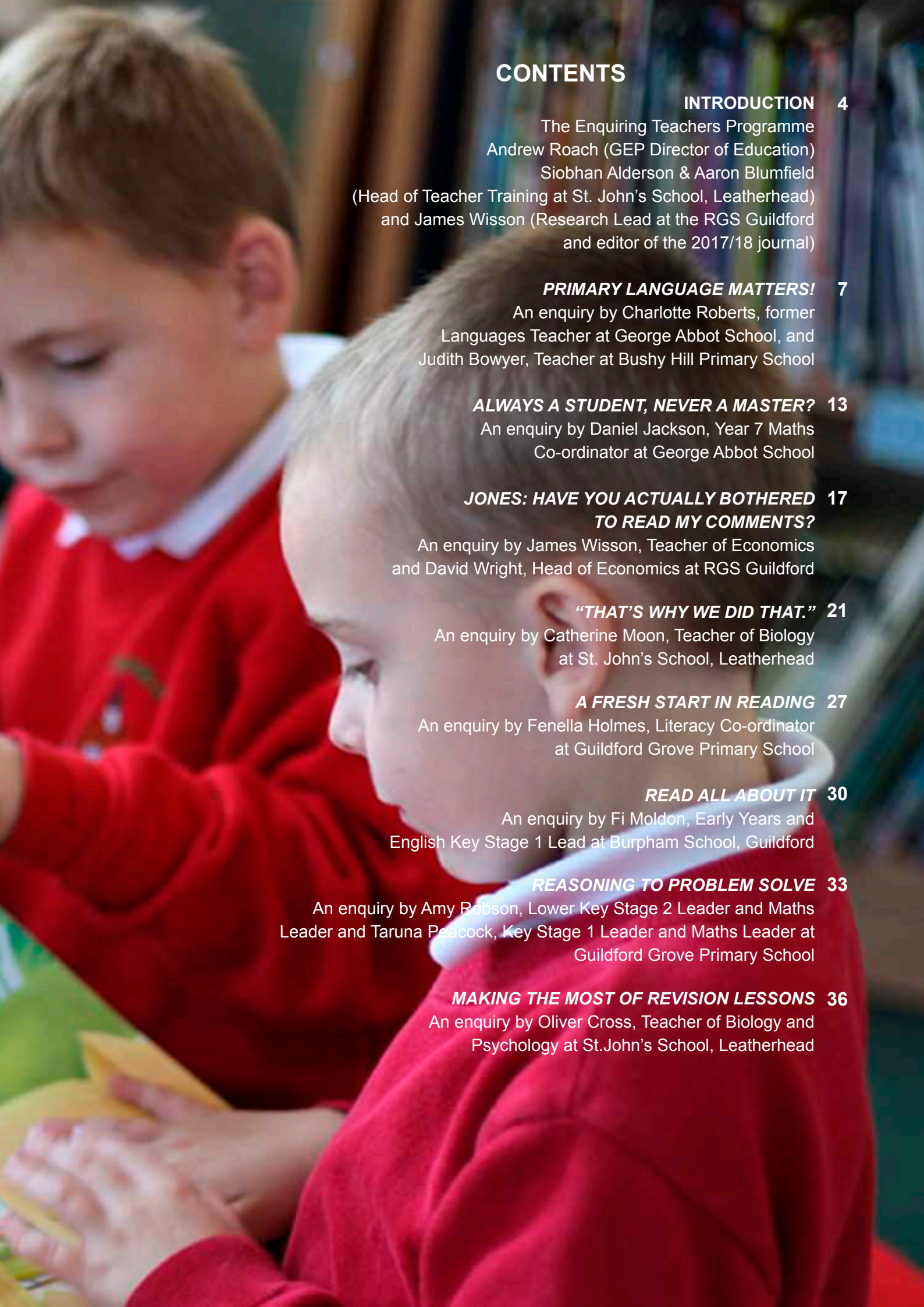
Enquiring Schools

A journal of evidence-based enquiry

2017/18 Volume 3



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Introduction

This journal collects the findings of teachers from the third year of the Enquiring Teachers Programme (ETP), and the programme continues to grow from strength to strength. Once again, the enquiries presented here represent the work of teachers from a wide range of schools, both state and private, primary and secondary. It is especially pleasing to see the spread of projects into a wider range of schools, giving more teachers the opportunity to conduct a rigorous enquiry into aspects of education that will allow them to improve their practice and benefit their students. The themes covered this year range from explorations into how primary and secondary schools can work together to better deliver foreign language lessons, to how best to use classroom time to teach Mathematics or scientific experiments, to how to improve marking efficiency at A Level. In short there is something for everyone in this journal, but one underlying thread which links all the articles is a sense of professionalism, expertise and passion for learning which is truly inspiring. In our modern age, opinion is accessible at the swipe of a finger to anyone with a smartphone, but thoughtful, considered and contextual enquiry is in much shorter supply; we are grateful to all those who have spent so long considering, testing and sharing their findings. The enquiries in the pages that follow will have an impact on hundreds of children over the coming years and ripples of those interventions will last for generations. In turn what has been learned and shared will go on to inform our colleagues throughout our schools and to shape more lives. This is something of which all enquiring teachers can be proud and is a fantastic example of how skilled teachers can change the educational landscape themselves.

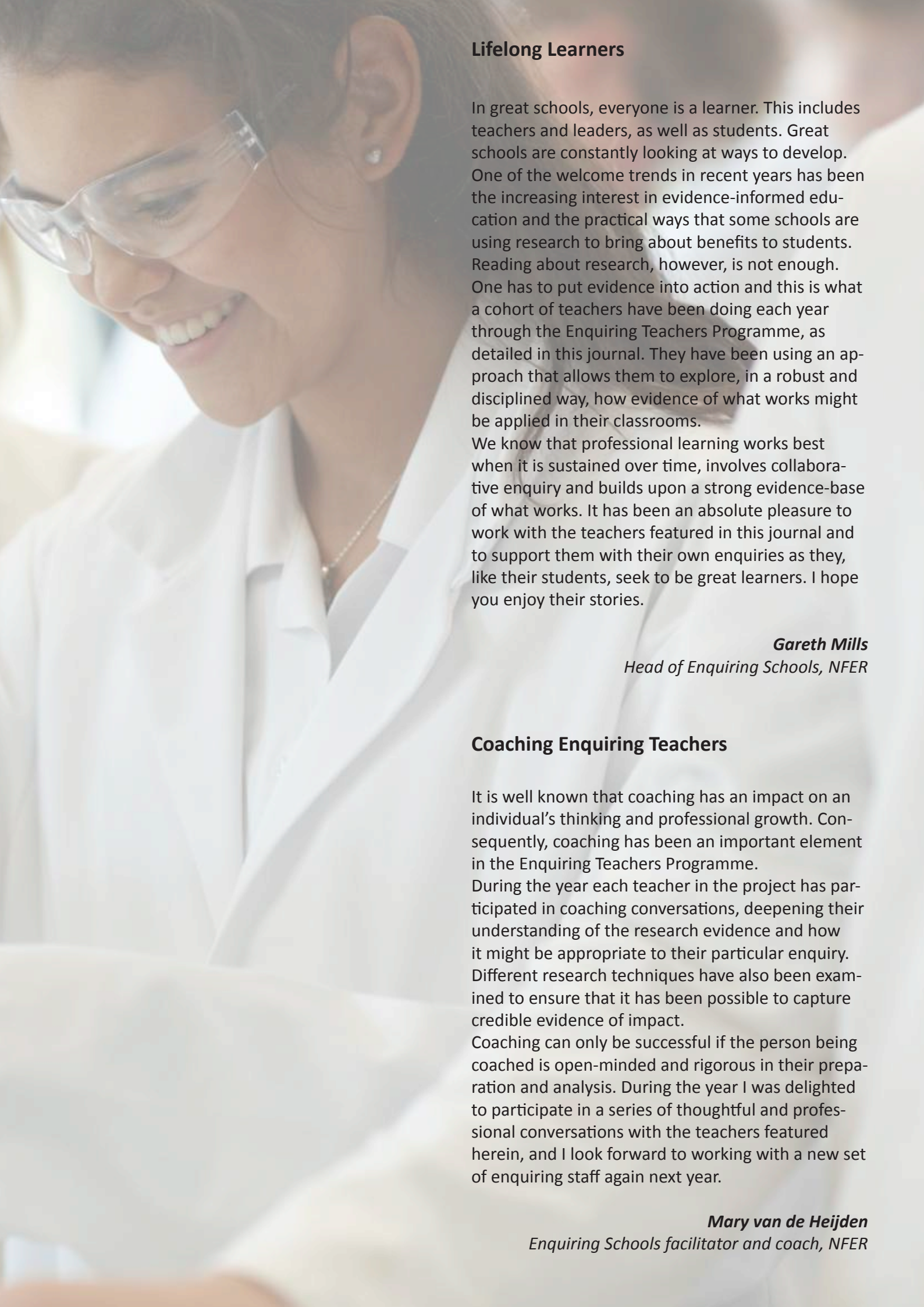
The spirit of the ETP is one of collaboration and partnership between professional educators and one key success of the programme is the way it facilitates the exchange of information, ideas and enthusiasm between a wide range of schools in the local area. Whilst the ETP began in a single school, it is now a stronger programme for that collaboration, underpinned by the shared goal of helping all our students achieve their potential. Significant thanks should go to all those who have helped facilitate the process, from Mary van der Heijden and Gareth Mills at the NFER to Paul Bridges and Tom Shimell at the RGS who were instrumental in establishing the ETP and getting it off the ground. Finally, without the support and goodwill of the schools involved (Burpham School; Bushy Hill Primary School; George Abbot School; Guildford Grove Primary School; RGS Guildford; St.John's School, Leatherhead) who support the programme, we would not be able to run the enquiries.

As we move through the fourth year of the programme the impact of what has gone before is becoming clear, with significant developments in a number of schools who have taken what their teachers have found to improve outcomes for students. That this has been achieved through the skill and endeavour of those teachers who work closely with their students is especially rewarding, showing a different way to develop schools, from the classroom up rather than from policy down.

Andrew Roach
GEP Director of Education

Siobhan Alderson & Aaron Blumfield
Head of Teacher Training at
St. John's School, Leatherhead

James Wisson
Research Lead at the RGS Guildford
and editor of the 2017/18 journal



Lifelong Learners

In great schools, everyone is a learner. This includes teachers and leaders, as well as students. Great schools are constantly looking at ways to develop. One of the welcome trends in recent years has been the increasing interest in evidence-informed education and the practical ways that some schools are using research to bring about benefits to students. Reading about research, however, is not enough. One has to put evidence into action and this is what a cohort of teachers have been doing each year through the Enquiring Teachers Programme, as detailed in this journal. They have been using an approach that allows them to explore, in a robust and disciplined way, how evidence of what works might be applied in their classrooms.

We know that professional learning works best when it is sustained over time, involves collaborative enquiry and builds upon a strong evidence-base of what works. It has been an absolute pleasure to work with the teachers featured in this journal and to support them with their own enquiries as they, like their students, seek to be great learners. I hope you enjoy their stories.

Gareth Mills
Head of Enquiring Schools, NFER

Coaching Enquiring Teachers

It is well known that coaching has an impact on an individual's thinking and professional growth. Consequently, coaching has been an important element in the Enquiring Teachers Programme.

During the year each teacher in the project has participated in coaching conversations, deepening their understanding of the research evidence and how it might be appropriate to their particular enquiry. Different research techniques have also been examined to ensure that it has been possible to capture credible evidence of impact.

Coaching can only be successful if the person being coached is open-minded and rigorous in their preparation and analysis. During the year I was delighted to participate in a series of thoughtful and professional conversations with the teachers featured herein, and I look forward to working with a new set of enquiring staff again next year.

Mary van de Heijden
Enquiring Schools facilitator and coach, NFER

Primary Language Matters!

An enquiry by **Charlotte Roberts** former Languages Teacher at George Abbot School and **Judith Bowyer**, Year 6 Teacher at Bushy Hill Primary School

Research into the transition of language teaching from primary to secondary school with the aim of changing students' perception of language lessons.

When is the best time to learn a language?

There is an enormous amount of research indicating that the younger you learn a language, the more likely you are to achieve a higher level of fluency. According to Dr Patricia Kuhl, professor of language acquisition, writing for the British Council's Voices magazine; 'By three, a child's brain is actually twice as active as an adult brain.' Kuhl's research shows that babies and young children are experts in their ability to acquire a second language. 'Our brains are dynamic and constantly active, and a baby's brain is the busiest of all,' she says. Research has shown that babies begin to understand language about twice as fast as they actually speak it. According to Kuhl, what's going on in a baby's brain is nothing short of rocket science; 'Babies', she says, 'can discriminate all the sounds of all languages... and that's remarkable because you and I can't do that. We're culture-bound listeners. We can discriminate the sounds of our own language, but not those of foreign languages. So, the implication seems to be that we should expose young children to other languages as early as possible, allowing them the opportunity to use their natural ability to distinguish different sounds and therefore learn and make sense of a new language while it is relatively straightforward.

