

## Mastery and fluency: Variation vs Variety

Name: Becky Bailey

School: Wavendon Gate Primary

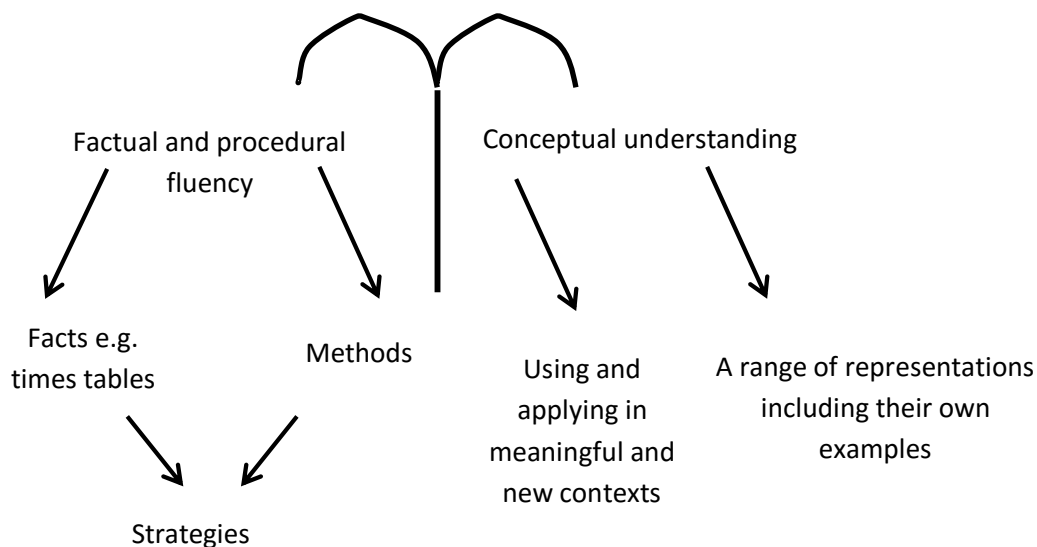
### Why did you choose to develop mastery and fluency in Mathematics?

I had previously focused on reasoning across the school through an earlier project and whilst this was having a significant impact on the pupil's confidence and their ability to make links, I noticed that children were lacking fluency particularly with number bonds and times tables. This was having an impact on the concepts that the children could access due to problems with their accuracy. It was also acting as one of the main barriers when attempting to narrow the gap between the lower and higher attaining children.

In addition to this, I was keen to look at depth in learning. This has been a key phrase 'floating' around since the introduction of the new curriculum, linked to the increased focus on mastery. The new curriculum now expects that children would be broadly moving at the same pace with at least 85% meeting the end of year standards. It is therefore important to be providing depth of learning with development of both factual and procedural and conceptual fluency to allow all children to reach the new increased expectations, rather than viewing fluency simply as 'rote learning'.

As I started the project, it became clear that my own understanding of some of these terms was not as strong as it could have been. This was something that I wanted to develop.

This image helped to support my own understanding as I went through the project.



The different fluency strands work together as a balance and children require all of these, combined with problem solving and reasoning, to be able to master concepts in mathematics.

Additionally, as a school, we have recently removed sets in mathematics.

This year is my first experience of teaching maths to a whole class rather than a set ability group. As well as increasing my own awareness of the strategies and teaching pedagogies to allow children to progress at the same rates and access the same concepts, I wanted to support teachers in doing the same.

### **In what way were you planning to develop Mastery in fluency?**

I wanted to develop Mastery in fluency by ensuring that fluency did not become 'rote learning'.

I decided to focus on the use of variation as an active teaching approach and method for practise that would engage children in the maths.

I wanted to use varied practice which would expose the structure and relationships behind the maths. The idea of this was to force children to develop generalisations and apply these to their own mathematics. Hopefully developing a stronger understanding. (Examples to follow).

I initially planned to do this by trialling activities in my own year group.

When I was confident with the 'new' terms and had developed a bank of activities and examples, I would share this with the staff in my school.

### **What did your project involve?**

My project involved developing and trialling a range of activities based on variation in practice and evaluating the impact that these had on the year 4 pupils.

These activities were used to expose the structure of the mathematics, allow children to make generalisations and then the activities would include a twist to ensure that pupils had fully understood the concept and could apply their understanding.

The aim was that over time, by providing a combination of practise for factual and procedural fluency, children would develop conceptual fluency which could be applied to different contexts and problems.

For example: With the activity below, I wanted to make explicit the concept of adding 10 in 3 digit numbers and then use this to explore what happened to **any number** when you added 10, particularly those where you would need to cross the boundary e.g. 1998

## What do you notice?

$$127 + 10 = 137$$

$$137 + 10 = 147$$

$$147 + 10 = 157$$

$$157 + 10 = 167$$

$$167 + 10 = 177$$

Can you explain what is happening? Why?

Can you continue the pattern?

We started with a straight forward activity. Pupils of all abilities were able to answer the questions and, additionally, most of the children began to notice that it was the tens column that was changing each time.

Together we looked at what would happen after 197 and why. It was particularly interesting to look at what the last 3 digit number in this pattern would be and justify what would happen next.

This allowed the children to gain a clearer understanding and apply this concept when dealing with larger numbers.

