

The role of cognitive science in the classroom

Cognitive science is being used increasingly to inform interventions, practice, and policy in education. Of particular interest to education has been research into motivation and reward, working memory and long-term memory, and cognitive load.

Findings from two areas of cognitive science have been especially influential: cognitive psychology, which is underpinned by interpretive, behavioural, and observational methods, and cognitive neuroscience, which is underpinned by brain imaging technologies. Many theories of effective learning have been derived from these research areas, including:

- **spaced learning**—distributing learning and retrieval opportunities over a longer period of time rather than concentrating them in ‘massed’ practice;
- **interleaving**—switching between different types of problem or different ideas within the same lesson or study session;
- **retrieval practice**—using a variety of strategies to recall information from memory, for example flash cards, practice tests or quizzing, or mind-mapping;
- **strategies** to manage cognitive load—focusing students on key information without overloading them, for example, by breaking down or ‘chunking’ subject content or using worked examples, exemplars, or ‘scaffolds’; and
- **dual coding**—using both verbal and non-verbal information (such as words and pictures) to teach concepts; dual coding forms one part of a wider theory known as the cognitive theory of multimedia learning (CTML).

These theories are already having an impact on teaching policy and practice in England. For example, the evidence review underpinning the Ofsted inspection framework draws significantly on approaches inspired by cognitive science:

‘It is, for example, becoming increasingly clear that using spaced or distributed practice, where knowledge is rehearsed for short periods over a longer period of time, is more effective than so-called massed practice.’

Our survey of teachers found that over 85% of respondents said that cognitive science strategies were central to their own approach to teaching. In addition, all early career teachers will be taught about memory and cognitive load as part of the Early Career Framework.