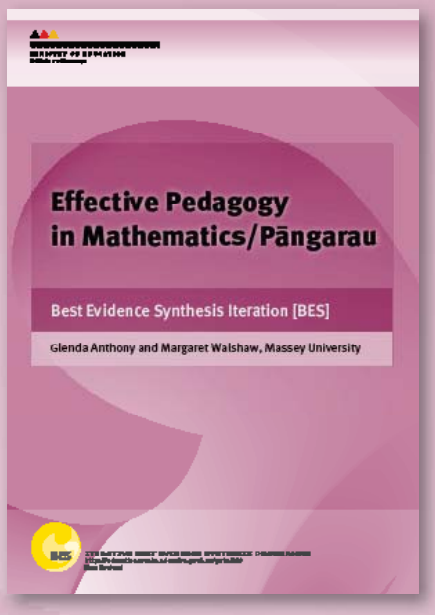
Use everyday rhymes and waiata to develop spatial skills and awareness

This is one of a series of cases that illustrate the findings of the best evidence syntheses (BESs). Each is designed to support the professional learning of educators, leaders and policy makers.



BES cases: Insight into what works

The best evidence syntheses (BESs) bring together research evidence about 'what works' for diverse (all) learners in education. Recent BESs each include a number of cases that describe actual examples of professional practice and then analyse the findings. These cases support educators to grasp the big ideas behind effective practice at the same time as they provide vivid insight into their application.

Building as they do on the work of researchers and educators, the cases are trustworthy resources for professional learning.

Using the BES cases

The BES cases overview provides a brief introduction to each of the cases. It is designed to help you quickly decide which case or cases could be helpful in terms of your particular improvement priorities.

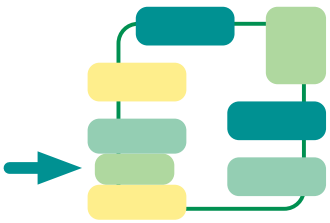
Use the cases with colleagues as catalysts for reflecting on your own professional practice and as starting points for delving into other sources of information, including related sections of the BESs. To request copies of the source studies, use the Research Behind the BES link on the BES website.

The conditions for effective professional learning are described in the Teacher Professional Learning and development BES and condensed into the ten principles found in the associated International Academy of Education summary (Timperley, 2008).

Note that, for the purpose of this series, the cases have been re-titled to more accurately signal their potential usefulness.

Responsiveness to diverse (all) learners

Use the BES cases and the appropriate curriculum documents to design a response that will improve student outcomes



The different BESs consistently find that any educational improvement initiative needs to be responsive to the diverse learners in the specific context. Use the inquiry and knowledge-building cycle tool to design a collaborative approach to improvement that is genuinely responsive to your learners

Use everyday rhymes and waiata to develop spatial skills and awareness

Children's informal mathematical knowledge originates with their everyday activities.

This short case illustrates how a young child uses the various spatial words in a waiata to direct her actions with a poi.

See also BES Case 19: *Use fun games to build mathematical knowledge and confidence in young learners.*

See also BES Exemplar 5/Ngā Kete Raukura 5: *Learning logs/He kete wherawhera.*

Mathematical learning experiences and activities

An effective mathematics pedagogy is built on the premise that all children and students are powerful mathematics learners. The development of mathematical competencies begins at birth: "in the early months of life, [babies] are busy learning about mathematics as part of the explorations necessary to the process of becoming members of the community in which they live" (Pound, 1999, p. 3). Beginning at birth, the developments that occur in the child's first five years represent a vitally important period of human development in their own right; they do not simply define a time to grow before 'real learning' begins in school (Ginsburg, Klein, & Starkey, 1998). Children develop holistically in the cognitive, social-emotional, and physical arenas, and mathematics plays a part in this development (Perry & Dockett, 2004).

