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Barriers to teaching for mastery: ‘differentiation’ and fixed ability thinking

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The China –England Exchange

- 32 Maths Hubs, 48 schools
- Autumn 2014 Two teachers/headteachers per hub visited Shanghai for a week, followed by two week visit by Shanghai teachers – demonstration lessons, teacher research groups
- Supportive networks/activities – NCETM, Hubs, ad hoc CPD/conferences, Shanghai textbook project, Primary Mastery lead teacher CPD
- Longitudinal evaluation, visits, interviews, quantitative analysis

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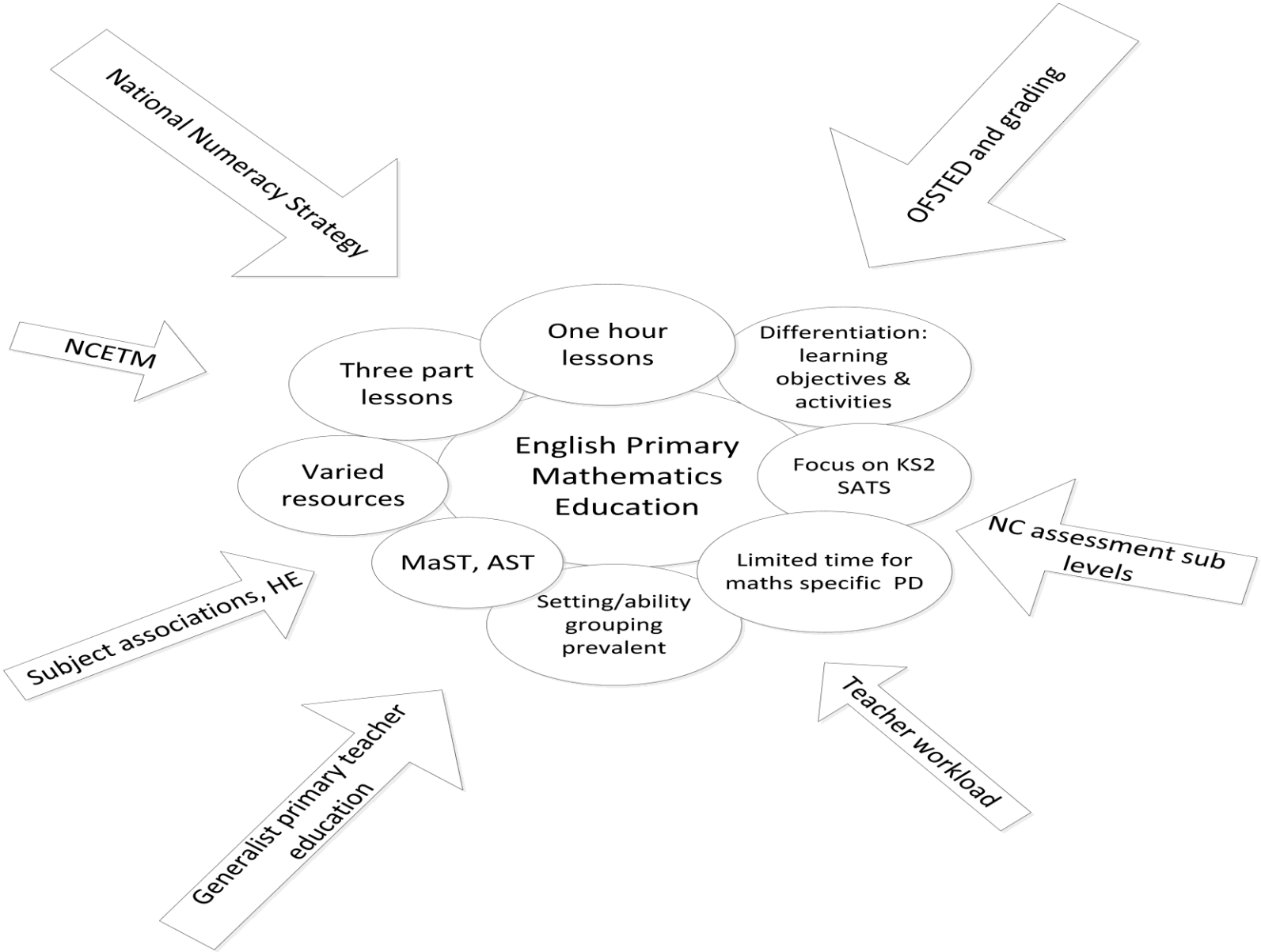
English Primary Mathematics Education



