

2015 2016

YEARBOOK



THE PRINCE'S
TEACHING
INSTITUTE

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The Prince's Teaching Institute Yearbook

This Yearbook contains summaries of the action-based research projects completed in 2015/16 by headteachers and subject leaders as part of our Schools Leadership Programme and Schools Programme Associate Department Scheme.

The projects:

- focus on teaching and learning
- support collaboration
- encourage staff to develop their specialist subject knowledge
- extend and enthuse pupils within and beyond the curriculum

We hope you will find these of interest and that you may take inspiration from the ideas presented.

The Yearbook also contains the conclusions reached by practitioners at each of our four residential conferences, as well as looking ahead to some of our plans for the 2016/17 academic year.

Full project reports are available to members and can be found in our online Staffroom at www.princes-ti.org.uk/staffroom. Information about the PTI and our upcoming events can be found at www.princes-ti.org.uk.

2015/2016

2015/16

Highlights of our year

*"The Schools Programme
has provided the support
and challenge to enable us
to develop engaging and
inspiring opportunities for
all students."*

Dr Marc Morris
Historian and broadcaster

Schools Programme and Schools Leadership Programme

Reaching over 340,000
pupils in 346 schools



Dame Barbara Stocking DBE
Former Chief Executive
of Oxfam



Headteachers' Residential



Lord Wilson of Dinton
Former Cabinet Secretary



*"All the speakers were
engaging and extremely
knowledgeable offering a
variety of things to take
away."*



Sir Christopher Hum KCMG
Former British Ambassador to China

Summer and Autumn Residentials

Art, English, History,
Latin, Mathematics,
Modern Languages,
Music and Science



*"I came away from
the Residential feeling
encouraged, more focused,
and with loads of new
resources to share"*



Michael Wood
Historian and broadcaster



Professor Sir Jonathan Bate CBE
University of Oxford



Professor Helen Cooper
University of Cambridge



2015/16

Highlights of our year



Dame Alison Peacock DBE

"Meeting with like-minded school leaders who are committed to delivering high-quality teaching and learning has inspired me at a time when it is easy to feel demotivated."

Primary Leadership Programme



"The range of subjects and themes covered was truly inspiring. I've been given so much to think about"



CPD Subject Days

545 teachers attended
30 exciting events, taking
expert knowledge back
to school



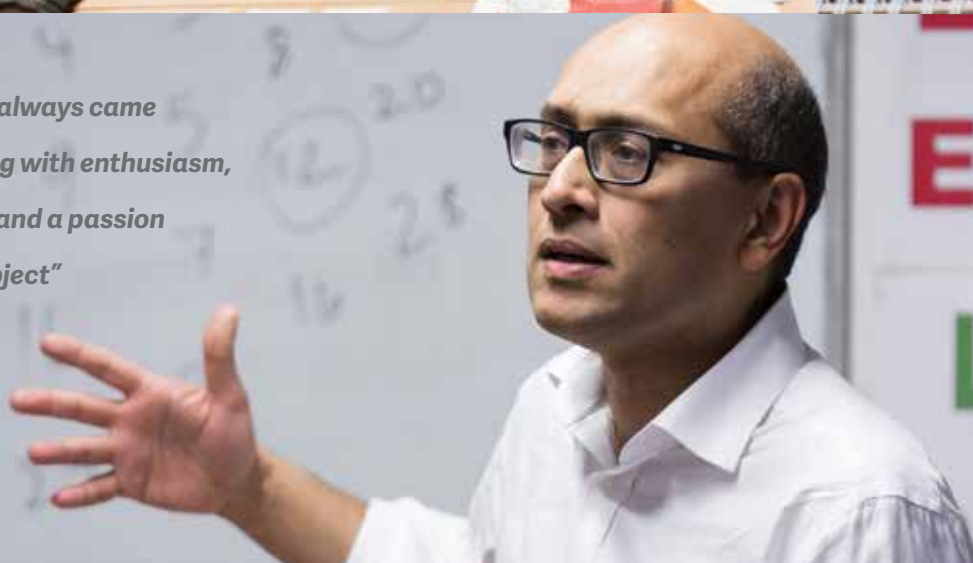


New Teacher Subject Days

Over 500 new teachers boosted their confidence to bring the latest thinking into their classrooms



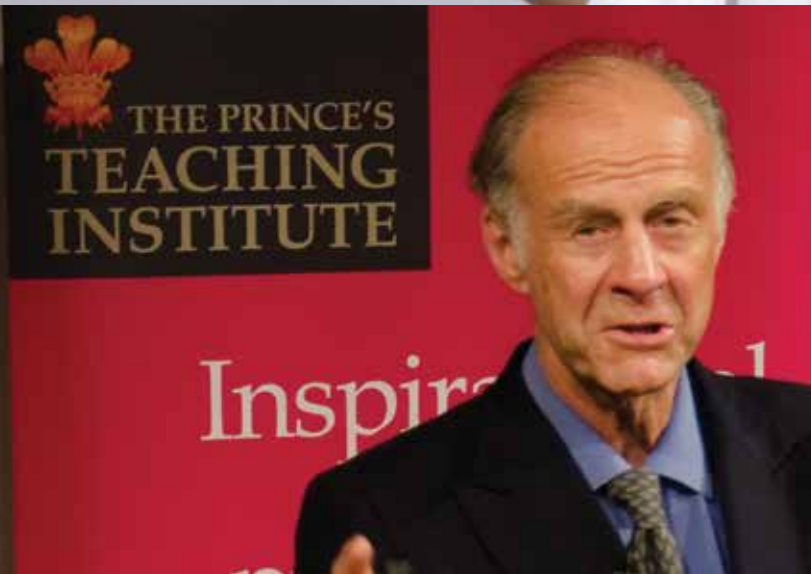
"Our NQTs always came back buzzing with enthusiasm, inspiration and a passion for their subject"



Explain

Level 4

Describe



Annual Lecture

Sir Ranulph
Fiennes OBE

Living dangerously

The voice of the profession

Conclusions reached by teachers and school leaders at each of our four residential conferences this year.

Secondary school leaders

Headteachers' Residential, January 2016

How to establish a strong school ethos:

Develop a clear set of values and model behaviour that pupils will come to internalise.

Involve the whole school community in shaping the ethos.

How to ensure great teaching and learning remains at the heart of school leadership:

Prioritise love of learning and never narrow education to meet accountability frameworks.

Empower and enthuse teachers in their subjects through continuing professional development.

How to succeed in educational leadership:

Have a clear vision, uphold your core values and make teaching and learning the absolute priority.

Be authentic and optimistic; know your staff well and discover what drives them.

How to recruit high-quality subject teachers:

Nurture talented individuals already in your networks and provide clear career pathways.

Raise the profile of the school through social media and local media.

Heads of department

Summer Residential, June 2016

English, History, Latin and Modern Languages

Out-of-school CPD inspires teachers to make learning challenging and creative

Delegates felt that this residential conference had boosted the morale, ambition and confidence of those who attended by allowing them to share best practice, hear from world-class lecturers and reaffirm the value of teaching their subjects.

Challenge, within and beyond the curriculum, prepares pupils for life

Pupils said they want to be challenged, and they rely on teachers to guide them through risk taking and prepare them for further study. Delegates concluded that the bar cannot be set too high for pupils, or indeed for their own teaching practice.

Changes to the curriculum can be seen as opportunities to introduce more creative and challenging teaching

While the new curriculum presents challenges, it also provides the chance to teach with more freedom and creativity. Delegates recognised, however, that greater collaboration between schools and with other institutions would be needed to keep workloads manageable.

Raising the profile of a subject can help ensure high student uptake

A range of factors attract pupils to study particular subjects. To promote high student take-up, teachers therefore recognised the need to ensure that students are aware of the opportunities that a subject provides beyond school and exams, including for self-development and further study, as well as the breadth and range of the subject itself.

Heads of department

Autumn Residential, November 2015

Art, English, Mathematics, Music and Science

The value of attending out-of-school CPD

Stepping away from the pressures of school allows teachers to reflect on and improve their teaching practice, to appreciate the value of the job and to reconnect with themselves as learners and practitioners of their subject.

Invest in teachers' professional development to aid recruitment and retention of inspiring subject teachers

Public perceptions of teaching can be barriers to recruitment, and more efforts should be made to broaden the recruitment pool. Ensuring proper investment in teachers' professional development, increasing the range of career pathways and providing more support for new teachers are crucial to retaining teachers.

Perverse incentives and lack of information are hindering which subjects students take-up

Delegates and panellists agreed that students lack full information for making subject choices and that there are perverse incentives in the system. On the one hand, the EBacc has been seen to devalue the Arts, which are a vital part of pupils' education and development. This has a direct impact on pupils with strong personal aspirations in the Arts. On the other hand, better careers guidance is needed to increase the numbers going into STEM careers, and this extra responsibility often now falls on the shoulders of teachers.

We must 'assess what we value, not value what we assess'

There is a danger that lesson content has become driven by exam boards, but delegates felt that students must be allowed to take creative risks in the classroom. Tiered assessment is valuable in some subjects, such as English, but not in Art. It is essential that subject specialists mark exam papers, and that there is dialogue between schools and exam boards.

Secondary schools should collaborate with primary schools to improve subject teaching

It was felt that collaboration with primary schools should be for pupils of all abilities, and should help to build primary teachers' own expertise. However, cross-phase collaboration is a two-way process, and secondary schools can learn from some of the creative teaching happening in the primary sector.

Primary school leaders

Primary Residential, October 2015

Passion for subjects should be promoted and teacher expertise recognised and developed - subject leadership is about inspiration, not administration

We must listen to our pupils and make efforts to discover what they actually think and what they have really taken away from lessons

Breadth in the curriculum is crucial - we need to engender a joy of learning across the subject spectrum, and make the curriculum meaningful rather than focusing on narrow outcomes

2016/17

A look ahead One-day Courses

For up to date information see www.princes-ti.org.uk/events

HISTORY

Autumn 2016

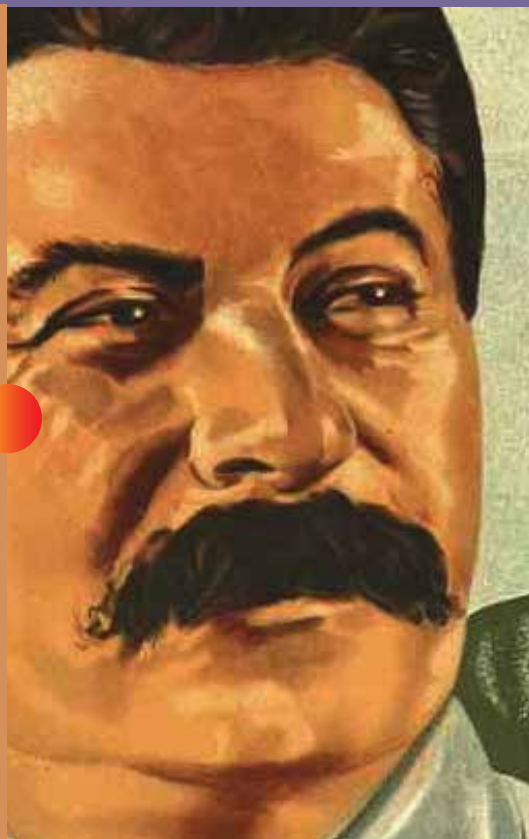
- Tsarist Russia 1855-1917
- Medicine and public health over 1000 years

Spring 2017

- Mao's China: 1949-1976
- Stalin's Russia

Summer 2017

- The First World War at KS3
- The rise of National Socialism



MODERN LANGUAGES

Autumn 2016

- French literature at KS3-5
- Fotos & Filme im Unterricht: KS3-5
- The Golden Age and the Spanish Civil War

Spring 2017

- Using German history to develop language skills at KS3-5
- Exploiting Hispanic literary texts for language manipulation

Summer 2017

- Contemporary French film
- German literature at KS 3-4: Die Lust am Lesen
- Using films and image in the Spanish classroom

ENGLISH

Autumn 2016

- Approaching modern drama
- Romantic poetry in the secondary classroom : Fostered alike by beauty and fear
- 19th-century novels for 21st-century students

Spring 2017

- Creative writing
- Frankenstein: Taming the monster
- Shakespeare in context at KS3-5

Summer 2017

- 19th-century poetry and the world
- Differentiating Shakespeare





GEOGRAPHY

Autumn 2016

- Population change
- Water and carbon cycles

Spring 2017

- Global ecosystems and biodiversity

Summer 2017

- Meteorology for KS3-5



MATHEMATICS

Autumn 2016

- Algebra – problem solved!

