BundleCounting and NextTo Addition Roots Linearity and Integration

Allan Tarp, the MATHeCADEMY.net, October 2019

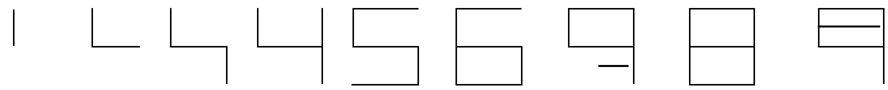
”How old next time?” “Four” the child said and showed 4 fingers. “Four?” I asked and showed 4 fingers held together 2 by 2. “No, that is not four, that is two twos!” the child replied thus insisting upon what exists, bundles of twos, and two of them. From this observation we can ask:

What kind of mathematical learning can take place when children count in bundles less than ten?

The methodology mixes French skepticism and American pragmatism: Traditions are deconstructed and grounded theory creates categories freely when working with the physical fact Many. Thus adding 2 5s and 4 3s on-top means changing units by recounting 4 3s in 5s; and 2 5s and 4 3s are added next-to in 8s by their area. So bundle-counting and next-to addition allows preschoolers to learn proportionality and integration, to be tested by designing appropriate preschool micro-curricula.

In the first micro-curriculum M1 children learn to use sticks to build the number icons up to nine, and to use strokes to draw them, thus realizing there are as many sticks and strokes in the icon as the number it represents, if written less sloppy. In the second, children learn to count a given total in bundles manually, using an abacus and by using a calculator. In the third, children learn to recount a total in the same unit. In the fourth, children learn to recount a total in a different unit. In the fifth, children learn to add two bundle-numbers on top of each other. In the sixth, children learn to add two bundle-numbers next to each other. In the seventh, children learn to reverse on-top addition. And in the eights, children learn to reverse next-to addition.

In most cases a calculator (to the right) predicts the result of the counting and re-counting jobs.

M1	I II III IIII IIIII IIIIII IIIIIII IIIIIIII IIIIIIIII  1 2 3 4 5 6 7 8 9	
M2	7 1s is how many 3s? I I I I I I I → III III I → B B I → 2B1 3s → 2.1 3s	**7/3 2.some** **7 – 2x3 1**
M3	‘2.7 5s is also how many 5s?’ 2.7 5s = 3.2 5s = 4.-3 5s IIIII IIIII IIIIIII = IIIII IIIII IIIII II = V V V II III = V V V V III	
M4	2 5s is also how many 4s?’ IIIII IIIII = IIII I IIII I = IIII IIII I I so 2 5s = 2.2 4s	**2x5 / 4 2.some** **2x5 – 2 x 4 2**
M5	‘2 5s and 4 3s total how many 5s?’ IIIII IIIII III III III III = V V V V I I so 2 5s + 4 3s = 4.2 5s	**(2x5+4x3) /5 4.some** **2x5+4x3 – 4x5 2**
M6	‘2 5s and 4 3s total how many 8s?’ IIIII IIIII III III III III = IIIIIIII IIIIIIII III III so 2 5s + 4 3s = 2.6 8s	**(2x5+4x3) /8 2.some** **2x5+4x3 – 2x8 6**
M7	‘2 5s and ? 3s total 4 5s?’ IIIII IIIII IIIII IIIII = IIIII IIIII III III III I so 2 5s + 3.1 3s = 4 5s	**(4x5 – 2x5)/3 3.some** **4x5 – 2x5 – 3x5 1**
M8	‘2 5s and ? 3s total how 2.1 8s?’ IIIIIIII IIIIIIII I = IIIII III IIIII III I so 2 5s + 2.1 3s = 2.1 8s	**(4x5 – 2x5)/3 3.some** **4x5 – 2x5 – 3x5 1**

An abacus can show how next-to addition of 2.2 5s and 1.2 3s gives 2.1 8s