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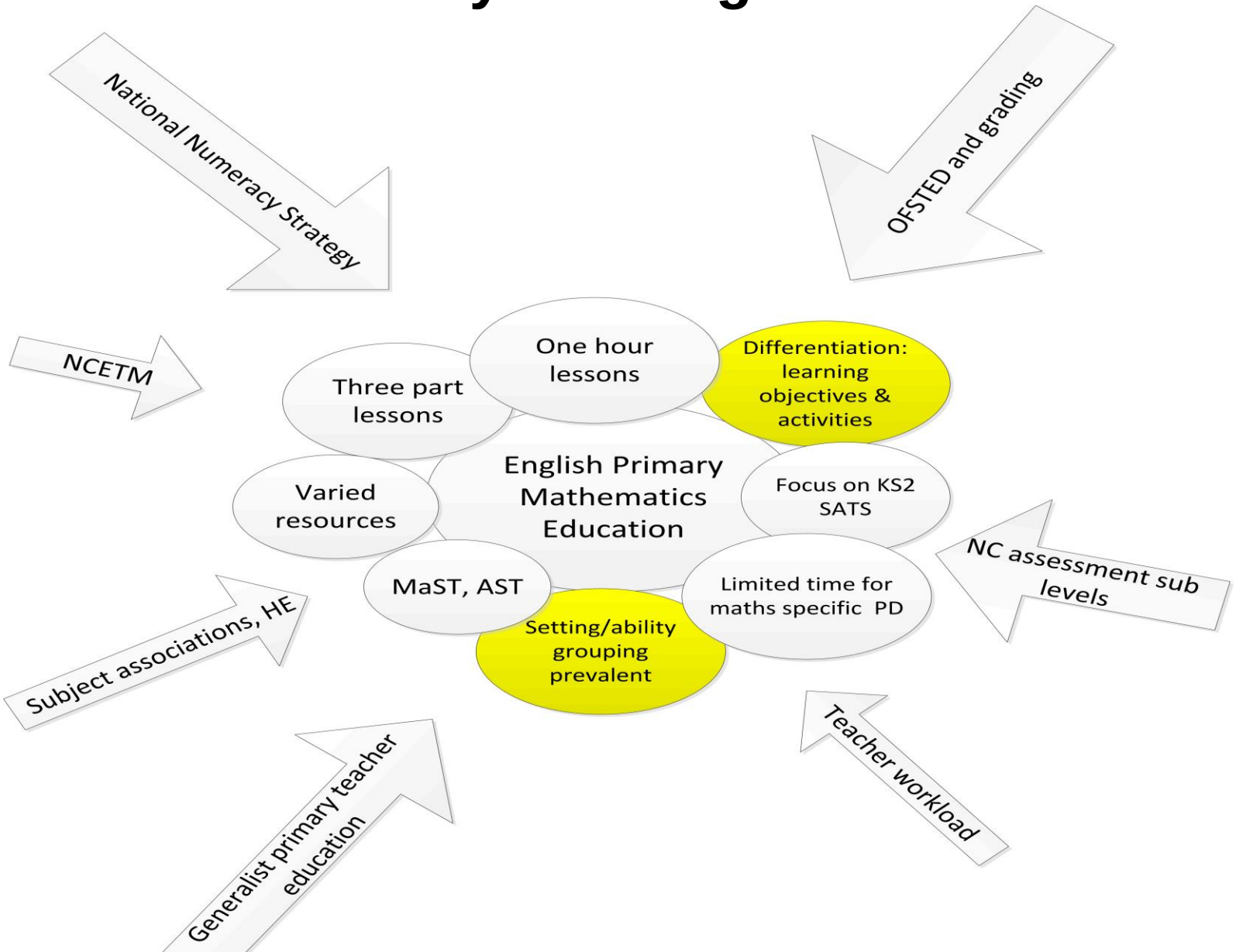
Focus on differentiation and ability thinking



