Maths support at the University of Hull: what we do and what we have learned

The Service

The University of Hull has been operating a support service for students, the Study Advice Services (SAS) [1] since 2001. This service offers support and guidance to students from all disciplines in academic writing, study skills and mathematics and operates both on the Hull campus and on the Scarborough campus. The mathematics branch of the service originated as the Mathematical Advice and Co-ordination Service (MACS) within the Faculty of Mathematics in 1995.

Currently the service has 8 part-time tutors, of which 6 are dedicated academic writing and study skills tutors, one tutor is split between the writing/skills side and mathematics and one tutor deals wholly in mathematics.

Support is offered in a number of ways: face-to-face individual support, group support, email support, workshops for departments, diagnostic testing and production of materials. Other than the workshops, all support given is confidential and we do not report back to departments, unless of course we see a large number of students with the same issue.

Appointments take place at the desk, which, on the Hull campus, is situated in the University Library. These last for 30 minutes and can be for a single student or for groups of up to 5 or 6. Appointments are fully student led.

Workshops are offered to departments. Often these are the result of problem topics being highlighted by diagnostic tests, or are areas which the students are expected to know but the lecturing staff simply do not have enough time to go over again. This year workshops in mathematics have been run for Computer Science, Hull University Business School (HUBS), Sports Science and Education.

Diagnostic testing is also used, with the method of delivery ranging from using the software Diagnosys [2] to writing subject-specific tests on Blackboard (VLE). These tests are used with Computer Science and HUBS (undergraduate and MBA programmes). In Computer Science the result is used to assign students to mathematics groups, whereas in HUBS the result is used to help the students to decide which group to attend.

Currently the service offers a series of around 30 booklets on various mathematical topics, with a similar number available for academic writing and study skills. These range from the basics of algebra through to vectors and onto solving differential equations. These booklets are made available to students in printed form at the SAS desk and are downloadable via the SAS website [3]. These leaflets are designed to be
as generic as possible so that they can be used by students from different disciplines.

There are also leaflets that have been produced in conjunction with departments to cover the topics that they need in a subject-specific way. For example, one very popular booklet is 'Mathematics for Nursing and Midwifery'. This booklet was produced after consultation with staff from the Faculty of Health and Social Care and covers topics such as fractions, algebra and dosage calculation. The service's Academic writing/Maths tutor on the Scarborough campus, Maureen Eastwood, has also been involved with the Education department and has produced a series of worksheets to help students with the TDA tests.

SAS Customers

Study Advice assists students from across a spectrum of disciplines for mathematics support. The subjects which generate the most appointments are Business, Nursing, Computer Science, Education, and Engineering. As well as this, support is given to students who are facing employers' psychometric tests. The students are a mix of traditional and mature students, home students and international students. However it appears that a disproportionately large number of mature students come to see us. Whether this is because they have given up more to come to university and want to make the most of it or if it is simply the time away from study that makes them feel more insecure, is not yet clear.

What we have learned

- Although it has been widely reported that students are entering university with a lesser grasp of mathematics than in the past, experience suggests that it is not purely lack of attainment at A-level that is the cause of students struggling with mathematics. Many of the students using the service are fresh out of college, but have already forgotten some of their A-level topics. On being given a quick run through of the necessary material it tends to come back to them quite easily. So the knowledge is there, it is just being forgotten.

- Confidence is also a big issue for many of the students who use the service. They know what they are doing, but unless someone tells them they are right, they remain unconvinced of their abilities. To help students get over this problem estimation is encouraged. By looking at the calculation they are about to perform and coming up with boundaries for the result, they can then check that their answer is of a sensible size.

- Often it is not the topic at hand that is causing the problems. A student having difficulty solving a quadratic via the quadratic formula, for example, may actually be having trouble with multiplying by negative numbers, dealing with surds or may not have seen the plus-minus symbol (±) before.

- Some of the students who use the service consider themselves to be 'maths phobic'. A large exercise involving algebra can be quite an unpleasant thing to look at on first sight, and makes the work look harder than it actually is. For these students it is suggested that they write out the first question only on a sheet of paper and then put the rest of the exercise away until they need to copy down the next question. Not having the other questions in view seems to help.

- It is very easy to confuse someone by writing something that is familiar in an unusual way, or by giving it a different name. With the students coming from different mathematical backgrounds, it is likely that some of them will have met different forms of notation. If notation is not introduced carefully students may get left behind wondering what that strange little symbol means.

Reaching the students

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- Students can be thrown by lecturers missing out lines in calculations or not explaining what has happened from one line to the next. One area where problems are caused is calculations involving trigonometric functions. It can be very tempting to assume that students know the trigonometric identities. But if the students do not know them, it can be very difficult to ascertain where parts of the equation have gone.

- Make support as easy to access as possible. The SAS booking system for appointments is computerised and located at the Hull desk. As the Library is open until 10 at night and right through the weekend, this makes it easy for students to book even when the service is closed. Evening sessions (up to 7pm) are also offered, along with Saturday mornings (not mathematics) to cater for students with full timetables or work commitments.
Maths is the language of the universe, so what have you got to say?

This year marks the 100th anniversary of the birth of Kurt Gödel - mathematician and one of the last century’s most influential thinkers – yet very few people have even heard of him. His work established the limits of mathematical logic and laid the foundations of modern computer science, yet his centenary has hardly made it into the mainstream media.

Public awareness of mathematics is low, although it lies at the heart of science and technology and is of ever increasing importance in modern society. Of course no one can be expected to start perusing mathematical journals with their morning coffee – we need good science writers to bring maths to life.

Plus magazine is launching the “Plus new writers award” in May to find the people who can bring mathematics to life. Published online and free of charge, Plus is an award-winning magazine about maths which is aimed at the general public. Its articles by top mathematicians and science writers provide a window into the world of maths with all its beauty and applications, and cover fields as diverse as art, medicine, cosmology and sport.

The competition is open to new writers of any age and from any background who can explain a mathematical topic or application they think the public needs to know about. The winning entries will be read by an international audience of over a hundred thousand in the December issue of Plus, and the prize pool includes an iPod. The closing date is 31st September 2006, and more information on the competition can be found on the Plus site, http://plus.maths.org/competition.

“It was people telling the big mathematical stories that made me realise at school that there was much more to maths than simple long division,” says Professor Marcus du Sautoy, author of the best-selling book “The music of the primes” and one of the judges of the Plus new writers award.

“Reading these stories inspired me to want to make my own mathematical breakthroughs. The future of mathematics depends on capturing the imaginations of those who will become the next generation of mathematicians.”

Gödel’s centenary highlights the need for writers who can share their passion for maths with the general public. With the 2006 new writers award, Plus hopes to celebrate these writers and encourage those of the future.

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