



Strategy Flexibility in Primary Mathematics: Children who have difficulties with maths

When learning mathematics, children are taught different strategies for solving the same problem. The aim is to increase strategy flexibility and enable children to select and use the strategy which is most efficient for a particular calculation. To illustrate, different strategies can be taught when adding within 20:

- *The retrieval strategy*, (e.g. knowing by heart that $6 + 7 = 13$)
- *The tie strategy*, (e.g. solving $6 + 7$ by adding $6 + 6 + 1$)
- *The decomposition-to-ten strategy*, (e.g. solving $6 + 7$ by adding $6 + 4 + 3$).

However, selecting the most efficient strategy for a given calculation is not necessarily a straightforward process. Children have to learn, through practice, which is the best strategy to use and this will be influenced by their personal preferences and also the emphasis put on a particular strategy in the classroom. Children may consciously or unconsciously select the strategy which is seen as 'most valued' in the classroom or the strategy the text book favours. The context in which children are learning strategies therefore needs to be taken into account.

Should we teach a variety of strategies to children who have difficulties in mathematics?

Studies have been carried out to investigate the issue, and researchers are divided in their opinions. Some researchers argue that low achieving children also benefit from being taught a variety of strategies whilst others argue that teaching a small number of strategies is more beneficial. In reality, there is likely to be some middle ground. For example, Verschaffel and colleagues suggest that, if the main aim is to solve mathematical problems *quickly and correctly*, children who have difficulties in mathematics should either be taught one single strategy for each arithmetical operation, or be given a rule to associate certain problem types with certain solution strategies. These researchers are careful to emphasise that *genuine strategy flexibility* with a good understanding of mathematical principles should still be promoted as a longer-term goal.

- This article raises questions about the way we teach mathematics and highlights issues for further reflection.
- Children are influenced by personal preference and context when selecting a strategy to use.
- Teaching different strategies through 'drill-and-practice' may not be the most valuable approach for all children. Researchers have suggested that becoming adaptive at strategy choice cannot be trained or taught – it needs to be promoted in a long term perspective. This may make strategy flexibility more difficult for younger and mathematically weaker children.
- For children with mathematical difficulties, it is perhaps more beneficial to teach a small number of strategies which they can learn to apply proficiently. An understanding of the principles behind the choice of strategy can then be developed over time.

The importance of children using a variety of mathematic strategies has long been emphasised as important. But is striving for a flexible use of different strategies of educational value to all children, particularly those who are mathematically weaker or who have mathematical difficulties?

Main Reference

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Further Reading

Ellis, S. (1997). **Strategy choice in sociocultural context.** *Developmental Review*, Vol.17, 490-524.

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