



Report on the 2015 Residential Summer School for teachers of Geography, Mathematics and Science

Held at Homerton College, Cambridge

22nd-24th June 2015



Presentations by subject leaders

Wednesday 24th June

Brief presentations were made on the final day of the Summer School by subject leaders from Geography, Mathematics and Science summarising the outcomes of the teachers' group discussions. The main points they made consisted of reflections on issues currently facing the teaching of their subjects and the value of the course itself.

The particular value of the course:

- Getting away from routine pressures of work and devoting oneself wholly to thinking about the subject one teaches.
- Becoming learners again and practitioners of geography, mathematics or science.
- The opportunity to update subject knowledge and learn about current research.
- Listening to expert and inspirational lecturers.
- Teacher-led workshops – enjoying the support of fellow professionals, sharing ideas about good practice, and preparing for new curricular specifications.
- Visits – for the Science delegates, to the Whittle laboratories, and for the Geographers, into Cambridge to get practical advice on the use of GIS (Geographical Information Systems) for data collection and analysis.
- The Pupil Panel – reminding teachers that they need to treat students as individuals, and to enthuse and challenge them: *“and if we get it right, we can create motivation that will last a lifetime”*.

Issues highlighted by the course and possible solutions suggested

1. Issues in recruitment and training:

- Lack of specialist teachers in STEM subjects and Geography
- Negative presentation of teachers and the teaching profession in the media
- Unreliable quality assurance

Possible solutions:

- Casting the recruitment net wider
- Concerted campaign by relevant national bodies to present a more positive image of these subjects
- More robust, subject-specific training
- The institution of a College of Teaching to set and maintain standards

2. Issues in curriculum change:

- Lack of up-to-date information
- Increased pressure on teachers
- Greater difficulty dispiriting for lower ability pupils

Possible solutions:

- Greater transparency from government and exam bodies
- More time and resource allocated
- Collaboration and sharing of good practice on the PTI model

3. Issues in subject choice:

- Low take-up of STEM subjects and Geography
- Perception of difficulty in the case of STEM subjects and lack of rigour in the case of Geography
- Having to prepare pupils for jobs that do not yet exist

Possible solutions:

- Better and more up-to-date careers advice
- Active promotion by potential employers of the skills and knowledge needed in their businesses
- Involving family members in workshops
- Work placements for teachers in industry and vice versa

4. Issues in primary schools:

- Subjects taught by non-specialist teachers

Possible solutions:

- More subject-specific training at this level
- Stronger links with secondary school departments

Plenary panel discussion in response to presentations

Wednesday 24th June

Panel members:

Bernice McCabe (Chair)	Co-Director, The Prince's Teaching Institute Headmistress, North London Collegiate School
Glenys Stacey	CEO and Chief Regulator, Ofqual
Stephen Munday CBE	Chief Executive, Comberton Academy Trust National Leader of Education with the National College for Teaching and Leadership
Graham Goldup	Senior Assistant Headteacher, Cardinal Newman Catholic School, Hove Geography Stream Designer
Neha Modha	Head of Key Stage 4 Mathematics, Paddington Academy, London Mathematics Teacher Leader
Alastair Cuthbertson	Former Head of Science, Ivybridge Community College, Devon Science Stream Designer

Main points raised:

The plenary discussion debated the following topics:

- Curriculum
- Curriculum change
- Recruitment of teachers

A summary of the main points raised is noted below.

Curriculum

"A curriculum that contains challenging material, rigorously taught is not only the right of children of all abilities but an essential requirement for their proper education." *How far do you consider this a realistic proposition, and what has been the experience of delegates discussing this in their workshops?*

Points raised by teachers:

- In Geography there is an Advisory body to the DfE promoting collaboration between schools and partnerships with subject associations in the provision of resources to help implement changes in the curriculum.
- Science teachers welcome the greater challenge for their more academically able pupils but are concerned about those for whom a curriculum with more emphasis on the vocational elements may be an appropriate alternative.
- Maths teachers similarly welcome the focus on understanding concepts but are concerned about the ability of foundation students to keep up and about the impact on uptake at A Level and beyond.