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Differentiation and ability thinking as systemic

- National: Different assessments (SATS paper levels, GCSE foundation, higher), 'dataification' - levels/sublevels of progress, selective education, commercial schemes
- School: Setting, G&T and SEND policies, schemes of work, levelling/sub levelling
- Classroom: 'ability' tables, planning three lessons in one, labelling – the 3cs, the 3bs, differentiation by task, **formative assessment is preformed – through fixed lenses**

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Reflection on the wellingtons story

- In what way have we/do we do this as teachers, perhaps in more subtle ways?

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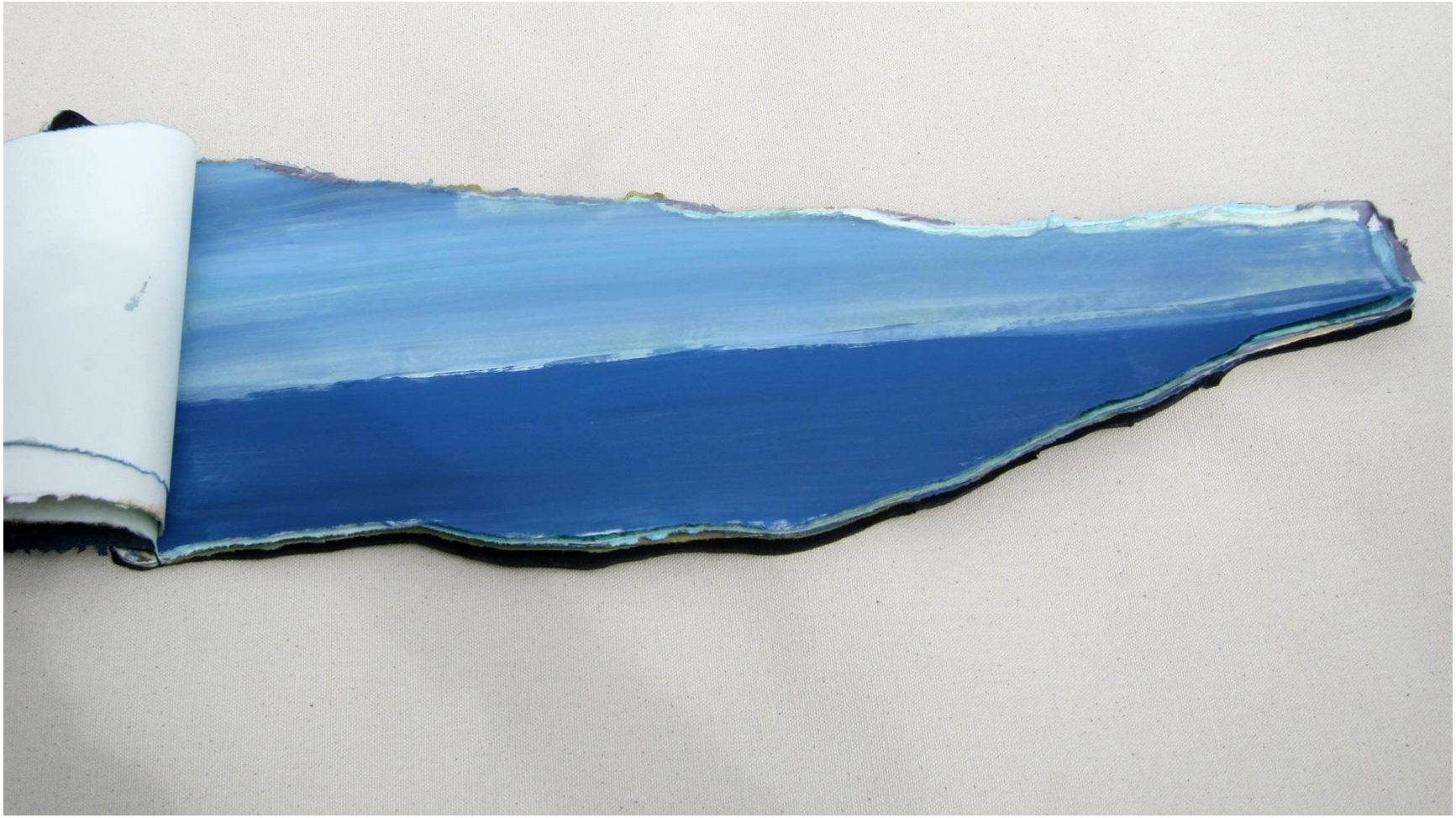
Sea change?