The British approach to language skills is something that is often reported on in the media, in comparison to other European countries who seem to excel in mastering other languages. In Germany, for example, students would have twice as much time in the timetable dedicated to English lessons which undoubtedly will assist their progress. Another article, as recently as May 2018 on the BBC News website, reports that the best time to learn a language is before the age of 10, even stating that after the age of 17-18 the ability plateaus and drops off in adulthood.

So, taking this all into consideration, the question is, why does the national curriculum not compel schools to teach a foreign language formally in every year of Key Stage 2?

The Languages Trend survey dated 2016-17 conducted by the British Council reports that only 37% of primary schools have been able to implement language lessons into their curriculum; dedicating lesson time and specialist teachers to them, with the rest of schools only fitting them in as and when the timetable allows, meaning that primary school students are having a very diverse experience of learning a language.

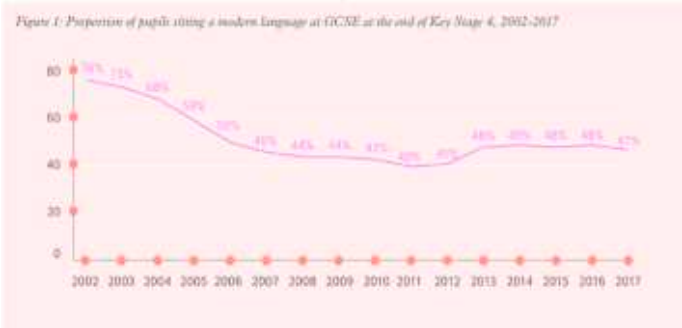


Figure 1: Taken from the British Council's Languages Trend Survey 2018

As one of us has taught secondary languages for ten years and seen first-hand how the level of self-consciousness increases through adolescence, we can only support a more cohesive approach to the transition of languages from Key Stage 2 to Key Stage 3. There have been many occasions when even very able students cited 'difficulty' as their reason for not doing languages either at GCSE or A Level (despite Charlotte's best efforts at convincing them). If students could establish a higher level of fluency and pronunciation earlier, this would help their confidence and progression through secondary school.

Sadly, as shown in Fig. 1, the number of students choosing a GCSE Language at the end of Key Stage 4 was down from 76% in 2002 to 47% in 2017. Students less likely to study a language at A Level means that some Language departments at University are having to consider closing down. Even the introduction of the EBacc is not making any significant difference to the number of students taking languages post GCSE.

Through the project, we wanted to start changing perceptions early - at primary school - by working together, sharing resources to focus on fluency and

building confidence which will hopefully have an impact on this small case study of students and their motivation and choices later on in their school career.

Initial issues

Types of contact primary schools have with secondaries (percentages out of all schools)	2018	2016/17
A local secondary school provides language teaching in my school	6%	8%
A local secondary school provides our Scheme of Work	2%	2%
A local secondary school provides training for teachers of languages in my school	5%	2.5%
We exchange information on language teaching informally	18%	23%
We collaborate in planning units of work in languages	2%	n/a
We plan language lessons together	1%	2%
We plan CPD sessions together	1%	2%
We take part in cross-phase observations	1%	4%
We take part in network/cluster meetings	16%	17%
We provide data on pupil progress in language learning at the point of transfer	9%	9%

Figure 2: Table from the Languages Trends Survey 2018 conducted by the British Council.

One of the issues we recognised at the beginning of the enquiry was the lack of communication between primary and secondary schools mainly due to time and staff not being available to share resources and for secondary schools to give some guidance to primary schools as to their expectations. As shown in Fig. 2, the amount of contact between primary and secondary schools has either decreased in the last year or is a very low percentage. Another factor that should be taken into consideration is that 41% of secondary schools have over ten feeder schools which makes the process of working collaboratively more complex.

According to the British Council's most recent Languages Trends Survey, approximately 80% of schools allocate between 30 minutes and one hour per week for language lessons, although comments from schools indicate that this is often irregular or replaced by other priorities in the curriculum. A comment from one of the schools surveyed says; *'As a school we "block" subjects across the year. For example, we may teach a whole French unit over the course of a week or two and then not cover the subject for another half term'. 'French is also often the first subject dropped (unfortunately) due to other things going on in the school.'*

Establishing links

Just as the enquiry question was being thought out, Bushy Hill Primary school, one of George Abbot's feeder schools, contacted the languages department, asking for help with their International Day. Language teachers from George Abbot went in to teach taster lessons in French, German and Spanish to students in Years 3 to 6. It was from this point on we decided to work together, sharing

resources to try to change students' French lessons, in order to harbour their enthusiasm to help increase confidence and hopefully fluency in the language.

Figure 3: International Day at Bushy Hill – taster lessons in French, Spanish and German

Gathering opinions

At the beginning of the project, Charlotte surveyed 90 Year 7s at the end of the summer term in 2017 across all three languages; French, German and Spanish. Asking them a range of questions about their first year of languages at secondary schools, the focus was to extract their opinions on why they thought it was

important to learn a language as well as asking them to compare their experience of learning languages at primary school to secondary school.

Figure 4: Responses to survey question: Why do people learn languages?

They all had a good understanding of why languages would be important in the future (the most commonly used words in their responses are represented in the word cloud in Fig. 4) meaning that they understood the value of learning a language. This is an important question to gauge their understanding of languages as part of the wider curriculum and the range of answers given was pleasing to see. Over 75% of those students surveyed said that they liked the structure and frequency of their lessons at secondary school. They said they learned more in Year 7 than in primary school (this was the most popular answer as well as students feeling it was more advanced – see Fig. 5) and appreciated the teacher's subject specialism. With dedicated time given to language lessons each week, students seemed to see the subject more positively, as a serious option.

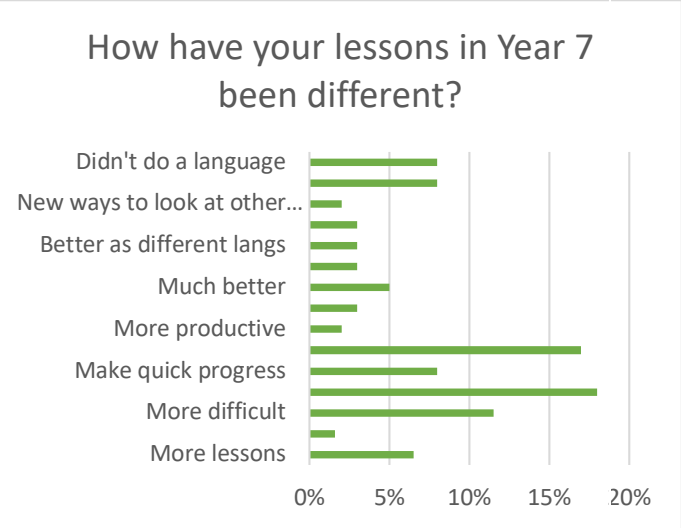


Figure 5 – graph to show Year 7s responses to question comparing primary language lessons with secondary school.

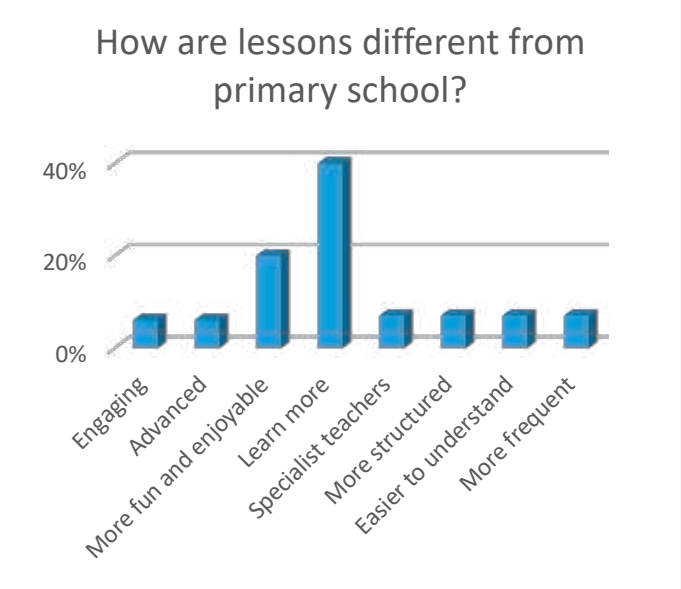


Figure 6 - Survey of ex-Bushy Hill students after a term of languages at George Abbot School

Some additional comments made included; *'When I came to George Abbot I disliked languages as at my old school I wasn't learning anything but now I love it as I have learnt so much.' 'My primary school progressed very slowly over two years whereas I have learnt more this year in German than I have over four years in two other languages.'* One student even said; *'Having a lot of homework has helped a lot with learning the language!'*

Once Bushy Hill and George Abbot started working together, Charlotte surveyed the former Bushy Hill students at Christmas 2017 (see Fig. 6 below) asking them similar questions to the previous survey after only a term of languages at secondary school. The responses indicated again that students found lessons more enjoyable as well as feeling that they were learning more, something that was commented on by most students surveyed.

Case Study: Year 6 classes Bushy Hill primary school

At Bushy Hill school each class is taught French from Year 3 to Year 6 by their class teacher or HLTA (Higher Level Teaching Assistant). There are a few members of staff who can speak French and three students across the school who have French speaking parents – two of these children are French speakers themselves. Lessons follow a programme called 'Rigolo' which encourages leaners to watch a short clip, discuss, play games, listen and repeat and complete written activities offline. These are in the form of worksheets which are mostly matching or cloze procedures. Due to a range of reasons this particular cohort has missed chunks of their French lessons over the years and have been taught by non-French speakers making this year a steep learning curve. This situation is not unusual in primary schools when language lessons will often be the first to be replaced by other activities when required.

Judith continued the enquiry with Year 6 students by initially surveying them as to what they perceived their level of French to be and what their confidence levels were. Then by using adapted resources from secondary school, the class had regular French lessons between February half term and the Easter holidays in April, around 45 minutes a week in which they were encouraged to take part in more written activities

where the focus on accuracy was taken away and more emphasis was put on to fluency.

Figure 7: Example of one of the first pieces of students' work.

Looking at building sentences, students were given a sheet like the one in Fig. 7 above and asked to complete it (with an example given at the top). Cognates were pointed out to help them then they moved on to building sentences with this vocabulary (see Fig. 8). The link was made between the spoken word and the written. The children perceived themselves as better at speaking then writing so by writing what they said (without the focus on spelling) their confidence increased significantly.

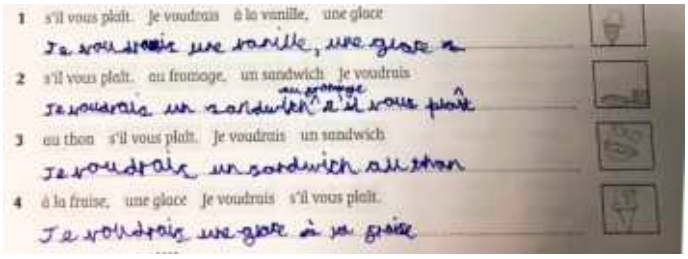


Figure 8 Example of initial sentence building

Figure 9 Tout sur moi sheet

Then Judith moved on to focussing on more independent work by giving students an example of what they may be expected to produce at home. A typical homework in Year 7 would be to write a paragraph about the topic studied in class, for example. Using the sheet in Fig. 9 as a starting point to collect ideas, students completed it in lessons to use as a basis for a longer written piece of work.

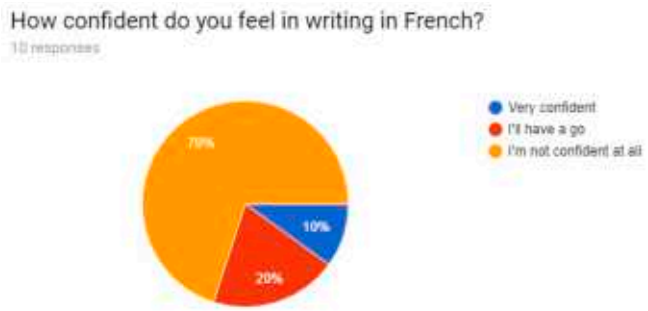
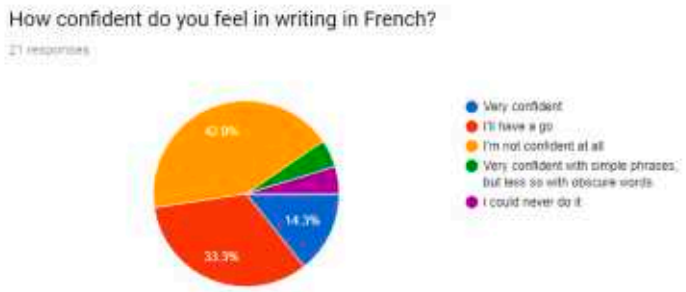


Figure 10: Initial survey for Year 6s about written French

The first survey (Fig. 10) that Judith did with her Year 6 class showed that 70% didn't feel at all confident writing in French and the additional comments that were collated indicated that students were concerned about spelling, linking words and other grammar issues as much as knowing the vocabulary. However, after the half term of regular French lessons using different resources from secondary school and focussing on fluency; the confidence levels among students had increased to 14.3% even saying they were "very confident" and 33.3% saying that they would "have a go" compared to 10% and 20% respectively. Some students even added that they felt very confident providing the phrases were simple.

