

www.mav.vic.edu.au



THE MATHEMATICAL
ASSOCIATION OF VICTORIA

Embedding
creative and
critical thinking
for continuous
and sustained
learning.

Jen Bowdon
Ellen Corovic

Overview



Embedding creative and critical thinking for continuous and sustainable learning

Ensuring that there is a consistency of high quality of teaching across a school is one of the greatest challenges of a leader. Explore how leaders can ensure professional learning in mathematics has a direct and positive impact on student learning outcomes. Examples of achievable, school-based professional learning programs that focus on collaborate practices will be highlighted. A framework of key questions a leadership team should address to maximise their investment in professional learning will be presented.

Warm up



Priorities

Rank these statements

re(Solve) MATHS BY
INQUIRY

Rank as a table

Priorities

①

②

③



Learning by doing

- Balance without numbers
- Rectilinear polygons



Direct and positive impact



Inquiry Protocols

The reSolve: Mathematics by Inquiry Protocol

reSolve: Mathematics by Inquiry amplifies existing approaches to teaching mathematics through structured and purposeful investigations of mathematical and realistic contexts. The reSolve Protocol provides a description of key features of school mathematics that underpin the Professional and Classroom resources in reSolve.

Strength of Presence			reSolve mathematics is purposeful. reSolve contests a view of school mathematics as a body of disconnected facts and procedures to be learned, by:
L	M	H	
			Presenting mathematics as a way of modelling the real world and as an abstract discipline.
			Focusing on substantial mathematical ideas.
			Supporting a rich interpretation and enactment of the content and proficiencies of the Australian Curriculum: Mathematics.
			Acknowledging mathematics as a creative and imaginative endeavour, continually changing and developing in a technological society.
			Connecting mathematics through deep linkages to other mathematical ideas and to other areas of the curriculum.

Strength of Presence			reSolve tasks are challenging yet accessible. reSolve contests a view that some students can "do" mathematics well and others cannot, by:
L	M	H	
			Activating existing knowledge, developing new knowledge and exploring relationships between key ideas by working on meaningful tasks.
			Engaging students in sustained inquiry, problem solving, decision making and communication.
			Providing opportunity for all students irrespective of background and experience.
			Structuring tasks and using technologies to optimise students' mathematical development.
			Using evidence of students' progress to inform feedback and subsequent teaching action.
			Providing prompts and activities meeting a range of student capabilities, from those needing assistance to those ready for further challenge.

Strength of Presence			reSolve classrooms have a knowledge-building culture. reSolve contests a view that mathematics is best learned through copying and memorising, by:
L	M	H	
			Sustaining higher order mathematical thinking through the active role of both teacher and student.
			Challenging existing conceptions and using mistakes as a vehicle for learning.
			Enhancing learning through active exploration of a variety of perspectives, including ideas from other people and disciplines.
			Building success and understanding through collaborative inquiry, action and reflection, enhanced by the use of technologies as tools for working mathematically.
			Eliciting productive dispositions, including productive struggle and the motivation and confidence to take risks.

Standards for excellence: AAMT



Professional Knowledge

Professional Attributes

Professional Practice

THE AUSTRALIAN ASSOCIATION OF MATHEMATICS TEACHERS

Standards for Excellence

in Teaching Mathematics
in Australian Schools

2006 edition

Professional Knowledge



Knowledge of students

- Teachers understand students social, cultural **needs**
- Teachers have knowledge of how students **use** mathematics
- Teachers understand students **confidence** in mathematics

Knowledge of mathematics

- Teacher knowledge of **content** and how to teach it
- Teacher understands the **connections** within mathematics and beyond
- Teacher understands how mathematics is represented

Knowledge of students' learning of mathematics

- Teachers know relevant **learning theories** and **research**
- Teachers know **developmental sequences**, language and representations
- Teachers have a **range** of effective strategies they use (student engagement)

