

## **Fusion or Friction? UK Teachers' Experiences of Cross-Cultural Teaching in China**

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Cultural exchanges between the UK and China have gained in popularity in recent years due to the success of East Asian countries in international tests such as PISA. Chinese 15-year-olds outperform their British counterparts in mathematics, and many practitioners are travelling to China to learn teaching techniques in the hope of raising standards back home. Twenty-six undergraduate trainee-teachers and eleven fully-trained teachers travelled to the South of China to observe mathematics teaching in primary schools. They also took part in the teaching of English, Mathematics, and Science. The aim of the trip was to observe the phenomenon of 'teaching for mastery' as advocated by the National Centre for the Excellence in Teaching Mathematics (NCETM). After the trip, four participants were interviewed via email on their experiences in China. The researcher found that the three trainee teachers and one qualified teacher felt that what was being implemented in the UK as 'teaching for mastery' had little to do with the actual practices in China, where the concept supposedly originated. The participants commented that they had witnessed several teaching methods they would bring back to their own classrooms, but that the UK should be wary of adopting practices without seeing them in the context from which they came. Additionally, participants found many differences in terms of behaviour, class structure and teaching experience, which will be discussed along with the questions: Can we transfer Chinese teaching directly to the UK? And: Is teaching for mastery actually a British construct?

**Keywords:** mastery, mathematics education, teacher training, China, teaching for mastery

## **Introduction**

The concept of mastery in mathematics was born out of a desire to emulate the success of East Asian countries in traditional assessments (Boylan et al., 2018). Attempts to transfer East Asian mathematics teaching methods to the UK, such as the clustered randomised control trials by Jerrim and Vignoles (2015), appeared to show a modest but positive treatment effect when mastery was implemented. Several teaching exchanges and cross-cultural comparisons such as those by Boylan et al. (2018) and Norton and Zhang (2016) have attempted to examine and explain differences in teaching methods and student attainment. Norton and Zhang (2016) state that Confucian values of mathematics influence the way in which it is taught in China and East Asia, with the subject not needing to be seen as immediately relevant to the learner.

This paper will look at the experiences of trainee teachers and one qualified teacher following on from a trip to China where they observed lessons in mathematics, as well as teaching in a Grade 5 (age 10-11) class themselves.

Twenty-six trainee teachers and eleven qualified teachers travelled to China as part of a fusion programme designed to encourage the sharing of methods between Chinese and UK practitioners. Three of these trainee teachers and one qualified teacher were interviewed via email following the trip, regarding their experiences observing and teaching in Chinese primary schools. Findings suggest that all the teachers witnessed teaching very different from what they were expecting, and two explicitly stated that what they had believed to be teaching for mastery was very different from the reality in Chinese classrooms.

## **Context**

The fusion of Chinese teaching methods into British schools has been a topic of discussion and research for many years now. This interest is based on studies such as those by Jerrim and Vignoles (2015) showing an increase in children's attainment following the implementation of so-called mastery principles. Tyumeneve et al. (2014) also found that mastery had a high positive relation to the ability to transfer mathematics to out of subject contexts. There is also some evidence of Chinese teaching incorporating Western methods; Yang and Li (2017) stated that Chinese kindergartens have been hybridising Eastern and Western curricula to improve provision. However, most of the fusion reported in literature has been on the adoption of Chinese methods into a British context.

The beliefs of teachers can be a major factor in reform of education, and adoption of mastery methods would require the support of teachers, parents and pupils (Boyd & Ash, 2018). Some features of what is called mastery, such as mixed ability settings, are not encouraged by many. Francis et al. (2016) found that parents supported streaming by prior attainment purely because they believed their children would be in the top sets, and that research supporting mixed ability grouping has had no impact on the reality in the classrooms. Yu (2009) examined the differences in the beliefs of Chinese and English teachers, and found that there

were significant distinctions between the way that they viewed teaching and mathematics as a concept. They discovered that teachers had similar beliefs about the importance of using real world examples, but that Chinese teachers placed more emphasis on the importance of the introduction of new concepts and methods, as well as the nature and function of proofs and the role of precise language.

Yu (2009) further found that English teachers tended to have a pragmatics understanding of theory in relation to mathematics, whereas their Chinese colleagues had a more scientific understanding. Boyd and Ash (2018) also explored teacher beliefs, following the implementation of a textbook-based 'Asian mastery' approach. They found that teachers' cultural beliefs changed, and that they began to believe in malleable mathematics intelligence as opposed to a fixed intelligence, changing their commitment to grouping pupils by prior attainment (Boyd & Ash, 2018).

