

Notes

- Mathematics anxiety is a prevalent consequence of current practice
- Psychological safety is essential to effective learning of mathematics
- Relatedness is a key feature of psychological safety in learning
- The authors are all members of the Mathematical Resilience Network with complementary experiences.
- Possibly seven competence areas?
- to consider current practices related to transition (infants to junior, primary/junior to middle, primary to secondary; KS3 to KS4), and the impact this can have on mathematics anxiety?

A. Affective Pedagogical Competence

Competencies that allow teachers to support learners' emotional relationship with maths.

• ***Growth-mindset-oriented teaching***

- Communicating that ability in mathematics grows and is not fixed.
- Praising **effort, strategy, persistence, and improvement**, not quick correctness.
- Normalising struggle as part of learning ("productive struggle").

• ***Creating psychological safety***

- Responding to errors appreciatively ("Thank you—this helps us think together").
- Avoiding shaming or high-stakes speed-based practices.
- Encouraging learners to ask questions and make conjectures without fear.

• ***Emotion-sensitive instructional decisions***

- Recognising signs of maths anxiety and adjusting pace, grouping, or task framing.
- Guiding learners to reframe anxiety as sometimes a signal of cognitive challenge, and not threat.

B. Metacognitive & Self-Regulation Coaching

Competencies that Helping learners understand and direct their own learning processes.

• ***Teaching metacognitive strategies***

- Encouraging planning ("What's your first step?")
- Monitoring ("How can you check what you've done?")
- Reflecting ("What did you learn from this attempt?")

• ***Explicit strategy instruction***

- Multiple approaches to the same task.
- Strategy choice justified through reasoning.

• ***Supporting self-efficacy***

- Using tasks at the right level of challenge so students experience "I can do this".
- Offering scaffolded steps that can be gradually removed.

C. Competence in Designing Tasks for Resilience

Competencies in selecting and structuring tasks that promote perseverance and coping.

• ***Low-threshold, high-ceiling tasks***

- Accessible entry points so learners can begin confidently.
- Opportunities for depth and extension so challenge remains meaningful.

• ***Productive struggle design***

- Tasks that are non-routine but solvable with persistence.
- Allowing time for learners to wrestle, revise, try alternatives.
- Evaluate strategies

Teacher Competencies in Mathematics.

- ***Use of multiple representations***

- Allowing learners to move between diagrams, symbols, concrete materials, tables, and spoken reasoning.

D. Formative Assessment & Feedback Competence

Competencies related to growth-promoting feedback.

- ***Strengths-based formative assessment***

- Identifying what the learner **can** do before addressing misconceptions.
- Encouraging learners to notice their own progress.

- ***Feedback that builds agency***

Effective feedback is:

- **Specific** (“Your diagram helped clarify...”)
- **Process-oriented** (“What strategy might you try next?”)
- **Autonomy-supportive** (“Which part would you like to rework first?”)

- ***Encouraging peer dialogue***

- Structured talk (think-pair-share, reasoning routines)
- Norms for respectful challenge and collaborative thinking

E. Mathematical Knowledge for Teaching (MKT) that Reduces Cognitive Threat

Competencies that enable instruction to be mathematically secure and clear and build confidence and self-efficacy.

- ***Deep conceptual explanations***

- Linking ideas to meaning, not just procedures.
- Anticipating misconceptions and designing pre-emptive supports.

- ***Using examples and non-examples strategically***

- Clarifying boundaries of a concept (e.g., what counts as a function).

- ***Clear, consistent mathematical language***

- Reduces confusion and builds confidence in reasoning.

F. Relational & Inclusive Teaching Competence

Competencies that build a sense of belonging in relation to mathematics.

- ***Building positive teacher–learner relationships***

- Warm, respectful, learner-centred interactions.
- Being responsive to learner identity and experiences with mathematics.

- ***Inclusive participation structures***

- Using varied entry points, multimodal responses, and alternative ways to show understanding.
- Ensuring all learners experience success and recognition.

- ***Cultural sensitivity in mathematics***

- Connecting maths to diverse backgrounds and lived experiences.
- Avoiding deficit narratives (“these children can’t...”).

G. Reflective Professional Practice

Competencies that support growth as a practitioner.

- ***Ongoing reflection***

- Analysing which tasks or interactions supported (or undermined) learner confidence.
- Using learner feedback to refine pedagogy.

- ***Flexibility & adaptive expertise***

- Adjusting explanations, representations, or pacing based on learner needs.
- Trying alternative approaches when something isn’t working.