

Lessons from Shanghai

Background

In September 2015, Hayley Steel (Curriculum Leader – Maths, Thetford Academy) and Helen McCartney (Maths Teacher, Kesgrave High School) visited Shanghai as part of the National Collaborative Project 1b: England-China Education Research and Innovation Project. The visit was organised by the NCETM through the Math Hubs network. There were 68 teachers from across England along with 6 NCETM coordinators, visiting 38 different schools across Shanghai.

The exchange is a research project that is seeking to improve the teaching and learning of mathematics, using the methods and approaches that have seen Shanghai rise to the top of the PISA rankings. We have learned about the social and cultural contexts in which Shanghai teachers and students work; the pedagogy that informs the practice; the systems that operate within and between schools; and the structure and content of lessons.

We visited Changzheng Secondary School, and Shanghai Experimental School (primary part of an all through school), observing lessons and Teacher Review Groups, as well as meeting students and learning more about the organisation of the schools. One teacher from each of the schools is to teach lessons at Thetford Academy during the three week return leg of the exchange in November.

In addition to the visits, we attended lectures at Shanghai Normal University (a teacher-training university) on the background and philosophy of Shanghai teaching. We also worked collaboratively with teachers from other hubs, sharing our experiences and observations. During lessons, we made notes and took photos and videos, and we obtained copies of the textbooks, homework books and teacher guides.



Social and Cultural Contexts

“Heaven – Earth – King – Parent – Teacher” - The Five Names of Honour

Shanghai is a city of over 24 million people and operates as a direct-controlled municipality of the People’s Republic of China. It has undergone huge changes during the past 30 years in terms of economic growth and investment. Shanghai is the richest province of China, and so it is not necessarily comparable with other countries.

Shanghai joined the PISA testing system to measure itself against other high-achieving, Far Eastern countries such as Singapore, South Korea and Japan. In the 2012 PISA assessments, Shanghai came top in maths, reading and science. By comparison, the UK was ranked 26th for maths, 23rd for reading and 20th for science. Shanghai’s success in maths is not just because of the success of the more able, but also because the less able perform strongly.

Schools are generally much larger than in England, with many schools having 4000-5000 students. The large number of teachers working together increases the opportunities for joint planning and observation, across grades, departments and school districts.

In China, teachers have always been held in high regard and education is valued in Chinese society. This was demonstrated by the annual “Teachers’ Day” which occurred during our visit, when students brought in gifts to show appreciation for their teachers.

There are high expectations for academic success, and students are expected to complete a large amount of homework. Support and high expectations at home are magnified by the recently relaxed one child policy, meaning that parents and grandparents are able to devote more attention to individual children.



Students are motivated to do well at school to pass high-stakes exams that lead ultimately to the best jobs. The lack of a social security safety net gives an added incentive to work hard. The mindset of hard work leading to self-improvement is reflected in the attitude of both students and teachers.

Standards of behaviour were extremely high, with only a small number of isolated behaviour issues reported during the visit. When not in lessons, students are generally not supervised – for example, eating lunch in their classrooms which they then tidy up according to a rota, supervised by class monitors. Uniform is simple and practical – a t-shirt with neckerchief to

show year groups, with cotton trousers. Most students wear trainers, which means that they do not get changed when doing PE or group exercise. Students stay in the same room for most of their lessons, going to other rooms for practical subjects. Classes have a form tutor who supervises “Self Study” sessions after lunch.

Between lessons, which last for 40 minutes, there is a 10 or 15 minute break. Students are able, and encouraged, to talk, move around or run about outside. Behaviour at these times is quite boisterous but when the music plays to signal the start of lessons, they immediately become silent and show sustained, high levels of concentration.



Classes are organised by Grade (Year group) and teachers generally teach classes in a single grade, following their classes as they progress through the grades. On average, teachers will teach two classes of 40 minutes per day. They also observe each other’s lessons frequently and then take part in Teaching Review Group meetings, in which the teacher explains their planning of the lesson, reflects on what happened in the lesson and makes suggestions about what they would improve. Other teachers then offer their opinions and suggestions for improvements.

The scheme of work follows the lessons as set out in the text book scheme, which is used across Shanghai. Planning meetings take place regularly, with teachers from the same grade, from different grades or from other schools in the district. Plans are shared and exam papers analysed to set priorities for improvements. Teachers discuss whether to vary the amount of time to devote to each topic, with review lessons built in to the schedule to consolidate concepts and address misconceptions.

Homework is automatically set after every lesson, with exercises from the homework books that complement the text books. Students’ books are looked at by teachers as they circulate in lessons but are not marked. Homework is generally marked with ticks and crosses and this happens before the next lesson, allowing interventions take place. These are organised in a variety of ways, sometimes with teachers going to see individual students during Self Study sessions after lunch, or students might visit the teachers in their office during the ten minute breaks between lessons.

Shanghai Principles of Education

Four Traditional

- High expectations in education – reinforced by stories and legends
- The belief that diligence and persistence change the future of individuals
- Respecting teachers and education
- Open and public exam system as a mechanism for safe-guarding the first three principles – exams are used for selection and social mobility

Eight Modern

- An open-door policy – borrowing the latest knowledge and experience, learning from other countries
- Long term planning – 10 year education plan
- Curriculum reform – new teaching methods, moving away from rote learning
- Teacher professional development – at least 120 hours in a teacher’s first year, 360 hours in the next 4 years
- Resources – particularly targeted at poorer areas
- Using teachers and head teachers to support other schools
- Money – moving from richer to poorer areas
- 30% quota for admitting lower performing students to the best schools

What can we learn from them?

Despite the differences in context, there are elements of the Shanghai approach that could be easily adopted in a British classroom, and have a dramatic positive effect.

The idea of building firm foundations of the “Two Basics” underpins Chinese education in general, and mathematics education in particular. Variation theory describes an approach that emphasises studying topics with a narrow, precise focus, but exploring these to a far greater depth to achieve mastery.

Two Basics

- Basic Knowledge
- Basic Skills

... extended to Four Basics

- Ideas – methods, ways of thinking
- Experience

Variation Theory

Conceptual variation – presenting a sequence of examples of a concept to allow students to develop from a superficial to a deeper understanding

Procedural variation – tackling the same problem with a variety of methods

Eastern teaching principles:

- “Pu dian” – procedural variation
- Step-by step (rather than a typical spiral curriculum model)
- Confidence – through being taken step-by step through a method
- Goal driven (rather than activity driven)
- One way, different speeds

Each lesson has a narrow focus, usually on a single key point which is clearly defined and explored from a number of different angles. Examples and exercises are carefully chosen to identify examples and non-examples of the concept, special cases or possible areas for confusion or misconception. There is an explicit emphasis on methods rather than final answers.

Content is restricted to the key point and this is not extended to topics that are met at a later grade. For example, in a sixth grade lesson on prime factorisation, index notation was not used to express prime factors as this is not introduced until a later grade. Prior knowledge is practiced by including types of numbers or algebraic terms that have previously been met – examples are not simplified to make it easier to focus on then key point.



“Life is a long journey not a sprint” – Changzheng Secondary School