

Distributed Practice: The Research Base

Studies of the effects of the timing of practice on learning and retention have a long history. The positive effects of “spaced” rather than “massed” practice were recognized as early as 1885 when the German psychologist Hermann Ebbinghaus published his seminal work on memory. Over the past century, Ebbinghaus’s findings have been repeatedly confirmed and extended. Strong positive effects of spaced practice have been found in a wide variety of contexts. Carlous Caple summarized this body of research as follows:

The spacing effect is an extremely robust and powerful phenomenon, and it has been repeatedly shown with many kinds of material. Spacing effects have been demonstrated in free recall, in cued recall of paired associations, in the recall of sentences, and in the recall of text material. It is important to note that these spacing results do generalize to textbook materials, meaning that subjects such as science can be manipulated by spacing effects. Also the effect of spaced study can be very long-lasting. (Caple, 1996, p. 22)

The role of distributed, or spaced, practice in the learning of mathematics has also been studied. Marilyn Suydam’s 1985 ERIC digest (ED 260891) summarized research about the role of review in mathematics instruction. She wrote, “Long-term retention is best served if assignments on a particular skill are spread out in time rather than concentrated within a short interval.” Suydam also noted that short periods of intensive review are better than long periods, and that games provide effective review.

The relevance of this body of research to the construction of elementary school mathematics curriculum was shown by the translations of Russian textbooks carried out by the University of Chicago School Mathematics Project in the 1980s. The Russian primary grade textbooks were clearly organized to provide spaced rather than massed practice and review (Stigler, Fuson, Ham, & Kim, 1986; Fuson, Stigler, & Bartsch, 1988).

From the beginning, accordingly, *Everyday Mathematics* was designed to take advantage of the spacing effect. An explicit attempt was made to ensure multiple exposures to important concepts and skills, spread over two or more years. As the *First Grade Everyday Mathematics* teacher’s manual states, “If we can, as a matter of principle and practice, avoid anxiety about children ‘getting’ something the first time around, then children will be more relaxed and pick up part or all of what

they need. They may not initially remember it, but with appropriate reminders, they will very likely recall, recognize, and get a better grip on the skill or concept when it comes around again in a new format or application—as it will!”

Selected Bibliography on Spaced Practice

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