

Analogies in the mind and in the classroom: Translating cognitive science into science education practice

Analogies play a central role in learning. They allow children to use their real-life experience and prior knowledge as a scaffold in the construction of new knowledge. They are particularly useful for learning about abstract relationships between things, such as the invisible forces and structures that instantiate scientific knowledge. Whilst children begin to learn about scientific knowledge in primary school, and often do so by analogy, their ability to learn in this way is highly constrained by various developmental factors. These constraints can often lead to difficulties in understanding concepts and can also lead to misconceptions. In this presentation, I will describe a series of studies that aim to understand how children's cognitive development constrains their ability to learn by analogy, as well as develop methods for teaching with analogies that take into account such constraints. In the first study, we developed a method for investigating how children's domain-specific conceptual development contributes to their ability to form analogies. This allowed us to examine how development in domain-specific concepts, working memory and inhibitory control contribute to 4-8-year-old children's ability to form analogies, as well as how the contribution of each changes across development. In the second study, we used an experimental design with 5-7-year-old children to test a priming method to focus children's attention on the concepts necessary to solve a subsequent set of analogy problems. Finally, I will describe ongoing studies that test a similar priming method for teaching scientific concepts to primary aged children.

Matthew Slocombe

Department of Psychological Sciences

Birkbeck, University of London

msloco01@mail.bbk.ac.uk