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New Primary curriculum

"The expectation is that the majority of pupils will **move through the programmes of study at broadly the same pace.** ..... Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on. " (Emphasis added)

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Learning for Mastery

Features of Western mastery approaches are (Guskey, 2010):

- diagnostic pre-assessment;
- high quality group based instruction;
- monitoring of progress through regular formative assessment;
- high quality corrective instruction for individuals or groups;
- leading to further formative assessment, and enrichment or extension activities.

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Shanghai teaching for mastery

Shanghai whole class interactive teaching aims to develop conceptual understanding and procedural fluency. This is achieved through lessons designed to be accessible to all through teacher questioning and incremental progression. This is supported by well-crafted mathematical models, exemplar problems and practice materials that focus on critical aspects of mathematical learning. To ensure pupils progress together, tasks are designed to allow for extension by deepening understanding and, in primary schools, daily intervention is used to support those needing extra tuition.

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Group mastery

A third mastery approach?

Or one purpose for learning for mastery or teaching for mastery?

- Greater emphasis on everyone learning
- Relational pedagogy
- What is needed for all to learn
- Learning without limits approach?

Classroom practices compared

	Shanghai	England
Teaching approach and purposes	Whole-class interactive teaching, brisk tempo to cover multiple small steps, focus on questioning, mini-plenaries, teaching for variation, mathematical talk an instructional priority. Emphasis on correct mathematical language.	Explanation through teacher transmission (quick pace) plus individual group practice (slower pace), start from objectives, plenary at end of lesson if at all.
Lesson content and purposes	Focus on specific content in a lesson including all small steps, mastery before moving on, start from mathematical content or problem, teaching for conceptual understanding and procedural fluency. Differentiation through extension/deepening rather than acceleration, the whole class progresses together.	Maximise content covered in a lesson, differentiated learning objectives, spiral curriculum, meeting objectives to progress through levels. Differentiated learning objectives and activities, low attaining pupils progress more slowly, higher attaining pupils accelerated.
Materials, models and resources	Textbooks that are aligned with curriculum support teaching with variation, variety of mathematical models and visual images used to support teaching for variation.	Variety of resources and materials, often worksheets, use of manipulables with younger pupils, usually one model or visual representation used per topic/concept.

School practices compared

	Shanghai	England
Organisation of mathematics teaching	Daily 35 minute lessons with practice as homework.Teachers teach 2 x 35 minute mathematics lessons a day, undertake daily intervention teaching, more time preparing than teaching, lesson design rather than lesson planning.	Daily one hour lesson with most practice in the lesson. Prepare and teach almost a full timetable of different subjects, small amount of planning time during the school day.
Curricula progression	Coherent progression encapsulated in textbooks that are system wide.	National curriculum interpreted as school schemes of work.
Pupil access to the curriculum	Pupils taught in all attainment classes of 40-50 pupils. Daily intervention by class teacher, pupils identified by daily assessment. Daily homework.	Mixture of setting, in-class grouping and all attainment teaching in classes of 30 pupils. Intervention often by teaching assistant to pupils identified for blocks of time - term or year. Weekly homework.
Teacher roles and professional development	Primary mathematics specialist, undergraduate study of mathematics, teach only mathematics. Teach the same class for a number of years. Teacher Research Groups embedded, 340-560 hours of collaborative professional development in first five years of teaching.	Generalist primary teachers with some specialist teaching at the end of primary school in some schools. Usually teach the same year group for a number of years. Limited opportunities for specific mathematics professional development.

