

## Research Study Modules

Each of the following study modules consists of:

- the module itself (in PowerPoint format) offering you activities, discussion points, etc. related to the research article
- the full research article
- some brief contextualising notes including things to do before you start, how long it might take and what others who have used this module think of it.

There is no recommended order in which to work through these study modules, nor that every element of it needs to be worked through. Rather it is a collection of activities, stimuli, discussion points, etc. from which the group working on it might choose according to their needs and interests.

In the end the success of these modules will lie in whether they help to engage you with the article and whether that engagement triggers something inside you and encourages you to work on your own teaching in some way.

### [1 - Jo Boaler, 'Promoting 'relational equity' and high mathematics achievement through an innovative mixed-ability approach' \(2008\)](#)

#### **Why you might be interested in this module:**

It is almost impossible to write a sentence about educational opportunities without inviting debate. This is a highly political and contentious issue which quickly intersects with people's deeply held values. You will consider how you promote equal educational opportunities and what is relational equity and why might it matter?

#### **Before starting this module you need to:**

- print out the article
- photocopy the worksheets 'how do you promote equal educational opportunities' and 'comparing lessons' which you can find at the end of the module
- have access to a computer/projector to display the PowerPoint.

*Other people have taken approximately 2 hours 30 minutes to work through this module*

#### **What people have said about this module:**

- The group/paired discussions that were stimulated revolved largely around the impossibility of mixed attainment teaching in schools where the senior team and Ofsted all wanted results and setting. It really led to some careful thought about what might make for effective mathematics learning.
- This module was viewed very favourably.

[Read the article](#)

[Download the module](#)

2 - David S Bolden, Tony Harries and Douglas P Newton, 'Pre-service primary teachers conceptions of creativity in mathematics' (2010)

**Why you might be interested in this module:**

Which quote would you agree with:

*'Maths does not seem to be creative. It deals more with numbers, calculations, and problem-solving. Much of maths seems to be based on rules'*

or

*'I would say that mathematics can be much more creative, it just needs the right person to make it creative. I saw scope for creativity in maths before but I see much more scope for it now'.*

This study module gives you an opportunity to explore your ideas of creativity in mathematics.

Before starting this module you need to:

- print out the article
- have access to a computer/projector to display the PowerPoint

*Other people have taken approximately 3 hours 30 minutes to work through this module*

**What people have said about this module:**

- I really enjoyed it.
- The PowerPoint was really useful and the article was a good read.
- The layout was user-friendly and seemed very logical.
- The way that the slides guided me through what sections to read, and then to stop and reflect made it very easy to follow and make use of the text.
- I will make sure I leave room for not only myself to be creative with resources but also allow my pupils to be creative with their mathematics.
- It has started the ball rolling on thinking of ways in which I can teach creatively and teach creativity. I am now going to think about how this is achievable within a maths classroom, and furthermore the importance of it.

[Read the article](#)

[Download the module](#)

3 - Esther Levenson, 'Fifth-grade students' use and preferences for mathematically and practically based explanations' (Draft article – 2010)

**Why you might be interested in this module:**

This article:

- presents current research on students' use and preference of two types of explanations

- informs teachers of issues to consider when planning their lessons based on students' ways of thinking and preferences in relation to odd and even numbers and equivalent fractions in particular which could apply to other topics in mathematics
- debates about whether using real-life contexts in tasks is useful and/or makes a difference to students' ways of thinking
- gives advice to introduce students to formal mathematics as early as elementary school.

**Before starting this module you need to:**

- print out the article
- have access to a computer/projector to display the PowerPoint.

*Other people have taken approximately 3 hours to work through this module*

**What people have said about this module:**

- I think that the topic of the study is interesting and thought provoking. When I first began reading the article, I was engaged.
- I'd be interested in reading further research papers that tackle mathematically-based explanations (MB) and practically-based explanations (PB) and at what point does a teacher change from a PB to an MB in a particular topic.

[Read the \(draft\) article](#)

[Download the module](#)

4 - John Mason, 'Effective questioning and responding in the mathematics classroom' (2010)

**Why you might be interested in this module:**

John Mason asks how questions arise and then conjectures on the nature of questions as a tool to focus or direct another's attention. He discusses specific types of question such as control and closed, enquiry and meta questions.

John suggests that a pattern of work where learners ask each other for help before asking the teacher is essential in a questioning conjecturing classroom.

**Before starting this module you need to:**

- print out the article
- have access to a computer/projector to display the PowerPoint

*Other people have taken approximately 2 hours 30 minutes to work through this module*

**What people have said about this module:**

- I thought it was an excellent module.
- John Mason's work is certainly quite readable - not too dense. I really like many of John's ideas.

