



Count me in!

Making mathematics more inclusive

As well as researching different teaching methods, the researchers involved in the project reported on page 2 also investigated whether different kinds of programmes ('traditional mathematics' and 'uses of mathematics') affected students' attitudes to the study of mathematics and their success with it.

The researchers argued that mathematics is important because it provides a useful and powerful way of seeing and analysing the world. It provides access to an understanding of science and technology and also to understanding big social ideas such as change, growth, risk and complexity. But when they spoke to teachers, learners and managers, the researchers found they often saw the value of mathematics in a different light. They tended to regard mathematics as important mainly because it has 'currency' in getting the grades/UCAS points required for university (the learners), performance management (the teachers) and in acquiring league table reputations (the managers).

Sometimes the learners did address the usefulness of mathematics, but this was significantly more evident among learners on 'uses of mathematics' courses. It was much more common to hear learners talk of the currency of mathematics in terms of 'looking good for the CV', or being 'needed for getting into a chosen course at university' (i.e. to become a success).

The effect of different mathematics programmes on inclusion

The researchers' main finding was that the AS 'use of mathematics' (UoM) programme encouraged learners to persist in learning the subject, and did so in a variety of ways, especially:

- coursework assessment which encouraged learners to explain their work and understand mathematical modelling rather than simply perform
- learning with the aid of technology, and
- learners' general appreciation of mathematics as a useful subject.

For almost all traditional (TRAD) AS mathematics, learners' drop out rates were high, particularly among learners with low GCSE mathematics grades and the intermediate tier GCSE. The researchers' observations suggested that these learners find the pace of the traditional AS mathematics courses too fast because teachers commonly devote little time for developing understanding,

So, the researchers argued, the 'uses' approach to mathematics can help widen participation especially to include those with lower GCSE

grades, but they warned of the danger of the 'uses' course becoming stigmatised as the course to lower grade GCSE learners, especially when there is no A2 course for these learners to progress to.

A case study

Kirsty had chosen mathematics to fill the gap in her subject choices [to go alongside chemistry and biology]. She got a B at GCSE but doesn't know how. From an early age she found mathematics difficult, especially mental mathematics, which she still finds difficult. But she was planning on going on to A2. Kirsty said: "I'm not the best student in the class, but it doesn't matter because I enjoy it". Kirsty also saw mathematics as helpful and useful: "It helps business studies and biology and chemistry, it doesn't faze me when we have a formula... and it also makes you think and be able to take a step back and think things through".

Kirsty had learned that mathematics was about solving problems and being creative in finding possible solutions. She said mathematics is "not black and white, there is always more than one way of solving the problem ... you can find your own way to do it". She commented on how this was different from her experience of other subjects, such as chemistry where they were simply told knowledge: "in chemistry you do experiments, but only what they tell you to do".

Kirsty also emphasised the importance of the sociable atmosphere she found in her mathematics class. The sociable classroom was a means for support in helping her learn: "I can ask others because it's quite relaxed." As such, she believed it OK to be wrong and that she could get help when she needed it.

Take action

Could you:

- identify real world examples or encourage your learners to spot examples from newspapers or other media sources which illustrate the concepts you are introducing?
- do more to emphasise that there are different ways of finding solutions to help prevent learners seeing mathematics as black and white?

Evidence source

Williams, J. (2008) Count me in - Making mathematics more inclusive: <http://gtcni.openrepository.com/gtcni/handle/2428/48298>

Project website: www.education.manchester.ac.uk/research/centres/lta/LTAResearch/tlrp/about/

The researchers carried out a questionnaire survey of nearly 1,800 students from 39 Colleges in England, 20 of which involved 'UoM' as well as 'TRAD' AS courses (and 2 UoM with BTEC engineering). The researchers also conducted a series of interviews with learners to ascertain their biographies, their attitudes to mathematics and future aspirations.