

2 Roles of ICT in the maths classroom

In other subjects, such as English and Humanities, generic tools such as word processors and the internet support research, writing and presentation without fundamentally altering the nature of the subject. In Mathematics, ICT has a more complex and disruptive effect. Here we identify 3 fundamental aspects of ICT use which may be overlooked in more detailed categorisation schemes. Each of these roles is important – but current practice tends to emphasise role 3 and neglect the others.

These roles are not completely defined by the particular software or technology in use, but also by task design, lesson planning and the behaviour of the teacher.

Role 1: A "Thinking Tool" for representing and analysing problems

This requires the development of *transferable* ICT skills that enable the user to *research, analyse, model or visualise* a mathematical problem or to *communicate* their findings. Fluency in the use of calculators, spreadsheets, graphing and geometry packages is central here. Although this requirement is clearly suggested by the National Curriculum, there are two important obstacles to overcome:

- This aspect of the curriculum is not well represented in high-stakes assessment (including many computer-delivered tests) so it tends to be neglected.
- Ideally, this role requires ICT to be available - as one of many resources – in the maths classroom whenever pupils are working on unstructured problems. An occasional lesson in the ICT lab built entirely around the computer is unlikely to achieve this.

Role 2: A "Microworld", offering a rich domain to explore

The computer can simulate real or imaginary situations, such as scientific experiments, machines or puzzles or provide access to substantial, realistic data sets, enabling pupil explorations which would be tedious, impractical or impossible by other means. These may be delivered in the form of a dedicated, easy-to-operate "applet" or "microworld" or as a ready-built document for a spreadsheet or geometry tool.

Such activities may not require the sort of *transferable* ICT skills described above – often the designers will have kept such requirements to a minimum - but they can greatly enrich the range, depth and realism of problems encountered by pupils in the maths classroom.

Role 3: A "Didactic Tool", that explains and gives practice

Here, ICT is used to support or replace the textbook, blackboard, teacher or examiner.

This can offer many advantages, such as aids to visualization, self-paced learning, instant feedback tests and enjoyable games for drill-and-practice. However, these uses do not usually foster the pupil's use of ICT as a mathematical tool or introduce richer problem contexts. Instead, the emphasis is on *delivering the traditional curriculum more efficiently*.