
Maths and Computing Specialist Schools

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The post-14 mathematics inquiry report, due in February, is expected to recommend a complete shake-up of school-level mathematics at GCSE and A level, including making the material more inspirational, and universities are likely to be lambasted for their failure to nurture mathematical talent and to encourage mathematics graduates to pursue teaching careers. See, for example, the interview with Professor Adrian Smith in the Education Section of *The Independent* on 22 January 2004 at:

<http://education.independent.co.uk/schools/story.jsp?story=483299>

In this note Graham Corbyn describes the progress of the Mathematics and Computing Specialist Schools, and how the group is already working on new initiatives, including a project with HE on using real data in schools, the creation of a network of teachers to provide inspiration to others and developing links with schools in other countries.

What we do

Designated Mathematics and Computing Specialist Schools (MCSSs) are expected to raise standards and develop further interest in mathematics across the whole ability range that will lead to whole school improvement. This includes a clear focus on developing innovative approaches in the teaching and learning of mathematics as well as sharing good practice across the curriculum, particularly through considered and effective use of ICT. In a general sense, all schools should have similar aims, and good practice is evident in mathematics departments of other specialisms, but the MCSS's are at the forefront of development and will promote new ideas and strategies for all those schools in the specialist schools network by presenting and sharing ideas through a range of conferences, network meetings and seminars arranged by the Specialist Schools Trust. The notion of all specialist schools having a key role within mathematics has been endorsed fully by the Specialist Schools Trust with the introduction of the first Mathematics Conference to be held in Cambridge in April to which all affiliated specialist schools are invited.

It is remarkable that from September 2002 to September 2003, the number of designate MCSS increased six-fold and during that year was the fastest growing specialism. Of course, it can be argued that with only 12 designated schools initially, the increase will appear impressive, but that doesn't take away the fact that there are currently 77 MCSS's and this number is extremely likely to increase substantially in September 2004. Also, it is not generally realised that mathematics is not only a specialist subject area in MCSS's, but also in other subject specialisms: Business and Enterprise; Engineering; Science; and Technology Colleges. This essentially means that, currently, over 800 schools have set themselves clear aims and objectives to raise standards of achievement in mathematics.

The community plan is equally as important as the school plan in any specialist school. Therefore, MCSS's are fully committed in becoming active partners in a learning society with their local schools and communities. The community dimension is divided into working with a number of local partner primary schools and at least one partner secondary school as well as actively engaging and working with universities, business and industry to promote the use of mathematics and computing outside of school. The wider community dimension has started to include international developments as briefly described later in this article.

Schools, without doubt, respond to achieving specialist status with pride and are thrilled to be involved and have opportunities to network nationally across a wide range of themes. Of course, it is difficult, as Subject Leader for Mathematics and Computing, to be able to offer support to every single school or individual mathematics teacher. Working with key strategic partners, including the mathematics associations, societies and government, is a main factor in the success of the Mathematics and Computing specialism. Links with these partners are maintained through our introduction of the Mathematics Expert Panel, Head Teacher Steering Group for Mathematics and Computing Schools as well as our Lead Practitioner Network for Mathematics as briefly described below.

There are too many projects and initiatives currently happening within and across the specialist schools and their communities to write about all of them here but a brief outline of a few initiatives follow. If you are keen to find out more please contact me by either email or by writing to the Specialist Schools Trust.

ExperimentsAtSchool – Real Data, Real Learning

Statistics has always been a key area in the mathematics curriculum at all levels. Traditionally, statistics has often been taught in isolation from the other areas of mathematics, and with curriculum time limited, the practical side of teaching and learning statistics has also started to disappear. Furthermore, data collection is time consuming, so pre-fabricated data sets are often used for analysis. This leads to the work having little relevance to everyday experiences, with the inevitable outcome that statistics can be of little interest to students.

However, statistics has a major part to play, not only in mathematics, but across the whole curriculum. Practical experiments are enjoyed by pupils as they have ownership of what they are collecting and the GCSE data-handling task provides an excellent opportunity to collect data, interpret results and relate findings to a real context.

To support schools in developing real data sets and practical data handling tasks, the Specialist Schools Trust, and specifically the MCSSs, have been directly involved in launching the *ExperimentsAtSchool* Project with the Royal Statistical Society Centre for Statistical Education (RSSCSE) at Nottingham Trent University. This is a joint initiative involving students across the whole age range in carrying out simple experiments and then sending the data to the *ExperimentsAtSchool* web site (www.experimentsatschool.org.uk) to form a

growing database for use in statistics lessons, not just in mathematics, but across most subjects in the curriculum.

