Maths Anxiety and Resilience

Conceptual Understanding in Numeracy

Professional Learning Pack

People who feel stress, apprehension and fear of situations involving maths, are said to experience maths anxiety. The papers in this pack discuss the causes and symptoms of maths anxiety and analyse how it can affect learning. Readers can reflect as to how our own actions, attitudes and experiences of maths may impact learners' feelings towards maths. A number of suggestions are made throughout the papers as to how maths anxiety can be prevented. Thought will also be raised as to how we can adapt our classroom practice to reduce the risks of maths anxiety arising and also develop a sense of mathematical resilience in learners.

READING 1

Ability and Mathematics: The Mindset Revolution that is Reshaping Education, Jo Boaler (2013)

Weblink: https://www.youcubed.org/wp-content/uploads/14_Boaler_FORUM_55_1_web.pdf

Although the paper does not directly discuss the topic of maths anxiety, it causes thought as to how the way we teach maths, can affect the mindsets learners develop in relation to maths. As such it should give an added dimension to discussion on maths anxiety. Boaler draws on Carol Dweck's work on mindsets and its relevance to mathematical learning. Boaler argues for the need to stimulate learning in maths which develops a 'growth mindset' in those we teach, where challenge is embraced and students believe intelligence is not 'fixed'. The paper also challenges traditional constructs of grouping within classrooms, arguing that ability groupings can negatively impact on the mindsets of learners. Thought is also provoked about how mistakes are viewed in mathematics, and how approaches which value mistakes as positive opportunities for learning, in turn stimulate brain growth.

Note: Jo Boaler's book 'The Elephant in the Classroom' is also an excellent, very readable piece of further reading for anyone interested in more of her work.

Reflective Questions

1. What are Carol Dweck's main findings in relation to mindsets?
2. To what extent does the evidence Jo Boaler provides support grouping children by ability?
3. How might your practice evolve after reading the section on mistakes?
4. Summarise the key messages from the text.

READING 2

Maths Anxiety: The Fear Factor in the Mathematics Classroom, Julie Whyte and Glenda Anthony – Massy University, (2012)

Weblink: View of Maths Anxiety: The Fear Factor in the Mathematics Classroom

This paper considers the role of maths anxiety and its impact on students' learning practices. Potential origins of maths anxiety are discussed, as the authors look at research that analyses how it may arise in the home, through attitudes and practices within society and in the classroom. A number of ideas are presented, that teachers can adopt to mitigate maths anxiety, with the contention made that the most important factor is the teacher's own attitude to maths.

Reflective Questions

1. On page 7 the authors state, 'Maths anxiety can affect individuals in varying ways, inducing a cognitive, affective or physical reaction.' Have you experienced any of these reactions yourself or noted them in students?
2. What are the potential origins of maths anxiety?
3. When discussing ways to mitigate maths anxiety in the classroom, the authors contend on page 10 that, 'Overriding any pedagogical and participation practice within the classroom is a teacher's attitude.' To what extent do you agree with this statement given the discussion surrounding how maths anxiety can be mitigated?
4. Summarise the key messages from the text.

READING 3

Developing Mathematical Resilience, Clare Lee (Open University) and Sue Johnston-Wilder (University of Warwick) (2012)

Weblink: http://oro.open.ac.uk/24261/2/3C23606C.pdf

In this paper the authors discuss mathematical resilience and its importance in allowing learners to overcome the barriers that learning in mathematics presents. It questions approaches to maths which focus on passing exams, arguing that they serve to create maths anxiety. The paper presents ideas on how to develop a sense of mathematical resilience in learners and its importance in helping students to use mathematics in the world beyond school and function mathematically.

Reflective Questions

1. What is mathematical resilience and why is it important?
2. The paper advances a number of ideas for effectively building mathematical resilience. What are your views on these ideas?
3. What implications does the paper have for current practice?
4. Summarise the key messages from the text.

READING 4

Math Anxiety: Can Teachers Help Students Reduce It?, Sian L. Beilock and Daniel T. Willingham (2014)

Weblink: http://www.aft.org/sites/default/files/periodicals/beilock.pdf

The authors explore how maths anxiety may emerge and question the notion that maths anxiety is just another term for being 'bad at maths', by exploring the effect it can have on our working memory. A number of interesting research projects are discussed, that provoke thought as to the causes and effects of maths anxiety. Practical suggestions that teachers can easily implement into their practice are also made, inviting teachers to consider what they can do in order to reduce such anxiety in learners.

Reflective Questions

1. On p.29 the authors state 'It seems socially acceptable to be anxious about math.' To what extent do you agree with this statement?
2. What factors may cause maths anxiety?
3. In the paper a number of suggestions are made as to what teachers can do about maths anxiety. What are your views on the ideas suggested?
4. Summarise the key messages from the paper.

READING 5

An Examination of Math Anxiety Research, Egan J Chernoff and Michael Stone – University of Saskatchewan (2014)

Weblink: Access through EBSCO – see 'Accessing Papers' section above.

Chernoff and Stone succinctly review research relating to maths anxiety. They look at both internal and external causes of maths anxiety before exploring a number of practical and reflective steps that educators can undertake in order to limit its development. The paper also raises questions as to how our own views of maths may be transmitted to learners and affect the way we teach.

Reflective Questions

1. What is maths anxiety and what can potentially cause it?
2. What are the implications of this paper for your classroom practice?
3. How do the views expressed in the paper equate with your views of maths?
4. Summarise the key messages from the text.

READING 6

The Anti-Anxiety Curriculum: Combating Math Anxiety in the Classroom, Eugene Geist – Ohio University (2010)

Weblink: Access through EBSCO – see 'Accessing Papers' section above.

Geist critically reviews literature in relation to the roots of maths anxiety. He addresses the effects of teachers' and parents' assumptions in creating maths anxiety. Geist also discusses the topic from the angle of gender differences and analyses how certain groups may be more susceptible to developing negative attitudes towards maths. The paper also addresses the curricular issues that may lead to maths anxiety such as high stress instructional methods and 'timed testing'.

Reflective Questions

1. What is maths anxiety and how can it develop?
2. What are your views on the use of high stakes approaches and timed testing and the impact it can have on learners?
3. The paper discusses how teachers may influence maths anxiety. Do you agree with the points raised?