Professional Attributes



- Personal attributes
 - Teachers **enthusiasm** for teaching and mathematics
 - Teachers **self belief** in themselves as a teacher (efficacy)
 - Teachers have high **expectations**
- Personal professional development
 - Teachers committed to continuous **improvement**
 - Teachers use professional learning to assist to **inform their views**
- Community responsibilities
 - Teachers actively contribute to the **wider community**
 - Teachers value the **home** school partnership
 - Teachers **connect** learning **outside** of the classroom

Professional Practice



The learning environment

- Teachers provide safe learning environments that empower students to become independent learners
- Teachers promote and value active engagement in mathematics

Planning for learning

- Teacher plan learning sequences taking into account student social, academic knowledge

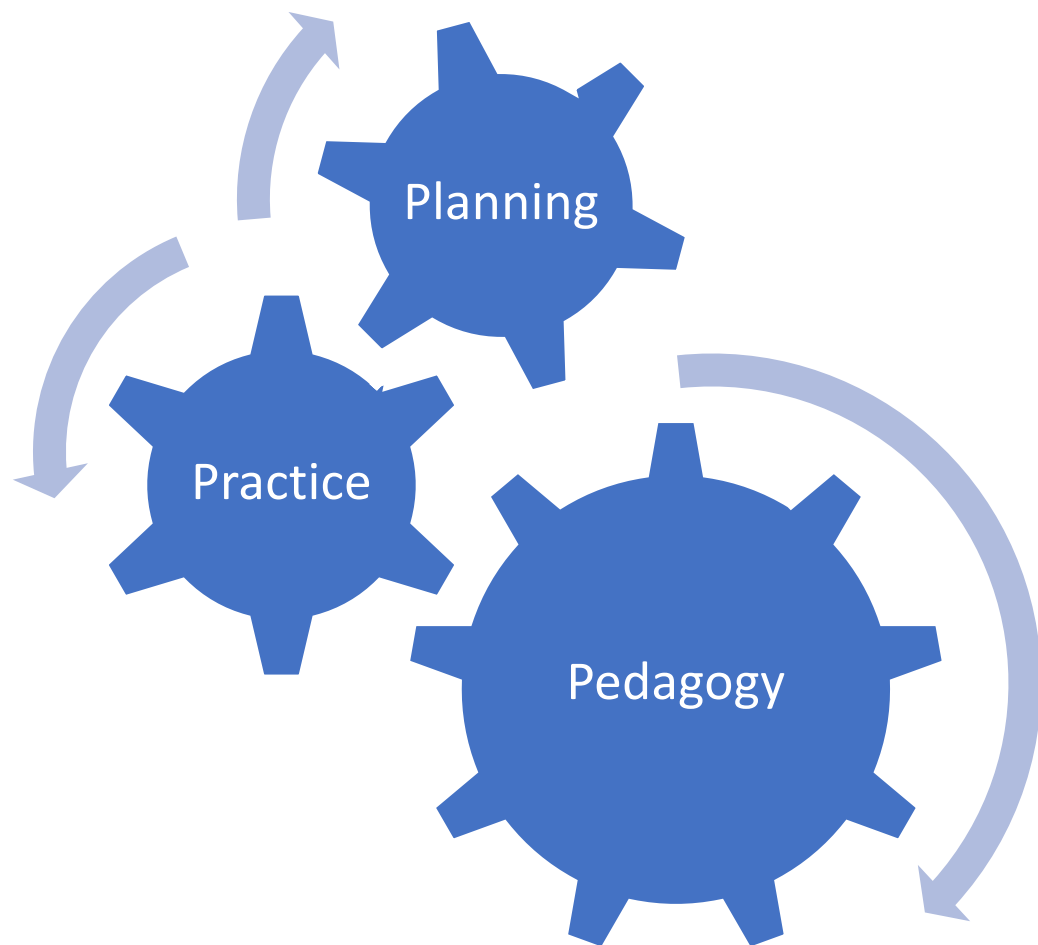
Teaching in action

- Teachers promote curiosity, problem solving, thinking and reasoning

Assessment

- Teachers use a range of on-going assessment types to assist in planning

Personal Professional Experience



How do we ensure our professional learning is sustainable and effective across our school?