Figure 11: Survey carried out after half a term of French lessons



Conclusions

Once the barrier of spelling was removed, the children were less worried about having a go. They gained confidence from their use of cognates in reading which they could apply to their writing – much as they do in their English lessons. The children enjoyed the work being sent from George Abbot school and this also gave

them an insight into future expectations.

Just by using a small case study for this investigation, the survey results clearly indicate that student perception of languages changed significantly after having more regular and structured lessons that they could see a link to secondary school. Some of the free writing produced by students towards the end of term showed a real improvement in their fluency (see Fig. 12 below) and confidence across different abilities taking into consideration that none of the students were able to put sentences together in French before we started the enquiry. The only experience they had was choosing words from a word bank to fill in gaps.

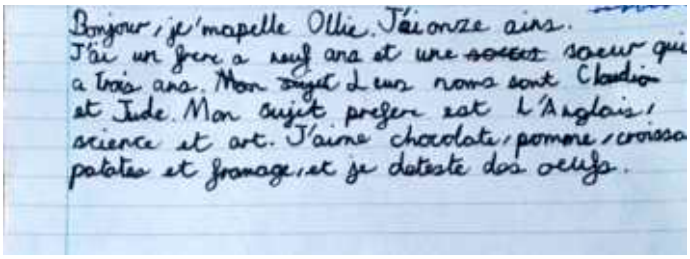

Bonjour, je m'apelle Ollie. J'ai onze ans.
J'ai un frere a neuf ans et une ~~soeur~~ soeur qui
a trois ans. Mon sujet d'eus noms sont Claudia
et Jude. Mon sujet preferer est L'Anglais,
science et art. J'aime chocolate, pomme, croissa
patates et fromage, et je deteste des oeufs.

Figure 12 example of paragraph written by Year 6 student, after half a term of lessons.

Next steps

In an ideal world we would like to build up a network of primary teachers from feeder schools and language teachers at George Abbot School so that resources can be shared, and all students can then come into Year 7 with the same experience of a second language. Similar networks have already been set up online such as the Primary Languages Network where schools would have to pay a membership fee to access resources and schemes of work.

Next year, Bushy Hill will be introducing a term of German and Spanish to Year 5 classes and we also hope to survey this year's Year 6 students following a year of languages at George Abbot. Bushy Hill will be moving away from their existing planning and extending the use of free writing opportunities. This will include a French exercise book which will go through the school and be used as a word and phrase reminder too.

Finally, it would be useful to follow this year's Year 6 class as they start their new language lessons at secondary school to see if the preparation they had this year will impact their progress and eventually the choices they make about languages in the future.

References

[1] www.britishcouncil.org *Language-trends-2016-17 & 2018 (Surveys)*

[2] British Council Voices magazine – article by **Tracey Chapelton** – *How can young children best learn languages? (20th June 2016)*

[3] www.bbc.co.uk/news/education - *All children should learn a foreign language say peers (22nd March 2012)*

[4] www.bbc.co.uk/news/health - *Critical window for learning a language (1st May 2018)*

[5] https://primarylanguages.network **-** Resources website

Always a student, never a master

An enquiry by **Daniel Jackson**, Year 7 Maths Co-ordinator at George Abbot

Can a mastery-style curriculum lead to improved student outcomes?

Abstract

Mastery-style approaches to teaching mathematics are being used widely across primary schools in England, receive millions of pounds' worth of funding from the government, are backed by the National Centre for Excellence in the Teaching of Mathematics (NCETM) and are statistically proven to improve student outcomes. Yet it has taken longer for this to filter into secondary schools, possibly as it has only recently become a focus of the NCETM[1].

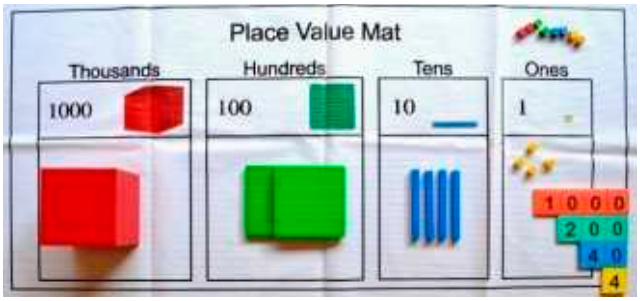


Figure 1: 1244 is not just a sequence of Arabic numerals

Our students, especially those outside of the upper sets, have been struggling with the demands of the new GCSE specification. When our teachers were asked why, the major consensus lay in two key responses: "they can't solve problems" and "they don't *understand* maths". When we use the word *understand* in maths, we mean a deep understanding of the concept, not the process. Much research has been done on process-concept-procept in mathematics[2] and how they are related to learning.

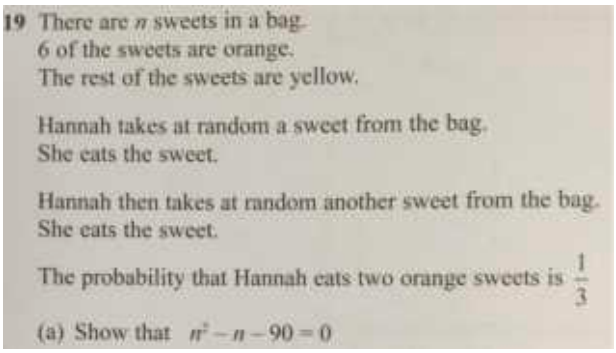
Einstein is quoted as saying that "insanity is doing the same thing over and over again and expecting different results". Clearly a change was needed and hence a mastery-style curriculum has been implemented across Year 7 as a pilot project, with the hope it would lead to greater success in assessments and lead to truly greater understanding of mathematics in our students. The successes of this project were often unexpected (although not unwanted!), and the challenges numerous.

A new educational landscape

I wrote in a previous article that "Recent changes to the mathematics curriculum have forced teachers to rethink how mathematics is delivered in the classroom."[3] Reflecting on this, I would caveat this statement with the word "should".

At my school, a successful comprehensive with a large catchment area, which has a GCSE cohort of 300, lessons were hastily rewritten to reflect the new GCSE content, but importantly, they didn't reflect its new style. Lesson planning still overwhelmingly focused on skills and fluency, with problem solving relegated to a crash course once the curriculum had been delivered.

The question below, designed to stretch the top end of the cohort, was from the GCSE 2015 higher maths paper under the old syllabus.


19 There are n sweets in a bag.
6 of the sweets are orange.
The rest of the sweets are yellow.

Hannah takes at random a sweet from the bag.
She eats the sweet.

Hannah then takes at random another sweet from the bag.
She eats the sweet.

The probability that Hannah eats two orange sweets is $\frac{1}{3}$

(a) Show that $n^2 - n - 90 = 0$

Figure 2: Q19 from GCSE Maths Higher 2015

This question led to an absolute furore over the difficulty of the exam and even trended on Twitter.

Importantly, questions of this style and 'difficulty' are commonplace in the new GCSE assessments from the outset, with most being more challenging than this. The difficulty of the exams is reflected in the grade boundaries. For the June 2015 exam paper, the grade boundary for a C was set at 33%. In the summer 2017 GCSE, the first under the new specification, an equivalent grade 4 was set at just 14%.

Mastery

The traditional way of teaching mathematics in our school has been to teach fluency and skills, and as soon as possible to move to abstract thinking, which in the majority of cases means algebraic arguments. This works well for those students who have already developed a conceptual understanding of

mathematics, in general students in our top sets who are continuing to perform well. For many of our students, however, they need help developing the understanding and links of maths. For these students, being able to see and feel the problem they have been tasked with solving can make a big difference to their success.

In the summer term of 2017, I decided to go and visit our local primary schools where mastery has become an integral part of their mathematical pedagogy.

Concrete-Pictorial-Abstract

All of the primary schools that I visited were really keen on using concrete-pictorial-abstract methods. Concrete is the use of physical resources to represent a problem, such as the use of place-value counters. Pictorial is where a problem is represented by a picture, frequently using a bar model like Fig. 3 below, and solved using the picture. Abstract is where most secondary teachers feel at home, but under the mastery approach considered the final step once understanding has really been embedded.

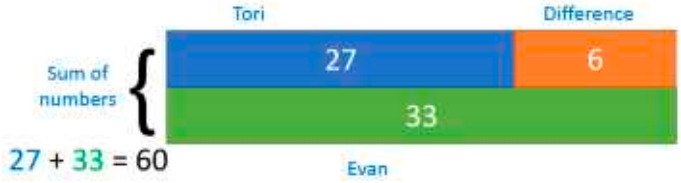


Figure 3: Bar model to solve "Tori has 6 fewer Pokémon cards than Evan. If Tori has 27, how many do they have in total?"

The schools were also all following the same scheme of learning, produced by the White Rose Maths Hub (now partnered with TES). In our old schemes, we would cycle through number, algebra, shape and statistics in 2 – 3-week blocks, with the ethos that this would stop students becoming bored and act as regular revision. In the new schemes, learning is done in large blocks, giving students plenty of time to understand and explore learning as outlined in Fig. 4.

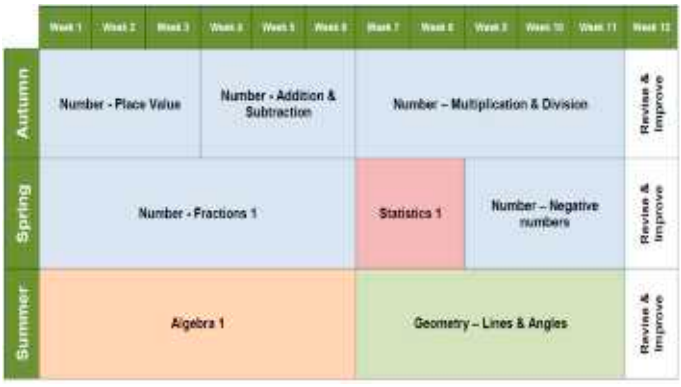


Figure 4: An example of a White Rose Scheme of Learning

The success of the White Rose schemes in primary gave us a clear indication that we should follow it in our secondary school too. The concrete-pictorial abstract approach would become embedded in our teaching with problem solving an integrated feature of all learning. Textbooks were to be abandoned, investigations and discussions were to become commonplace in all lessons, and time really devoted to exploring the richness of mathematics.

In the beginning…

The new mastery curriculum was launched at the beginning of the 2017 academic year for Year 7. At this point, most staff were reasonably excited although they didn't feel that there was enough support or time given to bring them up to speed with the changes. To aid this transition and to ensure consistency across the department, all of the lesson resources were planned in advance for staff.

The 13 teachers using this new approach were surveyed prior to the commencement of teaching. Around half of them had never heard of concrete-pictorial-abstract methods before, with the other half being aware of them but never having used them in a classroom. Some teachers indicated that they were nervous in using this approach in their classroom, although most said they were ready to give it a go with some even saying they were excited by the changes.

The first half-term of teaching was to be on place value, addition and subtraction. Concrete and pictorial methods were to be used extensively to support the understanding of what a number is, and help students to realise how the process of column addition and subtraction works. Place-value counters were given to all staff with some brief training on how to use them.

The results over the first term were somewhat disappointing. It became apparent that the majority of teachers had decided to teach in the old way, launching immediately into the abstract, showing students the mechanics of addition and subtraction without any knowledge as to why and assuming quickly that students understood place value in numbers.

Speaking with students at the end of the first half-term, most said that they had "enjoyed maths" and were "quite confident in it". I posed each student one of two

questions and asked how they would solve it, and to explain why it worked. They were:

a) 2.85 x 100
b) 300 – 21

All students to whom I asked the first question told me that "the numbers moved two places", but only a couple could explain why. Similarly, most students could set up a column subtraction, but again only one or two could explain why the 3 became a 2, the 0 a 9 and so on.

The end of term assessment highlighted these issues, in that most students could answer arithmetic and fluency questions, but given a simple problem or a question requiring an explanation, they were not much further on than where they began. The question below (Fig. 5) which focused on problem-solving, was answered very poorly across the year.

Figure 5: This question from a year 7 assessment stumped many

The use of a pictorial approach, for example a simple bar model (Fig. 6), reduces this problem to what it is; basic subtraction and division.

Figure 6: A bar model to solve the above problem

Spring is the time of plans and projects

It was clear that staff needed more time to develop confidence and trust in the methods they were being asked to use in class. Some additional department time was granted as was some time on our first INSET day.