Spring 2017

- Inspiring geometry and trigonometry for foundation learners
- Proof for all: Making algebraic proof attainable for all students
- Shape and algebra

Summer 2017

- Data handling and statistics
- Thinking about numbers

SCIENCE

Autumn 2016

- The science of human health
- Biology at the zoo: Using zoology to contextualise the new specifications
 - Investigating rates of reaction
 - Spectroscopy
- The curious nature of waves: Teaching wave behaviour at KS4-5
- Forces & mechanics at KS3-4

Spring 2017

- Biotechnology at KS5
- Biological transport: Membranes, the kidney and osmoregulation
 - Bonding
- Medical physics

Summer 2017

- Plant power! Engaging students with plants and photosynthesis
- Thermodynamics and electrochemistry



ART AND MUSIC

Autumn 2016

- Composition through the key stages with Howard Goodall CBE

Spring 2017

- Painting
- Loving listening: Teaching the new GCSE listening paper

Summer 2017

- Singing in the classroom and beyond

2016/17

A look ahead Residential Courses

**Primary Leadership Conference
for primary headteachers**

Thursday 13th – Friday 14th October 2016

Enrichment Conference for subject leaders:

Mathematics and Science

Saturday 12th – Monday 14th November 2016

**Leadership Conference for secondary
headteachers**

Monday 30th – Tuesday 31st January 2017

Enrichment Conference for subject leaders:

Art, English, Geography and Music

Monday 26th – Wednesday 28th June 2017





2015/16

New Teacher Subject Days

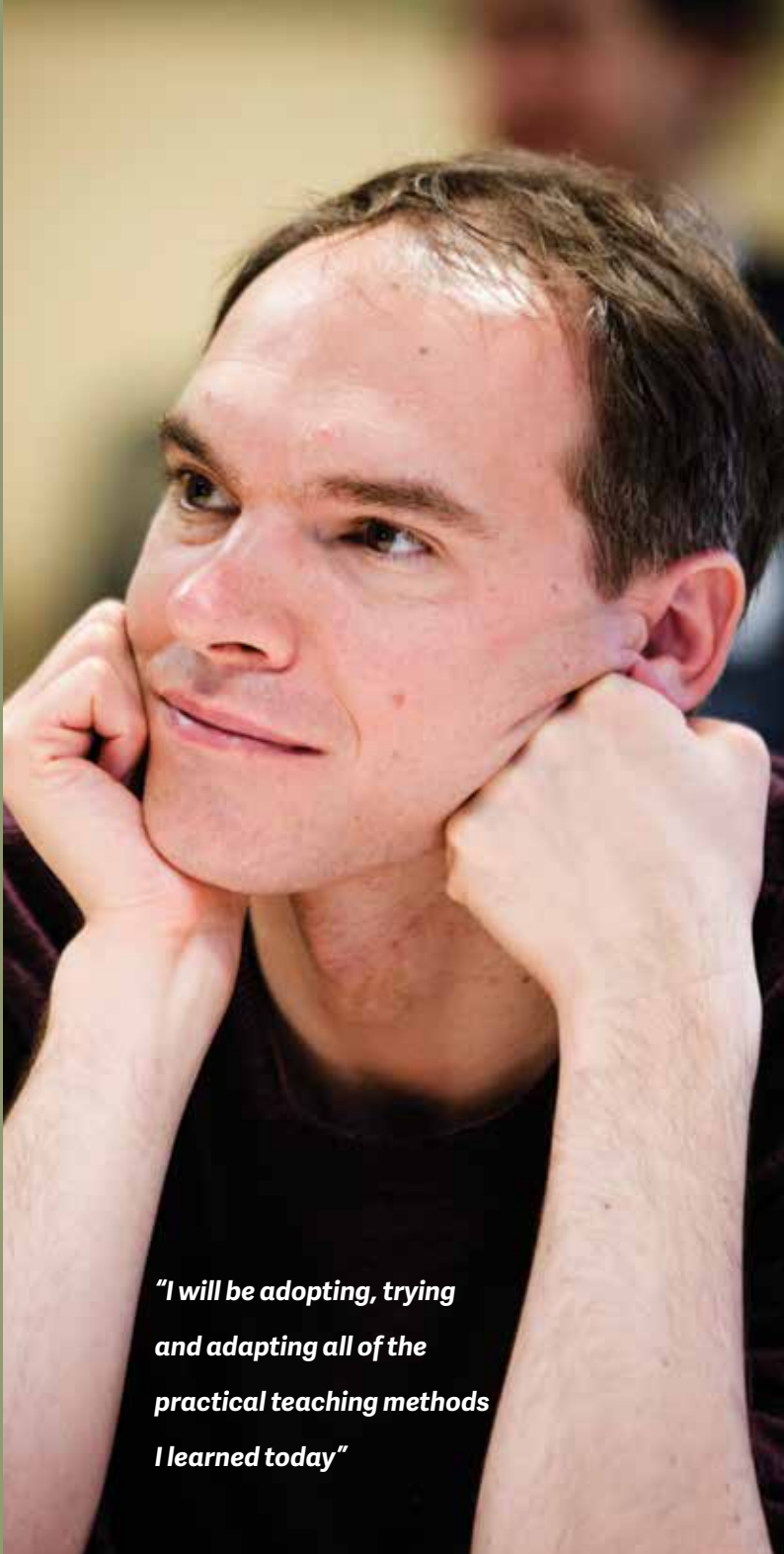
Specially designed for new teachers, this course of four Saturdays gives guidance on subject-specific teaching strategies, access to a wealth of subject-based resources, and contact with some of the latest academic thinking.

Subjects covered:

- Biology
- Chemistry
- English
- French
- Geography
- History
- Mathematics
- Physics
- Spanish


Location: Pimlico Academy, London

Courses are recommended for school-based teacher trainees, NQTs and those in their first few years of teaching.



*"I will be adopting, trying
and adapting all of the
practical teaching methods
I learned today"*

Schools Leadership Programme project summaries

- 
- 15 Promoting and supporting literacy across the curriculum
Plashet School, Newham
 - 16 Raising attainment in Geography at Key Stages 3 & 4
Robert Clack School, Dagenham
 - 17 Research, design and implementation of a new Key Stage 4 curriculum
Chiswick School, London
 - 18 Developing the Sixth Form from Good to Outstanding
Carre's Grammar School, Lincolnshire
 - 19 Implementing effective leadership strategies to deliver more inspiring teaching and raise achievement
South Wirral High School, Wirral
 - 20 Raising the profile of STEM subjects for girls
King Edward VI Camp Hill School for Girls, Birmingham
 - 21 Raising the level of literacy to enable access to a broad, subject-based curriculum
Launceston College, Cornwall
 - 22 Implementing an *Excellence Framework* for all subjects
Upton Hall School FCJ, Wirral
 - 23 Strengthening middle leadership
Whitefield School, Barnet

Promoting and supporting literacy across the curriculum

Plashet School, Newham

An 11-16 comprehensive girls' school



Aim: To increase teachers' knowledge of the literacy demands in their own subject and how to teach it implicitly, thus improving the literacy skills of students across the curriculum.

Background: The proportion of students from minority ethnic backgrounds and those whose first language is not English (EAL) is 96%. The proportion of students eligible for free school meals is well above the national average.

Method:

Year 1 & 2:

A literacy working party (from the English, Maths, Science, EAL, History, RE, Geography, ICT and Special Educational Needs (SEND) departments) formulated a school literacy policy which coordinated the different strands of literacy across the school. These included classroom strategies to promote reading, writing, speaking and listening, Ruth Miskin Literacy (RML whole school reading intervention), EAL, SEND and English interventions, and the use of the resource centre. Year 7 students were tested for reading and spelling very soon after they started at the school. Students who had a reading age below nine followed the RML intervention programme. Intervention consisted of five lessons per week of intensive phonics to help students develop reading skills up to a reading age of ten years.

Year 3 & 4:

The project changed to focus on supporting teachers with literacy in the classroom. A research group of teachers investigated the literacy needs of Year 7 students by conducting a book sample, following which it was decided to focus on three areas: extended writing, teaching explicit literacy skills and teacher training. The outcomes of this research were shared with all staff. Over a period of 20 weeks, a weekly literacy guide was distributed to all teachers that focused on a specific literacy skill, e.g. when to use a semi-colon. Literacy boxes were created for students and teachers to use in class. Students in Year 9 were appointed as literacy leaders for their classes and were trained in how to support reading and writing, and focus upon spelling, punctuation and grammar. One of the most successful resources was the Plashet Literacy Mat. All of these resources were available on Fronter, the school's online Managed Learning Environment, with ideas and strategies for their use.

Evidence: Exam results, online resources.

Impact: In 2015, 83% of students gained an A*-C pass in English Language whilst in English Literature the A*-C pass was 92%. 100% of the cohort was entered for English Language and 92% of the cohort was entered for English Literature. This was a tremendous achievement given that 96% of our students were speakers of other languages. Expected progress for English Language was 84% which is considerably higher than the national Average for 2015 of 69%.

The main focus is the Ruth Miskin Literacy intervention which starts in the October of the Autumn term. By January, 25% of students have regularly increased their reading age up to 9 years and over and no longer require this intervention. By April the number has increased to 50%. By the end of the academic year 90% of students have reached a reading age that enables them to access the literacy needs across the curriculum.

Reflections: The results for GCSE are largely due to the success of our interventions at KS3. It is the detail of what happens in the classroom that ultimately leads to the success of a school and this should always be the focus as it impacts on everything else.

Contact: Kalash Thakor, Assistant Head Teacher, kalash.thakor@plashet.newham.sch.uk

in English Literature the A-C pass was 92%... a tremendous achievement given that 96% of our students were speakers of other languages.*



Raising attainment in Geography at Key Stages 3 & 4

Robert Clack School, Dagenham

An 11-18 coeducational comprehensive school

Aim: To raise attainment and participation in GCSE Geography in order to make a significant contribution to the EBacc results. This was to be achieved by overhauling the Key Stage 3 Curriculum and focusing on the quality of teaching, learning and leadership within the department.

Background: Pass rates in Geography were below average.

Method: Year 1:

- An audit of teaching and learning (T&L) in Geography was completed. Good and Outstanding practice was identified in T&L at KS4, but only Satisfactory practice was identified at KS3, with too much passivity from pupils.
- Department discussion of an audit and action plan were agreed.
- A KS3 (Year 9) scheme of work review/overhaul commenced and joint lesson planning, self- and peer-evaluation began.
- A new Geography specialist was appointed.
- There was a positive outlook from department members.

Year 2:

- The KS3 scheme of work was adjusted so that there was a clear focus on a reduced number of key questions for each topic area. This facilitated more creative and in-depth learning in specific areas.
- T&L strategies became a permanent agenda item for departmental meetings and colleagues shared ideas and resources. A key focus in class was the use of paired discussion and questioning to encourage deeper thinking.
- Another audit of T&L was completed which reported that: *"overall, the quality of teaching has improved from that observed a year ago"* and *"questioning was a particular strength"*.

Year 3:

- GCSE (A*-C) results improved to 48%, just short of the target of 50%.
- 3 sets took GCSE Geography in Year 10 (65 pupils), up from 2 small sets (27 pupils) in the previous year.
- Developing appropriate fieldwork was identified as a key target for the KS3 subject leader.

Year 4: 3 full sets took GCSE Geography in Year 10 (70 pupils), and fieldwork was incorporated into the KS3 Year 8 scheme of work.

