



Teacher Research Bulletin

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Exploring Strategies to Promote Engagement and Progress in Practical Science



A view on research from Tony Le, Teacher of Physics

Having just completed my PGCE last year, where developing one's teaching practice was merely juggled with high academic demands, I was quite pleased to put educational studies behind me! It was only for the sake of curiosity that I attended the first CamSTAR meetings – as an NQT my participation is totally optional. Decidedly joining the student leadership group, I now find myself applying for the MA in Science Education at the IOE.

So what's changed in how we conduct practical science? In theory, nothing. What's changed however is how it is assessed; with the new GCSE and A-Level curricula not only stipulating that students conduct 10+ specific experiments, at least 15% of their exams will assess their understanding of these. At KS5 this is compounded by a rigorous assessment of how students record practical work and their practical competencies, which they must pass consistently over two years. Ergo, it is readily seen how important practical science skills are purely from an assessment perspective; never mind other obvious benefits!

I initially explored various strategies for practical lessons; nothing novel but simply well-thought out with the hope of yielding immediate dividends. Most Science teachers will have used these ideas already; i.e. defining fixed groups and assigning individuals certain jobs (often on a rota), giving students a list of equipment and an objective but no procedural instructions, having students plan the experiment themselves to name a few. The aim was to adopt these leadership promoting strategies with one Year 10 class while another followed more elementary methods, and to compare their progress over the year. Initial classroom observations were unsurprising; open ended investigations and higher orders of challenge invariably promotes more engagement. Indeed, it was the quantitative data that I was more interested in. However, given my own time constraints (in September I was still accustomed to teaching ten lessons a week!) and issues with accumulating adequate data (ten practicals distributed across three years...), it proved prudent to reserve this data collation for my two-year MA.

Further, I wanted to seek initiatives that would help develop 'the whole child' and cultivate transferrable skills that would transcend the science classroom. In the summer term, I'm planning for WCHS to host a training day for Year 9 students across the community in becoming practical science ambassadors, run by the Institute of Physics. Whilst set in a scientific context, the presentation and leadership skills they will develop will readily feed into other subjects and help expand student leadership opportunities. Provided student outcomes are positive, there is scope for hosting, or perhaps launching our own training programmes every year. Ultimately, whilst the primary objectives of these initiatives are to promote academic progress and meet new curriculum demands in Science, they will also endeavour to advance student autonomy and leadership beyond the constructs of science learning.



New perspectives on Gifted and Talented students

A research report from Philippa Hardiman, PGCE Student Teacher

During my time at Woodford, I conducted a study into the wider life of the school; myself and Ms Hamadouche chose to research the school's Gifted and Talented (G&T) provisions, by observing G&T students in KS3. We observed several lessons in a variety of subjects, including core subjects, languages and humanities, in order to understand how teachers adapted their teaching practices to accommodate G&T students, and how the students responded to this.

We conducted this research by observing the four Year 9 classes, particularly comparing the provisions made for G&T students in core subjects versus humanities and the arts. After talking to the students we found out that they were not aware that they were considered gifted and talented, although they did feel that they were being stretched in their subjects. Teachers varied in their view of G&T and how it should be approached. Most were of the opinion that G&T differentiation was important in lessons and that identifying students who particularly flourished in their subject not only helped those students but positively affected the attainment of the entire class. Teachers in some subjects also encouraged Gifted and Talented students to take an active role in their extra-curricular activities.

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New Perspectives on Gifted and Talented students

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Our findings showed that 40% of students in Year 9 were identified as Gifted and Talented.

- Science = 8/120
- English = 10/120
- History = 7/120
- MFL = 10/120
- Latin = 9/120
- Music = 11/120
- Art = 10/120
- PE = 7/120
- Maths = 9/120

For the school as a whole, identifying these students as G&T is incredibly beneficial. Through identification, students who are Gifted and Talented in particular subjects can experience opportunities they may not have been able to otherwise. Overall, pushing these high-achieving students creates an attitude of 'can do' and 'will strive for', and this generally improves the entire class attitude and attainment, and allows for high standards of concerts, sports teams and art work, which are good selling points for the school.

Scaffolding—remembering the basics!