A full step-by-step calculation policy of how to approach the addition and subtraction of fractions was put together so that staff had a handy guide. We discussed as a group some mathematical problems involving fractions and looked at the different ways that they could be solved.

One real highlight of this was the use of pictorial grids to add and subtract fractions. By using a grid, it not only allowed students to succeed but also to really understand through visual methods, the mechanics of the process. Below is from our calculation policy on how to add fractions. The work of making equivalent fractions is done by the picture. Staff buy-in increased as they could finally see a value in the change, and that students would be more likely to succeed in this topic.

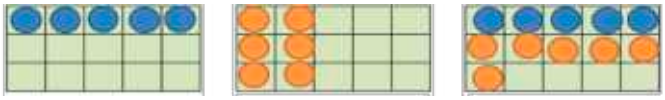


Figure 7: $\frac{1}{3}+\frac{2}{5}$ using a pictorial method

Although more staff (5 – 6) were now keen on using concrete and pictorial methods, students were very much not. During some learning walks in spring term, students felt that they were doing fractions well, but refused to engage with concrete or pictorial methods. When I pointed out to one of them (in an upper group) that their work was incorrect and that a picture might help, they seemed nonplussed. At this point, teacher buy-in was improving but student buy-in was the next step.

Let no-one ignorant of geometry enter

In the summer term, algebra was taught for the first half-term and geometry the second half.

The first major success of this project came in this term: the picture below (Fig. 8) shows a student voluntarily using a pictorial approach to solve an algebraic equation!

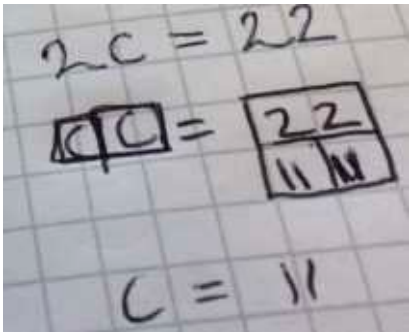


Figure 8: A pictorial representation of an abstract problem

The teaching of geometry was a real turning point of this project. Students in Year 7 had never learned formal geometry before, and as such had no abstract methods on which to fall back.

The work students have completed in geometry has been fantastic and some are already answering questions from the higher GCSE syllabus on interior and exterior angles.

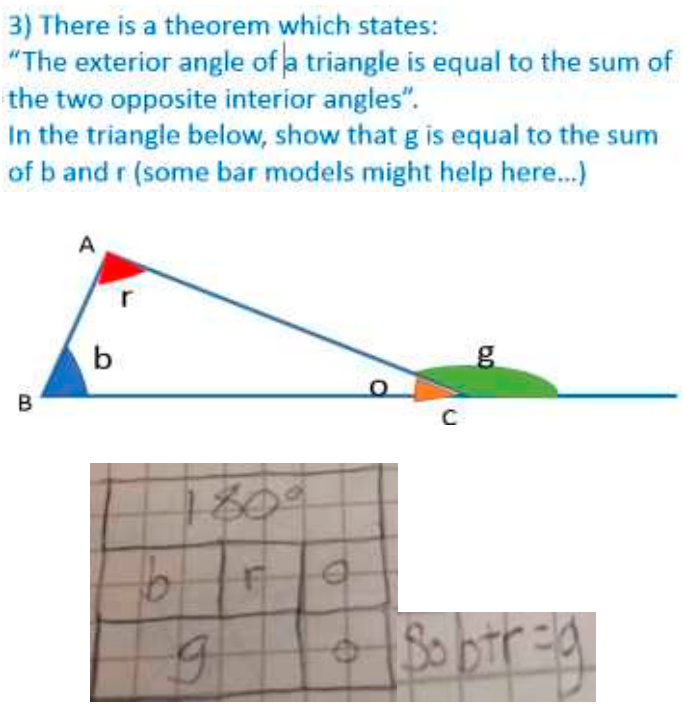


Figure 9: A GCSE question on interior and exterior angles

On a purely personal note, one fantastic moment for me was the following conversation with a student two weeks before the end of term:

Hypatia: *Sir?*
Me: *Yes?*
Hypatia: *Can I show you my book?*
Me: *Err… yes, why?*
Hypatia: *I solved all of the problems yesterday with bar models. I got them right and I'm really proud.*

Figure 10: Hypatia's bar-models to solve geometric problems

Results

For the end of year assessment, classes where teachers had clearly engaged in the teaching of mastery throughout the year outperformed those where it wasn't happening. On the side of the year on which I was teaching (150 students), there were three upper band classes containing 96 students in total. Two were engaged in the mastery approach and one not (which has an experienced teacher). Out of the top scoring 32 students in the test, 26 came from the mastery classes when one would expect 20 – 21. In the next 32 students, the majority came from the class not engaged in mastery, and then results were roughly similar in all subsequent groups. A similar result was noticed on the other side of the year, with 24 from the two mastery classes. The two middle band classes on each side of the year however performed roughly equivalently.

Unexpected success

At the beginning of the summer term, the whole concept of this project was reframed for me not as an exercise in curriculum, planning and pedagogy, but one of change management. Under this, it became clearer that whilst not all staff had engaged with the process, some had, and their success was to be celebrated. It is clear that this approach is working where implemented, and the schemes of learning for year 8 are to be updated to the mastery approach as well.

This approach has also paid dividends outside of the scope of the Year 7 curriculum. My Year 10 set 1 students who struggle with problem solving are now using bar models with success. A teacher of a Year 10 lower band class who were unable to add and subtract fractions were given grids and counters, and after sustained teaching in this style are now able to do so. As teachers develop confidence in the methodology, they are looking to apply it in other contexts so that all students can make progress in mathematics and problem solving.

Next steps

The Year 7 curriculum will be revised and improved for next year. More department time has already been allocated to developing mastery teaching across the department, and I will be tracking the progress of our new cohort against this one.

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Jones: have you actually BOTHERED to read my comments?

An enquiry by **James Wisson**, Teacher of Economics and **David Wright**, Head of Economics at RGS Guildford

How to improve the effectiveness and efficiency of written feedback

Abstract

It was ironic that as teachers of Economics, when marking student's work, we often demonstrated one of those topics that we taught our students to avoid wherever possible – inefficiency. Students would dutifully complete their essays, we would diligently mark and return them, only for the following typical exchange to take place:

"What you get?"

"15"

"Oh, I got 13"

The work would then be filed away (hopefully), only to be seen again when the student revises for the relevant examination (even more hopefully).

There is strong support in the research literature[1] for not only having students carefully read the comments provided by the teacher, but to actually *respond* to that feedback in such a way that increases their learning. Thus our first objective of this study was to investigate and test strategies that would improve student engagement in their feedback.

We also felt that too many teacher evenings and weekends were being spent marking essays; a view shared in a national context by the Department for Education's Marking Policy Review Group.[2] Our second objective was therefore to investigate strategies by which we could improve the efficiency of our marking, whilst maintaining or improving the quality of outcomes for students.

Baseline

Our experiment was focused on our Year 13 economists. We decided to focus upon a "one group, pre-test, post-test" design – surveying teachers and students before and after the intervention to track the effects of the intervention on both student learning outcomes and our own marking efficiency.

In terms of data collected, we focused on the following:

1. The time we spent marking student work.

Prior to running the experiment, we gathered some control data on essay-marking time (focusing upon questions that are worth the highest number of marks in A Level exams). David averaged about 13 minutes marking time per script and James about 17 minutes.

2. The time other teachers spent marking work – this included the RGS community who were responsible for marking extended written assessments at A Level, and other Economics Heads of Department at a number of schools.

Fig. 1 below summarises the combined responses of staff from both those groups – the external HoDs only reported either 6-10 minutes or 11-15 minutes per essay and so had a slightly lower average time per essay than the range of staff at RGS. However, both groups shared the same modal answer of 11-15 minutes per script, and this illustrates that time spent on marking A Level essays is significant within both our school and many similar schools.

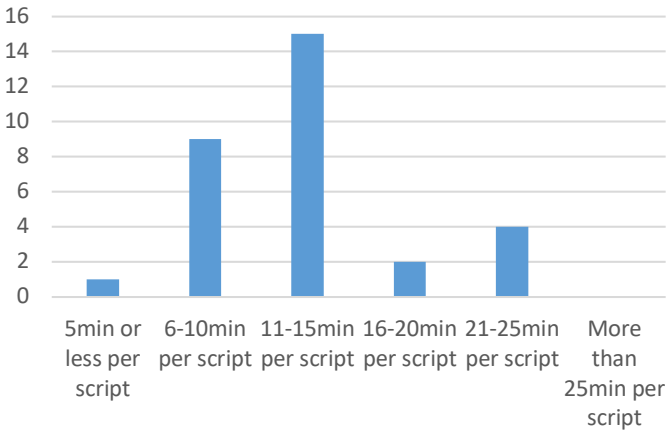


Figure 1: Staff Reported Minutes per Essay

3. The type of written feedback provided by staff.

All bar one person stated that they provided all of the following types of written feedback on an average essay: a grade/numerical mark, a written summary and suggestions for how the student could improve their work. Therefore, there is a clear focus on the summative aspects of feedback across the board. In contrast, the more formative aspects of feedback were far less common. In particular, 7 out of 31 teachers provided an exercise for students to complete in response to their homework, and 13 out of 31 teachers provided questions to extend students' thinking.

4. We approached the students themselves in order to determine their own views on effective written feedback. 35 students responded.

The first observation from our student survey was that students reported themselves to be quite ineffective learners. As Fig. 2 below illustrates, 32 out of 35 students reported that they read through feedback and then filed their essay away. This contrasts with the one student who read through feedback and then acted upon it.

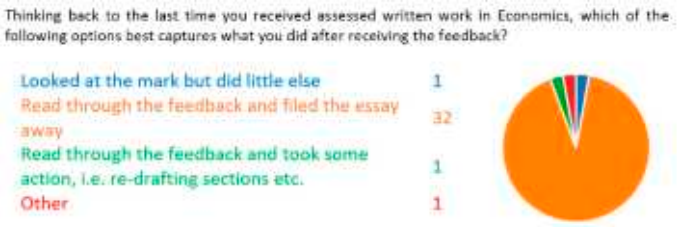


Figure 2: Results from survey of A Level Economics students

The second observation arose from an open question to students: "If you only received one type of feedback on your work, what would you want it to be and why?" Students were positive in their outlook with an overwhelming majority talking about 'even better if' or 'how to improve their work' as the key thing they would like to see. There was, however, some variation between students over how detailed this feedback should be – stronger students tended to seek 'big picture' feedback (e.g. "Analysis on my style of writing" while weaker students asked for more detailed comments or exemplar sentences/paragraphs.

Literature Review

Our approach led us to visit the work of others, on what constitutes effective feedback. The following represents a summary of what we found particularly useful and helped to shape our experiment.

- Black *et al*[3] focused on formative assessment and the *nature* of feedback. It looked at the (negative) effect of providing a summative mark, and as part of their feedback, that feedback should focus on getting students to *think* and *act* in order to take steps to improve.
- Hattie[4] considered feedback to be one of the most common features of successful teaching and learning but noted the need for a degree of *standardisation*. He also raised the point of there being very little research asking the students themselves about feedback, something we wished to address.
- Christodoulou[5] helped us to picture what we were looking for in assessing work, by focusing on a particular *skill* or *task*, rather than the essay in its entirety. This led us towards our setting specific feedback tasks rather than a typical 'make your corrections' approach.
- Glover & Brown[6] encouraged us to focus on the main weaknesses (or what went well) rather than on every minor error. Sherrington[7] provided the basis of an action-based *framework*, having students focus on five types of follow-up actions after their work had been marked.

Intervention strategies

As a result of our baseline analysis and research, we devised the following strategies:

1. Remove marks

As outlined by Black *et al*[3] summative feedback was an obstacle to students reading and acting upon feedback. Whilst we withheld their mark from their work, we were prepared to disclose it once the students themselves had provided their own estimate, reflecting on the feedback provided.

2. Differentiate feedback by student

Our initial approach was to pre-select students by the ability they had shown to date, categorising them as 'Green' (light touch), 'Amber' (moderate) and 'Red' (extensive), and streamlining our feedback accordingly.

3. Incorporate Response to Feedback ("RTF") framework

For every student, we would introduce an RTF task to be completed ahead of the next lesson. The task would be set based on the assessed work, with a view to improving that student's learning around a specific task or goal. The tasks accorded to a standardised framework which escalated by sophistication. In that way, a low-level task (such as re-drafting) would be used for a student struggling with key concepts whereas a higher-level task (such as researching) would allow the more capable student to stretch themselves.

Drawn from Sherrington[7], the RTF framework we developed is outlined in the table below:

RTF task	Example
REVISE - this is for a student who is struggling with basic knowledge concepts.	Bring in revision notes on interest rate transmission mechanism
RE-DRAFT - this should relate to specific paragraphs, and be targeted/specific by outcome.	Re-write paragraph 'X', this time embedding evidence in your answer.
REPEAT - this should allow (better) students to repeat good work.	Evaluate paragraph 'X', but this time incorporate 'elasticity'.
REVISIT - this should ask them to act upon specific feedback that will make their response or understanding (even) better.	Write an evaluative paragraph that links your two policy solutions.
RESEARCH - a small research-based task to stretch beyond the curriculum.	Would your policy recommendation differ for a different developed country - why?