Norton and Zhang (2016) did a cross-cultural study of Australian and Chinese teachers, they made several salient discoveries relevant to the findings of this study. They stated that Chinese teachers held a privileged position in society, and that this allows teacher training in China to attract the most knowledgeable candidates. They commented that many Australian teachers struggled with the kind of mathematical content that they would be expected to teach, whereas Chinese teachers showed mastery. However, they also commented that the relevance of the difference in students' scores could be dismissed due to the fact that Chinese students spent more time studying, and this would therefore have an impact on their mathematics attainment (Norton & Zhang, 2016). They further dismissed the children's scores as being due to the international tests being comprised mostly of low-order questions, which they claim Chinese students excel at (*ibid.*).

Miao et al. (2015) compared teaching in China and England and found that Chinese teachers scored higher on effective teaching measures, as well as pupils outscoring their English peers. However, the head teachers in the chosen schools were able to choose which teachers were studied (Miao et al., 2015). These sort of comparisons, and those by Norton and Zhang (2016), between Chinese, and English and Australian teachers, attempt to describe the differences between teachers, without taking into account the similarities. They also often negate to take into account the number of other factors that could impact upon attainment scores, and whether indeed these attainment scores are a relevant measure of teaching success, or pupil ability.

The teaching profession is seen very differently in China and in the UK, with teachers holding a privileged position in society (Norton & Zhang, 2016). Furthermore, teachers in China are experts in their fields, many holding a Master's degree in their particular field, and are expected to engage in intensive ongoing school-based professional development (Boylan et al., 2018). Teachers in Chinese primary schools were observed to teach around two or three forty-minute lessons a day each, repeating the same lesson to each class in a grade.

Conversely, in the UK, primary teachers are facing ongoing pressure in many areas, and are expected to teach all subjects, all day, with only a few hours a week dedicated to planning and development. Primary teachers therefore cannot be specialists in every subject that they teach, and hold a very different place in society than their Chinese colleagues. (Boyd & Ash, 2018).

## **Methods**

Originally the researcher planned to conduct face-to-face interviews, however, due to the undergraduate trainee teachers leaving the area for their Easter holidays, email interviews had to be undertaken instead. As an asynchronous mode of interviewing, email has many benefits as well as limitations (Bryman, 2016). Answers tend to be more thorough and grammatically correct, as the respondents have more time to consider their answers; additionally, email is a useful and unique tool when nonverbal and paralinguistic cues are not needed for evaluation (Curasi, 2001; Ratislavová & Ratislav, 2014). For this study, what respondents said was considered more important than the need to look at their tone and movements.

Burns (2010) stated that the email interview method enriches the array of investigatory tools available for qualitative social researchers today, although they will never be a replacement for face-to-face interviews (Ratislavová & Ratislav, 2014). For this study, participants were recruited from a group of thirty-seven people who took part in a university-led trip to China to visit, and teach in, primary schools. Out of this group, twenty-six were undergraduate trainee teachers and eleven were qualified teachers. All members of the group were contacted with a request to provide their university email if they wanted to take part in the study. The researcher received seven responses, and three students and one qualified teacher responded to the subsequent email with their answers to the questions.

Participants were emailed a consent form and information sheet, with five questions and a space for adding additional comments. The questions were designed to be as open-ended as possible, and asked participants about their experiences of the Chinese education system, their views on the teaching they had witnessed, and the methods or strategies they would take back to use in their own classrooms in the UK. Although the response rate was relatively low, this is expected of the email interview method (Bryman, 2016).

As Bryman (2016) stated that participants often lose momentum when they are expected to reply to more than one email, only one communication was expected of participants. The email method proved effective as an interview method, as social interaction was not required for the research, and standardisation of interview was not needed (Ratislavová & Ratislav, 2014). This method is further effective when anonymity is beneficial (Ratislavová & Ratislav, 2014), as it was in this case, as trainees preferred their comments to be kept anonymous. The method also allowed for participants to interpret the questions in their own way, and to go off on a tangent if they wanted to (Bryman, 2016). This helped with the

research as it allowed the researcher to see what was important to the participants, although email interview often results in less detail than a face-to-face method (Bryman, 2016).

## **Findings**

The overall finding was that the trainees and qualified teacher believed the UK should be wary of transferring the methods used in Chinese schools to schools in the UK, and that teaching for mastery is not necessarily the practice used in China. Additionally, trainees commented on the atmosphere and ethos of the schools they visited, mentioning many positive attitudes towards both learning and teaching. This echoes Norton and Zhang (2016) who stated that Chinese teachers held a privileged position in society.

### **Ethos and atmosphere**

The participants witnessed several teaching practices that they would transfer back to their own classrooms, as well as some practices they would adapt, or not use at all. The qualified teacher commented that they could see that the UK has a lot to learn from international practice, but that the UK pedagogy also has a lot to commend it. They noted that the last point was ‘too often overlooked and we are in danger of losing the good practice we have developed by simply replacing it with practice from another country.’

