

St Mary's University
Research & Literature Summary

Title and Author

Delano-Moore & Rimbey (2021) *Mastering Math Manipulatives*. United States: Corwin.

Summary

- Manipulatives are “physical objects teachers and students can use to discover, illustrate, and model mathematical concepts”. They are supportive of the learning process because they remove the abstract nature of mathematical knowledge.
- Piaget’s (1971) research proves that children learn best through engagement with concrete activities; manipulatives support this by providing a stimulus for discussion and hands-on learning.
- This forms an important aspect of the concrete-pictorial-abstract model of learning mathematics.
- Five basic representations used in mathematics: concrete, visual, symbolic, verbal and contextual.
- Manipulatives should be introduced and time allowed for them to be explored before they are used in the formal teaching of new concepts.
- A proposed strategy for employing manipulatives is: make a sketch, caption the picture, name the model, create a diagram, build the equation and write a word problem.
- Manipulatives promote access for all learners and increase equitable experiences for individuals.
- Attributes of manipulatives include: colour, size and shape, groupability/pre-grouped manipulatives, proportionality and virtual manipulatives.
- Effective use of manipulatives includes consideration of: access, distraction, curriculum coverage, assessment, classroom management, professional preparation and mastery.
- Commonly used manipulatives include: base-ten, fraction manipulatives, Cuisenaire rods, unit squares/cubes, algebra tiles and two-colour counters, geometric strips and solids, geoboards.
- Evidence of understanding and learning can be gathered through imagery (e.g. photographs and drawings) to promote assessment when using manipulatives in lessons.

Key Considerations for Practice

- Teachers have a range of resources available to them to support learners in making sense of new concepts.
- Manipulatives are not limited to a specific age group and are of equal importance throughout the learning of new mathematical concepts.
- Effective planning can promote the availability of a variety of resources to support learners and increase engagement in lessons.

Prompts for Professional Dialogue and Reflection

- How have you seen manipulatives used effectively in your context?
- What was the impact of manipulatives on learners? How did you know this was the case?
- What are the limitations of the current ways in which manipulatives are used in your setting?
- What opportunities for further development do you have in your use of manipulatives?
- What mathematics topics would benefit most from the increased use of manipulatives and why?

- What do you notice about the way manipulatives are used with learners of different ages?

