



Book Review

Improving mathematics education in New Zealand

Fred Biddulph

A review of
Teach your children well
by Choon Tan with
Veronika Meduna,
published by Canterbury
University Press, 1996.

The Third International Maths and Science Study (Biddulph, Gehrke, Taylor and Carr, 1997) indicated that mathematics achievement at the Standard 3 and Form 2 levels in New Zealand leaves much to be desired. To the many children who have struggled in mathematics, and the teachers who have struggled to teach mathematics effectively, this probably came as no surprise. In contrast, Choon and Rosemary Tan's three children in Christchurch (with their father's help) achieved outstanding results in mathematics. With additional home tutoring, all three passed university entrance mathematics while still at primary school, the youngest Michael passing Bursary mathematics at age seven years. What strategies did Choon Tan use to help his own children, and indeed the hundreds of others that he and his wife have since tutored? *Teach Your Children Well* sets out in very readable form the Tan approach.

The book has sections, rather than chapters, with inviting titles such as 'Nobody is born extra smart', 'Can anybody do maths?', 'The brilliant and the ordinary', 'What's the secret?' and 'School could be the best party in town'. The sections set out the principles, with some illustrations, of the Tan approach, rather than detailed step-by-step techniques. The principles are the key to the Tan way because, as they explain, there are no set formulae for success. In their experience, tutoring requires patience, caring and understanding by the tutor. It seemed to me that

the principles fall into four categories, namely context, pure mathematics, thinking, and humanistic learning theory.

Context

In terms of context, the Tans aim to help children discover the mathematics hidden in everyday life so they can appreciate the connection that mathematics has to their lives. And if a mathematical investigation (for example, sharing a cake) opens up issues such as

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fairness, integrity and justice then these are considered in the course of the mathematics study rather than left to some other subject domain.

Pure mathematics

The Tans are prepared to help their students tackle pure mathematics head-on, rather than contextualising it unduly. This is in keeping with those mathematics educators who advocate the development of number sense, that is, helping children to see how numbers work, and how they relate to each other. It is also in line with the step which the Dutch call



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'mathematizing' (Carr and Treffers, 1996) which means eventually focussing on making sense of, or personally reconstructing, the mathematical concepts themselves.

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Thinking

Choon Tan emphasises that mathematics is perfect to start off children's analytical, logical and creative thinking, and to maintain or boost their naturally inquisitive nature, as well as to develop their problem-solving talents.

Humanistic learning theory

A great many of the principles which the Tans set forth in the book are, it seems to me, entirely consistent with humanistic learning theory (Biddulph, 1997). Humanistic learning theory addresses the extremely important affective dimension to learning, something which most of us are aware of in our own learning but can overlook in our teaching. The Tans say (p.8) that "...we knew intuitively that learning progresses best if a child is not distracted by negative attitudes, lack of motivation or zeal for learning, put-downs and feelings of inadequacy or anxiety about mathematics." Consequently they pay considerable attention to helping children regain their confidence in their own capability in mathematics. They do this by providing the children with the highest possible degree of choice and control over their learning, by being encouraging and supportive of the children's learning endeavours, and by establishing a non-

competitive, co-operative learning environment. Basically they allow children to move through material at their own pace and even to a certain extent select their own material. They are also clear that children should have

...the opportunity to learn without being under pressure to perform or pass a test. Any form of assessment will make children feel under pressure, and the focus of their learning will shift from taking in as much as they want to know, to learning everything superficially for the short term to pass the examination.(p.54)

I don't agree with everything in the book (for instance, contrary to Choon Tan's idea, calculators used appropriately can be extremely effective in helping children develop a degree of number sense **before** they have learnt their times tables), but most of the views expressed are very soundly based indeed and are obviously enormously successful in helping children learn in mathematics. I am sure that many teachers would find the principles outlined in this extraordinarily caring approach to mathematics education quite enlightening, encouraging and useful in classroom practice. In a way the principles also challenge the structure of the latest mathematics curriculum document and may indicate directions for future curriculum development. I am particularly pleased that Choon Tan has published this book and made available to teachers the principles underlying his tutoring approach. I know that in the early days of his tutoring he offered to share his ideas and experiences with mathematics educators but on the whole they did not want to know. I think *Teach Your Children Well* remedies this earlier loss to the profession.

References

- Biddulph, F. (1997) Humanistic learning theory. *SAMEpapers 1997*, Centre for Science, Mathematics and Technology Education Research, University of Waikato.
- Biddulph, F., Gehrke, G., Taylor, M. and

Carr, K. (1997) Should we be concerned about primary school mathematics in New Zealand? *New Zealand Principal*, 12, 3, 16-20.

Carr, K. and Treffers, A. (1996) Mathematics education in the Netherlands: Realism in school mathematics. *SAMEpapers 1996*, Centre for Science, Mathematics and Technology Education Research, University of Waikato.



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