All participants commented on the positive attitudes towards school and learning held by teachers and students in the schools they visited. One participant, when asked what strategies they might use from observed lessons, replied that it was hard to answer the questions because ‘a lot of the good teaching methods and strategies come about because of the money allocated to teacher training and to schools in China, alongside the perceived importance of education.’ Another participant, in response to a similar question, stated that they would encourage a classroom culture where talk is encouraged, expected and valued as a learning tool by all.

Teacher subject knowledge was also mentioned by participants; in China, teachers teach one subject e.g. English, or Chinese, or Mathematics, and so are experts in their particular field. Where we do have this system in most secondary schools in the UK, it is not normal practice in primary education. The qualified teacher stated that they had witnessed ‘unbelievable’ music and art lessons, which could not be replicated in the UK due to lack of teacher subject knowledge and accessibility of resources.

### **Representations**

Concrete, pictorial and abstract manipulations are a key feature of teaching for mastery as defined and demonstrated by Jerrim and Vignoles (2015). Observation of the use of representations and manipulatives was mentioned by all participants, confirming the belief that these form a large part of the teaching in Chinese schools. One participant observed that children used Lego as a manipulative to aid calculations within word problems that involved

multi-step addition and subtraction a part of a narrative. They commented that this use of narrative and concrete representations led the children into the learning rather than presenting them with the calculations up front.

Another participant mentioned the use of concrete manipulatives such as plastic sticks, straws and elastic bands, which all children are provided with for their own use in individual small boxes. This allowed children to use these manipulatives at home and in lessons, to support their learning and understanding of mathematical concepts. The trainee commented, however, that the UK is investing a lot of money into branded concrete manipulation resources (such as dienes and numicon), based on the belief that mastery uses these. However, they stated that the resources in Chinese schools such as these small boxes and the teacher using a tissue box to explain shape, looked much cheaper and simpler, but led to the same outcome, suggesting that the UK is investing unnecessary money in mastery resources that are not actually featured in the successful East Asian countries.

On the subject of commercial schemes such as those which produce concrete resources, one participant stated that the practice of teaching from schemes such as White Rose, Power Maths and Maths No Problem can ‘stifle teacher and pupil creativity...facilitate gaps in pupil knowledge and deskill teaching staff.’ This goes against recommendations by the NCETM (2016) to use such textbook-based approaches.

### Writing

Regarding formal written work, one trainee stated that they would evaluate how much of this kind of work students in their class were doing, as they observed the students in the Chinese classrooms doing very little of this sort of work. Children were observed working practically and collaboratively with very little writing, and sometimes none at all. They believed that this was beneficial in keeping the children engaged and on task with their work. In the UK, children’s written work is constantly evaluated as a product of a lesson through book scrutinies and leadership walkrounds. The quality and quantity of children’s work is seen to be a reflection of the quality of teaching the child has received. This is not the case in the schools visited in China; all children worked out of workbooks and textbooks, and therefore, aside from mistakes and differences in handwriting, every child, every year, will complete and same work in the same order.

However, the practice of completing most written work at home is not beneficial in all ways; one trainee commented that they would prefer to mark their students’ work during the lesson where possible, to allow children to re-evaluate their answers and learn from their errors immediately. They observed very little assessment for learning during their time in China. One trainee also questioned how the use of textbooks allowed for adapting subsequent lessons to the needs of the pupils. Although they believed the textbooks gave a strong structure to the curriculum delivery, they did not agree with moving all children along at the pace as determined by the textbook. They stated that they believed the UK strategy of

adapting lessons for the needs of the pupils benefits the less able children in their learning much more than the Chinese approach they witnessed.

#### Differentiation and whole-class teaching

With regards to the concept of mastery, participants stated that the British idea of mastery was very different from the Chinese reality. One trainee recalled a conversation with their headteacher, who stated that they did not expect all children to progress at the same pace, but that the mathematically talented children should be taught different material in order to access higher levels of education in mathematics. This directly contradicts the principles of mastery as it is implemented in the UK by the NCETM (2016) and described by researchers such as Jerrim and Vignoles (2015).

Furthermore, one trainee commented that Chinese teaching seemed to have an over-reliance on whole-class teaching, which led to only a small minority of pupils volunteering information and answers, when other pupils took a more passive role. Common practice in the UK would involve a great deal of paired and table-based work, leading to a more collaborative approach. The trainees witnessed a very different approach in China, which they believed was detrimental to the students' learning. Whole class teaching is generally encouraged in East Asia, and therefore is seen as a part of teaching for mastery (NCETM, 2016). Furthermore, Miao et al. (2015) found that pupils performed better in classrooms where teachers allocated more time to interactions with the whole class, and less time with individual pupils or groups. However, they also made it clear that they did not believe this should mean there should be no group work in the classroom (Miao et al., 2015).