There are currently seven experiments, namely; As the Crow Flies, Marbles, Leaves, Mind over Matter, A'maze'ing Trace, Catching the Post and Number Recognition. All experiments are geared for a range of abilities and a range of associated worksheets will be developed. No sophisticated equipment is required and the experiments are relatively simple to carry out, with analysis taking the form of, for example, simple charts or more formal hypothesis tests.

The vision of the RSSCSE and the MCSSs, through the *ExperimentsAtSchool* project, is to work with schools of all specialisms to develop an expanding range of exciting experiments that pupils can explore to generate their own real data. The advantage of doing this on a national scale is that huge databases of information can be collected and schools will be able to sample specific data sets and compare their own results with schools in other regions or even other countries. This possibility of comparing individual class data with similar classes elsewhere in the world is unique and gives pupils the chance to be involved in a truly international project!

The Lead Practitioner Network for Mathematics

The Lead Practitioner Network was set up during the second half of the autumn term 2003. The mathematics network comprises six inspirational mathematics teachers who have a wide variety of experiences within the realm of mathematics education. They continue to teach within their schools but have effectively managed time in their school timetable so that they are able to inspire and work with others to the benefit of other schools, teachers and students.

The exciting opportunity for our lead practitioners has enabled them to set up specific case studies centred on their personal experience as well as the cutting edge ideas generated in conjunction with their associated schools. Examples of some of the work to date includes co-ordinating strong mathematics departments across three different specialisms, looking at the effective use of PC tablets in mathematics lessons, working with gifted and talented students (post 16) in conjunction with a university department as well as working with middle ability students in primary schools. These case studies and more will be available from April 2004 on our website www.schoolsnetwork.org.uk Without doubt, this new network is breaking new ground in the teaching and learning of mathematics and it is our wish for this network to continue and to expand.

Mathematics across the World

Mathematics and Computing Schools have been heavily involved in developing international links and projects. Some schools have had individual success in countries such as South Africa, Malaysia and India, but there have been a number of significant projects that have promoted the vision of mathematics and computing specialist schools in England on a far wider scale.

A number of head teachers from aspiring and designated mathematics and computing schools have recently returned from a 10 day study visit to New York supported by the British Council. The visit included visiting a number of schools in New York and gaining insights into the educational system that is in place there. As the community dimension is a major part of any specialist school in England, the opportunities to talk to people in business and industry in New York also proved valuable. A full report of the visit will be available in the near future.

A new initiative has included working with Bulgarian Schools of Mathematics. There are a number of these schools across Bulgaria, and although communication with them has just started, it is evident that there is an interest in what we have achieved in England and sharing ideas and supporting these schools is an area in which some of our Maths and Computing Schools will be involved. The Bulgarian schools are hoping to send a representative to our Mathematics Conference in April this year to promote our new partnership.

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TechWatch Courseware News

More info from TechWatch online at <http://itsn.mathstore.gla.ac.uk/news/techwatch.asp>

Geometrica02 introduces new features... Geometrica02 from Video Atelier introduces new features that let you do exact drawings, analytical geometry, and tests.

MathType 5.2 is out... MathType 5.2 is a powerful, professional version of the Microsoft Equation Editor which also: creates XML/MathML and GIF equations for web-based documents and helps with TeX and LaTeX.

Mathematica Translator add-on released... The Mathematica Translator is a brand new add-on package for Maple 9 that customers with the Extended Maintenance Plan can download now from the MaplePrimes website. This package provides translation tools for converting Mathematica® expressions, commands, and notebooks into Maple-compatible formats, automatically saving them or displaying them on screen. Maple 9 must be installed prior to the installation of this package. Important Note: This package is being offered as an experimental feature to Maple users. It will not translate Mathematica programs or work with Mathematica add-on packages. It may also leave some portions untranslated where there are no Mathematica interface equivalents in Maple.

Definitive Mathematical Functions Site Now Available
...87,160 formulas and 10,828 graphics about

mathematical functions are now available free at The Wolfram Functions Site (<http://functions.wolfram.com>). Created using Mathematica over the course of more than a decade by mathematical functions experts at Wolfram Research.

Innovative Semester and Annual Editions Make Mathematica for Students... Wolfram Research introduces the new semester and annual editions of Mathematica for Students. These time-limited (six-month and one-year), downloadable editions of Mathematica for Students provide an immediate and affordable way for students anywhere in the world to gain the Mathematica advantage in any class.

New XLfit expands the power of Excel... a new software add-in from Adept Scientific for the Microsoft Excel spreadsheet environment that enables automated curve fitting, statistical analysis and results presentation. XLfit extends the functionality of Excel and simplifies curve fitting, providing a straight-forward and efficient way for researchers to carry out all their statistical analysis within the familiar Excel environment.

Windows 98 to be supported until 30 June 2006... Microsoft is extending its support for Windows 98 until 2006.