- Doing well in exams is not the only sort of achievement; such things as the ability to work practically, collaboratively or creatively are also valued and sought after.

Responses from the panel:

- We should try not to feel that these changes are being done to us, but that we are still in charge of the National Curriculum.
- Some bravery is needed, and willingness to take risks; but that is likely to lead to the best outcomes.
- All is in the quality of teaching. The same subject in the same curriculum may be intensely inspiring or the opposite, depending on how it is taught.
- Not all parts of the curriculum need to be embedded in exams.
- These changes are not happening in isolation, but are being matched by changes in performance measures. So while there is to be more content and more prescription at KS4, there will also be better differentiated assessment and a raft of new qualifications; these should ensure that fewer students of lower ability are condemned to 'failure' but are able to find an appropriate level of achievement.
- Lessons from the past tell us how difficult it is to deal with changes in subject content, but there is also an opportunity to look very carefully at the details before deciding on a particular curricular pathway, while being aware that there is no magic formula for arriving at these decisions.
- Specifications which would lend themselves to the best teaching in a particular context are likely to lead to the best outcomes.
- Much detailed work has been done on equivalence in standards and this is now hard-wired into the system.
- Ofqual is involved in setting out how standards will be maintained through the transition from one curriculum to another; there is an ethical imperative to protect students so that they will not be disadvantaged by the changes.

Curriculum change

The teachers represented here by and large welcome the changes to the curriculum, but not the speed and manner in which they have been introduced, complaining of a lack of joined-up thinking in terms of the resources and training needed to implement them. Would you like to comment?

There was a plenary discussion:

- Teachers pointed out that the pace of change makes it impossible to meet all needs at once. As heads of department, they are always trying to catch up. *"We know we should be tackling problem-solving with KS3 pupils but have to concentrate on KS4 and GCSE."* They would have preferred a sequential approach to change: first KS3 and then KS4.
- The panel responded that:
 - A sequential approach would have taken longer than the life of a Parliament so was not realistic.

- On the other hand, it's impossible to change all the qualifications at once in all subjects as there is a limited amount of assessment expertise available across the country.
- Priority was given to Mathematics and English because these are key subjects and the need for change was represented as most pressing because of unfavourable international comparisons and, for instance, the claim that Maths GCSE was a poor preparation for A Level.
- The Association for Science Education stated that it has already been heavily involved in curricular discussions and by and large welcomed the changes being introduced.
- The next question is how the changes are being implemented in schools. For instance, the integration of practical work needs to be monitored by heads of science.
- Teachers pointed out that the changes may be welcome, but in order to be fully implemented they have to be accompanied by the extra resources needed. As it is, there is an effective cut of 2% and schools cannot even afford the necessary textbooks.
- The panel responded that we are where we are, and we'll have to make do, e.g. by sharing more resources (without cost) and getting more online; it will be a challenge, but one that we must and will meet.
- The teachers felt that there had been a loss of direct contact between teachers working on the front line and policymakers, and that by the time the information has filtered down to them, they have lost confidence in it.
- The panel responded that:
 - The creation of a member-led College of Teaching would give teachers a greater opportunity to be involved in the process of curricular change.
 - Subject Associations need to be reinvigorated so as to provide a channel of information into the College of Teaching.

Recruitment of teachers

Recruitment of teachers is clearly a major issue in all the subjects represented at this Summer School. How would you set about persuading a larger number of talented young people to enter the teaching profession?

The panel responded:

- The creation of a College of Teaching is an important step; raising the status of the profession is the best way of recruiting.
- However, this College cannot be expected to do everything, and there is a need to prioritise.
- One crucial area is the understanding and ethics of assessment, so that when teachers are asked to do something that makes them feel uncomfortable, they know where to go for advice; the problem revealed by a survey was the wide disparity in teachers' views.
- Another fundamental problem is that, whereas in surgery, for instance, there may be general acceptance of best procedures, there is no agreement of what constitutes the best way of teaching. It may genuinely differ from person to person, from day to day, and from class to class.
- At least in the subjects represented here – Geography, Mathematics and Science – there are Chartered Teachers in recognition of their status; there is nothing of the kind in the Humanities or Creative Arts subjects. This is an indication of the huge amount of groundwork that has to be done in order to make a College of Teaching effective.
- We all need to be zealous advocates for this great profession; to be 'loud and proud'.
- The fact that there are varied routes into teaching is a good thing, but we need to provide good and appropriate continuing professional development.