Musings on a key educational concept from Katie Hasler, Teacher Research Coordinator

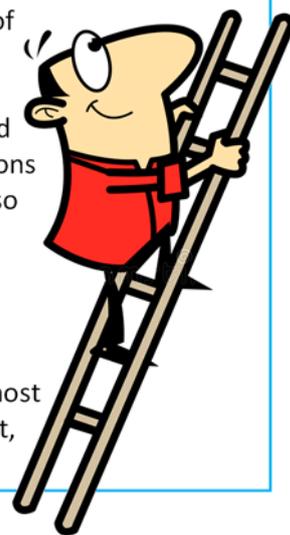
Having spent a good deal of time during my teacher training and NQT years thinking carefully about the concept of 'scaffolding', and how to design tasks which carefully guide students through the learning process, I'll admit that it's not something that I've spent a great deal of time considering (at least consciously) in recent years. However, my recent stint as a PGCE Mentor forced me not only to remember the details of what is undoubtedly a key teaching tool for all of us—but also to think in more detail about how it can be applied to non-subject-specific skills, as well as the content-based tasks that I perhaps focused on more during my teacher training.

A quick bit of internet research was enough to remind me of the key points:

- *Scaffolding theory* was first introduced in the 1950s by psychology Jerome Bruner.
- In brief, it involves offering an appropriate level of support to a student based on the level difficulty that the student is having with a task—and therefore gradually supporting students less over time as they get better at the task.
- This links with Vygotsky's theory of the *Zone of Proximal Development*—essentially, the difference between what a learner can do without any help, and what they can't yet do at all. Knowing a student's current position in the 'zone' for a particular task enables effective scaffolding to be put into place.
- Often scaffolding is achieved through breaking a task up into 'chunks', then providing a tool, advice or a structure to be used for each chunk.

What interested me in particular this term, however, was the potential for scaffolding to be used not just as a tool for completing subject-specific tasks, but also for teaching 'general' skills that we perhaps sometimes take for granted. I observed a lesson where students were being asked to discuss a piece of music that they were listening to. What they found difficult, however, was not so much identifying the musical features, but knowing how to approach the discussion in a productive manner. Having talked the issue through with Philippa, the PGCE Student Teacher, we realised that perhaps what was needed in this case was some scaffolding for the skill of group discussions itself—guiding students through the process of not only listening to the piece of music, but also sharing their ideas in a constructive manner, and considering how best to feed them back to the rest of the class. Admittedly, this did take a bit of thought to break the process down into helpful 'chunks' - but trying out the newly scaffolded task in the following lesson yielded great results in terms of the students' ability to engage with the task.

So what did I learn? While I am well used to scaffolding subject-specific tasks—and do so almost subconsciously in much of my lesson planning—there's a lot to be said for revising the concept, and to using it as a tool for teaching more 'general' lesson skills as well.



Research groups in **focus**:

Ideas from the Assessment and Marking Group

- **Charlotte** is working on the assessment of speaking skills in GCSE languages lessons:

"I am looking at the benefit (if any) of using 'student-friendly' grade descriptors for German speaking assessments. I have given students copies of both the official grade descriptors and a copy of a student-friendly version I have made. As a class we have looked at these and I am currently using them to give feedback to students on the current set of speaking exams.

- **Mary** is investigating the role of self-assessment, particularly with KS5 classes:

"On the whole, self-assessment has proved to be successful; student essays are improving in quality as the students become more self-reflective and self-sufficient in terms of understanding what makes a good essay. As part of this intervention, students have not been given grades as part of their feedback, relying on students using their own reflections and that of the teacher to support their understanding of how to improve. Whilst most students initially said that they preferred receiving a grade, this intervention has shown the students and me that this is not always the most helpful method—and students can make just as good (if not better) progress using more reflective feedback. I am hoping to roll this scheme out to the year 12s who will be starting to write essays on a film shortly.

I have also been trialling similar self-assessment activities with other year groups. Recently with a year 7 class, I asked students to analyse their work (in French) using an analysis grid (below). Students were really pleased that they were able to analyse their work in French—or Franglais! When I was looking at their work, whilst I highlighted language mistakes using the usual marking code (e.g. 'sp'/'acc'), my primary comments were based on what they had written in their self-assessment. This helps students to develop their skill in evaluating their own work—and could easily be adapted for other tasks.

