

Exploring Science with Young Children: A Developmental Perspective by Terry Russell and Linda McGuigan. London: Sage (2016). ISBN 978-1-4739-1251-9

This book examines the developmental journey that children in the 3-7 age range take as they progress towards scientific understanding and the role of adults in supporting children as they learn. There is a good deal of advice for educators, reference to a wide range of supporting research and a useful 'pause for thought' feature in each chapter.

The authors have backgrounds in developmental psychology and extensive experience as researchers and authors in the field of science education. Their aim in this volume is to apply research and theoretical perspectives to classroom practice for 'the benefit of learners' (p2). Among the intended readership are teachers, early-years practitioners, trainee teachers, teaching assistants and parents.

Underpinning the text is a 'constructivist' approach from the cognitive psychology tradition, (rather than a philosophical-epistemological stance). In common with most such texts that seek to promote 'good practice' in early science education, the authors do not seek to delve too deeply into the nuanced arguments regarding the validity of applying constructivist theory, such as the inherent tension between valuing children's ideas and enquires while hoping to transmit established facts and theories. The authors hint at this late issue (on page 152) by saying their stance is 'child-sensitive' rather than child-centred and suggest that 'adults must retain charge of the broader science agenda...' . They also review some of the neuroconstructivist advances in our understanding of learning but note such insights are 'not greatly at odds with practices such as those arrived at through more intuitive professional practices' (p19). Largely, while there is an acknowledgement of a complex relationship between theory and practice the book does not seek to critique received 'wisdom' regarding science education. This might have been addressed early on, added further originality to the text and would be useful to a readership such as postgraduate students working at 'Master's' level.

It is clear that the authors have a wealth of experience and knowledge in the field and, although the territory has been covered by many such texts over the years since science became a core part of a primary and early years curriculum, the book presents key theories, approaches and advice in a readable and up-to-date way. The authors take a 'holistic' stance, recognising that learning in science can emerge from a range of 'everyday' contexts that are familiar to young children. They are at pains to explain

this will require educators to seek out such opportunities through careful planning and that the notion that science can be 'covered' 'as it comes up in other subjects' is not sufficient. A useful chapter on planning and assessment explores this further and offers sound advice, particularly with respect to the role of formative assessment within planning and pedagogy. The chapter on 'the uses of (digital) technology' draws on recent research and provides useful current examples.

Overall the text is likely to be of most use to undergraduates on Education Studies courses that are strongly orientated to professional and vocational outcomes. The discussions around neuroscience, multimodal thinking and 'emergent science' provide worthwhile introductions and references for students wishing to explore them in more depth. Students on specialist modules such as 'Learning in Science' at my own institution, or those wishing to explore early-years pedagogy as a dissertation topic might also find the book useful.

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