Canadian Journal of Education
Revue canadienne de l'éducation

Making Math Stick: Classroom Strategies that Support the Long-Term Understanding of Math Concepts

Danielle Neer

Volume 45, numéro 3, automne 2022

URI : https://id.erudit.org/iderudit/1093002ar
DOI : https://doi.org/10.53967/cje-rce.v45i3.5821

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Éditeur(s)

Canadian Society for the Study of Education

ISSN

0380-2361 (imprimé)
1918-5979 (numérique)

Découvrir la revue

Citer ce compte rendu

Neer, D. (2022). Compte rendu de [Making Math Stick: Classroom Strategies that Support the Long-Term Understanding of Math Concepts]. *Canadian Journal of Education / Revue canadienne de l'éducation*, *45*(3), xxviii–xxix. https://doi.org/10.53967/cje-rce.v45i3.5821

Book Review/Recension d'ouvrage

Making Math Stick: Classroom Strategies that Support the Long-Term Understanding of Math Concepts
by David Costello
Pembroke Publishers, 2021, 144 pages
ISBN: 978-1-55138-350-7

Reviewed by:
Danielle Neer, Teacher
BC: School District 23 (Central Okanagan)

When teachers hear a student say, "I forget" or "I don't know" after a lengthy unit of study on a concept or topic, their frustration seems warranted; the hard work, effort and time put into teaching feels wasted. Based on both research and on his work as a teacher and administrator, in, *Making Math Stick: Classroom Strategies that Support the Long-Term Understanding of Math Concepts* (2021), Dr. Costello offers suggestions and strategies to "support students in acquiring knowledge and skills that [students] can retrieve and apply not only in the short term but also in the long term" (p.9). Throughout this book, Dr. Costello provides practical strategies for increasing students' learning by focusing on two key areas: (i) seeing student learning as more than encoding (Part I); and (ii) by teachers intentionally planning learning opportunities that "interrupt the forgetting process" (p.136) (Part II).

Based on research in the field, Dr. Costello indicates that there are three stages of learning: encoding (i.e., gaining knowledge), consolidation (i.e., "assigning meaning to that knowledge, which gets it into our memory") and retrieval (i.e., "getting knowledge out of our heads") (p.9). By moving toward learning opportunities that support

consolidation and retrieval tasks, teachers support students' long-term retention and application of information. There is now a focus on "learning as opposed to memorization" (p.10). In Part I, Dr. Costello provides strategies that students can use to build their capacity to remember and to recall relevant information. Through self-assessment (Chapter 1), making connections (Chapter 2), learning from mistakes and practical problem solving (Chapter 3), visualizing (Chapter 4), writing (Chapter 5) and reflecting on themselves as a learner (Chapter 6), students are given opportunities to strengthen their capacity to both consolidate new learning and to retrieve prior skills/knowledge.

In Part II, Dr. Costello suggests that there are more effective ways to plan for learning and to check for understanding than what are currently used in many classrooms. He indicates that there is an issue in many mathematics classrooms because teachers frame their yearly learning opportunities around units of study that are blocked or chunked by topic across the year to "cover" the entirety of the required curriculum. Dr. Costello wants teachers to "consider the potential [negative] impact of learning individual mathematical concepts in isolation through the course of a school year" (p.8). The "one-and-done" approach described above does not support long-term knowledge acquisition because it relies on short-term memory (p.7). Instead, teachers can intentionally plan to move away from this blocked approach toward one where concepts are presented across a large span of time (i.e., spaced) and where varied opportunities are provided for application and re-application in a spiral approach to conceptual learning and application. Chapters 7-12 provide specific instructional strategies and examples from classrooms at the primary, elementary and intermediate levels that support implementation of these strategies.

Dr. Costello's recommendations for how to move toward intentional teaching practices by providing spaced and mixed learning opportunities supports the goal of turning "students into independent learners able to apply concepts from memory" (p.136). By using research-driven strategies to build students' capacity both to remember *and* to draw on prior learning, teachers will be able to cover a wide range of required content knowledge and provide students with life-long skills for how to be a learner. While the recommended strategies are not subject-specific and will sound very familiar to current practices (especially in elementary literacy instruction) this book provides a succinct overview that will benefit new and experienced teachers' reflections on their practice.