

# Shanghai Teachers: mid exchange report

What are they doing? How's it organised? Early observations

For over a fortnight now, 29 teachers from Shanghai have been in English primary classrooms, teaching maths to pupils in 22 different schools across England. It's a key component of the England – China project within the new Maths Hubs programme. Understandably, there's enormous interest in the project from around the teaching community and beyond. Here, we give a snapshot, interim report of how it's going.

## How it's being organised

The Shanghai teachers have been placed in pairs, each pair linked to one or two primary schools, and partnered with teachers who visited Shanghai in September. In the main, each Shanghai teacher has been delivering maths lessons, on their own, in exactly the way they teach back home. Year groups covered vary across schools. The local teachers have always been in the room, occasionally intervening to help with any language-related communication difficulties, but largely there to continue their journey of developing a deep understanding of the Shanghai approach to primary maths teaching. Frequently, these lessons have also been observed by groups of teachers from within the school and from local partner schools, and post-lesson group discussions have often taken place, with the Shanghai teachers participating, to finely unpick the teaching strategies just seen.



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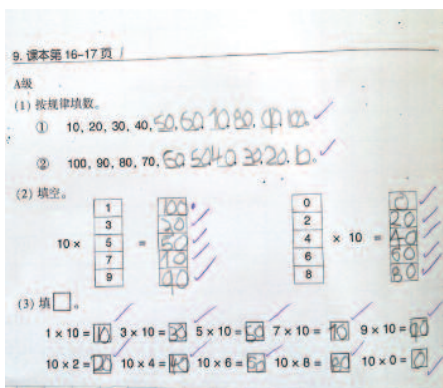
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# Features of the Shanghai approach

Since the teachers arrived, hundreds of 'Shanghai' lessons have been taught by the Chinese teachers, and observed and discussed by hundreds of English school teachers. The Shanghai teachers have thrown themselves into their task with enthusiasm, conscientiousness and good humour. Reports back from classrooms pick up some common features.

- Each lesson is designed in minute detail; each step choreographed; each question planned meticulously, and follow-up questions, according to a pupil's first response, also planned.
- The textbook is a constant component of the teacher's daily routine, from the lesson design phase, through the lesson itself to the discussion afterwards. One Shanghai teacher referred to it as 'his reference book.'
- There's a strong and ever-present emphasis on getting children to use words and sentences precisely to describe everyday situations that contain mathematical events. (*'The bus starts its journey with four passengers; then at a bus stop two more get on, so the bus now has six passengers'*).
- The Shanghai teachers approach what on the surface might seem simple areas of curriculum content (e.g. addition of single digit numbers) from a variety of angles, and at great length.





# Early Thoughts from Debbie Morgan, NCETM Director for Primary



**The work of our colleagues from Shanghai is proving immensely stimulating, and everywhere I go, I see and hear the English school teachers making comments that show genuine admiration of the Shanghai techniques they are seeing.**

## What we are learning

- There is great merit in spending longer in class on a smaller number of fundamental mathematical topics, but going into much more detail and depth, as the Chinese teachers do.
- One lesson connects to the next in the “step by step approach” with only small changes made (variation).
- All teachers are using the textbooks to support planning, and sections are copied and used with pupils. The textbooks are just as much a professional resource for the teachers as they are a learning resource for pupils.
- There is a constant and significant emphasis on mathematical relationships, for example a fraction of an area is the same concept as a fraction of a quantity.
- High expectations of speaking in full sentences and

mathematical language e.g –  $\text{addend} + \text{addend} = \text{sum}$ . The children respond very well to this approach.

- Construction of “rules” (generalities) with whole class repetition.