Boyd and Ash (2018) believe that the Western method of teacher demonstration followed by practice is a result of cultural myths such as the belief in natural talent. However, the findings in this paper show that belief in mathematical talent is not necessarily a Western myth, as it is also a belief among some teachers in China, leading them to deliver different content to those pupils. Boyd and Ash (2018) also stated that teachers who followed the mastery curriculum began planning their lessons towards subject knowledge. However, the trainee teachers observed very little planning, with most of the lesson pre-planned based on the structure of the textbooks.

#### Variety in calculation

One participant stated that, following their observations of Chinese mathematics teaching, they would advise newly qualified teachers (NQTs) to use a variety of calculation strategies, as this would give children a chance to find and use methods best suited to their style of learning. This echoes Yu (2009) who believed that the Chinese method of teaching mathematics involved a lot of logical reasoning, and application to other areas, and a variety of calculation strategies would help with that. One trainee witnessed an effective lesson where the teacher used partitioning alongside long multiplication, they stated that this variation helped children to consider their own metacognitive processes, and allowed them to



decide on the best approach for a particular problem. This is an example of where using a variety of calculation strategies was used effectively to support children's learning, and participants stated they would use such an approach in their own classrooms.

### Behaviour

Participants commented that they were surprised at the amount of low-level disruption in the classes. One participant stated that they expected a much more disciplined classroom, but experience chatter and disruptive behaviour such as looking in bags and drawing while the teacher was talking. Furthermore, one trainee witnessed more serious behaviour problems, where two children sustained broken bones; the teacher in this case blamed their behaviour on the lack of time they had to play outside. The trainee believed that this lack of time to play had a detrimental effect on the children's overall education.

Although some behaviour management techniques were witnessed, for example one teacher played music to get the class's attention, overall, trainees noticed a profound difference in behaviour from what they expected, and what they were used to in the UK. Researchers such as Boylan et al. (2018) talk of exchanges, but mostly just discuss what the UK can learn from China. However, as one participant stated, there are some areas of UK education, such as behaviour management, that are more successful than the Chinese methods, and therefore an exchange should involve a two-way trade of information and best practice.

### Conclusion

This paper does not attempt to state whether one country delivers mathematics better than another, but it does set out the major differences between what is believed to be teaching for mastery in the UK, compared to what is common practice in China. Many attempts have been made over the years to improve the teaching of mathematics, a considerable amount of change occurring after the publication of the Cockcroft Report (1982) which put a large emphasis on verbal exploration and reasoning (Boyd & Ash, 2018).

Mastery in mathematics is a concept of teaching that was brought over from East Asia and implemented by practitioners such as the NCETM (2016). Researchers such as Jerrim and Vignoles (2015) and Miao et al. (2015) have explored how these techniques can be transferred to the UK. However, fusion of two curricula must involve a two-way exchange, and any adaptation of another culture's practices must be done with caution. Furthermore, Norton and Zhang (2016) explained that China could look to the West for teaching reasoning, but that it should not forget that it is good at the fundamental basics of mathematics.

On the 2019 trip, the trainee teachers gained a great deal from their experiences in Chinese primary schools, they developed their teaching techniques in many areas of the curriculum, made connections with their Chinese colleagues, and examined the extent of whether what they had been told was teaching for mastery was actual practice in China. However, they also

saw many differences in practices which they believed were not indicative of a mastery curriculum as they had seen it in the UK. This echoes Boylan et al. (2018) who explained that the mastery innovation in England was not based on a systematic review of effective practice in mathematics, but solely from a desire to emulate the success of Shanghai and Singapore. Additionally, these findings suggest that China could learn from the UK in regards to aspects of behaviour management, as Chinese teachers are extremely informed in subject knowledge, but this must be supported by effective classroom management strategies.

Many practices, such as the use of concrete, pictorial and abstract representations, and varying the calculation strategies shown to children, the trainee teachers would happily adopt in their classrooms. This supports the view of Boylan et al. (2018) who believed that many of the specific practice of mastery, if considered individually, had the potential to improve attainment. However, as one participant stated, there are also many aspects of Chinese teaching that would not work in the UK, and the UK should be wary of imparting an entire style of teaching without considering the cultural differences involved. It is possible, if teachers in the UK held the privileged position in society that Chinese teachers do, and if UK schools had the funding to provide the resources that some Chinese children have access to (textbooks, extra-curricular activities, large facilities), many aspects of UK teaching would be very different.

One participant stated that they believed more research was urgently needed to re-evaluate the currently-used interpretation of teaching for mastery, and to determine the specific features of the teaching method which have a positive effect on pupil attainment. The researcher would agree with this, and additionally echo the call from Francis et al. (2016) who believed that mixed ability grouping needed a basis in scientific truth based on randomised control trials. More research is therefore encouraged into the differences between teaching for mastery in the UK, and practice in China, and an effort to produce further data supporting the teaching of children in mixed-ability settings.

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