

Improving continuity and progression in mathematics across the KS2/3 boundary

By John Heffernan of The Canterbury High School

Abstract/Summary

The objectives of this project were:

- to establish collaboration between year 6 and year 7 teachers to develop consistency in the teaching of arithmetic proficiency so that learning in KS3 builds upon and extends that in KS2.
- to identify vulnerable students who might find the transition process difficult and to put in place measures to ensure that their experiences of transition are positive.

Before meaningful collaboration between year 6 and year 7 teachers could be developed it was important that an honest and trusting relationship was developed in which each party understood and respected the views of the others. This task was very straightforward; we talked to each other. Despite our best endeavours, though, and the willingness on all sides for the project to be successful, we were unable to organise visits to year 6 lessons by year 7 teachers. The knock-on effect of this was that the collaborative planning activity that we wanted to undertake, in which lessons would be taught, reviewed and improved, did not happen. Our feeling is that the transition process would be much improved if such planning and delivery could take place. The ideal is for year 7 teaching to continue seamlessly from that of year 6.

Background

Research material supporting the importance of improving transition between key stage 2 and key stage 3 is abundant:

‘There is a consensus in schools and LEAs that improving continuity and progression in teaching and learning between key stage 2 and key stage 3 is a priority to raise standards in key stage 3’ (Moving On ... Effective Transition from Key Stage 2 to Key Stage 3, ESTYN, Jan 2004).

‘Classroom observation by primary and secondary teachers, in the phase that comes before or after their own, is one of the most effective starting points to improve continuity between key stages 2 and 3’ (Moving On ... Effective Transition from Key Stage 2 to Key Stage 3 ESTYN, Jan 2004).

Since 2005 there has been very little improvement in the standards of attainment in mathematics in key stage 2 and key stage 3. In key stage 2 a higher proportion of pupils gain the expected level in mathematics than in key stage 3 and this gap has increased since 2007 (Improving Numeracy in Key Stage 2 and Key Stage 3, ESTYN, April 2010).

The need to improve standards in mathematics is paramount. Collaboration between primary and secondary schools, with a particular focus on transition between the key stages, is a key focus of this project. It is postulated that closer collaboration between The Canterbury High school and 3 of its major feeder primary schools (Canterbury Primary School, Blean Primary School and St Stephen’s Junior School) will enable us to begin to address this issue.

The Canterbury Primary School is a smaller than average primary school. The proportion of pupils who are from minority ethnic backgrounds is below the national average, as is the

proportion of pupils who speak English as an additional language. The proportion of pupils known to be eligible for free school meals is above the national average. The proportion of disabled pupils and those with special educational needs, supported by school action plus or with a statement of special educational needs, is above average. Due to the increasing popularity of the school, the proportion of pupils who join or leave the school other than at expected times is above the national average.

The school has improved significantly in recent years:

'Pupils' attainment in reading, writing and mathematics has improved and is broadly in line with national averages by the end of Key Stage 2' (OFSTED, May 2012).

The school has elected to take part in this project to continue driving standards in mathematics forward.

St Stephen's Junior school is a larger than average sized primary school with the large majority of pupils of White British heritage. About one in six pupils is supported through school action, which is above the national average and about one in thirty pupils supported at school action plus or has a statement of special educational needs. This proportion is much lower than average.

The proportion of pupils, just over one in four, who are eligible for the pupil premium and those who are known to be eligible for free school meals, is above the national average.

The school meets the government's current floor standards.

OFSTED (May 2013) reported that to improve the school needs to 'Raise standards in English and mathematics still further and accelerate pupils' progress'.

Blean Primary School is a larger than average school with a large majority of the pupils of White British heritage, with a below average, but growing, number of pupils from other backgrounds. The proportion of pupils with special educational needs and/or disabilities is increasing and is just above the national average. The proportion of pupils known to be eligible for free school meals is well below average. The school has won several national awards, including the Healthy Schools status, the Gold Artsmark and the full International Award.

Aims of the Collaborative Teacher Project

To work collaboratively with primary schools to develop strategies, processes and procedures that will improve the continuity of learning and the progression of students across the KS2/KS3 boundary; particularly in light of the implementation of the new mathematics curriculum.

Details of those involved in the Collaborative Teacher Project

The project has been a joint collaboration between The Canterbury High School and three of its major feeder primary schools (The Canterbury Primary School, Blean Primary School and St. Stephen's Junior school) to improve the experience of year 6 pupils as they transfer from primary to secondary school.

A description of the Collaborative Teacher Project

Three year 6 teachers from the feeder primary schools experienced a day at Canterbury High School and assisted in the delivery of mathematics lessons.

The secondary teachers were then due to visit the primary schools to experience the year 6 lessons. However the primary teachers asked that observations of year 6 classes take place after the KS2 SAT examinations but despite our best efforts, we were unable to arrange mutually convenient times for these observations to take place. Lesson timings at the primary schools tended to be less rigid after the SAT examinations and secondary school teachers' timetables were never flexible enough to accommodate this uncertainty. The priority of the secondary school turned to preparation for the new academic year, with the challenges of the new curriculum uppermost in their thoughts, reducing the flexibility of their teaching staff still further.

A meeting then took place between the year 6 and year 7 teachers to consider differences in pedagogy across the key stages in the light of their experiences. This then allowed us to begin to

develop a consistent approach to the teaching of mathematics and to exchange information and data about students that were transferring to Canterbury High School.

The three year 6 teachers then collaborated in the teaching of year 7 students at Canterbury High School.