Evidence: Pupil survey results, staff survey/focus group results, lesson observations, subject take-up at Key Stage 4, attainment data including A*-C and A*-A pass rates.

Impact: By the end of the project (Year 5):

- The GCSE pass rate at A*-C improved significantly to 70% (up from 40% in 2011), whilst the A*-A pass rate improved to 14% (up from 6.4% in 2011).
- The improved outcomes in Geography contributed to the school's highest Ebacc pass rate of 36% (up from 10% in 2011).
- The numbers opting to study Geography at GCSE rose to one quarter of the year group (75 pupils).
- A Level Geography was introduced, with ten students opting to study it.

Reflections: These initiatives have proven very positive for both staff and pupils. Staff retention has improved as a result of a number of factors including better teaching and learning, excellent student behaviour, high quality leadership and the recognition of talent.

Contact: Sir Paul Grant, Headteacher, office@robert-clack.bardaglea.org.uk

This facilitated more creative and in-depth learning in specific areas

Research, design and implementation of a new Key Stage 4 curriculum

Chiswick School, London

An 11-18 coeducational comprehensive Academy



Aim: To maintain a Key Stage 4 curriculum that would allow the diverse student population to progress and succeed in both traditional examined and vocational courses.

Background: Results were rising year-on-year and students were engaged in their learning. However, changes in curriculum, driven by national initiatives, resulted in vocational courses being dropped or changed significantly, making them less suitable for students across the ability range.

Method: Year 1: Progress levels made by all students across Key Stage 4 were measured. A working group of staff volunteers was set up, incorporating teaching and support staff with varying degrees of experience but a genuine interest in the lost art of curriculum design. Recognising that very few would have had first-hand experience of designing a curriculum structure, this group moved from an opening session entitled "What is the main objective of any curriculum model?" to advanced curriculum design. Analysis of the current curriculum, together with interviews with staff, students and parents gave the team a real feel for what was required. They teamed up with Whole Education to look at curriculum design in more detail and make links with other schools on similar journeys.

Year 2: Team members made a number of visits to Whole Education partner schools. Different curriculum models were examined in depth, reports were written up and advantages and disadvantages were explained to the rest of the team. From this a list of key objectives emerged and the curriculum model started to take shape. The design process was completed with the team spending a long weekend at a hotel, piecing together a final proposal that was presented to the headteacher. The curriculum was subsequently costed, modelled and put to timetable.

Year 3: The curriculum was rolled out in September 2015. Students, staff and parents were all introduced to it in a structured way. It was well received, with all parties stating that they were happy with the offer and with the delivery methodology. The curriculum allows students choice and flexibility whilst ensuring depth of study.

Evidence: Staff and student questionnaires.

Impact: Whilst some of the concepts involved were fairly radical (mixing year groups on a course, extended periods of learning and the introduction of 'foundation' courses and one-year GCSEs), parents welcomed all changes with almost no resistance. Staff members across the experience range who had never before been involved in curriculum design were fully immersed within this project. This in itself was valuable CPD for all members of staff. The 'foundation' courses appeared to be a complete success. These fell into two categories: either a) non-exam courses which could lead to further more formal studies at a later stage, e.g. the Eco course for Year 9 Geographers or b) alternative accredited courses capable of standing alone, e.g. the Jamie Oliver Food course.

Reflections: It took time to evaluate what we already had in place, what research models were already in existence and to detail their strengths and weaknesses, particularly putting these in the context of our students. Finally a solution was tweaked and adjusted until the working team was happy to deliver this to the rest of the staff; ownership was complete. The support and assistance of Whole Education was instrumental in informing our offer; we learned from the relative strengths and weaknesses of models implemented in other schools. Experience to date has demonstrated that students are not picking up the 'foundation' courses in the numbers anticipated. This is down to parental pressure to pick exam-board accredited courses and a perception that 'non-academic' equates to 'of little value'. Yet where students have picked these courses, they have been incredibly well received, and we are working on marketing these courses better for the next academic year.

Contact: Tony Ryan, Headteacher, ary@chiswickschool.org

The curriculum allows students choice and flexibility whilst ensuring depth of study



Developing the Sixth Form from Good to Outstanding

Carre's Grammar School, Lincolnshire

A selective boys' grammar school with a co-educational Sixth Form that is part of The Robert Carre Trust and the Sleaford Joint Sixth Form (SJSF) Consortium with St George's Academy.

Aim: To improve the quality of teaching and learning in the Sixth Form in order to raise standards at AS and A2. To improve cross-curricular collaboration within school and across schools, and to improve the skills of teachers to have a demonstrable impact upon student progress.

Background: In 2012 the A2 results had been disappointing and after the Ofsted report in February 2013, action points were identified to raise attainment at Key Stage 5.

Method: Year 1:

- A Quality Assurance questionnaire was completed by all the students at Carre's and St George's Academy to identify the areas of best practice in each subject.
- To help staff to use Alps data to enable students to make better progress, an Alps training session was held for all staff in the Sleaford Joint Sixth Form.
- The focus of inset training days was teaching in the Sixth Form with workshops that exemplified good practice and sharing of sample lessons/activities. A consistent model was defined with emphasis on independent learning, student engagement, challenge and active learning, marking and feedback and organisation of Sixth Form student files. Allocated teaching time across the SJSF was increased for Year 12 from 8 hours per 2-week cycle to 9 hours.
- Independent study periods for Year 12 were supervised by staff.
- Staff appraisal cycle. All teachers in KS5 had objectives relating to student progress.

Year 2:

- A quality assurance process was implemented across both schools, focused on exam data, lesson observations, student voice feedback, work scrutiny, learning walks, intervention and parental engagement. The key was to engage all departments and ensure that this process focused on continual improvement, rather than being a once a year 'tick box' exercise.
- Newly designed student diaries/planners and termly one-to-one progress reviews with tutors were introduced.

Year 3: A work experience week was introduced for all Year 12 students followed by Careers' Fair Event. Students were encouraged to attend Sutton Trust Summer Schools and Oxford UNIQU to raise aspirations.

Evidence: AS & A2 results, Alps data, lesson observations, Student QA feedback.

Impact:

	Feb 2013	Feb 2016
A2 results A*-B	43%	58% (target 55%)
Level 3 value added	Below Average	Above Average
AS results A-B	32%	42.3%
Outstanding lesson observations	10%	45%
Requires Improvement lesson observations	45%	0%
Alps Teaching and Learning grade	7	4

Reflections: The main factor which resulted in such significant improvement was a clear vision which is shared by all staff. The big challenge has been to move away from teacher-led lessons to ones in which the students really take control of their learning. Perhaps our biggest challenge is to find the most effective way to share good practice both within our own school and across the two schools.

Contact: Diane Hickmore, Director of Sixth Form, diane.hickmore@carres.uk

The main factor which resulted in such significant improvement was a clear vision which is shared by all staff



Implementing effective leadership strategies to deliver more inspiring teaching and raise achievement

South Wirral High School, Wirral

An 11-18 coeducational comprehensive school

Aim: To raise achievement further by delivering more outstanding teaching through peer coaching for staff and a focus on assessment and tracking of pupils.

Background: The Ofsted report in April 2013 had rated the overall effectiveness of the school as 'Good'.

Method:

Year 1: Three voluntary *Pathfinder* groups of ambitious and enthusiastic staff conducted action research into *New Technologies*, *Peer Coaching* and *Literacy*. Subsequently these staff ran whole-school inset sessions based on their findings. These sessions were well attended and received excellent evaluations. 25 colleagues signed up for peer coaching and 48 iPads were purchased for new technologies and significant training embedded; every department subsequently used iPads in lessons. 300 new lessons using new technologies were networked with other schools.

To ensure that there was an improved level of understanding by staff of the new assessment and tracking systems, support was provided through mentoring and coaching. A pupil passport for Year 6 pupils was very effective in enabling new Year 7 pupils to hit the ground running.

Year 2: The whole-school target was to encourage students to read more often and across a range of genres. Initiatives included establishing a Reading *Pathfinder* group and launching a *Reading for Pleasure* scheme attended by a playwright and author. Students read for pleasure during registration on a set timetable and reading was recorded and monitored. A culture of recommended reading within the school was encouraged through the library, noticeboard displays, newsletters and teacher 'Recommended Reading' posters. An innovative CPD programme was developed which builds on the ideal of the 'self-improving teacher' using peer coaching and the enterprise network 'Yammer' for building teacher learning communities.

Year 3: The focus was on effective target setting across departments to reduce underachievement by students. A Writing *Pathfinders* group was established to focus on spelling, grammar and extended writing responses. The CPD programme was further developed, following whole-school evaluation of its first year and building on the key school priorities.

Evidence: Staff surveys, student voice feedback, attainment data.

Impact: In 2015, 42% of lessons observed were Outstanding (27% in 2013), 55% of lessons observed were Good (67% in 2013) and 3% Requires Improvement. Evaluations showed that staff greatly appreciated gaining the new support network of peer coaching; this was one of the primary vehicles for improving the training model for staff.

Reflections: By developing a culture of 'sharing the learning' and driving an innovative CPD model to support our colleagues we believe that we are preparing well for the new demands of the modern world. Our challenge is to continue with following our principles of a team approach, whereby there is distributed leadership throughout the school striving for excellence. Our project has been aided significantly by branching out and doing significant research which we have tailored and made bespoke for our school. We have benefitted by being part of several networks such as The Prince's Teaching Institute, Leading Edge – SSAT, ASCL and by being proactive in terms of facilitating collaboration between schools.

Contact: Jay Durham, Assistant Headteacher, jwd@southwirral.wirral.sch.uk

staff greatly appreciated gaining the new support network of peer coaching



Raising the profile of STEM subjects for girls

King Edward VI Camp Hill School for Girls, Birmingham

A selective girls' grammar school with academy status

Aim: To transform the Design Technology (DT) Curriculum at Key Stage 3 to raise the profile and uptake of STEM subjects in the Sixth Form and beyond.

Background: Pupils are very able and reflect the diverse and multicultural population of the West Midlands, but few apply for STEM subjects at university.

Method:

Year 1: A new scheme of work was introduced for Year 7 DT supported by a pupil-friendly booklet to consolidate and extend students' learning, whilst providing opportunities for reflection on progress and skills developed. Projects included building kites and egg-mobiles and a link was established with the Dyson Educational Partnership. The removal of a formal assessment element meant that students could experiment and explore without fear of being judged on their outcomes.

Students from Years 7, 9 and 12 attended the Lego League competition event at the University of Birmingham and reported on their experience in a school assembly, the school newsletter and a BBC radio interview. The reflection section of the booklet completed by pupils provided excellent feedback. This was evaluated and used to inform improvements and amendments to the scheme for the following year.

Year 2: Building on Year 7 successes, Year 8 projects included: 'How stretchy is a jelly snake?', building a model of a town using geometrical constructions, simple machines, constructing a machine to project a multi-link cube as far as possible, discussion and investigation into perceptions of and the history of manufacturing, including a look at cutting-edge technology (3-D and 4-D printing and augmented reality), production line techniques for making Christmas decorations and the aerodynamics of paper aeroplanes.

A curriculum was introduced which also provided a six-week STEM enrichment course to each student in Year 12. The course included: space travel, nanotechnology, making machines, ethical considerations of scientific development, evolution, health risks of mobile technology and the benefits of modern communication technology. Sixth Form students were in regular, direct contact with the STEM ambassador based at Network Rail. A residential at the University of Birmingham's School of Electrical, Electronic and Systems Engineering was attended by the Sixth Form STEM ambassadors, who also successfully ran a well-attended STEM Club for the lower school.

Evidence: Pupil questionnaires, staff and parental feedback.

Impact: In addition to the curricular content, other huge benefits to students included a noticeable development in problem-solving skills and team building and a marked improvement in the capacity of very able learners to take risks, to accept setbacks and to adapt practice accordingly. The emphasis was consciously on self-development, ambitious thinking and risk taking. Parental feedback was unanimously positive. Staff feedback pointed to an enhanced awareness of the uses and potential of engineering and technology, along with augmented pupil and staff enjoyment. The three STEM ambassadors in Year 13 were conditionally accepted onto Engineering courses at universities for 2016.