Mathematics learning experiences should be both planned and informal/spontaneous

Young mathematics learners need opportunities and encouragement to become familiar with numbers, shapes or measuring tools before they can understand them:

> They [young children] need to practise counting so that it becomes automatic before they can understand the value of numbers. When they are familiar with the shapes of building blocks, they can then use them in more varied ways and make more complex structures and patterns. Children therefore need opportunities and encouragement to become familiar and to practise if they are to investigate and generalise relationships and apply mathematics to problem solving, such as using counting to see if shares are fair. (Gifford, 2005, p. 160)

Within early childhood settings, these opportunities to learn arise from both naturally occurring, informal experiences and from planned activities. Based on findings from two large scale UK projects, Effective Provision of Pre-school Education (EPPE) and Researching Effective Pedagogy in the Early Years (REPEY), Siraj-Blatchford and Sylva (2004) concluded that the most effective settings provide both and achieve a balance between the opportunities for children to benefit from teacher-initiated group work and the provision of freely chosen, yet potentially instructive, play activities.

Everyday activities and play situations provide a source of mathematical experiences

Children's informal mathematical knowledge originates within the course of their typically occurring everyday activities. Infants, for example, learn about time and pattern through the use of rhymes and song and develop spatial skills and awareness as they move around their environment. Likewise, the everyday activities of telling time, sharing, cooking, playing games, completing puzzles, counting, estimating distances, and making music provide rich opportunities for young children to practise and develop mathematical competencies.

E rere Taku Poi

Royal Tangaere (1997, pp. 40–41) provides an example of how 18-month-old Rangi uses poi and an accompanying waiata to develop her sense of spatial concepts. The words of the song successfully direct her actions with the poi.

Original Dialogue	Translation	Nonverbal Actions
Toru whā	Three four	Hands on hip
E rere taku poi	Fly my poi	Swings poi in front of her and
E rere taku poi ki runga	Fly my poi above (me)	above her
Ki runga	above (me)	
E rere taku poi	Fly my poi	Brings poi back in front of her
E rere taku poi	Fly my poi	
Ki raro	below (me)	Swings poi down below
Ki raro	below (me)	
E rere runga	Fly above (me)	Swings up
E rere raro	Fly below (me)	Swings down
E rere roto	Fly inside	Swings into body
E rere waho	Fly outside	Swings away from body
E rere taku poi	Fly my poi	
E rere taku poi	Fly my poi	Swings poi in front of her and then
Ki runga	Above (me)	
Ki runga	Above (me)	above her

A number of thesis and research studies (e.g., Arakua, 2002; Craw, 2000, Davies, 2002; Haangana, 1999, Young-Loveridge, Carr, & Peters, 1995) contain documented examples of mathematics experiences in New Zealand early childhood centres and many others can be found within the early childhood and mathematics exemplars documents.

Play—a key component of children's experience—provides a source of spontaneous mathematical activity, language, and thought (Davies, 1999; Ginsburg & Golbeck., 2004; Irwin & Ginsburg, 2001; Parsonage, 2001). In spontaneous play, "the practice of the community creates the potential curriculum" (Macmillan, 2004, p. 37). For example, in the following episode, the child makes a connection with a home experience and uses mathematical positioning language when describing the specific details of the snail's movements.

> A four-year-old was observing a snail crawling over pieces of celery and carrot when she said: "I'm patting him. He didn't like it [as the snail slid off the celery]. I'm putting him on the carrot. He's trying to get off. One of these snails was on my garbage bin at home. He's going to fall off it in a minute. He's going down. He can get down. (Macmillan, 2004, p. 37)

While spontaneous play in an early childhood setting enables children to engage in the practice of learning mathematics independently of the teacher, research also points to the value of shared interactions, particularly those shared with an adult. The teacher from Craw's (2000) study reports that playing games with children is "a very good basic thing for maths

... we play lazy lion king ... so when we count, sometimes we count 1, 2, 3, 3, ... right up to 10 or in Māori up to ten ... now when I play with the picture one, I count like this with them, 10, 20, 30, 40 ... that's how the new order comes in ... or from 0, 5, 10" (p. 10). Findings from the REPEY study (Siraj-Blatchford & Sylva, 2004) suggest that "the achievements of settings as evidenced by their cognitive outcomes appear to be directly related to the quantity and quality of the teacher/adult planned and initiated focused group work that is provided" (p. 720).

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