[Read the article](#)

[Download the module](#)

5 - Michael C Mitchelmore, 'The role of abstraction and generalisation in the development of mathematical knowledge' (2002)

Why you might be interested in this module:

- It gives insight into learners' understanding of angle.
- It provides a context for thinking about abstraction and generalisation more generally.
- There is a lesson sequence about angles which can be discussed and critiqued. Only half the students came to understand an abstract concept of angle. These are for Year 3, but teachers at all school levels can use them to think about how generalisation and abstraction can be fostered, or not, through lesson design.

Before starting this module you need to:

- print out the article
- have access to a computer/projector to display the PowerPoint.

*Other people have taken approximately 2 hours 30 minutes to work through this module*

**What people have said about this module:**

- We thoroughly enjoyed ourselves
- it is a good module to use as a team CPD activity
- this greatly improved my understanding of the concept of angle and the hurdles leapt over by learners in order to understand the concept.

[Read the article](#)

[Download the module](#)

6 - Dave Pratt and Richard Noss, 'The Microevolution of mathematical knowledge; the case of randomness' (2002)

**Why you might be interested in this module:**

- the paper is about randomness – a difficult idea for students
- it describes how complex it is to move from meeting a new idea to recognising when it is useful in a new situation
- it describes how context affects learners' understanding of a new abstract idea – the authors call it 'situated abstraction'
- it gives insight into how sequences of tasks might be designed that lead learners to apply a new idea.

Before starting this module you need to:

- print out the article

- have access to a computer/projector to display the PowerPoint
- download the [ChanceMaker software](#) and be able to use this software while working through the module.

*Other people have taken approximately 2 hours to work through this module*

**What people have said about this module:**

- I was interested from a research point of view as our school is working on a culture of action research so it links with the whole school plan.
- The questions generated some good discussion about teaching and learning.
- it was an excellent starting point for idea generation, sharing views and opinions with more experienced teachers.

[Read the article](#)

[Download the module](#)

7 - Erlina R Ronda, 'Growth Points in Students' Developing Understanding of Function in Equation Form' (2009)

**Why you might be interested in this module:**

- it is about how learners come to understand functions, and connect them to their understandings of equations
- it is about the idea of growth points to describe structures of ideas that form nodes in a network
- it provides a model of how to use tasks to find out about development of understanding across year groups, something a mathematics department could do as a joint project.

**Before starting this module you need to:**

- print out the article
- have access to a computer/projector to display the PowerPoint.

*Other people have taken between 2 and 4 hours to work through this module*

**What people have said about this module:**

- It was provoking and therefore useful.
- The slides made the article more accessible, concentrating on key points and giving ideas for discussion/focus.

[Read the article](#)

[Download the module](#)

8 - Nathalie Sinclair and Violeta Yurita, 'To be or to become; how dynamic geometry changes discourse' (2008)

**Why you might be interested in this module:**

Reading this paper could help you to better support students to move between static and dynamic geometry. It explains that:

- Teachers and students may perceive, and refer to, geometrical objects differently when they use dynamic geometry software.
- There need to be accepted ways to handle situations that did not occur in the static case.
- Teachers and students might see and reason about the dynamic shapes in different ways (when students have not constructed the geometrical objects themselves).

**Before starting this module you need to:**

- print out the article
- view the interactive files
- have access to a computer/projector to display the PowerPoint.

*Other people have taken approximately 2 hours to work through this module*

[Read the article](#)

[Download the module](#)

9 - Malcolm Swan, 'A Designer Speaks: Designing a Multiple Representation Learning Experience in Secondary Algebra' (2008)

**Why you might be interested in this module:**

- Malcolm Swan was Professor of Mathematics Education at the University of Nottingham.
- In this article he begins with the educational theory behind the design of his activities.
- You will look at the learning experience itself and how it was used and received by students in the classroom.
- You will find out how Malcolm designed his activities and look at the research which underpins his approach.

**Before starting this module you need to:**

- print out the article
- photocopy the resource sheet
- photocopy the card matching activity which you can find within the article
- have access to a computer/projector to display the PowerPoint.

*Other people have taken approximately 2 hours 30 minutes to work through this module*

**What people have said about this module:**

- We thoroughly enjoyed ourselves.

- it is a good module to use as a team CPD activity.

[Read the article](#)

[Download the module](#)

[Download the resource sheet](#)

10 - Anne Watson and Els De Geest, 'Principled Teaching for Deep Progress: improving mathematical learning beyond methods and materials' (2005)

**Why you might be interested in this module:**

In this module, you will explore:

- different views of lower attaining students' mathematical experiences;
- strategies used by the teachers involved in the project to enrich their students' experiences.

And by engaging with the study and its findings, begin to consider the impact for your own teaching.

**Before starting this module you need to:**

- print out the article
- have access to a computer/projector to display the PowerPoint.

*Other people have taken approximately 2 hours to work through this module*

**What people have said about this module:**

- this has changed my view about the mathematical curriculum entitlement for low attaining students in my school
- this article was easy to read and made me think about things I can do with my pupils.

[Read the article](#)

[Read the abstract](#)

[Download the module](#)