Managing Year 5 Mindset, Mastery and Motivation in Mathematics: Adaptability to the power of 3

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Research Question
How might intentionally designed teaching strategies cultivate positive attitudes and flexible approaches to Mathematics in Year 5 boys?

Research Context and Participants
Prince Alfred College (PAC) is an independent boys school in Adelaide, South Australia. Established in 1869, it is affiliated with the Uniting Church and is an accredited International Baccaulaurate school. Approximately 1100 boys, including boarding and international students, aged between 2 and 18 years old attend PAC. Our school is guided by the motto: De brave deeds and endure and the values: Work Hard: Be Kind.

The participants were my Year 5 class - 19 boys, aged 10 and 11.

The Research Action
Three components of adaptability were central to the project: BEHAVIOURAL adaptability - Adjusting one’s actions or behaviour in response to uncertainty; COGNITIVE adaptability - adjusting one’s thinking; EMOTIONAL adaptability - adjusting one’s positive and negative emotions.

The boys revisited growth mindset and also watched “Yourscribed” videos that challenged negative mathematical mindsets. They approached adaptability from many different angles and came to see its value in Maths and life. Strategic and explicit mathematical instruction ensued with a focus on number sense and problem-solving. A Mathematics expert-in-residence also provided problem-solving guidance and opportunities. The plan included:

➢ Goal-setting
➢ Explicit teaching
➢ Practice
➢ Self-regulation (metacognition)

Problem-Solving Tool Kit
This helped the boys connect with and make use of diverse problem-solving strategies.

Key Readings


Data Collection
Two questionnaires were given to begin the project and again at the conclusion and the results compared.

Observation, conferencing and field note writing were used throughout the project.

Photographs and video captured information regarding the boys’ tasks and engagement and provided a useful ongoing record.

Work samples were a powerful means of data collection; outlining the boys’ strategies and Mathematical processes, recording methods, accuracy and errors in calculation as well as the amount of work completed in lessons.

An on-line survey concluded the project.

Data Analysis
Three levels of mindset were identified...

Deficiency in number-sense and mental maths strategies became apparent. Systematically teaching mental maths and problem-solving strategies to the boys resulted in:

➢ Greater mental maths scores and strategy use
➢ Application of various strategies in problem-solving
➢ Increased contribution of mathematical knowledge and ideas from a broader range of boys

Chisel: A chisel is usually used to cut wood, bone, or hard objects. In mathematics, it is used to help students break down problems and find the answer.

Screwdriver: Looks like a long-handled tool. It helps to fix, tighten, or loosen objects. In mathematics, it helps to solve problems by turning or rotating, or twisting.

Hammer away at solving a problem until you hit it or a solution and the problem is ‘cracked’/solved.

Spanner - is adjustable to remove or add small parts. Works well for solving. With pattern spotting, we continue the pattern by looking at what has been removed or needs to be added. Eg 2, 4, 7, 9. What fits in the gap?

Mental maths - Number-sense and Place value.

Reasoning Logically is like measuring: decimal points, the 'visualisation' strategy to record the process.

Visualisation: It's fun to learn all the interesting strategies and patterns and their combinations.

Reasoning - look at your strategy, what might have gone wrong, what was missed out?

Recall: It's good to be able to solve a maths problem using what you can fully understand.

Conclusions
Fostering adaptability is a journey which requires persistence by students and teachers alike. This project concluded that:

➢ Intentionally designed teaching strategies and experiencing success cultivated positive attitude to Mathematics in the boys.
➢ The boys adapted their strategy-use to ‘best fit’ problems.
➢ Sharing the journey with colleagues is empowering.

A significant conclusion drawn from this project: Teacher adaptability is crucial for successfully impacting students.

Further Information
This poster and further information is available at http://www.theibsc.org/

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