Reflections: A key factor in success was the appointment of an effective STEM coordinator who enhanced the links with universities and local industry partners. The facilities, resources, expertise and support available from partners in industry should not be underestimated.

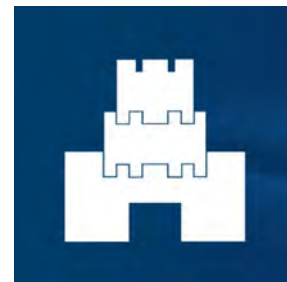
Contact: Annie Gouldsworthy, Assistant Headteacher, a.gouldsworthy@kechg.org.uk

a marked improvement in the capacity of very able learners to take risks

Raising the level of literacy to enable access to a broad, subject-based curriculum

Launceston College, Cornwall

An 11-18 co-educational comprehensive school (part of the Launceston College Multi-Academy Trust)



Aim: To raise the literacy level of both staff and students to ensure that a rigorous, subject-based curriculum could be delivered and accessed successfully. The aim was for the average reading age for Year 7 students to be at least in line with the average chronological age of the cohort and for no student to have a reading age which was more than two years below their chronological age.

Background: At the start of the project 92% of Year 7 were on or above target for predictions for the end of year, leaving 8% who were not and 100% with the potential to improve. There was a mixed picture of staff literacy as highlighted by the quality of their written reports. Marking tended to be subject-specific and students experienced a wide variety of styles and methods. The success of literacy interventions, such as Read Write Inc. (RWI) and Guided Reading had shown that intensive programmes were highly effective.

Method:

Year 1: Staff literacy training workshops covered the following topics: handwriting, common literacy problems, developing long answers, cross curricular literacy, literacy intervention at KS3, written communication and Read Write Inc.

All Year 7 students were enrolled in an online reading programme called Accelerated Reader which tracked and monitored their reading progress. A reading book became part of essential school equipment and students were encouraged to read for 20 minutes per day. A reading mentoring scheme supported students in Years 7 and 8 with a reading age below 8 years. The trained Year 10 mentors were carefully paired with a reader.

Year 2: Based on faculty feedback, the work was refined so that there was a sharper focus on literacy for exams, effective feedback and tracking of interventions at KS3. The Accelerated Reader programme continued with mixed results, however the smaller scale phonics programmes proved more effective.

Evidence: Exam results, interim assessments, faculty reviews, use of exam terminology in lesson observations, mock exam result analysis, student reflection.

Impact: Staff are talking to students far more often about what they are reading and why. Reluctant readers have been engaged and students have become more independent in their reading. They are also more confident in their descriptive, persuasive and informative writing.

Small-group interventions continued to have a positive impact on student progress: the majority of RWI students improved their reading age by at least eight months and one student increased her reading age by as much as two years and seven months. Reading mentoring benefitted both the students and the mentors. In 2015, during the second year of the project, GCSE results increased by 10% to 66% gaining 5 A*-C (including English and Maths), There was a rise in Average Point Score (APS) per entry from 40.6 to 41.2.

Reflections: Developing a College literacy policy, bringing all the initiatives together and reviewing their impact has helped raise the profile of this vital work. With the Accelerated Reader programme it is important that there is time built into each day for students to read, otherwise you will not see results.

Reluctant readers have been engaged and students have become more independent in their reading



Implementing an *Excellence Framework* for all subjects

Upton Hall School FCJ, Wirral

An 11-18 Roman Catholic girls' grammar school (converter academy)

Aim: For all staff to contribute to an *Excellence Framework* for their subject, which combines the outstanding school ethos with outstanding teaching and learning.

Background: The school had a strong community ethos and the challenge was to embed this more firmly within the curriculum.

Method:

Year 1: A *Vision and Values* booklet which summarised the FCJ ethos across all of the schools in the trust was created. The project focused on bringing together this document and the Ofsted definition of what makes an Outstanding school, making them all come alive in the classroom. Subject leaders completed an excellence framework document for their area which brought together teacher standards, ethos, values, Ofsted definitions of 'Outstanding' and an action plan for the year. Pedagogy was examined to make sure that the teaching would result in Outstanding outcomes.

Year 2: The whole staff were involved in training to develop co-operative learning techniques and encourage pupil interaction and engagement. The school also hosted a 'TeachMeet' so that staff from UHS and other schools could share good practice. The focus on pedagogy led to creating a teaching and learning group and also a pupil pedagogy group. One of the targets was to increase value added (VA) and pupils needed a much greater awareness of what they need to do to improve, so a new assessment policy was written. Investment was made in new software to analyse tracking data and to identify pupils who needed intervention. Efforts were initially concentrated on middle achievers.

Year 3: A group of staff worked with staff from other FCJ schools to make sure that the FCJ ethos was firmly embedded into the work done in lessons. The work on assessment was strengthened by a new group of staff who specifically looked at assessment strategies and at ways of sharing these, such as via a Teaching and Learning Newsletter. Work on increasing VA continued with very specific intervention groups in English and Maths. Over a period of time, these pupils were asked to complete specific tasks aimed at their weakest areas, which had been identified through tracking.

Evidence: Pupil and staff questionnaires, attainment data, lesson observations.

Impact: Questionnaires about ethos prompted a positive pupil response. They also felt the new assessment framework had a positive impact. Teachers were very positive about involvement in the pedagogy group. In Year 2, VA for middle achievers rose from 1001 to 1053. In Year 3, VA was the highest it had ever been at 1041.1 and the English department was in the top percentile in the country.

Overall VA data:

Year	All	Disadvantaged
2013	1010.6	992.7
2014	1028.2	1004.0
2015	1041.1	1028.4

Reflections: We have learned that we can make huge strides when we include the whole school community in a project such as this. All subject leaders were heavily involved in the writing of the excellence frameworks and all staff were involved in the ethos project. One of the biggest challenges was to keep the project manageable and not to lose sight of what we wanted the end product to look like. This was overcome by making the focus of the project a little more specific after each year.

Contact: Andrea Gaunt, Deputy Headteacher – Curriculum and Pedagogy

*we can make
huge strides
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include the
whole school
community in
a project such
as this*



Strengthening middle leadership

Whitefield School, Barnet

An 11-18 coeducational comprehensive school

Aim: To raise standards across the school by empowering middle leaders and thus reducing inter-departmental variation.

Background: The school of 800 pupils is ethnically diverse; 72% of pupils have English as an additional language (EAL) and 54% are eligible for free school meals.

Method:

Year 1:

Inset training on *Inspiration Leadership*, delivered by an external agency, received positive feedback from staff. Middle leaders were then involved in an in-house professional development programme to share good practice across the school. Line management meetings improved with a common structured approach and thus senior leaders were better informed about progress. Preparation work for gaining *Investors in People* accreditation supported improvements in communication with the school's directors of learning. The History, English, Modern Languages and Music departments joined the PTI Schools Programme.

Year 2:

There was increased involvement in in-house training and sharing good practice by existing and aspiring middle leaders, who, in turn, were supported by links with the Institute of Education. An improved appraisal and pay policy was introduced to support school improvement. An Ofsted inspection in 2014 identified the school as a "Good and improving school with Outstanding Leadership and Management". The school was invited to join the London Schools Gold Club and a bid to deliver training to other schools, which included a session on developing middle leaders, was accepted.

Year 3:

The Geography and Art departments also joined the PTI Schools Programme. Middle leaders focused on tracking students against targets and they were offered secondment opportunities to join the senior leadership team. Student leadership was developed into a planned programme across every year group from Years 7 to 13. The pastoral system was reviewed and redesigned in preparation for new directors of progress posts in every year.

Evidence: Lesson observations, attainment data, exam results.

Impact:

- There was improvement in Quality First Teaching across all departments, with lessons graded as: 88% Good or better: 11% Outstanding, 77% Good, 12% RI, 0% Inadequate.
- Several middle leaders gained promotion to senior leadership positions.
- Results improved: in 2015, KS4 value added was broadly average or above in all subject areas.
- 20% of low ability students met the national benchmark of 5 GCSE passes, including English and Maths, (nationally, only 6.7% of low ability students achieve this). The school was named as 4th in the UK for achievement of low prior attainment, disadvantaged students. There was an increase in top A*-A grade passes at GCSE and GCE level.

Reflections: If middle leadership is not effective, it is difficult (if not impossible) for schools to move towards 'Outstanding'. There is considerable talent and expertise within every school, especially at middle leadership level. Harnessing this expertise through paired working, coaching and middle leaders delivering training to their teams and the whole school makes good use of this expertise. Consistency is key here, and middle leaders have to ensure that what is happening in every classroom for every student in every lesson is the best it can be.

Contact: Liz Rymer, Headteacher

The school was named as 4th in the UK for achievement of low prior attainment, disadvantaged students

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Improving and strengthening the transition to higher education



Palmer's College, Essex

A Sixth Form college with approximately 1,700 students

Aim: To ensure that students who choose to study English-based courses at university are equipped to meet the demands of their degree courses by providing enrichment material to broaden and deepen their subject knowledge beyond the confines of curricula.

Background: The proportion of adults and young people from Thurrock who progress to higher education (HE) is low. The implicit overarching aim of the project was therefore to provide students with the resources they might need to overcome social, cultural and intellectual barriers to studying at degree level.

Method:

Year 1: A guide to studying English at university was produced; it included information about the variety of courses available, departments with high reputations and particular strengths, modes of delivery, and advice about making choices and applying. High achieving and ambitious students were invited to hear from university professors and gain insight into applying to the more competitive universities. A group of students visited the English department at Queen Mary, University of London and two students attended a series of sessions on English Literature at Reading University as part of the Reading Scholars Scheme.

Year 2: A series of weekly lunchtime meetings for students applying to study English at university was established. These meetings focused on researching courses and institutions and were followed by supervision of the personal statement drafting processes. Once applications had been submitted, the focus shifted to wider reading and a series of talks by teachers on their specialist academic areas, designed to enhance students' subject knowledge.

Year 3: A substantial 'stretch and challenge' handbook was created and issued to students to introduce them to the sort of material that they would encounter in the context of an HE English course, thus providing them with a head start. Students were encouraged to enter creative writing competitions, and nineteen saw their short stories appear in a collection published by the Young Writers organisation. Two students attended a summer school at Oxford University.

Year 4: Further initiatives included a screening at the college of the National Theatre's production of *Frankenstein*, a Skype broadcast of a lecture on psychoanalysis and Toni Morrison's *Beloved* held at Nottingham Trent University.

Evidence: Student surveys, university application feedback.

Impact: Student surveys indicated that they appreciated the initiative and, in particular, the opportunity to have their UCAS applications guided by a subject specialist. All students who participated in the programme received offers of places on English-related HE courses. 2015/16 was the first year in which a student gained an offer from Oxford University to study English Literature. Staff enjoyed making use of their specific areas of academic expertise and enthusing students.

Reflections: The main challenge was making students aware of the programme. Although it was advertised, not all students who might have benefitted from participation were initially aware of its existence. We have recently created a Twitter account, which should improve communication with students.

Contact: Neil Allan, Subject Area Manager, English, n.allan@palmers.ac.uk

All

students who participated in the programme received offers of places on English-related HE courses



Developing and nurturing a debating culture within school

Upton Hall School FCJ, Wirral

An 11-18 Roman Catholic girls' grammar school (converter academy)

Aim: To raise students' confidence and participation in their use of spoken English and thus to raise the standard of their formal spoken English. To encourage students to engage with current events and contemporary issues.

Background: At this very academic institution, students tended to be literate and literary without necessarily having strong oral communication skills.

Method:

Year 1:

- Teachers attended debating training.
- A weekly Key Stage 5 debating club was established.
- English colleagues were trained and other subjects became involved.
- Students entered national debating competitions, e.g. the English Speaking Union (ESU) Schools' Mace.