## What we’re seeing from the English pupils

- The times-table and number fact knowledge is, in patches, weak, and not only is it slowing pupils down but it is detracting from complete focus on the new learning, or the problem that needs to be solved. The Shanghai teachers are supporting strategies to address this. Interestingly, the strategies advocated by Chinese teachers are much more than mere memorisation, which can be short term, but include looking for patterns and relations. The order of teaching is tens first, then connect the fives, then 2, 4 and 8...etc.
- The current wide range of prior attainment in many English classes can impede the pure implementation of the Shanghai approach for a whole lesson. Hence I think there is a case for – mid lesson – a deeper task (the Chinese use the phrase *Dong Now Ching*) being given to those who’ve shown speedy grasp of content so far, to give others time to finish. This is not acceleration – but deepening.
- The most encouraging and pleasing observation, though, is that, in the classes exposed to regular Shanghai teaching this month, pupils are showing clear signs of progressing!

**See two in-depth lesson reports in the annexe on page 5**



## Teacher quotes:

*We have had an extremely positive experience that has had direct impact on the Year 2/3 class's understanding and application in multiplication. Our Shanghai colleague has expertly designed lessons that continually build new knowledge and understanding through deep and varied teaching. We have also seen the great impact that same day intervention has had in preventing the gap and ensuring learners begin the next day at the same starting point.*

**Luke McNamara, Outwood Primary Academy Ledger Lane, Wakefield.**

*We continue to be impressed and slightly humbled by the ease with which they (the Chinese teachers) incorporate procedural and conceptual variation into their lessons and the students that they are teaching are already showing a deeper understanding of the underlying concepts covered. The impact on other teaching staff in the schools is palpable and they are already keenly incorporating aspects of the Shanghai approach into their lessons.*

**Nigel Cross and Linda Kelly, Enigma Maths Hub, Milton Keynes.**

*Our teachers are responding enthusiastically to the mastery approach, particularly in terms of the depth of understanding that the pupils are developing. We had an 'open' day for delegates from across our hub and beyond to observe lessons taught by our Shanghai teachers and then unpick strengths. It has been great to discuss mathematical concepts in this way and certainly our pupils and teachers are feeling energised by this whole process.*

**Sukwinder Samra, Elmhurst Primary School, east London.**

*We currently have over 100 (local) teachers observing the (Shanghai) lessons in the next two weeks. We have asked each observing teacher to make notes on the lesson and, to trial one aspect of Shanghai maths in their own schools. We will gather all colleagues who took part in the observations together on 12 December to share findings and explore future impact on their practice.*

**Lindsey Gallagher and Ashleigh Lawrence, Benton Dene Primary School, Newcastle.**

*Our teachers have been blown away by the variety of concepts taught (by the Shanghai teachers) within 35 minutes and the mathematical connections that are made. The children have expressed a 'can do' attitude to all mathematics presented to them and have developed resilience and independence in such a short space of time. It has been incredible to watch!*

**Lisa Bradshaw, St St Mary and St Thomas' CE Primary School, St Helens.**

*Teachers in our school have been impressed by the small steps that are taken (by the Shanghai teachers) to develop deep understanding, and this has enabled them to reflect on their own practice, and they are keen to try out some ideas in their own classrooms. The children are becoming more precise in the language they use to explain their thinking and they have more confidence to 'have a go'. They are also starting to notice patterns in numbers and their recall of small facts has definitely improved. It has been a valuable and rewarding experience for all of us.*

**Marie Jacklin and Stef Habershon, Chorlton Park Primary School, Manchester.**

*Our teachers have focused on Fractions, in two KS2 year groups, and really gone back to basics, in order to deepen the children's understanding. The detail in which the concepts are taught is striking and nothing is assumed, everything is taught explicitly. We have sent invitations to local schools and have a number of teachers coming in to observe lessons. Their feedback so far has been immensely positive and we even have teachers coming back for a second visit later in the week.*

**Anna Raine and Julie Nicholls, Disraeli School and Children's Centre, High Wycombe.**

## What next?

This party of Shanghai teachers return to China at the end of November. But another group is due here in February/March next year, and they'll be teaching in 20 different schools, in all the Maths Hub areas not covered in this year's visit.