A joint CPD event was then due to take place to focus on the value and the outcome of collaboration in the transition process and to further develop consistency in teaching methodologies applicable to both KS2 and KS3. However the difficulties involved in this (as with the observations of year 6 teaching by year 7 teachers) proved to be insurmountable. The plan was subsequently revised so that the author of this report visited the primary schools allowing one-to-one CPD sessions to take place. The expectation is that the learning of the year 6 teachers during this project will be passed on to other teachers within their schools.

Year 6 and 7 teachers were due to work collaboratively to deliver workshops at a numeracy summer school. The workshops were extended to include literacy activities with additional drama sessions in the afternoons to add variety and to better prepare students for life at secondary school. The literacy and numeracy workshops were delivered by secondary specialists, supported by a number of enthusiastic assistants. Year 6 teachers were invited to take part, and appeared keen to do so, but ultimately did not take up the offer.

What has been learned from the project?

Closer links, greater cooperation and improved levels of trust have been developed between participating schools, all of which will continue into the future and will facilitate a better transition experience for pupils transferring between the key stages. Regular meetings, discussions and lesson observations have taken place and the core purpose of the project has been achieved. The transition project, undertaken by primary schools in term 6, has ensured that focused mathematics teaching has continued after the SAT examinations were completed and has provided valuable information for year 7 teachers.

All year 6 students were asked to complete a short calculations activity in which they chose to answer either simpler or more difficult questions involving the 4 operations. They were given the freedom to use whichever calculation method that they preferred. In total 260 calculations were made with only seven of them (2.7%) employing informal calculation methods, five of which were incorrect. The conclusion must be drawn, therefore, that the students who chose methods other than formal methods had little understanding of what they were doing. The emphasis in the new curriculum of encouraging formal calculation methods seems to fit in with current practice and will not lead to any significant change in the way that calculation is taught.

Multiplication and division recorded the highest numbers of students opting for the easier questions (22% and 28% respectively) as well as the greatest number of incorrect answers (30% and 37%) indicating clearly –and unsurprisingly – that these areas are less well understood than addition and subtraction. Of those students who attempted the more difficult multiplication question, 32% got the answer wrong. The secondary school will address this worrying statistic as a matter of urgency because, although the multiplication algorithm is known by most, it appears to be known only superficially; it can only be used by many in simplistic situations. Application to problem solving is beyond a significant proportion of the students.

Year 6 and year 7 teachers all demonstrated a passion to do the best that they could for the students within their care. In the summer term, though, the definition of what was best for the children appeared to be different depending on which side of the fence you sat. Year 7 teachers would rather the children continued with regular mathematics lessons right up until the end of the school year. They shared a concern that the SAT examinations, on which key stage 4 targets would be set, measured something that was no longer relevant in September. Six weeks of term time in which mathematics lessons were treated with less urgency, followed by six weeks of summer holiday bereft of any mathematics deemed them ancient history and a poor indicator of

current understanding. Such is the concern that the SATS examinations have been retaken by the students in the first weeks of year 7.

The year 6 teachers point of view is perhaps more holistic. They are aware that the children have worked very hard, sometimes under considerable amounts of stress, in the weeks before sitting the SATS examinations and have earned the opportunity to engage in more enjoyable – and equally educationally valid – activities such as rehearsing for a school play or spending time away on a year 6 camp; children enjoying their last few weeks of primary school is a very important consideration. The secondary school's preference would most likely be that numeracy lessons were conducted with the same degree of urgency post SATS as they were before them and, thus, a middle ground will need to be found to satisfy both parties - a continuation of the study of mathematics needs to be combined with an exciting and memorable last few weeks at school.

Impact on teachers' practice

Primary school teachers have a much improved understanding of secondary school pedagogy and a better awareness of the next stages in the mathematical development of the children that they are teaching. They understand better the reasons why topics need to be taught in a particular way and the consequences that misconceptions might have in later years. Some of the teaching methods that they have observed in year 7 lessons have been integrated into their own teaching and one of the participants has been so enthused by the process so as to enrol in a mathematics subject knowledge enhancement programme.

Secondary school teachers have benefitted less than their primary colleagues due to them not being able to observe year 6 teaching. Analysis of the 'My Calculations' activity, though, has provided them with valuable information on the understanding, or otherwise, of their new cohort and is already impacting teaching plans in year 7.

Impact on others

A major impact of the program has been the improved transition experience of students transferring between the schools. The author of this report has visited the year 6 classes on many occasions, joining in the teaching of lessons and providing enrichment activities to engage and enthuse the students. Moving to a new school is less daunting when you are already familiar with members of its staff and some of its methods.

Inviting vulnerable students, who would ordinarily find the transition process more difficult, to a summer school where they met a number of year 7 teachers and staff, practised some mathematics (all of it conducted in a relaxed and enjoyable manner) and explored their new school whilst it was much less busy than usual, was a great success. Anecdotal evidence suggests that students who had been expected to be challenging have, in fact, settled in very well as a result of their attendance at this initiative.

Advice to teachers who may want to try something similar

Time is the major constraint with a project such as this. Teachers are very busy people and engaging in an activity to improve the transition process places considerable extra demands on their time. Even though they are willing, they are often unable to comply fully with requests that are made of them. Time management, careful planning and realistic expectations are vital. Engaging school leaders in the validity of the project, so that participants are allowed the time to engage in the process effectively, would be an excellent starting point.

References and resources produced or used

We are indebted to the kindness and generosity of the Thanet Maths Transition Project who allowed us to adapt their resources to suit the needs of our project.