Year 2:

- Year 11 students established a KS3 debating club.
- A wide range of debating resources were collected, e.g. motion lists, timing pro formas, ESU handbook, Rotary Club Youth Speaks handbook, ESU competition DVDs, debating websites and YouTube clips.
- Links were forged with the ESU for teacher training.
- Links were made with staff who run debating at Birkenhead Sixth Form College.

Year 3:

- A number of students entered public speaking competitions.
- A debating competition with the local Sixth Form college was hosted at school.
- Links were made with the organiser of the Rotary Club Youth Speaks competition.
- Student election hustings were arranged to coincide with the national general election.

Evidence: Attendance registers for debating clubs, student questionnaires, competition success.

Impact: Debating became popular and enjoyable. The students involved became more politicised and aware of contemporary issues, such as election debates on TV, *Question Time*, *Sky News* and quality newspapers. Student debaters enjoyed the challenge and excitement of competition and grew in confidence as a result. The school team became North West Regional Champions of the national debating competition, the ESU Schools' Mace. They also made it to the national final in London, where finalists were comprised of the top 12 debating schools in the country (out of 400 competing schools). The school entered the Rotary Club's Youth Speaks Public Speaking Competition and came third out of eight local schools. Students have quoted this valuable experience in university applications and student debaters achieved the top band in speaking and listening marks in GCSE English.

Reflections: Establishing a debating club in a school (and with it a debating culture) is a hugely rewarding project which undoubtedly benefits all the people involved, particularly the students. Assisting young people to become more confident, more articulate, more informed, more independent and more sociable is an extraordinarily worthwhile aim for any school and any teacher. Challenges included the new curriculum changes which have seen the speaking and listening component dropped from GCSE English Language. There have also been constant timing clashes with revision sessions and other clubs to overcome.

Contact: Steven Jackson

Student debaters enjoyed the challenge and excitement of competition and grew in confidence as a result



Encouraging students to be more ambitious in their reading, writing and use of the English language

Gordon's School, Surrey

An 11-18 coeducational, non-selective state boarding school

Aim: To raise the profile of reading for pleasure and to develop oracy outside the classroom.

Background: Pupils performed well in English but there was a desire to develop a passion for the subject beyond the classroom and beyond exam results.

Method:

Year 1:

Initial efforts focused on a smaller number of pupils so that lessons could be learnt before rolling out to the rest of the school.

- All Year 7 and 8 pupils participated in the 'Rooted in Reading' Scheme.
- All Year 8 pupils then participated in the Carnegie book shadowing scheme to enhance the 'Rooted in Reading' Scheme.
- A link was established with a local feeder primary school. They visited the school to take part in a poetry writing workshop.

Year 2:

The mandate was widened to reach across the school.

- A cross-curricular link was established with Art and History around the topic of conflict.
- Pupils were entered for a series of external writing competitions.
- Provision within lessons was adjusted to engage with the literary canon (particularly at KS3 where there was more flexibility) to encourage students to read more challenging texts.

Year 3:

As well as maintaining what had already been achieved, the focus this year was on oracy.

- A reward scheme was introduced for KS4 pupils to mirror the successes that had been achieved in the 'Rooted in Reading' Scheme.
- Increased opportunities were introduced for pupils to take part in debating.
- 'Model United Nations' was introduced.
- Enrichment opportunities included a residential trip to Dorset to experience Hardy country and a 'Jekyll and Hyde' experience to London for Year 10 pupils.
- Four author visits were arranged.

Evidence: Library data, competition results, involvement in extracurricular activities, pupil voice.

Impact: In the first year of the Carnegie scheme, Gordon's School posted more book reviews than any other school and the scheme continued to be popular. In the third year spring library analysis, Years 7 and 8 had more library loans than the rest of the school put together. Also, 250 pupils entered the BBC 500 word short story competition with 9 pupils selected to move to the next stage (twice the number who had made it through in the previous year). Involvement in trips was very high. At the second MUN competition, the students won a 'Distinguished Delegate' award. As a result, pupils have planned their own MUN conference. Pupil voice surveys have revealed that 85% of pupils read for pleasure each week.

Reflections: Due to staff changes, the route across the three years has not always been clear. Much of the reading promotion had an impact at KS3. The reward scheme that we attempted to introduce to KS4 did not work, perhaps because the prize (a Kindle) was not attractive to KS4 pupils; we are still thinking about ways to involve Key Stage 4. We are also looking to adapt units to take into account that pupils' favoured genre of books is action and adventure.

Contact: Rea Mitchell, rmitchell@gordons.surrey.sch.uk

Pupil voice surveys have revealed that 85% of pupils read for pleasure each week

Developing enthusiastic and self-reflective writers through the study of literature at Key Stages 3, 4 and 5

Tendring Technology College, Essex

A large comprehensive, part of the Academies Enterprise Trust, located on two sites, five miles apart



Aim: To give students opportunities to improve their writing through activities such as workshops, competitions, visits by writers and links with universities.

Method:

Year 1: Questionnaires were conducted by staff and feedback from students recorded. Results at KS3, 4 and 5 were analysed and assessment was measured through progress reviews and trackers.

Year 2: A link with Essex University's Film, Theatre and Literature department was established. Further feedback was gained from staff and students.

Year 3: The link with Essex University was consolidated and students wrote articles about visits made by professors. More theatre visits were arranged and a film club was established. A Literary Lunch for sixth formers was arranged – students read a particular book and discussed it with the owner of a local bookshop.

An enrichment day for KS4 was held - the author of *The Pomegranate Tree* came and spoke to students, shared her journalistic experience and raised awareness of the issue of refugees. Students were buzzing after hearing this author. In KS3 Antony Horowitz came and spoke to students about his writing. Students entered the Royal Mail writing competition. At KS3 regular reading competitions and the library sticker chart with prizes stimulated reading.

Evidence: Student feedback, exam results.

Impact: Outcomes for creative writing in coursework and controlled assessments improved: 98% of students achieved a C or above at GCSE in coursework or controlled assessments.

Students said that they enjoyed the writing and they had learnt new skills to improve their writing. They particularly found the university lectures, e.g. the lecture by Professor John Gillis on *Antony and Cleopatra* and talks on *Volpone* and Blake's poetry 'fun' and 'engaging'. Students had incorporated ideas from these lectures into their essays and two students received full marks in their exam scripts. This showed that the students were able to use this information to become more self-reflective in their writing.

One student won the Jack Petchey Award and with the prize money treated her form to a trip to the theatre to see a Shakespeare production.

Exploring connections between film or media and literature has been a useful way of engaging students, as have theatre visits and regular reading competitions at KS3.

Reflections: The challenges were that students had to be motivated to stay in for after-college workshops and to enter writing competitions, but this was achieved. Consistency is a key factor in ensuring that objectives are met, in particular ensuring that the project is extended across all key stages.

Students were buzzing after hearing this author



Increasing subject enjoyment by focusing on 'the writer's voice'

Queen Elizabeth's School, Barnet

An 11-18 boys' grammar school with academy status

Aim: To promote creativity, a love of writing and self expression in students, within and beyond the curriculum.

Background: During the course of the project the school's Queen's Library opened with a full-time librarian, which significantly increased the opportunities for developing extra-curricular activities.

Method:

Year 1:

- A new travel-writing scheme of work was introduced for Year 7, helping students to focus on understanding the purpose, audience and tone of a piece.
- Competitions and incentives were offered for creative writing and anthologies of students' work were created.
- Reading for pleasure was promoted through lunchtime reading clubs and teachers gave talks about their favourite books.
- The head of department attended creative writing CPD with the PTI. Training workshops were held and best practice shared with PTI members from other schools.

Year 2:

- The literature club developed and Year 12 students organised and advertised different themed activities in every term.
- As the popularity of the competitions increased, a new page on the school's intranet was developed to display students' work.
- The school librarian, the Art department and Sixth Form volunteers created a literary tube map which was published for Year 7 exercise books.
- A trip to the British Library to see the Gothic exhibition was organised which inspired pupils in their writing as well as providing teaching tools.
- Year 11 (Set 1) and Year 12 helpers ran a lunchtime revision clinic and shared examples of excellent written work to help improve exam technique.

Year 3:

- Two poets (one a former student) and a novelist gave talks at school.
- The creative writing club was expanded and reading lists were widened further.
- Year 7 students were invited to select a 'challenging classic' outside their normal comfort zone and create presentations about their understanding of the texts.
- Year 6 students were invited from the area to take part in a friendly competition.
- More non-fiction writing activities were promoted across Key Stage 4.

Evidence: Student questionnaires, exam results, club attendance, competition entries.

Impact: The project created opportunities for departments and pupils to work collaboratively and students requested more class competitions and opportunities to read out their work. The creative writing club grew by over 50% over the course of the second year with greater attendance and competition entries, and the Year 12 organisers enjoyed their ownership of it. GCSE results improved from 43% A* (2013) to 52% A* (2015).

Reflections: Personally I have realised that students achieve their best when they have a genuine enjoyment of a subject. To have skill and flair in written expression is something which needs to be practised and enjoyed, with lots of motivational and relevant incentives to keep students engaged and interested.

Contact: Sarah Snowden, ssnowdon@qebarnet.co.uk

The project created opportunities for departments and pupils to work collaboratively



Encouraging extracurricular reading amongst Key Stage 4 students

St Angela's Ursuline School, London

An 11-18 Catholic comprehensive girls' school with a coeducational, multi-faith Sixth Form

Aim: To encourage students to sustain and extend their reading at KS4 in order to raise overall attainment.

Background: Many students have English as an additional language. The students do not necessarily come from homes where reading is an accessible diversion and therefore there is less modelling of reading from adults. The transition and progress from KS4 to KS5 were notably less successful than for other stages of the school. Gaining experience in reading longer and more complex texts independently was considered the key to making this transition easier.

Method:

Year 1: A Book to Film club was introduced and a whole-school assembly focused on Book Week. Some reciprocal reading pairs were established and Year 10 students reported increased confidence through helping younger students. Progress was measured through comments taken from those involved at the end of the programme.

Year 2: A programme of specialist talks by teachers was developed for KS4 and KS5 students. Using KS5 students to promote reading to younger students through speed-dating was a successful model as it created genuine interest in the texts and supported the idea that more social activities around books would be a strong way to develop reading skills.

Year 3: A Book of the Month scheme was introduced which promoted a different title each month to be discussed in tutor groups and then available from the library in class sets. Students were encouraged to write reviews.

Evidence: Student questionnaires, assembly PowerPoint.

Impact: The students reported that the Book to Film club, made them try different books, or even if they did not read the book, helped them learn about different books. The response to the lecture series was very positive and attendance fairly steady, although the impact on KS4 students was limited. A session delivered by a former student who had gone on to do her PhD at Cambridge was particularly successful. The speed-dating activities were successful to the extent that plenty of conversations took place between Sixth Form and younger students but again few KS4 students were involved because they felt overburdened by exams and study support.

Reflections: The range of different activities undertaken during the project has been impressive and has given us a good insight into the ways KS4 might be further engaged with developing reading for pleasure in the future. The most successful activities were those which took the focus out of the usual learning areas, e.g. Book of the Month and teacher lectures. We will be following up these ideas in future and gaining feedback about the impact they have on students.

We have learned several things. Firstly, that it is better to develop a single activity over time and focus on getting feedback from that to develop in the next year. Secondly, that creating more staff involvement both in the department and across the school is the key to creating and sustaining momentum.

The most successful activities were those which took the focus out of the usual learning areas



Improving independent learning in Geography at Key Stage 5

Upton Hall School FCJ, Wirral

An 11-18 Roman Catholic girls' grammar school (converter academy)

Aim: To maintain and improve high levels of attainment at AS and A2.

Background: The Geography department is very successful, with a large cohort of Year 11 pupils often achieving 100% A*-C at GCSE and a large uptake at A Level. However, at A2 students need to develop the ability to 'think like geographers' in order to access higher levels.

Method:

Year 1: The aim was to identify pedagogy that could foster an ethos of learning through enquiry. The department continued to build on the existing work with co-operative learning structures, particularly using Kagan principles. The department contributed to the whole school INSET day on pedagogy by delivering sessions on independent learning. A debating club was set up outside curriculum time, focusing on issues of geographical importance.