- Retention is a priority, so we must take care to nurture and protect new entrants to the profession.

Pupil panel

Monday 22nd June

The panel consisted of 7 students from 3 secondary schools who were at different stages of their school career, from Year 10 to Year 13.

Three main themes emerged from their responses to questions about what motivates them in Geography, Maths and Science lessons:

- Challenging subject material
- Relevance of the subject to everyday life
- Their relationship with the teacher

Challenging subject material

They **enjoyed being challenged** in lessons, e.g. being asked in the first A2 Chemistry lesson to work out the structure of benzene using their existing knowledge. Maths was enjoyable because it required logical thinking and, the deeper the thinking, the more interesting it became; there was a competitive element to getting the right answer. Chemistry challenges online were stretching.

Relevance to everyday life

They enjoyed lessons where “*there’s a point to it*”, e.g. Chemistry and Geography gave them an appreciation of the patterns and processes in the world around them. Practical processes in lessons, e.g. the oxidation of alcohol, could be related to potential future careers. There was “**a satisfaction of knowing**” about every day processes that perhaps others were unaware of. Geography could be related to current events, e.g. the recent earthquake in Nepal, and was the “*key to our futures*” in terms of humans’ effect on the planet and its resources. Everyday examples in lessons which related to scale, e.g. the size of a comet in relation to a football pitch, gave a helpful perspective. Geography A Level fieldwork, e.g. actually going to a river, “**related to real life**”. They also appreciated links being made between subjects, e.g. Mechanics in Physics and Statistics in Biology.

Their relationship with the teacher

A relationship based on “*mutual respect*” was emphasised as a key feature of good teacher. A good teacher is one who inspires you to want to work and to read more outside the lesson. Teachers “*should not give up on lost causes*” but should put in the effort for everyone. Teachers should care and be approachable, not judgmental. Teachers should give students the freedom to make mistakes and the time to evaluate their mistakes to move forward. The students all appreciated consistent, enthusiastic teachers who could inspire them; they wanted “*to leave the lesson wanting more*”. However, a teacher’s subject passion had to be combined with good communication with students, i.e. the lesson should not go over their heads. Extracurricular activities were appreciated although the panel did not appear to have many such opportunities in

their schools. They commented that whole-class intervention didn't work and should instead be directed to the needs of individuals.

Subject choices depended on many factors, e.g. good and bad experiences of teachers, the apparent ease or difficulty of subjects and career aspirations. There was a strong feeling that there should be more Maths taught at KS3 to support Science subjects at KS4.

Selection of quotes from delegate evaluations

"[The Lectures were] hugely inspirational, delivered by people who were obviously passionate about their subject and incredibly knowledgeable."

"I have enjoyed being exposed to new Science like I have not been for years. Being taught is nice!"

"[The Pupil Panel was] a very nice way start the Residential because it reminded us of what is important to the students and set a positive tone."

"I think the balance is pretty much perfect. The subject sharing was excellent and I loved the lectures. I had forgotten how enthusiastic I am about my subject."

"Thanks for a wonderful and enriching experience."

"Excellent. First time I have updated my subject knowledge formally in a long time!"

"Most CPD focuses on the teaching side. It was good to get updated in subject knowledge by experts. This is something we rarely get a chance to do unless we devote a lot of our personal time to it."

"It certainly restored my love for the subject and reminded me why I teach."

"I had never been to Cambridge before, so I thought I'd happily go outside and wander round the town; however, the magic happening around me kept me in and I did not want to go anywhere else."

"My fire has been relit and this can only enhance my teaching."

"I like the opportunity to do CPD in an external environment as it gives you a chance to chat to teachers from other schools and time to reflect on your own teaching and what you would like to develop and enhance."

"A refreshing, reinvigorating experience with like-minded people who are driven by a desire to enrich the experience of young people. What more could I ask?"

"Fantastic lectures on inspirational material."