**Retrieval Practice**

 Retrieval practice is an example of a strategy that can enhance the integration of information processing from the working memory into the long-term memory. If students have already learnt facts and information related to a new topic and this has been optimised through retrieval practices (tests, mind maps, quizzes, flash cards etc) pupils don’t need to overload the working memory capacity considering them; instead recalling facts from their long-term memory to speed up the learning process (Creaby, C 2020; Chandler and Sweller, 2009). This creates capacity in the working memory to process the new material. In this way learning can to take place more readily. Pupils can optimise the chance to learn new material, by committing previous knowledge of past information into long-term memory. Teachers need to think about how they design the learning sequence and activities so that they enhance the development of schema and automatic recall. When pupils are required to apply their learning to problem solving they can do draw on recall facts and schema development to answer the problem (Pope, D., 2020).

A range of research supports the effectiveness of retrieval practice in retaining knowledge in the long-term memory.Hendrick and MacPherson, (2017) believe that retrieval practice is important because without prior knowledge it is difficult for pupils to integrate new information. Retrieval practice can remind you what is being taught, help with difficult topics and identify gaps in knowledge or misconceptions (Weinstein et al., 2019). Barenberg Roeder & Dutke, (2018) & Roediger & Karpicke, (2006) suggest that retrieval practice makes it easier to find the information and improves your memory. We have to expend effort and think hard to remember something and that this is why retrieval practice works (Dunlosky et al., 2013). Retrieval practice is far more effective than more frequently used strategies such as re-reading and needs to occur a reasonable time after the topic has been initially taught. This maybe through testing knowledge via questioning, using flash cards, a test, through pupil self-testing or getting pupils to write a concept map). It is important that the pupil receives accurate feedback from the teacher to check their answers or by the pupil checking accuracy themselves (Creaby, 2020). There seems to be an uptake of retrieval practice by teachers which Shibli (2020) suggests maybe due to it being easy to implement, observe and measure. It is also a low resource activity. Shibli (2020) summarises how retrieval practice works as follows:

* Learners listens to a question in their working memory (WM)
* WM accesses the schema from their long-term memory (LTM)
* An expert with a well organised schema can do this quickly and solve the problem, answer the question
* A novice with a disorganised schema will find it harder to remember
* So regular retrieval practice (quizzes, tests etc) strengthens this retrieval process
* The aim of the retrieval practices is to move the information into LTM
* WM has finite capacity
* LTM has seemingly infinite capacity
* The more info in the LTM the less the demand on the WM and the more capacity it has

**Caution**

Coe (2020) suggest caution with the evidence for the efficacy of retrieval practice works. Most of the evidence comes from laboratory studies with USA psychology undergraduates, who receive accreditation for this as part of their course. There were 223 studies in laboratory settings and 30 studies in classrooms. Regardless of the settings the effect size for both is medium to high, 0.62 for lab studies vs 0.67 for classrooms. Coe (2020), suggests therefore that current trend for retrieval practice is supported. He remains unconvinced that retrieval practice will lead to better learning because of the variables that were tested in the studies were often simple eg verbal materials, paired words etc (Dunlosky et al., 2013, p. 32). He queries whether retrieval practice will be as effective in more complex tasks, and there is some support for this from studies (Van Gog and Sweller, 2015 & Rohrer et al; 2019). The suggestion is that retrieval practice seems to be effective for fact learning and may not be for more complex learning. Coe’s biggest doubt lies in the difference in context between what works under controlled laboratory research conditions and how this actually translates to authentic classroom practice. He likens this to the Bananarama Principle: *‘It ain’t what you do, it’s the way that you do it.’*(Higgins, 2018). Shibli (2020) concurs with this suggesting that the research evidence from retrieval practice potentially overly simplifes the learning process and does not take into account 30 learners being in the classroom. Coe goes on to identify some of the possible reasons why retrieval practice might not work in the authentic classroom situation:

* Retrieval questions might focus solely on factual recall (these questions are easier to generate) rather than requiring higher-order thinking
* Questions might be too easy and boost confidence without providing real challenge, which is likely to be a key ingredient for generating the kind of learning hoped for
* Too much time could be allocated to the quizzes, effectively losing the time that students need to cover new material (Coe, 2020)

To overcome these challenges he suggests that teachers need 3 skills teachers:

1. **skill**(e.g. being able to judge whether students have originally learnt the material, being able to create good questions)
2. **understanding**(e.g. that effects are biggest when recall is hard)
3. **commitment**(e.g making time to plan the quizzes and keep them going, reducing ‘teaching’ time to fit them in).

Other studies also express some caution with regards to the research evidence. Kupper-Tetzel & Erdfelder (2012) suggest that here is a lack of clear evidence in the research studies regarding the gap in time between teaching new material and testing it. Bjork and Bjork (1992) in Shibli (2020 identify the infallible nature of the human memory. Memory can change from day to day and can be impacted on context, emotional state, etc eg *“Sitting in a chaotic classroom environment is not going to support retrieval practice and neither is coming to school hungry.”*

It is worth considering whether the amount of time that tests and quizzes take does not ‘eat into’ teaching time and that retrieval practice can only happen after the teaching has occurred (Shibli 2020). Teachers roles are to make the learning accessible, clear and understandable so pupils can see how facts and concepts are connected (Tharby, 2019). Shibli (2020) suggests that it is better for schools to focus on CPD to promote effective teaching of the original material, rather than relying on the ‘easy wins’ such as retrieval practice. *“We cannot reduce learning to retrieval practice, and we have to remember that our models of learning might not seamlessly translate from theory to practice in the classroom.”* Finally Muijs (2020) reminds us that pupils need to be taught about cognitive strategies, eg retrieval practice, before they can use them.

**References**

Shibli, D ‘*It’s not about the retrieval practice’* Impact Magazine, Chartered college, Jan 2020

Creaby, C *‘Learning to learn: Using evidence to enhance knowledge retention and improve outcomes’* Impact magazine Chartered college Jan 2020

Coe, R *‘Does research on retrieval practice translate into classroom practice?’* Impact magazine Chartered college Jan 2020

Dunlosky J, Rawson KA, Marsh EJ et al. (2013) Improving students’ learning with effective learning techniques: Promising directions from cognitive and educational psychology. Psychological Science in the Public Interest 14(1): 4–58.

Van Gog T and Sweller J (2015) Not new, but nearly forgotten: The testing effect decreases or even disappears as the complexity of learning materials increases. Educational Psychology Review 27(2): 247–264.

Rohrer D, Dedrick RF, Hartwig MK et al. (2019) *A randomized controlled trial of interleaved mathematics practice*. Journal of Educational Psychology. Epub ahead of print. DOI: 10.1037/edu0000367.

Küpper-Tetzel, C.E. and Erdfelder, E., 2012. *Encoding, maintenance, and retrieval processes in the lag effect: A multinomial processing tree analysis.* Memory, 20(1), pp.37-47.

Sumeracki, M.A. and Weinstein, Y., 2018. Optimising learning using retrieval practice. *Profession*, *18*, p.19.