Auto-analyse sur les devoirs (homework)

J'ai écrit (I wrote) / j'ai utilisé (I used) / ce qui était particulièrement bon (what was particularly good was)

	Oui	Non	Les commentaires du professeur
J'ai écrit le paragraphe.			
J'ai écrit l'entrevue.			
J'ai utilisé les opinions.			
J'ai utilisé les "connectives" (et/mais)			
J'ai utilisé "je"			
J'ai utilisé "il" / "elle"			
J'ai utilisé un négatif (je n'aime pas...)			
J'ai utilisé "parce que"			
Ce qui était particulièrement bon c'était...			
Ce que je pourrais améliorer (improve) c'est....			

Flipped Learning in GCSE Science

An update from Katie Estruch and Preet Sehmi's research project

Our aim is to find out if flipped learning at GCSE will change the proportion of lesson time spent on each assessment objective. We are of the opinion that we currently spend too long focussing on AO1, particularly in Year 9, due to the new specifications increasing the volume of content. We hope that through flipped learning, the students will complete the AO1 style tasks for homework and therefore we can spend more time teaching AO2 and AO3 skills, which are more challenging and should therefore improve student achievement. To determine if our predictions are accurate, sixth form volunteers have been trained on the differences between AO1, AO2 and AO3 skills and have observed a mixture of two biology teachers' lessons recording the proportion of time spent per lesson on each AO. The percentage of students that complete their homework is also recorded, as flipped learning is dependent on students completing homework tasks. Our next stage in the project is to create a sequence of flipped learning lessons and have the sixth form volunteers observe the proportion of each lesson we spend of each AO so we can compare the impact.

National developments in Teacher Research

Chartered College of Teaching Launches prestigious 'Founding Fellowship' to celebrate contributions to teaching profession

The Chartered College of Teaching, the professional body for teachers and leaders, has launched a new, prestigious category of membership. Founding Fellowship is aimed at those who have been in the profession for 10 years or more and recognises their significant contribution to the teaching profession.

Professor Dame Alison Peacock, Chief Executive of the Chartered College, said: "Teachers with experience are amongst our most trusted and valuable assets. As a professional body we seek to harness their wisdom and expertise in building an authoritative trusted voice throughout education. Recognition of the huge contribution that experienced teachers make to society is long overdue. Not only are they inspiring the next generation of young people, but they also provide a strong blueprint for new teachers embarking on their career. Peer nomination to Founding Fellowship provides a prestigious opportunity to give recognition to those who have made a significant contribution to our brilliant profession."

To become a Founding Fellow, teachers and leaders will need to be peer-nominated. As part of the application process, nominees will be required to provide evidence surrounding a number of professional standards, ranging from a commitment to career-long professional learning, supporting colleagues and engaging with research and evidence. Nominations can be made at www.chartered.college/fellowship.

Reduce working hours to tackle teacher retention, suggests new research

According to a new study by the National Foundation for Educational Research (NFER), teachers work the longest hours at 50 hours per week during term time, followed by police officers (44) and nurses (39). Working long hours over prolonged periods, as teachers are doing, can create pressure and stress, with potential negative effects on health and well-being, all of which may impact on staff retention.

The research, funded by the Nuffield Foundation, looks at how the teaching profession compares to nursing and policing - two of the other large and important public sector professions. Pay caps and job pressures have reportedly fuelled staff shortages across the public sector. Using Understanding Society survey data, NFER examined how full time teachers compare to full time nurses and police officers. Comparing the characteristics of each profession's workforce, earnings, hours worked and job satisfaction, the research found that working hours is still a matter of concern for teachers. It shows that the long hours that teachers work during term time exceed the amount of extra holiday time they may receive. Even after taking account of school holidays, full-time teachers still work the equivalent of 45 hours per week.

NFER Chief Executive, Carole Willis, said of NFER's findings: "This is an important piece of research to gain insight into whether the difficulties faced in recruitment and retention are unique to teaching or common to other professions in the public sector. Our analysis shows that long working hours is one of the main barriers to improving teacher retention, an issue that is consistent with our previous reports in this series, and that working hours have been increasing over the last five years. Therefore, we recommend that further work to reduce the working hours of teachers should be a priority for school leaders and the Government." The full findings from Research Update 4: How do teachers compare to nurses and police officers? can be found on NFER's website.