It was also important that appropriate time was set aside to achieve the RTF task. It needed to be short, to maintain student engagement, and time was needed in the subsequent lesson to go through the task, which was typically achieved on a peer-to-peer basis.

Hypotheses and Results

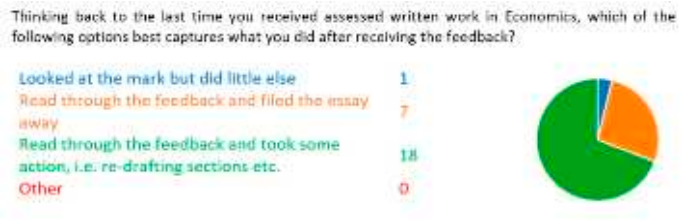
Hypothesis 1: that average marking time per script should fall (efficiency).

The data supports the view that our focus on efficiency did indeed bring down our average marking time. Over the period of the intervention, David's average marking time dropped to 8min per script from a pre-intervention level of 13min and James' average marking time dropped to 13min per script from 17min.

We also expected to reallocate our marking time towards the weaker (Red) students at the expense of the stronger (Green) students. Whilst David was able to achieve this, it was not to the extent that we would have expected, and James actually found the opposite in his marking. We concluded that this target was aspirational, and in practice it can take a little more time to mark and allocate appropriate stretching RTF tasks for stronger students, given the complexity of their responses.

Hypothesis 2: that a stronger focus on formative assessment (and a removal of summative assessment) should help to accelerate student progress and students' perception of their progress (effectiveness).

At the end of the experimental period we conducted a survey targeted solely at those students who experienced the intervention. We saw that 18 of the 26 students reported that they read through feedback and took some action upon it. While this is somewhat mechanical (as we provided students with RTF tasks) it is encouraging to document this change in behaviour.



Further, there is some evidence that students are convinced more strongly of the need for constructive feedback. Contrasting the baseline survey with that conducted post-experiment shows that students now rank 'Follow-up task' as 4th most important (from last out of eight different feedback options) in terms of contributing towards their skills as an economist.

Finally, students on the whole reported that they both reflected more deeply upon feedback as a result of the RTF tasks, and would tend to agree that completing the RTF tasks has led to improvements in their knowledge and skills.

Conclusions

We have been able to demonstrate improved efficiency and effectiveness of our feedback. We have been particularly convinced by the simple removal of summative feedback such as marks/grades and the incorporation of the RTF framework.

Differentiating our feedback by student has been less conclusive as a time-saving exercise, and we found ourselves differentiating by task, providing light-touch feedback to those students who demonstrated expertise in their assessment, whether that was a student who had been classified as strong, moderate or weak in the past.

It is possible that some of our own results have been subject to the Hawthorne Effect,[8] where through observing one's own efficiency in marking leads in itself to reduced marking times. Even so, this is a positive result considering the number of scripts marked over the course of the year.

Next steps

We are indebted to many teachers at the RGS and the wider economics community for providing their feedback practices with us, and we want to share the outcome of this research in case they can benefit from our research.

Also, to consider whether it is appropriate to change our departmental marking policy to reflect our findings. At a minimum we will seek to withhold marks (to ensure that students reflect on feedback) and incorporate an RTF template (to ensure students act upon the feedback), given that these aspects appear both to be easy to implement and to be well supported by our data.

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“That’s why we did that.”

An enquiry by **Catherine Moon**, Teacher of Biology at St. John’s School, Leatherhead

Pushing higher level thinking skills using core practicals in science

Introduction

The idea for this particular educational study morphed quite dramatically through its research stages. The idea started from using the physical laboratory space to improve practical skills in science. However, it became apparent very quickly that students did not understand the purpose of their core practicals and were not able to access higher level thinking skills to link the biological theory to the practical based skills. When A Level Biology students were surveyed about the types of practical based examination questions they find most difficult, the majority struggled the most with interpreting results (*Fig. 1)*. This, therefore, became the new backbone of this project. 50% of students found questions based on the Core Practical Assessment Criteria (CPACs) the most difficult. The majority also found that applying the theory to explain results and evaluating the method the two hardest skills for them. These two are closely linked to Bloom’s Taxonomy of higher level thinking skills (Bloom, 1956).

This study is particularly important in the current academic atmosphere because the new A Level examinations have shifted heavily from basic recall to analysis, evaluation and application. A lot of weight has now been put on these core practical skills, which also appear in the new A Level examinations. This study was particularly applicable to the students involved because of the availability of excellent scientific facilities and because of the need for more independent learning. They have developed an attitude of ‘just tell me what I need to know’, which unfortunately has done them a disservice with the new examinations. Based on this initial survey, I have taken a few core practicals and have either changed my approach to how I introduce each practical or introduced a different method of analysis and evaluation. The implementation of these changes was with the same goal in mind: to get students to change their view of these core practicals from a ‘tick box exercise’ to a valuable application of scientific theory to any set of results or variations of an experiment. In

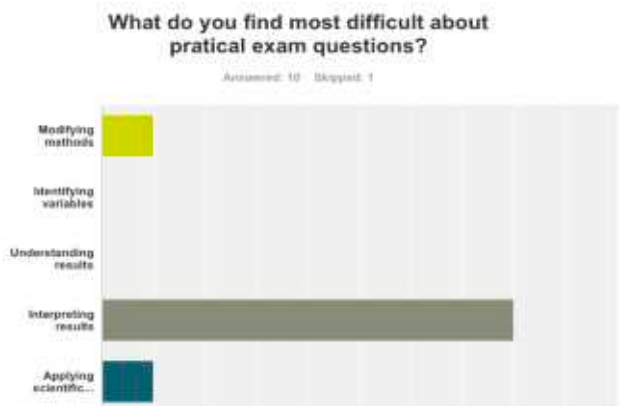

Figure 1: Results from survey of A Level Biology students

order to have this flexibility of thought, they must be able to access the higher-order thinking skills. Beyer (1984) highlights the importance of developing these skills in teaching by identifying their components, developing an effective and sequential curriculum including these skills, and improving their testing. The exam board’s focus on the first and third point of Beyer’s rubric, but it is the responsibility of the teachers to develop the second. These practicals were designed to find an effective way to practice these thinking skills within the curriculum.

Method and Analysis

A variety of methods were used during this project. It very quickly became trial and error research. Due to the nature of the methods used, it is more prudent to go through each practical and analyse its results independently. The study was done on two Biology AS classes (16 students), and two Biology A Level classes (18 students), both with a 60/40 split of boys and girls. It is important to note that these classes are shared with three different teachers and the study was done on a third of the A Level Biology syllabus.

1.Calibration of Microscopes

The method on this core practical was done with the current AS students within the first term of the academic year, but their success was compared to the current A Level students who did the same core practical last year. Last year, the teacher taught this skill theoretically, focusing on how to calibrate a microscope and use this to measure objects accurately, before attempting the practical itself. This year, the skill was actively taught with a much more ‘hands on’

approach. Students then worked in teams with window pens and wrote out their method and calculations on the windows. The benefit of this method is it allowed the teacher to note any errors quickly, and for students to make changes and modifications at the same time as they carried out the practical. Students then took a picture of their window and were then instructed to evaluate their methods. This was their first core practical and their evaluation skills were very basic and mainly descriptive.

Analysis

Following this updated approach, when students subsequently carried out the practical individually for formal assessment, the results were outstanding. Students were assessed on their techniques and ability to follow a method (1a), use the appropriate equipment and measuring strategies (2d), and make accurate observations (4a). These are assessed by colour coding: green means the skill is completed to a high standard, yellow means they are working towards this skill and red means the skill was not accomplished. The previous cohort achieved 100% yellow for 1a, 50% yellow and 50% red for 2d and 43% yellow and 57% red for 4a for this same practical. The current class achieved 94% green and 6% yellow for 1a, 100% green for 2d and 47% green, 35% yellow and 12% red for 4a using the updated method. Although students are still learning to access higher level thinking skills, the method and the process they used increased their confidence in completing this practical to a much higher standard. I believe in part this was because they were provided with background knowledge first to help them with their working memory the second time. As Willingham (2009) noted, they have been allowed to practice a procedure as well as problem solve.

2. Natural Selection

Two ways to introduce higher-order thinking skills are through allowing students to assess an evaluation and providing them with the appropriate material to do this against criteria, and the second is allowing them to be creative. Particularly in science, it is important for students to be able to test a hypothesis by creating an experimental design (Brookhart, 2010). This method was applied for the AS students and the purpose was to get students to use their theoretical knowledge, to apply their own methods, and to be able to analyse and evaluate a method to test for natural selection. Each group was required to plan a method for a group in the other class, with only the hypothesis provided and the equipment available. They then followed each other's methods and evaluated these while completing the practical (using different colour pens). Finally, students completed a student survey to record their perceptions of the practical.

Analysis

From the student survey, most students didn't believe they were more careful when planning a method for someone else and they didn't find it easier to think through the necessary variables in a method, however, 76% agreed or strongly agreed that it was easier to be critical of someone else's method and therefore evaluate it. 84% found it easier to evaluate a practical while they carried it out, and the same percentage said that this method made them more aware of the necessary detail needed when planning a method. 70% of the students stated that doing this activity helped them understand what was needed to achieve the CPAC skill on evaluating and modifying the method. From a teacher's perspective and verbal feedback, it was clear that the students were identifying many more variables that needed to be controlled and improvements to methods when they were doing another group's method. The project allowed them to focus solely on the modifications, which gave them a much more critical approach to this skill than if they were writing a method in the classroom.

3. Gibberellin and Daphnia practicals

This method involved the A Level students and included two different practicals; for the first (Gibberellin), one class was asked to begin by answering an exam question. This was discussed and marked as a class prior to the students planning the practical using what they had learnt from the exam question and the discussions. They then used this method to carry out the practical and evaluated it as they did so. The reasoning behind this approach is that students can utilise higher-order thinking skills by focusing on one question or main idea and being able to break this down into smaller parts (Brookhart, 2010). The second class were issued a very basic method, and then tasked to modify and improve this as they carried out the experiment. After completing the experiment, they then answered the exam question, which was marked by the teacher. The classes were

then asked to swap these methods for the second core practical (Daphnia) so they each had an opportunity to try each method. The students were then given a survey to fill out regarding the practicals, with a scale from 1-5 (1 being 'strongly agree' and 5 being 'strongly disagree').

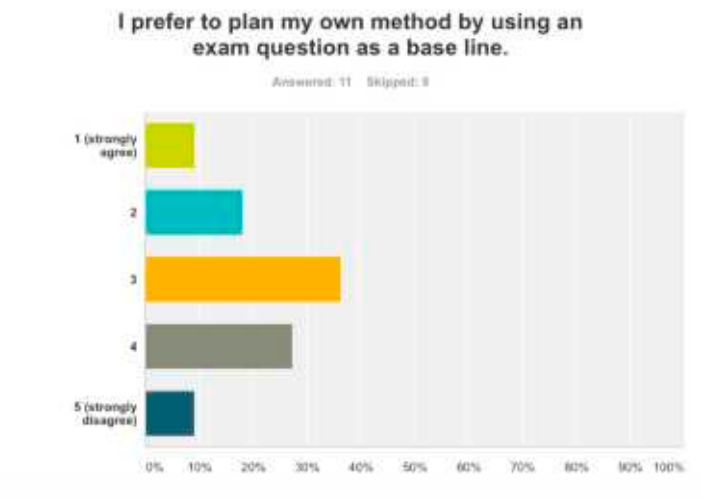

Figure 2 from student survey

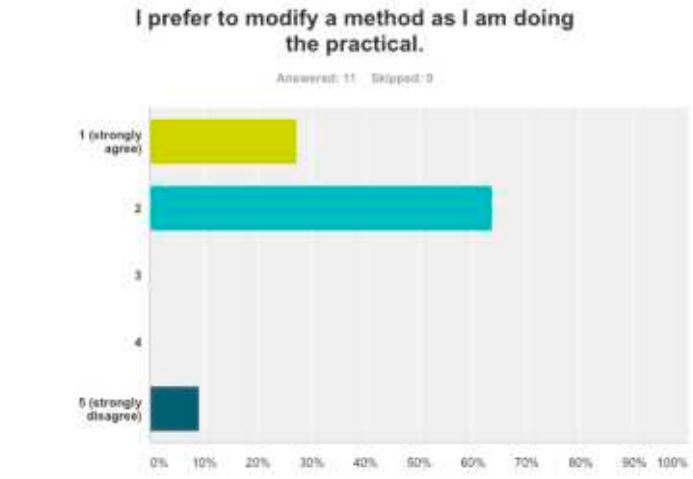

Figure 3 from student survey

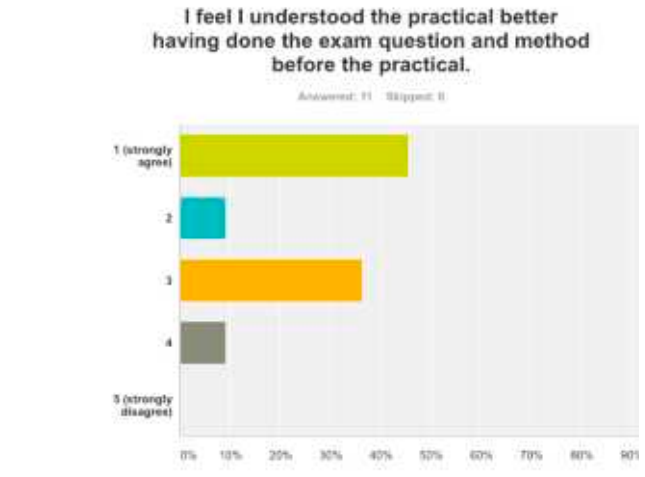

Figure 4 from student survey

Analysis

From the survey, 36% of the class preferred not to plan their own practical using learning gained from answering an exam question. A much higher percentage (91%) preferred to modify a provided method and then carry out the practical, before answering an exam question (*Figs. 2 and 3)*.