Year 2: A 'Golden Nugget' award board was introduced where A Level students were required to contribute news and research items. Many of these 'stories' provided a foundation for seminar and discussion groups and structured geographical debate. 'Geography syndicate learning' groups were established and groups of Year 12 and 13 students worked together on revision topics. A departmental Twitter account was set up and Year 12 and 13 Geography Facebook groups were organised by the students, which enabled them to continue their syndicate learning beyond the classroom and allowed ex-students to support current A Level students with their UCAS applications and to give guidance on exam preparation. Upton hosted a 'teach meet' in order to share good practice with other schools and links with Liverpool University continued. Extra-curricular activities included a visit to Iceland.

Year 3: For the first time Year 13 students were expected to incorporate some aspect of independent work for their Unit 4a fieldwork. A group of Year 9 pupils attended a Chester University sustainable futures event and Year 13 attended a lecture at Chester University on exam technique. For the first time in a number of years a team was entered for a regional Geographical Association quiz at Chester University – and won! Former students gave career talks at school.

Evidence: Student voice, learning walks, student exit questionnaires, exam results.

Impact: Over recent years the number opting for AS Level has risen, from 12 in 2010 to 34 in 2015. The retention rate from AS to A2 also remained high with outstanding A2 results (68% A*-B in 2015) and many students continued their study of Geography at university, including Russell Group universities and even Yale. Links with local universities have improved, although changes in personnel at Liverpool University made this difficult in Year 2. In exit surveys, A2 students identified the uniqueness of their studies in Geography at Upton Hall.

Reflections: The students' appreciation of their experience of studying Geography, their exam success and the numbers continuing at university are very pleasing. They endorse the value that a focus on independent learning has had on students' experience and outcomes.

Contact: Andrew Smith, asmith@uptonhall.org

many
students
continued
their study of
Geography at
university,
including
Russell
Group
universities
and even
Yale



Using social media to extend and enthuse students at Key Stage 5

Altrincham Girls' Grammar School, Manchester

An 11-18 girls' grammar school with academy status

Aim: To improve engagement with the KS5 curriculum and enhance exam performance.

Background: There was a high uptake of Geography at KS5 but it was not necessarily matched with a commensurately high level of academic attainment and engagement, nor a high level of uptake of Geography (or related disciplines) in tertiary education.

Method:

Year 1: A survey amongst current and former students showed that Facebook (81%), Instagram (70%), YouTube (70%) and Snapchat (81%) had high rates of at least daily usage. Twitter had a comparatively low daily usage rate (48%), but a strong overall usage rate (93%). After research, Snapchat, YouTube and Instagram were deemed to have relatively low potential for educational application so were not considered for the project at this stage.

All students surveyed used the account for further reading

Nine Geography departments across the UK were also surveyed, all of which used Twitter for a range of applications, including sharing news stories (and encouraging further reading), reminders and announcements, photo sharing and sharing good work. Pupils also generated some interesting ideas such as allowing students to 'take over' the account for a week, sharing a wider range of news sources and general interest stories and making more interactive content, e.g. quizzes.

27 former and current KS5 Geography students were surveyed about their use of and attitude towards, the AGGS Twitter account as an educational tool. All students surveyed used the account for further reading to some extent; some on a weekly basis but others only monthly or less frequently. The nine former students interviewed had all used further reading they had found from the Twitter account to inform an answer in a written examination, and seven out of eight had used it for homework and mock examinations. The also had good interaction with other features of the account such as 'FotoFriday' and 'Map of the Week'.

Year 2: Improvement in the 'Analytics' section of the Twitter desktop website meant that it was possible to analyse the ways in which followers interacted with our tweets. The department also started an Instagram account and found that although there were fewer followers than on Twitter, students were more likely to interact with posts. However, given that only photographs or videos can be posted, the practical applications of this are uncertain.

Evidence: Student surveys, analysis of social media usage, exam results.

Impact: Analytics showed that students typically engaged more with light-hearted content, and as a means of drawing them in and enthusing them about Geography this is clearly very positive. However, there was no clear evidence from examination results how, or if, social media had enhanced learning because there were too many other variables to consider. A staff survey showed that all full time staff had contributed to social media content, and their own areas of interest had helped to enhance the content made available to our students. For example, the head of department (a keen photographer) contributed the FotoFriday content on the Twitter account, and a younger, more tech-savvy member of staff set up the departmental Instagram account.

Reflections: The academic benefit of using Twitter is something that we did not manage to quantify, however the potential for engaging or enthusing students about a subject is considerable. A key success of this project is the development of a manageable use for Twitter (in terms of time and bureaucracy) which works for the department and students. We feel it is sustainable and look forward to continuing to use Twitter with future academic years.

Contact: Mike Lovelady, mlovelady@aggs.bfet.uk



Encouraging gifted and talented students to study History at university

Cardinal Newman Catholic School, Hove

An 11-18 coeducational comprehensive voluntary aided school

Aim: To increase teachers' skills in providing suitable levels of challenge and enrichment, and in giving advice on further study of History. To improve A and A* results and increase the numbers studying History at degree level.

Background: There was a high uptake of A Level History students, but few chose to study the subject at university. Teachers were inexperienced at supporting the most able to prepare for interviews at top universities.

Method:

Year 1: Student voice data revealed that pupils lacked sufficient independent study skills. Summer preparatory reading tasks, graded as essential, challenging, extra depth and overview, were created for those entering Year 12. Homework tasks involving reading and research facilitated flipped learning. Gifted and talented students were identified in the spring term.

Year 2: Lessons featured greater differentiation. Stretch and challenge tasks, intended to stimulate deeper discussion, critical thinking and independence, were modelled in department meetings. Reading lists were extended to include more degree-level texts and A/A* students were encouraged to read these. Guest speakers from the University of Sussex visited the school. Talking time was introduced at the start of lessons to allow students to coach each other and explore their prior research on new topics. Student trackers were produced to help staff and pupils reflect on their progress over time.

Year 3: Visits were successfully arranged to the University of Sussex library and the National Archives to support students with accessing primary sources and wider reading. Students found this enriching and stimulating and were able to reference challenging historical works by professional historians. Two students attended an Oxbridge Summer School and secured interviews for History joint honours at Oxford. An Oxford tutor was invited into the school for a session on interviews and a mock interview question bank was started. The two students reported being thoroughly prepared for their interviews. Neither received a place, but the feedback from Oxford showed that both had achieved 9/10 on History and had scored lower on their joint option at interview.

Evidence: Student and teacher voice data, uptake at A Level, university applications, student reading records, coursework marks.

Impact: Students reported much greater confidence in their independent work and reading, and all 'gifted and talented' History students achieved A/A* grades in their coursework essays. The number applying to History/joint History honours at university also increased. The projected A Level intake has now doubled, with particular interest being expressed by highly able GCSE students due to the support available for stretch and challenge and the championing of applications to Russell Group universities. Teachers have also reported greater confidence in supporting students in their applications.

Reflections: The department has come a long way in encouraging independence and supporting our most able students to challenge themselves, but there is still a need to embed this consistently across modules. It is disappointing that we are yet to get a student into Oxbridge, but we feel galvanised by the high ratings which our interviewees received.

Contact: Molly Rozier, m.rao@cncs.co.uk

The number applying to History at university increased and projected A Level intake has now doubled



Promoting cooperative learning through debate

Upton Hall School FCJ, Wirral

An 11-18 Roman Catholic girls' grammar school (converter academy)

Aim: To inspire students to think and learn independently, to raise the profile of History, to raise pupil attainment and to encourage collaboration between departments and with outside organisations.

Background: Students were too reliant on teacher input in lessons rather than engaging in independent learning, especially at Key Stage 5. The project aimed to build on the department's existing work with co-operative learning structures, particularly using Kagan principles, to foster enquiry and independence.

Method:

Year 1: Kagan structures were successfully implemented in History to increase pupils' confidence in contributing to class discussions. However, time constraints made it difficult to introduce extracurricular activities, so it was decided to work within the curriculum. A new KS3 curriculum was planned, based entirely around enquiries, which required pupils to hone their research and argument skills. The curriculum was made more controversial and structured debates were introduced that had pupils still debating the issues as they left the classroom.

Year 2: Debate was promoted outside lessons in a cross-curricular initiative with the English faculty. Two students entered, and one went on to win, the Historical Association's national Great Debate competition. Students participated in the Wirral Youth Parliament and were highly commended by members of the Council. Political issues were further debated through links with the Government and Politics department, and a whole-school mock general election was held to coincide with the real thing, with hustings further enhancing pupils' public speaking skills.

Year 3: The enquiry-led curriculum was developed further and a spirit of debate was embedded into KS3 classes. A one-off Year 9 enquiry lesson on Jack the Ripper was delivered to Year 9 as they were making their GCSE choices, preceding the largest uptake of GCSE History for 8 years. New resources were developed to enhance exam performance by encouraging debate and linking between topics.

A student spoke to MPs in Parliament on the subject of 'Magna Carta and the Suffragettes' on International Women's Day following her debate training in the Great Debate competition. In collaboration with the Anne Frank Trust, pupils were trained to guide their peers and parents around an exhibition on Anne Frank's life. Some went on to become ambassadors for the Trust, delivering Anne Frank's story to local primary schools and helping to run workshops. This helped to raise the profile of History while also encouraging pupils to share the fruits of their skills in enquiry and public speaking.

Evidence: GCSE uptake, student achievements, collaboration with outside organisations.

Impact: Visible successes, such as the competition win, were widely shared and celebrated in school and uptake of History as a GCSE option increased greatly (30% higher in 2016 than in 2015). Collaboration with the Anne Frank Trust has proved highly empowering for pupils who had lacked confidence and has strengthened links with parents and the wider community.

Reflections: Although there is no direct evidence that results have been enhanced, we are delighted with the overall impact on school life and the raised profile of History within the school. Challenges came from the overwhelming demands of a changing curriculum, but the project successfully evolved so that extra-curricular achievement fed into the curriculum rather than adding to it.

Contact: Sarah Hannam, shannam@uptonhall.org

*highly
empowering
for pupils who
had lacked
confidence*



The impact of Sixth Form coaching and mentoring

Ravens Wood School, Bromley

An 11-16 all-ability boys' school with academy status

Aim: To become an accredited Academy (Hub) by extending existing coaching and mentoring qualifications across other departments and schools, in order to raise the aspirations and performance of both mentors and younger mentees.

Background: The Mathematics department already offered the Institute of Leadership and Management Level 2 Qualification in Coaching and Mentoring for Young Learners to a small group of Sixth Formers, who then conducted one-to-one tutorials and also supported teachers in classes, which created a wonderful atmosphere of peer learning and support.

Method:

Year 1: Staff in other departments were encouraged to participate and close links were set up with the English department. Five English, one Science and two Geography students were enrolled into the programme. The English Lead Teacher was fully integrated into the process and trained as an internal verifier. The school gained accreditation as a hub centre and details were made available to local schools if they wished to participate.

Year 2: A few changes were made, including interviewing students to assess their suitability and make them aware of the expectations before the start of the course. This led to fewer dropping out, and 28 out of 29 students gained their qualification. Extra sessions were set up to ensure that all subjects involved had suitable leadership and support. This allowed students to work in subject-focused groups with a teacher who knew the subject fully. An outside speaker helped to coach students on how to approach their mentees and get the best out of them, which the mentors found both useful and thoroughly enjoyable.

As well as the subjects represented in Year 1, students from DT, Economics, History and PE also joined the programme. Initial contact was made with other schools but no responses were received.

Year 3: Unfortunately teachers' time constraints meant that only students from Maths, English and Geography enrolled in the course. More use was made of mentors in Sixth Form classes, which was especially helpful when teachers were away for a lesson. The coaching and mentoring programme achieved Academy status within the school, meaning that students from across the school would be able to select it as their enrichment option in succeeding years.

Evidence: Student and teacher surveys, in-depth pupil feedback, mentee results and progress.

