

Foreword

Chris Athey

This is a very important book not least because of its range. The authors have gathered evidence from children over a 15-year period. They analysed almost 700 samples of children's graphics showing how powerful patterns of cognition (schemas) in the early years of development gradually evolve into recognisable forms of writing and mathematics. Their aim, and unique achievement, has been to chart the progress of children's thinking through their mark-making from birth to 8. They have bridged the gap between Early Years and primary education.

When seen across such an age range, the children's explanations of the meanings of their own marks represent an exciting intellectual journey through childhood which will provide new insights for parents and professionals into the developing relationship between language and thought. The representations show a gradual emergence of more complex relationships between mathematical language and mathematical thought.

Evolving co-ordinations are vividly illustrated by children's own graphics and speech representations. In each case specific and appropriate references from the literature are given. These aid comprehension of complex material. The references are extensive and illuminative and specific page numbers are given at the end of quotations. This scholarly practice will be much appreciated by readers who may wish to pursue sub-themes in the book of which there are many: variations in pedagogy in different countries, working with parents and creating a mathematically stimulating environment are just a few.

The authors are vigorously in favour of school procedures which encourage children to be more participatory, and have greater autonomy, in their own learning. Many useful references are given in support of this constructivist pedagogical position.

One aspect of the enquiry shows that the majority of teachers still rely on mathematics worksheets where subject matter is neatly divided into discrete steps. Some of the children's cognitive confusions arising from these tasks are discussed. These confusions have to be seen against the clear conceptual understandings of children discussing their own invented symbolic systems.

There is nothing sentimental about the child-centred orientation of the attitude held and evidence gathered by these two authors. They are tough teachers making a case for improving children's thinking, and mathematical thinking in particular. Their central thesis is that the gap in children's mathematical understanding is bridged through supporting the development of children's own mathematical graphics. At present there is a wide, conceptually dangerous gap between adult understanding of the thinking of young

children and the later, more adult, thinking of primary stage children. If continuities between early and later thinking can be illustrated, as they are in this book, early education will be seen as an indispensable part of lifelong learning and will be less dependent on either political `good will` or as a response to social problems.

Teachers, hopefully working with parents, can develop their own knowledge of early spontaneous patterns of thought in young children. Where adults learn the language and thought of young children they become better translators for the children into the language and thought of more formal mathematics. Adults are assisted by the children themselves who want to embrace more formal aspects of mathematics just as they wish to acquire more advanced strategies and skills in other areas of the curriculum. In translating between their informal and formal mathematical graphics children can exploit both. They will move with ease between their spontaneous ways of working things out, and their more newly acquired, more formal concepts. This is not a one-way movement: children move in an infinite loop as their translation supports them in becoming bi-numerate. Confidence will be maintained as competence increases.

The book is interestingly written and will strengthen professional knowledge on the development of meaning in children aged from birth to 8.

Chris Athey
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