Similarly, we then reflected on our learning and considered what might happen when adding and subtracting 100 and 1000.

$$1968 + 10 = \boxed{\phantom{000}}$$

$$1978 + 10 = \boxed{\phantom{000}}$$

$$1988 + 10 = \boxed{\phantom{000}}$$

$$1998 + \boxed{\phantom{00}} = 2008$$

$$\boxed{\phantom{000}} + 10 = 2018$$

$$2018 + 10 = \boxed{\phantom{000}}$$

What do you notice?

What's the same and what's different?

What about?

$$3967 + 100 =$$

$$4007 - 10 =$$

$$6797 + 10 =$$

$$3999 + 100 =$$

We have continued to explore activities like this both for practising fluency and teaching new concepts.

When teaching new concepts this approach has enabled pupils to recognise and generalise patterns, rules and approaches.

Following on from this and the successes I have had, I am now beginning to share these strategies with staff through INSET.

I will be putting together a bank of activities that go across the year groups and allowing staff to share and reflect on their own experiences of trialling these in their own classroom.

*There are examples of variation that were created as part of our fluency project. These give examples from Foundation Stage to Year 6 in addition and subtraction as well as multiplication and division*

### **What differences did it make to your learners?**

Initially, I worried that the children would not connect with this method and would find it too repetitive. Instantly, I realised this was not the case. It actually increased confidence for all my learners and I found that it was accessible for all abilities.

My least able children were able to connect with the patterns and follow this through, though sometimes needed support with the twist.

My able children were able to connect with the pattern and expose the structure, explaining their interpretations and generalisations.

My more able children were beginning to ask their own questions and extend their own understanding.

*It is important to note, that the ability of the children differed depending on the context.*

Additionally, this variation approach significantly boosted confidence of pupils in my class as

most of the time all of the children could access the same concept and begin to make the links.

The structure and order of the questions meant that the relationships became more explicit e.g.

What do you notice?

$$2 \times 4 = 8$$

$$6 \times 4 = 24$$

$$10 \times 4 = 40$$

$$12 \times 4 = 48$$

$$2 \times 8 = 16$$

$$6 \times 8 = 48$$

$$10 \times 8 = 80$$

$$12 \times 8 = 96$$

By laying the questions out in this way. Pupils began to spot the link between doubling and the 4 and 8 times tables. I don't believe as many of the children would have accessed this if I had included the questions in a 'pick n mix' activity.

We could then use this understanding to apply to more complex questions e.g. using the 4 times tables and the facts we knew to solve  $24 \times 8$

We used the example below to explore what happened when multiplying by multiples of 10. Following on from this we used money as a twist to expose the misconception of adding on zero.

What do you notice?

$$2 \times 3 = 6$$

$$4 \times 5 = 20$$

$$2 \times 30 = 60$$

$$4 \times 50 = 200$$

$$20 \times 3 = 60$$

$$40 \times 5 = 200$$

$$2 \times 300 = 600$$

$$4 \times 500 = 2000$$

$$200 \times 3 = 600$$

$$400 \times 5 = 2000$$

$$20 \times 30 = 600$$

$$40 \times 50 = 2000$$

As this project is still early on in its implementation, I am yet to measure the progress in terms of impact. However, I have seen a difference in the pupils speed and accuracy when answering mental questions and also an increase in enthusiasm and engagement with fluency style exercises.

Children are beginning to use their reasoning skills alongside the fluency practise which is supporting their understanding and their ability to retain and apply knowledge.

### **What difference did it make to your school?**

This project is still in its infancy and so currently its impact on the whole school is difficult to measure. In January, I was able to introduce the concept during INSET and share a number of the activities I had carried out.

Staff were keen to adapt some of these and create their own activities which we will share and reflect on at the next staff meeting.

To support staff in creating activities that adopt variation in practice, I purchased copies of the Maths No Problem textbook and workbooks which contain ideas for activities and practise that follows the small, logical steps required for depth of learning. They will hopefully support staff in using this teaching technique.

### **What did you learn yourself?**

Firstly the project particularly developed my understanding of fluency and the different ways that this can be practised in the classroom. Most importantly, I think it emphasised the fact that time must be taken for explicit teaching of the relationships and structures in maths and then separate time must be provided for practise on a regular basis. Fluency is not rote learning.

The project also taught me the importance of carefully planning and selecting the examples and questions I use in my lessons. Before this project, I would regularly make questions up on the spot or include 'variety' – more of a pick n mix approach. Whilst I know there is still a place for this, I have realised that I must think carefully about the journey that I take children on and that pupils will benefit from having the structure exposed explicitly. By adding a 'twist' children are then able to take their generalisations, manipulate and apply it and develop a clearer understanding.

Finally this project helped me to see that variation in practise can be used at different points during a lesson and can also be used as a teaching strategy for new concepts. It is not an approach I would use as a standalone pedagogy but combined with other strategies, I have found it extremely beneficial.

### **Any other comments / How someone else might use this project / What difference could this project make to other schools?**

This project may support teachers who are trying to develop a clearer understanding of terms like variation in practice, conceptual fluency and factual and procedural fluency.

It may support teachers who are looking for examples of activities to try that fit the variation practice teaching approach.