feature

NUMERACY SKILLS DEFICIT AMONG BIOSCIENCE ENTRANTS

THERE IS GROWING concern that many entrants onto bioscience degree programmes lack the skills that, according to the Government, define a 'numerate individual'. This, despite the fact that most, if not all, possess at least grade C in GCSE Mathematics, and many possess a higher mathematics qualification (e.g. AS- or A2-level Mathematics).

In contrast to the Government's definition of a 'numerate individual', many bioscience entrants:

- fail to recognise why numbers are important and have a limited sense of the sizes of numbers and where they fit in the number system;
- lack confidence in their ability to deal with basic mathematical concepts, arithmetic and algebra;
- are unable to calculate accurately and efficiently without the aid of a calculator;
- do not possess strategies to check whether their answers are reasonable; and
- are unable to manipulate numbers and equations, to convert between units of measurement, and to explain and make predictions from data presented in graphs, charts and tables.

Reasons proposed for the perceived decline in numeracy skills include:

- changes to GCSE and A-level Mathematics curricula in the 1980s and 90s;
- an over-reliance on the use of calculators and computers for simple calculations; and
- students' lack of confidence in, and irrational fear of, anything numerical.

The Government's National Numeracy Strategy is attempting to address some of the above through proposed changes to the teaching of mathematics in schools and via initiatives aimed at creating a climate of greater support and encouragement for parents and children at home, as well as within the wider community. However, higher education is unlikely to reap the rewards, if any, of such policies for another five to ten years. Nevertheless, in an initiative that may yield more rapid returns, teachers and academics have united to provide a single voice in advising the Government on mathematics curricula, assessment and the training and supply of mathematics teachers. The Advisory Committee on Mathematics Education (ACME) is an independent committee, chaired by Sir Christopher Llewellyn Smith and based at the Royal Society.

In the shorter term we will continue to be confronted with the problem that we can no longer assume that our entrants possess the necessary base level of numeracy skills upon which tertiary bioscience programmes of study aim to build.

So, what are our options? Raising our entrance requirements to include AS- or A2-level Mathematics is simply not feasible and may prove futile given growing concerns about assessment policies and declining standards at GCSE, AS- and A-level. Adopting strategies aimed at improving entrants' numeracy skills is one option that includes:

- offering summer courses prior to or following entry to undergraduate programmes, or one-year foundation modules that cover specifically the mathematics required by the biosciences;
- using the results of diagnostic tests (paper- or computer-based) to organise revision classes or tutorials;
- encouraging the application of mental calculation and the more appropriate and effective use of calculators;
- providing drop-in 'surgery' facilities where staff can help with students' acute problems of understanding;
- organising tutorial support, either within or outside subject-specific modules; and
- providing access to self-help and independent learning resources (e.g. self-instructional texts, computer-based learning packages, and web sites).

Whatever strategy(ies) you adopt, be prepared for a challenge! Many students do not appreciate the limitations that numeracy skill deficits place on learning in the biosciences and often resent any time spent explicitly on basic numeracy skills. And do not forget those high achievers who may feel disenfranchised by your attempts to cater for the low achievers. ■

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RESOURCE STARTER PACK

We have put together an introductory resource pack, including a quick guide to LTSN Bioscience, an annotated list of useful online sites for bioscience educators, a bioscience learning and teaching bibliography and a list of bioscience education journals. Copies have been sent to Staff and Educational Development departments in the summer; those that requested copies for distribution should have received them in early September (copies can still be ordered from: ltsnbioscience@leeds.ac.uk). The pack can also be found on our web site *http://bio.ltsn.ac.uk/resources/bioscience/publications/index.htm.*