
SECTION 5: INFORMATION COMMUNICATION TECHNOLOGY (ICT) AND MATHEMATICS

Much as the use of ICT has increased in the last few years the provision across classrooms still tends to vary although the general awareness level of teachers has improved, their skills have not always kept pace. The skills required to run and maintain a school network, write functioning software or to install a suite of programmes are not the same as the ability to navigate the internet or find your way around a spreadsheet and the latter skills are probably more use to today's Mathematics teacher.

ICT should enhance good Mathematics teaching. It should be used in lessons only if it supports good practice in teaching Mathematics. The whole range of ICT can be used in various ways to meet two important goals in the teaching of Mathematics:

- To support your teaching
- To motivate learning

Here are a few considerations that might help you organise your thoughts on the use of ICT in your school.

Find out what is already available in your school and what is already being used. In some schools specific programs or tasks are assigned to particular year groups either to avoid demand on the system or to avoid work being repeated every year.

Make sure that you know the level of computer provision in your school, what is available, how it is booked, what access you personally, and hence your classes actually have? How many of your lessons are already block-booked by other departments?

Talk to existing staff and make use of online forums where teachers discuss problems and solutions to software issues.

Finance for new software can be expensive and may be controlled by senior staff – you may have to present a good case for whatever you want to use.

There can be problems with engagement when computers are only available to a small number of learners. How will you manage such limited options, in small groups and rotations perhaps? You will need to provide meaningful tasks for those learners who are waiting their turn.

Planning

ICT is a valuable resource which should be used appropriately to help develop learners' knowledge and understanding in their study of Mathematics. It is important, however, to consider where ICT may add value to the learning over other non-ICT resources.

Does using ICT add any value to the execution of this activity that enhances the learning better than doing it using other, non-ICT resources? Does the use of a computer make the learning better, faster, more wide-ranging? Can some aspects be enhanced so that more progress is made in other ways? For example, drawing pie charts and bar charts by hand is an important part of many examination syllabuses. However if you want fast charts for learners to interpret the shape of, or to display their findings for communication purposes then Excel can produce them in seconds. They can also produce exotic charts that actually hinder understanding of the results so learners need to be taught to be careful how they use them. Beware that the creativity of the activity does not reside in the software rather than in the learning.

Before making any decision about using ICT in a lesson or a series of lessons, some questions need to be addressed:

- How well does it fit with the learning objective?
- How well does it extend the learning/understanding?
- How much will it cost in time, money resources to use ICT?
- How confident am I with the resources?
- Can it be used to support struggling learners?
- Can it be used to extend the experiences of more capable students?
- Will the students learn new skills/knowledge or be practising and securing old skills and knowledge?
- Will the overall learning experience be improved?
- How will the class work, in groups or individually?

Evaluate the session afterwards

- What would it have been good to know before you started?
- What did you find out that you did not know before?
- Did the students in general do more or less work than they might have done in a non-ICT lesson?
- Were the students showing better motivation?
- Did particular students shine who previously had not?
- Overall was the learning experience improved?
- Why is the experience worth repeating?

The internet is a rich source of puzzles and problems, articles on famous mathematicians, revision notes and games but authenticity of sources can be a problem so you will need to check any sites before you give your learners access to them.

Particular favourite sites include:

www.mymaths.co.uk a subscription site that includes revision packs and both lesson and online homework

www.bbc.co.uk/bitewise school and GCSE revision supported by TV programmes

www.mathsisfun.com puzzles and games with a mathematics content

www.mathway.com a question database with explanations and problems

www.puzzles.com a collection of all kinds of puzzles and games

<http://www.primaryresources.co.uk/online/negnumorder.swf>

A great place to practice ordering integers.

<http://classroom.jc-schools.net/basic/math-integ.html>

Many games about integers are linked on this page.

<http://www.bbc.co.uk/skillswise/numbers/wholenumbers/ratioandproportion/ratio/game.shtml>

A quick and visual way to work with ratios and proportions

<http://www.bbc.co.uk/skillswise/numbers/wholenumbers/ratioandproportion/ratio/game.shtml>

This racing game gives you plenty of proportions to solve as you race against your friends or the computer.

<http://www.funbrain.com/poly/index.html>

This game allows you to practice area and perimeter.

You can always google 'useful Maths sites' and have fun searching.

Search well for ideas and try comparing different sites. Experienced staff will have their favourites but don't be afraid to try something new. Test any new software by trying to make it go wrong. Your students will find all sorts of problems and you need to be prepared.

Consider building up your spreadsheet skills, it can save time if lots of calculations need to be done or data-processed. Multiple worksheets can be produced, stored and used again. These can be adapted for slower or faster workers or to produce individually tailored worksheets with larger fonts for students with poor eyesight for example. Use them for building and completing sequences (Nth terms).

Use a graph plotter for graphs and coordinate work and situations where you want students to think beyond the ordinary restrictions of the current skill levels

Opportunities for ICT in the Cambridge Secondary 1 Mathematics Framework

Appendix D of this guide lists ICT opportunities and suggestions for use within Mathematics.