Impact: The vast majority of mentees (86%) felt that their confidence had increased and 72% said that their ability had improved. Teachers were even more definitive, stating that 97% of mentees had increased confidence and 79% had improved ability. 20-30 students gained their Coaching and Mentoring qualification in each year of the project.

Reflections: This has been a truly wonderful project to be a part of, as we are not only creating future leaders and managers but also impacting on younger students who are gaining confidence and ability in an area that was previously a concern to them. Success was also due to making participating students aware of the wider benefits of the qualification in terms of job interviews, university applications and leadership skills. Hopefully, now armed with data about the impact of the project, it will be easier to convince other schools to join this scheme.

Contact: Charlotte Mace, cm@rws.uk.net

impacting on younger students who are gaining confidence and ability in an area that was previously a concern to them

The impact of lesson study

Robert Clack School, Dagenham

An 11-16 coeducational comprehensive school



Aim: To introduce the concept of lesson study into the Mathematics department, and to embed Bowland materials into the Key Stage 3 curriculum.

Background: Robert Clack was one of 12 secondary schools accepted to participate in the Bowland Lesson Study project. Our interest was in examining how written and verbal mathematical communication could be improved at KS3.

Method:

Year 1: Two teachers took part in the Bowland Maths project, researching and collaboratively planning lessons on three occasions throughout the year with external input from the borough advisor. These were delivered as public research lessons attended by up to 25 participants, and the two teachers observed research lessons in several other schools. The focus during the post-lesson discussions was on student learning and how this could be developed, rather than on judging the teacher's performance. An external expert concluded the discussions, an important element often overlooked in UK lesson study.

Year 2: Participation in lesson study was increased across the department and Bowland materials were embedded into KS3 schemes of work to give students exposure to extended problem solving tasks with a focus on developing mathematical communication. Teachers would plan and deliver the Bowland tasks in pairs, observing each other in the lessons.

One of the Bowland Maths participants attended a two-week immersion programme in Tokyo to observe authentic Japanese lesson study methods. She found that Japanese teachers put a lot of thought and detailed research into lessons, anticipating student responses and how to react to them to develop deep, conceptual understanding. The use of research lessons to improve teaching and learning, rather than as observations to prove competence, was refreshing.

Year 3: Lesson study was implemented school-wide. To overcome difficulties for teachers finding time to plan collaboratively, they were allowed to use twilight inset time to plan their research lessons in detail. Bowland assessment tasks were being used regularly in KS3 lessons, and departmental meetings were used to discuss their implementation. Student and teacher feedback was positive; students enjoyed the challenge and openness of the lessons, as well as the group work element. Teachers reported students' communication skills improving as a result of using the tasks.

Evidence: Teacher voice, student performance, school-wide implementation.

Impact: Rigorous preparation and anticipating student responses makes teachers increasingly confident in the management of student learning. Teachers involved in lesson study commented on the usefulness of more intensive collaboration with colleagues. Bowland assessment tasks have improved students' written and verbal communication skills. Problem solving appears to motivate students to learn and the teachers involved have developed significant expertise in teaching problem solving in mathematics.

Reflections: Lesson study works best if teacher participation is voluntary, so the initial group involved may be small. Problem solving is not easy to teach; it is critically important that teachers are given opportunities, such as through lesson study, to learn the requisite skills to teach it.

the teachers involved have developed significant expertise in teaching problem solving in mathematics



Maximising the uptake of A Level Mathematics through the KS4 curriculum

Ark Academy, Wembley

An 11-18 coeducational comprehensive academy

Aim: To involve all staff in ambitious teaching that provides students with a rigorous, challenging and engaging Key Stage 4 curriculum and prepares as many as possible for the opportunity of taking a Mathematics A Level.

Background: The school was founded in 2008 and the Sixth Form was newly opened when the project began.

Method:

Year 1:

A structured approach was taken to co-planning the KS4 Maths and Additional Maths curricula, involving the whole team. Training focused on approaches to teaching A/A* topics and early A Level Maths. Links were made with other successful schools to share best practice, and KS4 pupils were encouraged to enter external competitions, such as UKMT, as individuals and as groups.

Year 2:

The department worked with schools across the Ark network that already had Sixth Forms, and good practice was shared during Hub Days. A KS5 curriculum was planned with a focus on developing conceptual understanding, engaging students with relevant 'real-world' links and fostering their mathematical curiosity.

Year 3:

The percentage of students achieving A*-A in GCSE Maths and A*-C in GCSE Additional Maths was monitored, as were their perspectives and take-up of A Level Maths and Further Maths. A Mathematical Society was set up and speakers gave talks about mathematical career options and the benefits of a Maths degree.

Evidence: GCSE results, take-up at KS5.

Impact: The majority of targets were met or exceeded at GCSE: 88% A*-C (target 80%), 39% A*-A (target 35%) and 96% A*-C in Further Maths (target 90%). 61 out of 99 Year 12 students continued to A Level, with many more wanting to take Maths but missing the entry requirements.

The curriculum that was developed provided students with a variety of types of activity, opportunities to develop their conceptual understanding, support and challenge, and links to mathematics in the 'real world'.

Reflections: As I come to the end of this project, I feel it is important to note three factors without which these goals would have been very difficult to achieve:

- Recruitment of high quality, passionate, motivated and hard-working staff.
- Collaborative working to ensure consistency and sharing best practice across the department.
- Planning backwards to ensure that from Year 7 students (not just 'set 1 students') are being prepared for A Level Mathematics.

Contact: Emi Ozeke

The curriculum that was developed provided students with... support and challenge and links to mathematics in the real world



Promoting independent learning

Colyton Grammar School, Devon

An 11-18 coeducational, selective grammar school

Aim: To develop teaching and learning styles to promote more independent learning, and thereby better prepare pupils for life beyond school.

Background: The department and the school were not convinced that enough was being done to support the development of personal study skills. A Year 11 learning journal had been introduced, but the success of this had been limited.

Method:

Summary journals: A maths-specific version of the Year 11 (first year of Sixth Form) learning journal was developed to be used in conjunction with the whole-school learning journal. This was then introduced to Year 9, asking them to keep a 'summary journal' of notes and key concepts. They were effectively writing their own revision guides. This proved so successful that it was later expanded across KS3 and 4.

Independent learning and links with homework: A Level homework had traditionally consisted of core tasks, review tasks for those who were not confident and extension tasks for those who were. While linked with mastery of key topics, it did not provide enrichment opportunities. In addition to the syllabus, a variety of enrichment opportunities were introduced, including:

- Individual research and presentations on topics.
- Practical tasks linked to mechanics concepts like forces and acceleration.
- Group work on proofs, card tricks and tarsia puzzles which are not in the curriculum but enhance mathematical understanding.

Mastery: Lesson studies were conducted to find ways to help students who had not done well in assessments. The successful method was to have students review actual exam questions in small groups, with stronger students paired with weaker ones to come up with the answers but also common mistakes and misconceptions. Students then identified which topics needed further work, before a mini re-test.

Evidence: Summary journals, assessment data.

Impact: The summary journal has been a success, with staff integrating them into their teaching and many KS4 students now using them without being prompted. All of the independent study tasks have become integral parts of the teaching programme and activities for mastery are being embedded with all year groups. Unfortunately, due to the changes at GCSE, there is a need to move away from the three-year Sixth Form so there may no longer be time to include practical activities.

Reflections: The seeds for independent learning should be sown as early as possible, so starting in Year 7 seems like the correct thing to do. We believe that these changes have made a positive impact on our students and their confidence, but there were implications on timings and schemes of work needed adjusting as a result.

Too often students have a very narrow view of what maths is, and the opportunity for research and wider reading is essential. It was important to embed the idea of mastery into our day-to-day work, and we will try to see how the enrichment tasks currently used in the Sixth Form can be adapted for use lower down in the school.

All of the independent study tasks have become integral parts of the teaching programme



Helping students develop a strong foundation in algebra and mathematical techniques

Oakwood Park Grammar School, Kent

An 11-18 boys' selective grammar school with a coeducational Sixth Form

Aim: To raise standards of algebraic ability at GCSE in order to improve results, gain a stronger cohort at AS Level and provide stretch and challenge for more able students.

Background: Algebra was by far the weakest of the four mathematical strands in the school, and students often found the jump from GCSE to AS Level too difficult. Retention into A Level was poor and students were not choosing to study Maths-based courses at university.

Method:

Year 1: Top-set Year 10 students were taught OCR FMSQ Additional Mathematics, second set the Edexcel Level 3 Algebra Award and broad-banded sets the Level 3 Award.

Year 2: After initial enthusiasm, many of the Year 11 students sitting the Level 3 Award found it too difficult and could not see the value of it in relation to their actual GCSE. Overall success rates with algebraic questions did not improve from previous years, but a closer look revealed that those who focused on the L2 Award did perform better in their GCSE and gained confidence in tackling algebraic questions. The pass/fail grading system of the Edexcel awards was not providing students with the motivation to aim for a particular grade, so the Year 11 second set were switched to the more accessible and rewarding AQA GCSE Certificate in Further Mathematics, which are graded A⁺ (A⁺ with distinction)-C.

Student interviews and questionnaires revealed that students chose Maths at AS Level because it was one of their better GCSEs, despite advice from teachers about the major step up in difficulty. A new approach to algebra was implemented in Year 12 that assumed no prior knowledge and used stronger students as facilitators. Experiments with teaching styles in Year 7 showed that while 'funky' fun and student-led lessons were more successful for teaching accessible content and revision, new or difficult content was best taught in a more 'traditional' style. Embedding algebra award content into schemes of work also proved successful.

Year 3: The calibre of students taking AS Level Maths was strong, suggesting that pupils were better informed of the rigours of A Level Maths. Of the 13 students who had not experienced additional algebra qualifications, 10 are in the bottom 20 of the year group (49 students in total).

Evidence: Baseline data, exam results, student take-up.

Impact: Although there was no measurable increase in students' success at algebraic questions, the quality of uptake in Year 12 improved and more students went on to take Maths-based courses at university (3 in 2015 and 4 in 2016). The different approach to algebra in Year 12 also helped to improve grades. Year 12 Autumn assessment data showed an increase in A grades from 15% (2013-14) to 43% (2015-16). A⁺-C grades increased from 42% to 77%.

Reflections: We realised that intervention with algebra needs to be earlier and that it is important for students to experience more difficult algebra before Year 12, so that they can gain an insight into how big the jump is to A Level.

Contact: Jon Rhys, jrhys@opgs.org

more
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to take
Maths-based
courses at
university

Using a class blog to support the transition from GCSE to AS Level Mathematics

Sawtry Village Academy, Cambridgeshire

A mixed secondary school and Sixth Form which is part of the Cambridge Meridian Academies Trust (CMAT)



Aim: To explore students' experience of the transition from GCSE to A Level in order to provide better preparation and support.

Background: Numerous students struggled with the leap from GCSE to AS Level Mathematics which often led to a poor exam performance or a high dropout rate.

Method:

The ever-increasing use of social networking among students was harnessed and a WordPress blog was set up with an A Level Mathematics group of 12 students. WordPress was chosen as it appeared the most user friendly and its format made it ideal for sharing ideas and resources. The students were able to download the WordPress app on their mobile devices which then made it very easy for students to upload photos of their work to the site when asking for specific advice with a question or their method.

The contributions students made to the blog over a six week period were analysed by coding the content. The student posts were categorised into the four main themes of:

- Student question directly to teacher
- Student response to peer's question
- Administration question by student to peers
- Mathematics question by student to peers

All students were given a questionnaire to complete and three students were interviewed in order to follow up on relevant and interesting points raised by the questionnaire. Students were chosen who fell into one of the following three categories

- Frequently posted questions
- Frequently responded to their peers' questions
- Did not post

Evidence: Questionnaires, analysis of blog content, interview transcripts.

Impact: The majority of the students in the questionnaire had found the blog to be a supportive tool, with all of them wishing it to continue beyond the research trial period and many stating they would like a blog to be set up in other subjects too. The study found that initially students' fear of how they would be judged by their peers was a significant limiting factor on how willing they were to interact on the blog, with many students not wishing to appear 'stupid'. However, students' confidence grew as the trial went on, which was reflected in the increased frequency of posts. Several of them also 'lurked' on the blog, using what other people posted without actively contributing themselves. One student, who predominately posted answers, found the blog to be a very useful way of revisiting topics and consolidating his learning.

