Core Function → **Personalized Learning**

Effective Practice → **Cognitive Competency: Intentionally address students' accessible background knowledge to facilitate new learning**

Indicator: All teachers reinforce elements of mastered knowledge that can be retained in memory through recitation, review, questioning, and inclusion in subsequent assignments. (5096)

Explanation: Activating a student's prior knowledge has been shown to have a positive impact on learning. How best to activate that prior knowledge in a student, however, depends on the amount and complexity of prior knowledge the student has. Mobilization is the best strategy for students with less content knowledge; perspective taking is better for students with more.

Questions: How does activation of prior knowledge impact learning? What are the best practices for reinforcing elements of mastered knowledge?

How does activation of prior knowledge impact learning?

Data from the last 30 years clearly shows that students' ability to think well requires knowing facts and content. "The very processes that teachers care about most—critical thinking processes such as reasoning and problem solving—are intimately intertwined with factual knowledge that is stored in long-term memory (not just found in the environment)" (Willingham, 2009, p. 28). This prior knowledge improves memory for new information and does so in several different ways according to Pressley & Hilden (2006). First, prior knowledge helps learners store new information in larger chunks rather than separate elements. Second, prior knowledge helps establish useful associations, that is, stronger connections, between old and new information. Finally, prior knowledge helps student decision-making about which are or are not pieces of useful new information.

The availability of prior knowledge, on its own, is not sufficient to achieve higher learning outcomes (Mayer, 2003). Prior knowledge provides learners with a relevant context in which new information can be integrated, but learners must *actively* use the available prior knowledge by establishing relationships between the assimilative context held in working memory and new information (Mayer, 1979). The prior knowledge is thought to provide a "scaffold" that allows students to add new knowledge to their existing prior knowledge. The scaffold, as it is known in building construction, has five characteristics: it provides a support; it functions as a tool; it extends the range of the worker; it allows a worker to accomplish a task not otherwise possible; and it is used to selectively aid the worker where needed. (Greenfield, 1999, p. 118) According to Vygotsky (1978), there is a transfer of responsibility from the teacher to the learner and the scaffolding can be removed, as the learner moves toward independent activity.

What are the best practices for reinforcing elements of mastered knowledge?

Effective teachers provide varied, meaningful practice to ensure student mastery and transfer of a skill to other meaningful situations (Villaume & Brabham, 2003). According to Wetzels, Kester & van Merrienboer (2011), however, the method for activating prior knowledge influences how well that knowledge gets activated. The two primary methods for activating prior knowledge are mobilization and perspective taking.

In mobilization, learners are encouraged to think about all knowledge they have in a certain domain (Peeck, 1982). Mobilization is a bottom-up strategy in which learners can freely activate a set of concepts that are only loosely connected and have not yet developed into a coherent knowledge structure (Wetzels et al., 2011). When relationships are established between the activated set of concepts (i.e., scaffold) and the newly provided information, the information can be integrated with the prior knowledge (Ginns, Chandler, & Sweller, 2003; Kintsch, 1988). This provides learners with a relevant context (Peeck, van den Bosch, & Kreupeling, 1982), which helps them to extend their prior knowledge (Kintsch, 1988). This mobilization may occur through recitation, review, self-explanations (e.g., Chi, de Leeuw, Chiu & LaVancher, 1994), problem-based discussion (e.g., De Grave, Schmidt, & Boshuizen, 2001), or a variety of other methods. According to Wetzels et al. (2011) mobilization is especially effective for learners with lower levels of prior knowledge; if learners establish relationships between their prior knowledge and new information provided to them, their prior knowledge increases (Ginns et al., 2003).

Alternatively, perspective taking has been shown to benefit learners with higher amounts of prior knowledge (Wetzels et al., 2011). In perspective taking, learners are assigned a perspective from which text or material should be considered. This is a top-down strategy in which the learner activates specific prior knowledge content that is related to the assigned perspective. This specific set of prior knowledge already includes relevant concepts and their interrelations to support the perspective (Anderson, 1990); the elements in this content set are more closely related to each other than the prior knowledge that is targeted with a mobilization strategy. Additional information that is acquired through a perspective-taking strategy is thought to round out a learner's existing knowledge, adding detail to and filling gaps in an already robust knowledge base (Goetz et al., 1983).

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