I believe this is because they found the process easier and there is a smaller chance of 'failure'. When asked if they understood the practical better having answered the exam question first, only 54% agreed and 36% were neutral (*Fig. 4)*.

When asked the same question about answering the question last, 72% said they understood the practical better using this method (*Fig. 5)*.

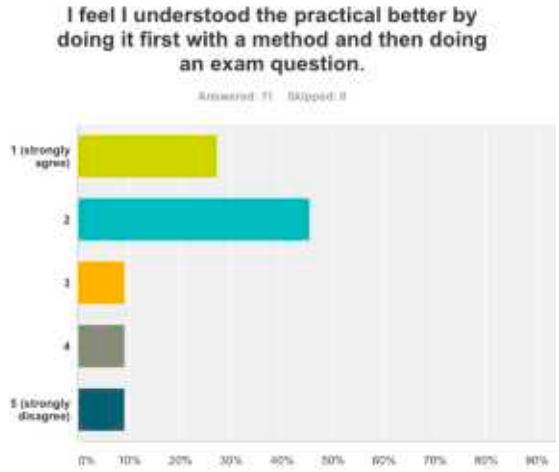

Figure 5 from student survey

However, there was more of an extreme for this point, as 18% disagreed or strongly disagreed with this method. 81% found that they were able to include more detail doing the exam question last (as opposed to 18% who said they added more detail to their own method). 63% felt that they applied more independent learning by doing the exam question last and modifying a basic method. Their comments for preferring to do this method first included:

"It was easier to understand why we did each step in that particular order when it was pre-laid out."

"I felt more comfortable that I knew which were the controls needed rather than guessing them first."

"I felt like I was modifying most of it myself rather than relying on the internet and hoping I have done it right."

As a teacher, it seemed that the student's perception and the outcome was actually very different. When assessing each core practical, it was apparent that there was a much deeper knowledge of the practical, the reason for doing it, and the application of theoretical knowledge when the students completed the exam question first and discussed this prior to doing the practical. Their evaluation and analysis of the practical was much clearer, and their understanding of the results were linked very specifically to the mark scheme they had done previously. This was obviously not the case for all students and it must be acknowledged that each student's learning style is unique. One conclusion is that the method of doing an examination question before students plan and modify their own methods is a very valid way of completing a core practical; it pushes students to utilise their higher-level thinking skills, which they need to be continually developing. However, it should be noted that this conclusion is based on a small sample size. I believe that if this method had been applied much earlier on in their A Level studies, students would become accustomed to evaluating and analysing results to higher levels of detail, thus being more open to this process of carrying out a core practical. It would also build their confidence in their own ability much sooner in their learning development.

4. Other methods used

There were other methods applied to other core practicals, but these will only be briefly mentioned as they were either less successful or have no practical way of being analysed effectively. For a practical on measuring biodiversity in a rock pool, students were asked to research a method individually for two lessons. The practical was then planned as a whole class, before each student took turns adding a part of the method, introduction, control or risk to the method on the board (this was also cited using their references). Once the whole class was satisfied with their method, it was carried out. This appeared to be a successful way of planning a method and getting students accustomed to using research, however analysis was difficult as it was done *en masse* and then marked by another teacher.

Another method was getting students to use an app which allowed them to take a step-by-step video (and add captions) while they completed the mitosis practical. Students explained that they did not like this method as it distracted them from doing the whole practical without interruptions, and they felt the creation of the video held no practical purpose.

Conclusion

It was clear from the student surveys, assessed practicals and examination questions that students find the evaluation and analysis part of the CPACs the most difficult. A secondary conclusion is that evaluating a method before doing an actual assessed core practical significantly improves results and outcomes. Swapping methods allowed students to be more critical of a method and it highlighted the need for details. There was a clear preference of students to modify a pre-existing method before evaluating this method and results prior to completing relevant exam questions. Based on their core practical work however, their perception was different to the outcome. Doing an exam question first and discussing this as a class provided the students with a much deeper understanding of the method and the reason for doing various steps in that method. This could be that students primarily just lack confidence in their own abilities and are still not used to consistently providing higher level thinking skills; having a basic method that they can improve themselves provides them with a 'security blanket'. If these methods had been applied sooner, it is possible that students would eventually gain more confidence and no longer require additional help or input. By creating the variety in each practical, this should promote their attention and benefit all students and their individual cognitive style (Willingham, 2009).

Limitations

The sample size is unfortunately very small and it is not possible to do any significant statistical analysis on the results. It must also be considered that these particular students were a strong sample as these were the students that decided to continue with A Level Biology into their second year; in the current AS cohort, several of the students will likely drop Biology as a subject next year. Another problem was that the perception of students is often very different to their actual outcome and approaches should often be more to the teacher's discretion rather than the students' opinions. Finally, it was very difficult to compare a range of contrasting methods because they were used in several very different practicals. It is possible that students simply

found one biological concept easier than the other, regardless of the method they used to complete it.

Next Steps

It will be important to feedback these results to the students. It will also be necessary to go through the methods and the modifications as a class and discuss their reasoning from the feedback. One student suggested that they be provided with a set of standard results while they do the practical and then get them to answer questions in which the results vary from this set. I believe this would be a very useful method to get students questioning the reason for the results they obtained. Another student suggested proving them with the mark scheme of exam questions while they do the practical, so they could add these points to their modified method. This would allow them to identify what sort of points they should be picking up on while they do a core practical. Finally, I believe it is important to choose specific core practical assessment criteria (CPAC) next year where these methods used would be the most beneficial.

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A Fresh Start in Reading

An enquiry by **Fenella Holmes**, Literacy Co-ordinator at Guildford Grove Primary School.

How can we ensure non-fluent readers are not left behind in whole class guided reading sessions?

Context

All educators know that being a fluent reader is essential to children's academic success. Whole class guided reading, where children are taught reading skills as a class rather than in ability groups, is a new approach that aims to achieve this objective. Guildford Grove Primary School began teaching reading skills using the whole class model in September 2016 and I wanted to investigate whether this method of teaching was meeting the needs of all students. Teaching in this way for one year contributed to a significant increase in the number of children achieving the expected standard in their KS2 SATs, however I wanted to monitor aspects other than attainment and collect data from different year groups.

Narrowing the Focus

In order to make the focus of the research project more specific, I carried out a staff survey. This showed that staff were becoming confident when planning and teaching using the whole class approach and that they believed there was more opportunity to give the children feedback. An area of concern that was identified by almost all respondents was how the model catered for readers who are less fluent than their peers. Staff stated that students who were not fluent, those without SEND, struggled to access the text that the rest of the class were able to read.

Figure 1. A word cloud generated from the teacher questionnaire.

This presented me with a more focused research area into the provision being made for children less fluent than their peers.

Fluency

Most definitions of 'fluent' relate to spoken language. For example, a fluent linguist will 'be able to express oneself easily and articulately'. However, for the purposes of this study, a more appropriate definition of fluent might be, 'smooth, graceful and effortless', with synonyms such as 'easy, natural, unbroken, uninterrupted and continuous'. When applied to reading, a fluent reader should be able to read an age appropriate text with ease, in a continuous, unbroken manner. In order to do this, the reader must be able to decode the text quickly and efficiently so that they are not frequently interrupted by the need to sound out new words. Therefore, for the purposes of this discussion, a fluent reader has the decoding skills necessary to read a text continually and a non-fluent reader is lacking in these decoding skills. Comprehension of a text is a different skill entirely and was not considered during this study.

Fresh Start

Whilst investigating provision for less fluent readers, I was made aware of 'Fresh Start' which is an intervention that was being used in Years 5 and 6 at Guildford Grove. Fresh Start has been developed by Read Write Inc. and the Education Endowment Foundation found that Fresh Start 'shows considerable promise as an effective catch-up intervention for low-attaining readers'[1].

The Fresh Start intervention combines spelling and word knowledge with reading fluency and comprehension skills. The programme contains thirty-three modules and these range from a very basic, largely phonics based introductory module, where children learn to read words such as 'cat', to modules that prepare children for the reading demands of the secondary curriculum. Children are assessed and grouped by module.

Some of the principles behind Fresh Start are:

- Pre-teaching key vocabulary to build confidence
- Repetition of adult modelled reading
- Active involvement using choral responses, working in pairs and acting the part of the teacher
- Developing familiarity around quality texts
- Addressing any gaps in phonics knowledge from key stage 1
- Including regular points for reviewing and re-assessing

Fresh Start at Guildford Grove

At Guildford Grove, the Year 5 and 6 teachers found that this intervention had had an impact on children's reading ages after one term. I decided to trial the implementation of Fresh Start in Year 4. I wanted to measure how Fresh Start might affect children's reading ages and whether it would change their attitudes towards reading.

In order to establish a baseline from which to measure impact, I collected summative assessment data, obtained the children's reading ages and carried out a student survey for children chosen to take part in the intervention. I also collected the same data for the rest of the year group to act as a comparison. In the survey, students were asked to rank themselves on a scale from one to five when presented with statements about reading.

Figure 2: Children taking part in the Fresh Start intervention.

Findings

I measured the impact of Fresh Start after it ran in Year 4 for three half terms i.e. half an academic year. I interviewed the class teachers who taught the children taking part in the intervention to establish what impact they perceived the intervention to have had. All teachers thought that the children taking part in the intervention were now able to read more fluently. They reported that the children were armed with strategies to decode new words and that the children were better able to access texts that the rest of the class were reading. This evidence, while anecdotal, was powerful in that teaching professionals noticed a difference in reading skills after the intervention had taken place.

When looking at how Fresh Start had impacted on children's reading ages, the evidence was similarly positive. The way we measure reading age is by having children read a series of sentences that increase in difficulty. When they have made a certain number of mistakes when decoding the words, the sentence reading stops and the point that the child has reached is used to calculate their reading age. Every child taking part in the Fresh Start intervention increased their reading age by over one year in three half terms. We would expect a child's reading age to increase by one year (for example from 7 years 5 months to 8 years 5 months) over the course of a whole calendar year. The children taking part in Fresh Start were able to make this improvement in half the time.

Once the intervention had finished, I carried out another student survey to ascertain what impact the intervention had had on the children's perceptions of themselves as a reader. I focused on the responses to three key statements:

- I read like everyone else my age
- I can understand the books we read in class
- I get stuck when reading

The children rated themselves on a scale of 1 – 5, with 1 being never and 5 being always.

Below is a table (Fig. 3) detailing the responses of the students who took part in the intervention:

	Never 1	2	3	4	Always 5
I think I read like everyone else my age					
Before Fresh Start		25%	75%		
After Fresh Start			50%	50%	
I can understand the books we read in class					
Before Fresh Start			50%	50%	
After Fresh Start				75%	25%
I get stuck when reading					
Before Fresh Start		50%	25%	25%	
After Fresh Start			25%	75%	

Figure 3: Student survey responses

From the table we can see that there has been a positive shift in the way the children rated themselves against the first two statements.

This suggests that the children who took part in Fresh Start now feel more positively that they read like everyone else their age and that they think they better understand the books read in class.

Interestingly, in relation to the statement 'I get stuck when reading' there was an increase in children rating themselves closer to 'always'. This suggests the children who took part in the intervention now view themselves as getting stuck when reading more often than they did before. Perhaps this is because, after the intervention, the children now have an increased awareness of when they need to apply decoding skills. Or perhaps they felt they were struggling with the more complex texts they would be expected to read at the end of the academic year.

Evaluation and Next Steps

From this simple research project, we can see that the Fresh Start intervention has had an impact on children's reading age and their perceptions of themselves as readers. This increase in reading age would suggest that the Fresh Start intervention positively affects children's reading fluency. It improved their ability to decode and therefore they made fewer mistakes when completing the reading age assessment.