As a result of this research the department has decided to set up a blog for all Sixth Form Mathematics classes to support students in their studies.

Reflections: The class teacher also found the blog an extremely useful tool; it allowed them to answer students' questions at a convenient time, to upload resources and to see where interventions were needed to tackle key problem areas.

Contact: Louisa Hay, lhay@sawtryva.org

students found the blog to be a supportive tool, with all of them wishing it to continue beyond the research trial period

Developing oral and written communication skills using SOLO assessment at Key Stage 3

Queen Elizabeth's School, Barnet

An 11-18 boys' grammar school with academy status

Aim: To encourage students to develop higher order skills such as detailed explanation, application and evaluation.



Background: QE Boys is one of the top state schools in the UK and typically 50% of the Sixth Form take at least one Science A Level. High achieving students tended to approach Science as facts to be learned and to focus on what would be assessed. The removal of national curriculum levels gave the Science department the freedom to develop more meaningful assessment strategies.

Method:

A new KS3 course was developed which contained a more focused practical component. Focus was given to student-led activities which encouraged detailed exposition. Students were assessed using the SOLO framework where achievement is measured according to how an answer is structured in line with Bloom's taxonomy. The Head of Science contacted leading experts in this method from Denmark and New Zealand. Contact was also made with a local school in Stevenage which had successfully implemented SOLO across all key stages and subjects in order to share best practice. A staff handbook was created with links to explanatory materials, exemplar tasks and marked work. SOLO tasks were incorporated into schemes of work. Workchecks of student books, learning walks and observations occurred each term to track use of SOLO in lessons and homework, which also enabled any inconsistencies between staff to be identified.

Evidence: Questionnaires, student work, lesson observations and a focus group of 15 Year 7 and 8 boys.

Impact: SOLO was experienced by 92% of the cohort across all three sciences and it was used in a variety of ways, both in and out of directed lesson time. Feedback indicated that the majority of students found SOLO helpful in identifying challenging topics – ones which would require much deeper thought – and 86% said SOLO encouraged them to improve their written work without prompting by a teacher. Common ways of integrating SOLO involved use of thinking maps (22% of activities), hexagons (50% of activities) and progress sheets (27% of activities) where students self-assess their progress.

The questionnaire and focus group also identified areas to be developed:

- Inclusion of SOLO in summative assessments so students see that the skills they have developed in class and through independent study are valued.
- Recording of SOLO data on a central system so that teachers can review it more easily and are accountable for its use in the classroom.
- Discussion with other subjects about implementing it in their area, as students expressed a desire to use SOLO throughout their studies.

Reflections: The challenges with implementing any change were always going to be about staff and student mindset with this project. As it is only being implemented in Science at present, and was completely new to teachers, there was some resistance from some staff. This was overcome through support with the production of a department handbook which contained a map of resources and explanatory information, departmental meetings where best practice was shared and collaborative development of resources.

Contact: Dr Sarah Westcott, swestcott@qebarnet.co.uk

86% said SOLO encouraged them to improve their written work without prompting by a teacher.

Developing teachers' subject knowledge within and beyond the curriculum

Tendring Technology College, Essex

An 11-18 coeducational comprehensive academy, split over two sites (Years 7-9 and Years 10-13) about five miles apart



Aim: To develop teachers' subject knowledge, both within and beyond their subject specialisms by sharing good practice and expertise within the Science department. To increase uptake of both Triple Science at Key Stage 4 and Science-based subjects post-16.

Background: The nature of the split site required most members of the Science team to teach beyond their area of specialism. Staff specialisms at the start of the project were: Biology 58%, Chemistry 17%, Physics 25%. Key Stage 3 practice focused largely on the KS3 curriculum, with little consideration of future requirements at KS4.

Method:

Year 1: Staff completed subject-knowledge audits and audits of confidence in relation to areas of pedagogy (e.g. questioning strategies, group work, differentiation) and subsequently staff attended training in Spencer Kagan's Cooperative Learning. In the inspection that academic year, this style of cooperative learning was identified as more successful than those lessons where more traditional, often less structured, group work activities were used. The whole department mapped the skills required for the GCSE syllabus, e.g. planning practicals, in line with the requirements of the Individual Skills Assignments. Sharing good practice became a larger proportion of departmental meetings.

Year 2: A series of teaching and learning 'twilight' sessions were organised around curriculum topics with titles such as 'Difficult, dull and dangerous Chemistry' and 'Physics for the unenthused', as well as some Biology sessions. Enrichment activities available for students included:

- Royal Society of Chemistry Bill Bryson Award (national winners in this academic year)
- UK Chemistry Olympiad (60% of students receiving an award)
- Spectroscopy in a suitcase (including links with the University of Essex)
- STEM trip to Hawaii
- Astronomy Club

Year 3: A whole-school STEM coordinator was appointed with a view to further raising the profile of STEM subjects and facilitating work between STEM departments. Enrichment activities continued with an Ecology Club, who planned and built a pond and wildlife area which is also used by the local primary school. The whole department developed a best practice guide for constructing schemes of work and staff worked collaboratively to write them.

Evidence: Exam results, subject take-up.

Impact: There was an increase in the number of students taking Triple Science, from 15% to 22%, and an increase in the number of classes for A Level subjects: Chemistry and Physics increased from 2 to 3 classes and 1 to 2 classes respectively. In the final year, 85% of students taking two or more A Levels in Science subjects went on to study Science at university. Developmental lesson observations highlighted an improvement in subject knowledge for teachers, especially where Science teachers were delivering lessons out of their subject area. A member of the Science team was accredited as a Specialist Leader in Education. This accreditation was facilitated by a number of activities that had been undertaken as part of the PTI project being completed.

Reflections: Overall, we feel the project has been successful as it has not only led to improvements in the areas identified in this report, but it has also influenced the way we think, identify priorities and strategically plan.

Contact: Simon Harding, Curriculum Leader Science (11-18) / Specialist Leader of Education, sharding@tendringtechnologycollege.org

lesson observations highlighted an improvement in subject knowledge for teachers



Encouraging girls to study Physics in the Sixth Form and beyond

St Angela's Ursuline School, London

A large comprehensive voluntary aided Catholic girls' school with a coeducational (but predominantly female) Sixth Form

Aim: To encourage more girls to study A Level Physics, to raise attainment and to see a greater number of pupils entering university to study Physics.

Background: At the time of starting the project, the majority of places on the Physics A Level courses were occupied by boys and the department had no specialist Physics teacher. Results in A Level Physics were very comparable with those of Chemistry and Biology and also Maths, but the course was not performing well when measured by indicators such as ALIS and Alps, which measure pupil progress based on GCSE results.

Method:

Year 1: Initiatives included inviting A Level students to talk to the KS4 girls, trips to engineering careers days in London and summer schools at Queen Mary, University of London. Activities in school were further developed with the Science club taking on more steady staff and the Sixth Form benefitting from visiting workshops from Queen Mary. KS3 and 4 schemes of work were rewritten and taster sessions were run for Year 11 girls to experience an A Level Physics lesson for themselves. A programme of staff training was started with a course running across the year entitled 'Physics for non-specialists', with a strong focus on difficult topics and conducting practical work in Physics.

Year 2: Improved GCSE results led to a greater number of girls moving into A Level Physics and the Year 12 class was a majority female class for the first time (12 out of 20 pupils). These girls went on to achieve much more highly than the boys, so reversing the trend of previous years. A Physics graduate was recruited and she was able to provide a great deal of input into the delivery of A Level and GCSE Physics and help with the on-going 'Physics for non-specialists' course. She also provided a strong role model for the girls. Students entered the British Physics Olympiad for the first time as well as a robotics competition run out of Brunel University. Visits and video-linked calls with academics for a variety of physical science-based areas were arranged.

Year 3: Unfortunately the Physics specialist and another key Science teacher left, therefore enhancement focused on external activities, e.g. girls going to summer schools in Physics and Engineering at Cambridge and at Imperial. Use was also made of the 'Women in Science and Engineering' day at UCL. More students than before entered the British Physics Olympiad across Years 10-13.

Evidence: Exam results, subject take-up, attendance at extracurricular events.

Impact: The overall trend seen in GCSE Physics was one of sharp improvement followed by a steady plateauing of the results, both in terms of raw scores and in the amount of progress being made. A Level results did not show such a sharp improvement, nor the value-added, but there was a lot of improvement seen among girls in each year group, who overtook the boys in terms of grades and progress made during the course. Looking at the pupils who attended clubs and special events in Key Stage 4, it seems that these events did not lead to many students choosing STEM subjects after 16, but they did excite and interest those pupils who were already inclined towards Physics and Maths.

Reflections: It seems it is not extra activities and add-ons that cause girls to move into A Level Physics, but it is much more likely to be the natural enthusiasm of the teacher for the subject together with the confidence of the teacher to deal with the subject in hand.

Contact: Daniel Clift, Head of Physics, daniel.clift@stangelas-ursuline.co.uk

there was
a lot of
improvement
seen among
girls in each
year group



MOUNTS BAY
ACADEMY

Raising literacy through astronomy

Mounts Bay Academy, Cornwall

An 11-16 coeducational academy

Aim: To harness pupils' enthusiasm for astronomy and improve literacy through the creation of an astronomy club.

Background: Students were able to demonstrate understanding when prompted however they struggled to convey their understanding when answering longer exam questions.

Method:

Year 1: A weekly astronomy club (MBAstronomers) was set up which several Year 7 students attended. Activities included discussions and making models, e.g. of black holes, constellations and telescopes. The National Space Academy came in to give a Physics Masterclass for Year 10 students. Dr Brian Sheen from the Roseland Observatory gave a riveting presentation to Year 9 students on astronomical imaging techniques and meteorites. Resources from the Solar Centre at Stamford University were used to make hand-held spectroscopes.

Year 2: A member of the Landsend Astronomers came in to school once a month to share his vision of 'backyard astronomy', including solar flares and sunspots. Summer lunchtime sessions were held outside of the lab using a telescope with a solar filter to look at sunspots. The MBAstronomers demonstrated the telescope to their peers and explained how telescopes worked and their observations. This was an excellent opportunity to demonstrate their verbal skills. The GoSkyWatch app and the Stellarium app were used to look at constellations and the night sky in the Northern Hemisphere.

Year 3: MBAstronomers helped to plan the Tim Peake Launch event held at school. During the Year 6 Open Evening, three telescopes were set up outside with help from Landsend Astronomers and parents and potential students had the opportunity of looking at the moon. Year 7 students led this activity and enjoyed being 'experts' for the night. Lesson planning included many opportunities for literacy focus. For example, when teaching the life cycle of stars with Year 11, they initially sequenced images of the various stages of 'medium' and 'massive' stars, using keywords to identify the stages. After peer discussion they then planned the answer as a series of bullet points, finally writing out a final draft with connectives.

Evidence: Markbooks, student videos.

Impact: The pupils who attended the club were of a wide ability range although most of them tended to be less able or have statements of special educational needs. Feedback indicated that the writing frames and scripts helped, but students still lacked confidence in writing. The Year 11 lesson on the life cycle of stars proved that approaching an exam question by breaking it down through discussion and identifying keywords definitely helped students to improve their longer exam answers. MBAstronomers have raised the profile of astronomy at Mounts Bay and as a result, students will be offered the opportunity to study for GCSE Astronomy after school. However, the level of literacy needed for the Edexcel Astronomy GCSE is high and most of the students who have attended the club in these last few years would find it very challenging.

Reflections: On reflection, choosing the Astronomy Club as the basis for collecting data and evidence was not the most rigorous choice to make. It would have been more useful to base the project on either 'Inspiring students through astronomy' or 'Strategies to improve literacy in Science' – this would have generated quantifiable data across the department.

Contact: Michelle Weightman, Head of Physics, mweightman@mountsbay.org

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