This is a two-year project, with the overall aim of perfecting Shanghai methods in the participating schools and then spreading the practice widely around schools in each Maths Hub area.



This report has been produced by the NCETM, coordinators of the Shanghai teacher exchange and the Maths Hubs programme, which is funded by the Department for Education.



# Appendix:

## In-depth lesson reports, as seen by Debbie Morgan

### A lesson on fractions with Y4

The teacher introduces herself and shows a map of Shanghai on the interactive whiteboard (hurry up, I think to myself, and get on with the maths!). She then says China is the whole and Shanghai is a part. The lesson continues with the children selecting cities in China that they know or have been to, repeating the same sentence, China is the whole and .....is a part. A map of Europe is produced- Europe is the whole and England is a part.....England is the whole and London is a part.....Then the context of the school – if the school is the whole, can you name a part, each time expressing this in the same form as the sentence introduced. Errors are picked up, such as the school is the whole and Year 4 is a part, where the school is a building and year 4 are children; the whole and the parts need to be the same noun. The lesson continued with looking at part of a journey and a whole journey (length), a shape and parts of a shape, which children cut up and stuck back together

(area); a group of 6 swans, with one coloured red (quantities). For every context the same sentence was used. The whole is.....a part is .....

The children are asked to look for parts and wholes at home for homework. I'm sure they will be jumping out of the woodwork by now. As I looked round the room I realised everyone was "getting it." But why wouldn't they? It was so conceptually simple, yet at the same time deep. It is another example of variation where the same conceptual idea is applied to different structures – area, length, quantity – providing an opportunity to make connections and generalise a mathematical concept. How often do some of our children get stuck with fractions of areas and never really move on and make the necessary connections to deepen and secure understanding of the concept?

### A lesson on subtraction with Y2

The lesson starts with a context: a story as it was explained to the children: a picture of a car with 4 children in it and then a picture of one child getting out of the car. The children are asked to explain in words what is happening and then asked to write this as a number sentence:  $4 - 1 = 3$ . They are then asked what the 4 represents, what the 1 represents and what the 3 represents? A common feature of Shanghai teaching is for the concrete and the abstract to be represented together and strong links made between them in order to develop deep understanding. The language of "At First", "Middle" and "Now" were used to describe the minuend, the subtrahend and the difference, and yes this language, although not introduced in this lesson, is introduced early in Shanghai to express with precision mathematical relationships. The lesson reflected an aspect of what is known as "variation" in Chinese teaching, a step by step logical and detailed approach, varying the focus on different aspects of the concept. So questions were presented where the unknown was the 'end' or 'now' part of the story, the 'middle' part of the story or the 'first' part of the story and children were required to use their logic and reasoning to identify what the picture would look like and how they would write the number sentence.

A key moment arose when  $4 - 0 = 4$  was written on the board and the children asked to explain the

story. A common story was that at first there were 4 in the car, then everyone got out and then everyone got back in the car again. The teacher very skilfully addressed this misconception by working with one child's "story" and her current thinking.

**Teacher:** *How many in the car at first*

**Child:** 4

(the teacher writes 4 on the board)

**Teacher:** *What happens next?*

**Child:** 4 children get out of the car

**Teacher:** *how would we write that*

**Child:** minus 4

(the teacher adds - 4, and expresses 4-4)

**Teacher:** *What happens next?*

**Child:** 4 children get back in the car

**Teacher:** *how would we write that?*

**Child:** add 4 (4 - 4 + 4 is now written on the board)

**Teacher:** *how many are in the car now?*

**Child:** 4

(4-4+4=4 is now written on the board)

**Teacher:** *Is this the number sentence we were asked to write a story for?*

The penny begins to drop as the children realise their error. This careful attention to the children's thinking, identifying children's misconceptions, going with the thinking whilst scaffolding development of thinking, is a key feature of Shanghai teaching.