Whilst there are benefits to running the Fresh Start intervention, there are also drawbacks. The intervention must be run in small groups with an adult who has been trained appropriately. This means it can be used as a 'catch up' intervention for a small number of students but it becomes quite time and labour intensive if a larger number of children are chosen to take part. When trialling this intervention in Year 4, we limited the group to children who were expected to access the Year 4 curriculum, not on the SEND register for reading and whose reading age was more than a year behind their actual age.

Another limitation to the intervention when running it with younger students is that the Fresh Start modules increase in difficulty quite quickly. The intervention is designed to 'catch up' and fill gaps, therefore once a Year 4 child has completed the first few modules, the demands on their reading comprehension become much greater. If professional judgement was not used, the children taking part in Fresh Start could be completing modules that include end of Key Stage 2 level comprehension questions. Therefore, they would be expected to understand more than their peers not taking part in the intervention.

The Year 4 teachers felt that Fresh Start would be beneficial to run again next year. We would need to limit the number of modules that children in Year 4 complete to ensure they are not working on concepts beyond the expectation for their year group. Therefore, we would not expect this intervention to run for the whole academic year. We also discussed slowing down the pace of the modules to give children even more time to re-enforce learning. This would mean that children do not move through the modules at such a great pace.

My intention is to continue to measure the impact of the intervention into the next academic year. I would like to ascertain whether the children that took part in Fresh Start have only received short term benefits or whether the progress in their reading age is sustained.

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Read all about it

An enquiry by **Fi Moldon**, Early Years and English Key Stage 1 Lead at Burpham School, Guildford

Having developed a Mastery approach to our teaching across the school, we questioned whether a whole class approach to reading would enable us to meet the needs of all learners in becoming 'successful readers'.

Context

Reading is one of the most important skills we give to our children during their school experience. Books stir the senses, inspire the imagination, develop emotional literacy and fascinate the reader in terms of new knowledge about the world. However, books now need to compete with the more visual and more instant attraction of the world of the internet, social network sites and video entertainment. Even without the demands of a new reading curriculum, the challenge for today's teachers is considerable.

Conflict

A whole school INSET day focussing on reading revealed a very positive number of reading experiences in our school timetables. Teaching techniques included Guided Reading sessions, opportunities for 1:1 reading with adults and parent volunteers, paired reading sessions within and across classrooms in addition to dedicated interventions to support phonic and comprehension gaps together with frequent opportunities to share a class story before lunch or at the end of the day. However, our end of Key Stage data revealed that our reading results were beginning to trail our writing and mathematics scores. As a staff body we agreed that successful readers needed sharper skills to meet the high demands of the revised National Curriculum. Monitoring revealed that there was little consistency across year groups in the planning, provision and vocabulary used in teaching sessions. Good practice observed within the school, and in other local settings, revealed that where children made good progress their reading diet consisted of high quality, whole class reading experiences. Online blogs and educational social network sites have also explored the value of a whole class approach, so we felt it was certainly worth investigating.[1,2,3] An evidence-based research exploration was attractive in that it would help to ensure that we didn't simply leap into a current trend.[4]

During a further training session, the staff selected the VIPERS structure to focus on (see Fig. 1). The entire school community – parents, volunteer readers, TA staff and teaching staff – received training to enable us to develop a consistent vocabulary necessary to embed these terms. A second round of monitoring later revealed an overwhelmingly higher consistency in the planning for the teaching of these reading skills, now following a common planning structure. In addition, 58% of staff noted that parents had mentioned that their child had referred to the vocabulary of VIPERS while sharing books at home. 42% of teachers also said that children in their class had referred to VIPERS when exploring texts in other curriculum areas, for example, during topic lessons. It appeared that we were developing a consistent vocabulary across the school that was recognised between and across classrooms. We're currently focussing on planning ahead to ensure that learning from text forms a more integral part of the teaching learning activities.

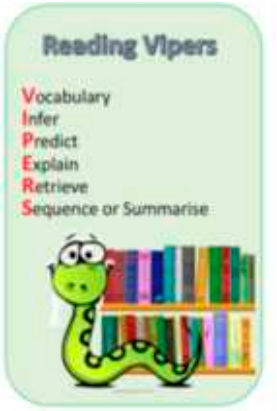

Figure 1: The VIPERS structure

A staff survey had initially revealed questions about how a whole class approach would engage and support all learners. While the children could now refer to and explain the new terms, it was important to explore these concerns.[5] Our survey in March gave us lots of evidence from teachers that they felt that using Whole Class reading brought many benefits to different groups of children in their classes. Comments recorded included:

- 'You can aim high and teach from the top introducing every child to a variety of texts that otherwise they might not have come across'
- 'It gives me a quick overview of every child's ability/level of understanding. Misconceptions can be addressed straight away. Vocab can be explained quickly and easily'

- 'Raises aspirations of all children, brings whole class on together… prepares children for sitting the same SATs paper…whole class enjoyment and sense of achievement is higher'
- 'All levels benefit…give lots of opportunities to hear others' predictions and use imagination; encourages others to be brave and do the same'

Climax

Further lesson observations revealed that although the 'Working Towards' (WT) students were contributing with enthusiasm and confidence; the 'Exceeding' (E) students were not always choosing to share their understanding.

Moreover, some children were voicing their concerns about having exchanged guided reading for whole class reading. They missed working in a small group setting with an adult – the chance to share their meaningful related experiences and to feel valued and special: *'sometimes you don't get to read at all' (Y4 girl).* Their skills were most definitely sharper, the data demonstrated progress, but for them reading had become just another task or challenge.

What kind of readers do we have?

I undertook a diagnostic toolkit with 6 children (3WT and 3E) from each year. It was a very thorough test that explored the children's interest in reading, their ability to read and the frequency with which they read. Most importantly it asked them to rate themselves on each of these. Again, the Exceeding children's opinions concerned me most. They had lower opinions about their reading ability.

Exceeding children clearly had less self-confidence but demonstrated the greater skills. They enjoyed their personal reading more (82% compared to 33%) – but they felt less successful at it. **When discussing their reading they had high expectations and tended to put themselves down as a reader;** *'daddy says that when I read, I read too fast I don't use the right voice'.* They were sometimes over-analytical, more scientific and more cautious in coming to their conclusions*: 'I'm not really sure because I think he wants to go with his friend but he won't because he knows he'll get in trouble, but, I suppose he might not get found out... I'm not sure really'.*

Key data from diagnostic test	WT	E
Enjoy reading	33%	82%
Read at home frequently	25%	63%
See a picture in their head as they read	33%	100%
Draw on previous experiences to understand text	8%	62%
Rate themselves highly as good readers	58%	18%

Table 1: Diagnostic test results

I have assumed that an **'enthusiastic'** reader should **'enjoy'** the act of reading. Equally I imagine that a **'successful'** reader should be able to interpret what they read in order to enable them to answer SATs style questions. I felt drawn into a conflict with myself here – it seems that we were trying to develop successful readers, but perhaps at the expense of their enjoyment? The children are able to apply rules and strategies, generic terminology and vocab, but is this taking too much priority over an emotional and personal response to literature that gives children a chance to escape and make sense of the world and people around them?

What kind of readers do we <u>want</u> our children to be?

This was pivotal in my research. It seems as a school we are better preparing children for success at reading tests. But reading enjoyment seems to be in decline. It is time to explore what 'successful reader' actually means. Does this *just* mean that children are able to decode, infer, predict etc. with confidence? Surely what is desirable is that these skills equally help a reader to enjoy the process of reading to a greater extent?

As a school, we now feel that we have a consistent language to use in the teaching of reading skills. As a subject leader, I also feel that the quality of the teaching of reading has developed hugely. Teachers know what to teach and now have a useful format to use to plan for it. We are now focussing on the breadth of the offer of the reading experience we give our children, for example, emphasising the importance of sharing class books, whole class timetabled private reading periods.

Closure

I've greatly appreciated the experience of undertaking an extended project that has enabled me to evaluate and experiment with my thinking through reflective

research. Working in Early Years can be isolating in a busy primary school. Having the opportunity to work alongside older children, and also teaching and non-teaching professionals has been really stimulating.

Conclusions

Having raised the quality and the consistency of the teaching of reading within the school, our next steps are to ensure that we also communicate the importance and value of reading for **pleasure** – to fascinate and to inspire. Our goal should be to develop strategies that will inspire children to **want** to read and to be good at it, by creating a rich and varied reading diet. The project will continue into the coming year.

We need to make reading ***irresistible*** and not just ***essential*** – and certainly not solely to meet the needs of national testing. Our school is now looking at ways in which we can achieve this. The wide range of opportunities that we identified at the start of the term that we give to support the teaching of reading, need to be individually analysed in terms of how these contribute to each child's enjoyment of reading. We are appreciating more, for example, the importance of a shared book at the end of a morning session, opportunities to encourage authors to come and share their love of writing, school book clubs and even an interactive approach to encouraging reading at home. Most of all, we will work with parents and staff to ensure a partnership approach that will encourage all adults spending time with our children to model reading for pleasure.

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Reasoning to Problem Solve

An enquiry by Amy Robson, Lower Key Stage 2 Leader and Maths Leader and Taruna Peacock, Key Stage 1 Leader and Maths Leader at Guildford Grove Primary School.

An enquiry into whether an increased understanding of reasoning in teaching staff will have an impact on the ability of children to problem solve.

Our context here at Guildford Grove

Guildford Grove is a school within an area of socioeconomic deprivation mixed with cultural deprivation, with the school experiencing just under 50% Pupil Premium, less than 30% SEND and high mobility with 28 languages spoken across the school. These percentages are well above the national average but are subject to change throughout the year. Since the school opened, the percentage of children reaching expectations in maths has improved by 53% and so as maths leaders we wanted to continue this upward trend and maintain a high number of children reaching age related expectations.

Alongside this, there is a high deprivation of language; McCann acknowledges that 'The average child will have started primary school with a receptive vocabulary of 2,100 – 2,200 words. By the time they leave at the age of eleven, this will have increased to about 50,000.'[1] As teachers, an understanding of how children learn is essential but, even more so, a complex understanding of their language barriers is vital for teachers in our context.

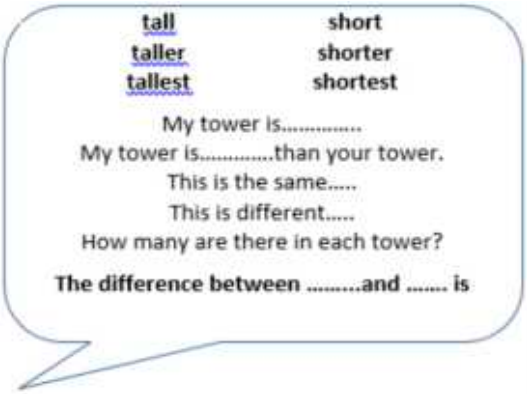

Figure 1: Problem-solving language being used in a year 2 class

Teachers' level of understanding

Initially we wanted to focus on improving the impact of reasoning on problem solving in the whole school. We conducted a survey to identify the level of understanding amongst staff regarding problem solving and this word cloud shows our teachers' high level of understanding of this mathematical concept.

Figure 2: This word cloud shows the responses from the teaching staff at Guildford Grove regarding what problem solving is.

We quickly realised that we needed to focus on our own classes. We started by conducting a baseline assessment of the children we would focus on. We gave them a mathematical problem *(see magic square activity below)* to solve and it dawned on us during the observations that they were unable to articulate mathematically.

The sum is 15.

	7	6
9	5	
4		8

Figure 3: The problem-solving square used

Here is a transcript of a child's reasoning for the above in Fig. 3.

Teacher: *How did you know that was a 2?*

Child: *Cos 2 'unins' 7 make 9 and then add 6 and then count on make 15.*

Teacher: *Next one. How did you work this one out? Why is that a 1?*

Child: *Because and then if you just add you got 14 and then you just add 1 together 15.*

Teacher: *And why do you need to get 15?*

Child: *And because it says the sum is 15*.

Teacher: *Good last one then.*

Child: *Because if [you] add on from 8 and 3 mean 11 then 4 more make 15.*

This was the starting point for our research project. Our focus centred on improving the children's use of language and being able to articulate mathematically. We shared our findings of the baseline assessments with staff and highlighted that every teacher would be expected to plan practical activities and time for children to talk about their maths. Teachers were encouraged to model good use of mathematical language within their lessons and use displays to support children with their use of vocabulary.