Summarise

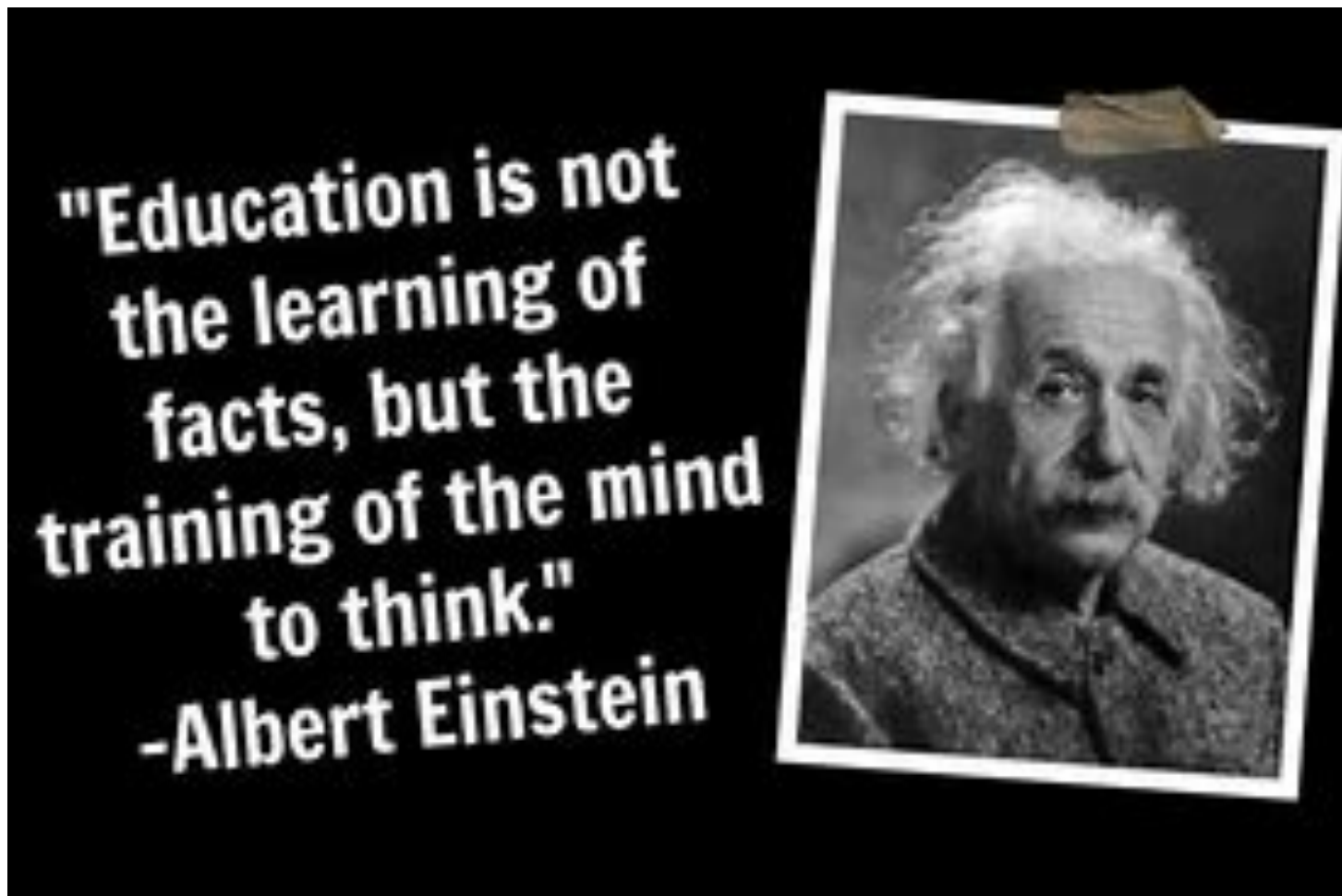
3: Things you learnt from this workshop

2: Connections with what you do at school

1: Question you still have



[This Photo](#) by Unknown Author is licensed under [CC BY-SA](#)



Ellen

ecorovic@mav.vic.edu.au

Jen

jbowden@mav.vic.edu.au