. Homework is always an important issue in schools, so viewing the evidence on homework is very useful. Huntington Research School has a handy blog on **'Homework: what does the evidence say?'** [Click here to view](https://educationendowmentfoundation.us8.list-manage.com/track/click?u=cb569f99caaaedff117cdc74c&id=a4c9312929&e=ab6bf9c839). 3. 'Cognitive load' is a very popular concept and it is being shared with many teachers, but we likely need to dig into the evidence and find out more. Happily, the New South Wales government have produced an excellent guide - **'Cognitive load theory: Research that teachers really need to understand'**. [Click here to view](https://educationendowmentfoundation.us8.list-manage.com/track/click?u=cb569f99caaaedff117cdc74c&id=378d7752f4&e=ab6bf9c839).   You can access all the **EEF's guidance reports** - with clear and actionable recommendations for teachers on a range of high-priority issues - by [clicking here](https://educationendowmentfoundation.us8.list-manage.com/track/click?u=cb569f99caaaedff117cdc74c&id=6f775c6a21&e=ab6bf9c839). | | |  |  | | --- | |  | |