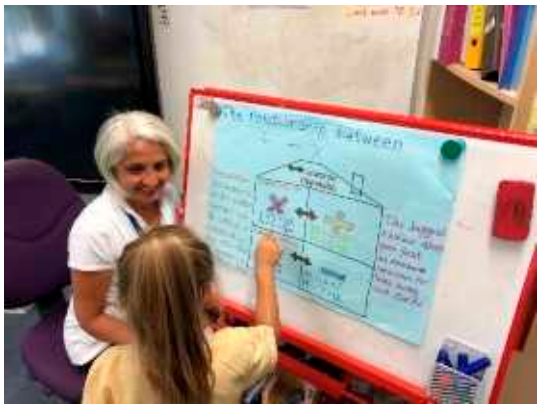

Figure 4: Developing language and linking this to the mathematical symbols in the classroom

In the spring term, we were fortunate to be able to share our NFER project and the maths journey the school has been on since it opened in 2001 to maths leaders from local Guildford schools. The maths leads observed children talking about maths in classes from Foundation Stage up to Year 6. The feedback was positive, and all maths leaders agreed that children at Guildford Grove love maths and were very engaged. One leader said, "there was a real buzz!" However, the most valuable feedback we received was that "the more practical the activity was the more language the children used and that recording often got in the way of giving time for speech."

Improving our own practice

With our findings from the maths leaders' day in mind, we focused on implementing the following across the school:

- Maths working walls in the classrooms where key vocabulary is displayed and explicitly taught and modelled with the expectation that children use the language when reasoning about their maths
- Provide children with talk prompt cards. Here is an example of a prompt card used in Year 2. See Fig. 5 below.

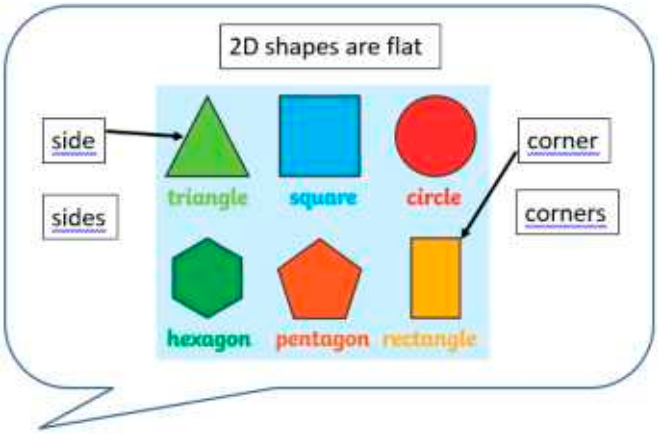

Figure 5: Vocabulary prompt card used in Year 2.

- Provide a range of manipulatives on the tables for children to use. We found it was essential to show children how to move from the concrete and pictorial with the use of manipulatives such as the photograph below.

Figure 6: Example manipulatives.

- Emphasis on writing was not necessarily needed. Consider oral versus recording. For children to become fluent and confident in articulating their maths and using the correct vocabulary, we have emphasised the importance of providing opportunities for children to engage in mathematical discussion with their peers and adults.

We started by implementing the above in our individual classes. In our planning, we ensured that we identified key language and vocabulary cards that could be used, as well as modelling sentences in which we expressed our own mathematical thinking to the children when solving problems. Children were then encouraged to follow the same process when talking about their maths.

Conclusions

We found that the children were more confident in expressing how they had arrived at an answer and were more inclined to use the language surrounding the topic in order to make their mathematical reasoning clear to another person.

We asked the same child to complete the magic square activity again and the language used was more mature and mathematically focused. The below transcript shows that children are using mathematical language more frequently when reasoning.

Teacher: How do you know that is a 2?

Child: You need to add 2 to make the answer up to 15.

Teacher: How did you know this one?

Child: 9 add 5 is 14, so that means I need 1 more to get to 15.

Teacher: And finally, how did you get this answer?

Child: 4 add 8 is 12, you need to add 3 more to make 15.

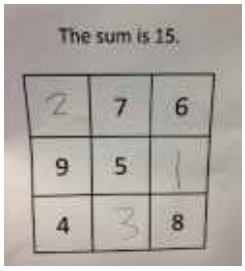

Figure 7: The child's answers to the problem for the second time.

This transcript shows a more mature and confident use of the terms 'add', 'more than', 'more', 'make' and 'answer'. This highlights that a focus on mathematical language in the classroom gives children the confidence to use this when needed to explain their mathematical processes.

To assess children accurately we use PUMA assessments to gather data about our learners at three points throughout the year. In order to see if there had been an increase in the children's ability to problem solve, we used a focus group and gave them the same questions in the autumn and summer term to see if they were able to answer more after the implementation of the actions points from the maths' leaders feedback. The results showed a 38% increase in children correctly answering the same problem-solving questions. The questions chosen were solely problem-solving questions requiring the children to use and apply mathematical knowledge in order to be successful. This is an indication that the children were more able to identify and fully understand the language in the test. Nine out of twelve children were able to correctly answer a 'How many more?' question in the summer term compared to only six out of twelve answering the same questions in the autumn term.

Furthermore, it was noted that the children were aware of their mathematical thinking. Children in Year 2 were quoted as saying 'what do I know about this number?' 'I know it's an even number so…' which shows an increase in their ability to draw upon and make links between mathematical knowledge in order to solve a problem.

Next steps

These findings are only the beginning of a project which will be continuing at Guildford Grove. The school is engaging in a mastery approach focus next year which is something we had identified as a way of enriching the teaching of maths.

We are going to delve deeper into our data and identify any groups of children who can be targeted to reason and articulate their mathematical thinking.

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Making the most of revision lessons

An enquiry by **Oliver Cross**, Teacher of Biology and Psychology at St. John's Leatherhead

Typically, revision lessons towards the end of the year are a finite resource. What can we do to maximise their value?

The issue

It is a well-known fact that there is a large volume of material to cover at Key Stage 4 level. In a number of subjects, including Biology, the vast majority of the course content is taught in Year 10. Unfortunately, this means that there is often limited time for revision during lessons prior to the end of year examination period.

Over the last couple of years, my departmental colleagues and I have observed that a large number of our students were making little or no effort to revisit the relevant topics before arriving at their limited number of revision lessons during the summer term. In my opinion, the students' lack of familiarity with the topics under study drastically reduced the effectiveness of these revision lessons. Therefore, I wanted to investigate whether it would be possible for me to improve the effectiveness of revision lessons.

Who was involved?

My two Year 10 sets were the focus of my enquiry. In total there are 8 sets in this year group (the students are set according to their ability with set 1 as the top set). This year I have taught sets 2 and 7, a total of 36 students. At St. John's, all students undertake a computer-adaptive assessment, known as MidYIS, at the beginning of year 9. Interestingly, the MidYIS assessment data reveals a relatively small difference between the two sets; the mean target grade for the students in set 2 is 7.6 compared to 6.8 for set 7. In May, the students in both groups sat an end of year assessment that covered everything they had been taught since September. Both sets were entitled to two weeks of revision lessons prior to their assessment week.

Student voice

The first step involved all 36 students completing an initial questionnaire in March. In addition to this, I conducted two focus group interviews; each group consisted of four students from each set. At this stage, I wanted to establish their attitudes towards both revision lessons and revision in general. The data that I gathered was then used to plan an 'intervention week' in May.

The vast majority of my students (75%) stated that they prefer to revise inside the classroom instead of at home.

During the focus groups, those that stated they prefer to revise inside the classroom were required to justify their preference. Their responses centred on two main premises. Firstly, they stated that they feel supported with their teacher present in the room. Secondly, revision at home was judged less favourable as a number of students claimed that it is very difficult to resist the distractions present. One student summed this up rather bluntly during one of the focus group interviews:

'There are too many distractions at home. I would much rather go on my phone and play Xbox than sit in my room reading textbooks and doing exam papers'.

Furthermore, I also wanted to discover my students' preferred revision methods. They were all required to select their three preferred methods from a list of six options. If I am honest, I was slightly surprised that 65% of my students included 'testing yourself with someone else' as part of their trio. Consequently, owing to its popularity and interactive nature, peer testing formed an integral part of all the revision lessons in the intervention week.

Finally, nearly two thirds of students (65%) strongly agreed with the following statement: 'revision lessons are useful'.

The intervention

I decided to split their fortnight of revision into two parts:

In week one, the students were not required to undertake any tasks prior to arriving at their timetabled lessons. The lessons in this week consisted of a combination of both student-led and teacher-led activities including peer assessment and class discussion. This format is currently used by all

members of the department in the lead up to both internal and external assessments.

In week two (the intervention week), I decided to employ the flipped classroom method. Arguably the simplest definition of the flipped (or inverted classroom) is as follows: 'inverting the classroom means that events that have traditionally taken place inside the classroom now take place outside the classroom and vice versa'.[1] After reviewing some relevant literature, it came to my attention that a large amount of research into the flipped classroom utilised group-based interactive learning activities inside the classroom.[2]

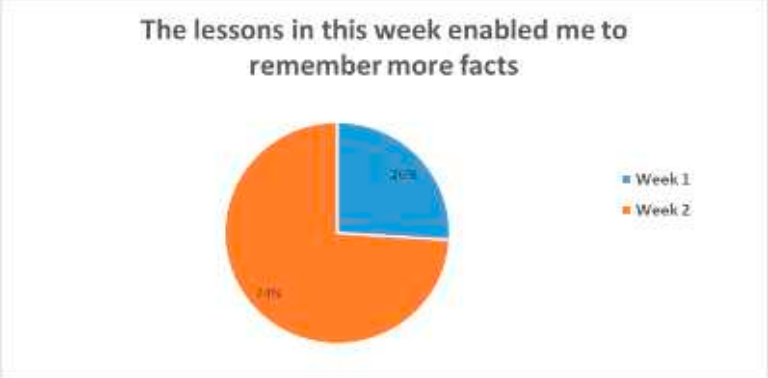
In week two, students in both sets were instructed to use pages that I had created on Firefly (the school's virtual learning environment) to prepare for their lessons in this week. Each student was required to use the resources on the aforementioned pages (topic summaries and videos) to review, in advance of the lessons, the topics being covered this week.

Furthermore, the students were required to use these resources to create a set of ten questions for each topic. The purpose of this activity was two-fold. Firstly, the questions were required for peer testing in a subsequent lesson. Secondly, it meant that the students were actively engaging with the aforementioned pages.

Once the students had sat their end of year assessment they completed a second questionnaire. This provided them with the opportunity to reflect on their fortnight of revision lessons.

Results

The second questionnaire revealed some interesting trends. Most notably, the majority (74%) of my students felt that that the lessons in the second week enabled them to retain more factual knowledge.



Additionally, when asked to select which week was more enjoyable the vast majority (85%) opted for week two.

During the lessons in the second week, there was more time for me to engage in conversations with my students. This is easier to achieve with the flipped classroom method, as the activities enabled me to move away from the front of the classroom for a larger proportion of each lesson. This meant that I was in a stronger position to address the individual needs of my students.

I was also able to produce visit reports for all of the Firefly pages that I had created. On average 93% of the students in set 7 accessed the pages; slightly higher than the average of 81% for set 2. This is perhaps unsurprising when you take into account that nearly all of the students (94%) either agreed or strongly agreed with the following statement, 'I am confident using Firefly'. Furthermore, the vast majority of those students who failed to access the Firefly pages in their own time felt that the first week of lessons was more useful.

Conclusions

There appears to be good evidence that my students value revising inside the classroom, a learning environment in which they feel supported and are able to avoid potential sources of distraction. In my opinion, this serves to emphasise the importance of scheduling revision lessons within the academic year; schemes of work, for all year groups, ought to include a period of time that is allocated specifically to revision. Of course, it is imperative that a teacher does not disadvantage their students by delivering the syllabus at an inappropriately fast pace in an attempt to ensure that there is sufficient time for revision inside the classroom. In order to avoid this issue schools may decide to offer revision clinics during school holidays; however, speaking from experience, these are not universally popular amongst both teachers and students.

Crucially, the results of this enquiry suggest that the flipped classroom method led students to report that they retained more facts. This is significant, as approximately half of the marks available on the Edexcel IGCSE Biology examination papers require

Reflections and next steps

Personally, I found the whole process an interesting experience for a number of reasons Firstly, prior to undertaking this project I feared that a large number of students would fail to access the Firefly pages in advance of the lessons, thus reducing the usefulness of my enquiry. This was certainly not the case; I was very pleased with my students' level of engagement with the resources that I had created. Secondly, I was also impressed at my students' level of engagement with this pedagogical approach; I expect that in the vast majority of cases this would have been their first exposure to the flipped classroom method.

However, it is worth pointing out that I encountered some limitations associated with the flipped classroom method. For example, throughout the second week it was necessary to prepare alternative activities in order to cater for those students that had failed to access the Firefly pages prior to the lesson. This meant that at times I could not devote as much attention as I would have liked to the group of students that were prepared.

Furthermore, from September 2018 St. John's are set to introduce bring your own device (BYOD) across the whole school. In theory, this should mean that it is even more straightforward for students to access, in their own time, content on a variety of different platforms, not just Firefly. Next year, in light of the introduction of BYOD and the results from this enquiry, all members of the Biology Department plan to replicate the aforementioned methodology, both in advance of end of year assessments and at other points within the academic year.

References

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