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Date	March 2017
Key stages	KS2
School type	LA maintained, primary
Themes	Mathematics

Why are girls who are working above age related expectations at the end of Key Stage 1 not achieving the same at Key Stage 2?

Wormley C of E Primary School

Context

Wormley C of E Primary School is a larger than average school situated in the Broxbourne district. The school was rated as 'good' by Ofsted in November 2016.

The focus

On Friday 18th September 2015, the Herts for Learning maths team hosted a national conference with Jo Boaler, Professor of Mathematics at Stanford University, as the key note speaker. Many Hertfordshire teachers attended the conference to find out more about developing mathematical mindsets and were inspired to continue improving opportunities in mathematics for their pupils through an action research project. The purpose of the project was to explore some of the themes covered by Jo Boaler and research different ways of developing mathematical mindsets. *This case study has been written by Emma Saxby, Year 4 Class Teacher and Lower Key Stage 2 Phase Leader at Wormley Primary School.*

I started with the broad question of 'Why are girls who are working above age related expecations (ARE+) at the end of Key Stage 1 not achieving the same at Key Stage 2?' I then considered looking at difference in mindset between boys and girls in maths, particularly those who are higher attaining and if there was a difference from Key Stage 1 to Key Stage 2. However, I thought this would be difficult to measure, therefore, have considered looking carefully at feedback that is given to boys and girls from Key Stage 1 to Key Stage 2 to observe whether there is a difference that may lead to this change that may affect mindset. I will track a sample of girls throughout the year to see how the feedback they are being given alters their attitude, mindset and achievement in maths alongside the support that I will be giving staff in giving feedback that encourages resilience, a growth mindset and a positive attitude towards maths. My question is now 'How does process feedback affect the attainment of higher achieving girls in maths?'

80% of the children that are not achieving the expected two levels progress from end of Key Stage 1 to end of Key Stage 2 are girls in our school. This therefore features on our School Development Plan (SDP) so I would like to try to work to improve this in my whole school project. Also, having listened to Jo Boaler speak at a recent maths conference, I was inspired and feel very passionately about mindset and empowering girls within maths.

Observing a higher attaining girl crying when I tried 'The Week of Inspirational Maths' from Youcubed highlighted how she was not resilient enough to cope with this feeling of challenge and wondered if this was due to the feedback that she was given previously. Studies have shown that 'clever' girls lack self-confidence and belief in

themselves when it comes to maths. Many studies suggest that the comparatively poorer performance of UK pupils in world rankings is due to in part to the 'I can't do maths' culture.

Description of my approach

- I will use observations within classrooms to observe feedback given to these children and how the feedback they are given affects their attitude to learning in maths.
- Pupil questionnaire – I will speak with the children themselves to gauge their mindset on maths and how they feel that their feedback impacts on their learning and achievement within school.
- Staff questionnaire – I will also speak with the staff from Key Stage 1 to Key Stage 2 to see how they feel that feedback influences mindset, attitude and attainment of pupils and if this differs between boys and girls.
- CPD time to discuss feedback that will be conducive to creating a growth mindset in our pupils.

Widening the approach

As it is a whole school focus on our SDP, I wanted to involve as many of the children as possible. It would seem that we need to focus on Key Stage 2 girls, however, I observed that some outcome feedback was being given in Key Stage 1 where this may all stem from.

My colleagues suggested changing my question from including 'process praise' to 'process feedback'. This was due to the fact that they thought there needed to be a balance between what has been done well and points for improvement.

From a staff meeting that I have had, it was said that verbal feedback has the most impact on the children's progress. Therefore, I decided to focus on this rather than written feedback.

Impact and recommendations

I decided to give information in smaller groups to allow for more discussion and debate as people feel more comfortable in the phases that they work in rather than a whole staff CPD.

From my pupil interviews, I have noticed that the girls are more open to being challenged in maths, they know that they are not aiming for perfection and that they can always improve. Although, I still feel that they like getting everything right. They all enjoy maths and think that the feedback they get helps them to improve. As a result of my CPD sessions, staff have been more deliberate in their feedback that they are giving and they are being more specific. The impact of this has been that the girls that I have targets are now able to use this language when talking about their learning.

The project has allowed me to develop my coaching skills as I have been more aware and noticing the practise that is commonplace in my setting. I have learnt a lot as a middle leader and the value of non-hierarchical development as my colleagues have been very supportive.

Taking the project forward, I would like to review the profile of maths feedback and marking within my school's marking policy and focus now on written feedback as well as verbal. I would also like to involve parents in this process to encourage them to give similar feedback to their children and to encourage a growth mindset in their children, particularly mothers and their daughters in maths.

Contact	**Emma Saxby, Year 4 Class Teacher/LKS2 Phase Leader at Wormley Primary School**
Reading and website references	**Boaler, J. (2009) *The Elephant in the Classroom: Helping Children Learn and Love Maths* , London: Souvenir Press Limited** **Boaler, J. (2015) *Mathematical Mindsets: Unleashing Students' Potential Through Creative Math, Inspiring Messages and Innovative Teaching*, John Wiley & Sons.** **Bubb, S. and Earley, P. (2007). *Leading & Managing Continuing Professional Development*. 1st ed. London: Sage Publications.** **Dweck, C. (2012). *Mindset—How you can fulfil your potential*. 1st ed. London: Robinson** **Pritchard , A (2009) *Ways of learning—Learning Theories and Learning Styles in the Classroom,* Abingdon, Oxon: Routledge** **Walkerdine, V. (2005). *Counting girls out*. 1st ed. London: Routledge / Falmer.** ***Websites:*** **Gurney-Read, J. (2017). *Damaging maths mindset holding pupils back*. [online] Telegraph.co.uk. Available at: http://www.telegraph.co.uk/education/educationnews/11199064/Damaging-maths-mindset-holding-pupils-back.html** **Growth Mindset Maths. (2017). *Growth Mindset Maths*. [online] Available at: http://www.growthmindsetmaths.com/** **Teacher Development Trust. (2017). *What makes effective CPD? - Teacher Development Trust*. [online] Available at: http://tdtrust.org/what-makes-effective-cpd-2** **Youcubed at Stanford University. (2017). *Inspiring Students to Math Success and a Growth Mindset*. [online] Available at: http://www.youcubed.org** **School website: www.wormley.herts.sch.uk**

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