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(some) Headline interim findings

- Great deal of enthusiasm for teaching for mastery in majority of the 48 schools
- Impact on teacher relationship to teaching mathematics
- Significant changes in practice
  - classroom practices – more models, change in talk, slower pace, brisker tempo, exploration of ‘variation’, all together
  - school practices – lesson timing and structures, intervention, all attainment grouping

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Enablers and barriers

Enablers identified were:

- support from the NCETM and the Maths Hub;
- senior leaders and mathematics coordinators' commitment to change;
- teachers' openness to change;
- headteachers' willingness to lead or support implementation.

Barriers identified were:

- teacher **beliefs, attitudes** and subject knowledge;
- resources to support teaching for mastery;
- challenges for implementation in Early Years Foundation Stage (EYFS) and Year 1;
- cultural and structural differences between England and Shanghai.

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Beyond a deficit model

- A deficit model implies that teachers or an education system needs fixing
- Simplistic equation Shanghai practices = good, English practices = bad
- Practices are individual (teachers or schools)

An alternative is to understand beliefs, attitudes and practices as shared, justifiable, based in reasoned ethical and pedagogical judgements in response to structures, policy, resourcing, accountability regime, ‘state of knowledge’ etc. and rooted in personal and social histories. Also it is important to recognise that much in 'teaching for mastery' is not new to English primary practice.

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Differentiation and ability thinking in exchange project

- A strong impression on visitors to Shanghai – **emphasis on everyone together**
- One of the most dramatic changes – some teachers/schools came back from shanghai and reorganised teaching away from ability grouping.
- Change to teaching the class together, different approach to planning

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Fixed ability thinking

Variety one – mathematical ability is (relatively) fixed

- Mathematics ability is something that is innate – linked to discredit concepts of IQ
- ‘good at maths people’ and ‘bad at maths people

Variety two – the ability to learn mathematics is (relatively) fixed

- Fast learners, slow learners

Variety three – different types of learners, learn mathematics differently

- VAK, access to models, types of representation, enactive and iconic for some, symbolic for others

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The consequences

- Access to different curricula that predicts differences in outcomes
- Teaching to the label rather than the child (for example, see Rachel Mark's research)
- Maths ‘pipeline’ to failure for many and this can begin happening as young **as 4 years old**
- Those seen as most able/fastest move through quickly and may lack resilience

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Challenging beliefs

Persisting beliefs

There is evidence from research that ability grouping does not help pupils to learn effectively. However, my experience is that since we have put Year 6 and Year 5 into sets one and two things have improved. The set two are happier now that we can deliver lessons that are more appropriate for them. It is easier for us to plan as teachers. We are now extending setting into Year 4 and Year 3. (Primary Mathematics co-ordinator(s)- composite quote from teachers' Masters assignments)

Changing beliefs

And because we're not differentiating as such any more... where the teacher will set the same kind of work for everyone… So, the children feel that they can access it a bit more. They feel that, yes, I can achieve this, I can do it. So, there's more of a can-do attitude…. And they're not really classing themselves as, 'Oh, I'm better than you', or, you know, 'You've got different work than me'. They know that it's, they're all on the same page. (School 5, Exchange teacher)

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Discussion

- How do beliefs about differentiation and ability thinking influence assessment practices?
- What happens if we drop - all, most, some?

Reading

Marks, R. (2013, January). " The blue table means you don't have a clue": the persistence of fixed-ability thinking and practices in primary mathematics in English schools. In *Forum: For Promoting 3-19 Comprehensive Education* (Vol. 55, No. 1, pp. 31-44). Triangle.
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Future

- Learning without limits network
- ATM all attainment teaching group

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