

# SMILE Classrooms

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SMILE has for many years encouraged and supported the use of computers within the mathematics classroom. Much has been, and continues to be, devoted to the development of MicroSMILE which is used extensively for the teaching of mathematics at all levels, from infant to adult education.

Logo presents exciting and challenging ways of experiencing mathematics. This was quickly recognised by SMILE teachers, and a Logo project was set up. The materials developed, 'Mathematics and Logo', support and encourage pupils' independent exploration with Logo.

Spreadsheets and databases have been increasingly perceived as powerful tools for solving mathematical problems; this is influencing the materials that are currently being produced by SMILE. Additionally, a number of other software items have been referenced as SMILE tasks, and working groups continue to look for more.

Given that SMILE has encouraged the use of this range of software within the mathematics curriculum, is the use of computers part of all our pupils' mathematical experience?

A small and informal survey of 27 SMILE schools found that only one is not using MicroSMILE. The frequency of use varies, depending mainly on whether hardware is available in the classroom on a regular basis. When it is, teachers reported that MicroSMILE is used every lesson. Logo is being used less frequently, databases and spreadsheets very rarely. Other software (such as *L*, *FGP*, *Maths with a Story* and *Investigations with a Micro*) is being used infrequently and depends upon the choice of individual departments.

Teachers gave a variety of reasons for their choice of software and the frequency with which they used it. These seem to fall into two broad categories: organisational and educational.

From the organisational viewpoint, teachers like MicroSMILE because it is easy to use. It requires only that the computer be switched on, that a disc be inserted and that the pupils know which

task they are required to attempt. The teacher's role then becomes one of giving mathematical assistance, with occasional intervention, rather than one of providing the constant support sometimes necessitated by other software.

Educationally, teachers use MicroSMILE for many reasons. It gives pupils the opportunity to work at a computer and is highly motivating. Pupils really enjoy the experience of using the computer to *do* mathematics, and in addition the user-friendliness of the software allows them to experience success, not only with the mathematics, but also with the computer itself. Experiences therefore should always be positive (providing work is set appropriately!). The discussion and collaboration between pupils that MicroSMILE seems to generate is another important reason why teachers value the software so highly.

MicroSMILE can present concepts in a new and challenging way so that consolidation and practice do not become tedious. Instant feedback helps pupils to develop a deeper understanding of the mathematical ideas. MicroSMILE can be very thought provoking; in particular the resource and investigative programs, which generate data easily, leave pupils free to explore the mathematics in depth.

Many of the educational reasons given for using MicroSMILE apply also to Logo, databases and spreadsheets. They can be motivating, interesting and challenging. They can enable pupils to develop a deeper understanding of mathematical concepts, and can often introduce pupils to ideas they would not meet otherwise. The use of these types of software encourages collaborative working styles and generates discussion. Additionally, by introducing pupils to these packages, teachers are providing powerful tools which pupils can choose to use in their own mathematical explorations.

However, according to the survey, Logo, databases and spreadsheets all seem to present organisational problems for the teacher. When pupils first meet this kind of software they need time to explore, in order to be able to set and

to achieve their own goals. The demands that this places on the hardware within the classroom means that the computer will be inaccessible to the rest of the class for a considerable period of time.

Spreadsheets and databases in particular require a large amount of teacher input in the early stages. This presents a dilemma for the teacher. Either she responds to the needs of those working with the computer, making her inaccessible to the rest of the class, or she responds to the demands of the rest of the pupils, in which case the needs of those working with the computer may be neglected. Intervention at the correct time can be crucial when pupils are working with this type of software; if opportunities are missed, pupils can become dispondent, fail to see the potential power and possible appli-

cations of the software, and may choose not to use it in the future.

In addition to these organisational problems, teachers feel that, unlike MicroSMILE, they need some knowledge and expertise of the software before they are prepared to introduce it in the classroom. Due to their ever increasing workload, and to the shortage of appropriate INSET, many teachers have been unable to acquire this knowledge, and still do not feel confident enough to use the software.

These obstacles may explain why Logo, databases and spreadsheets are not being used in the classrooms as frequently as MicroSMILE.

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## Unhelpful Categories

*Rosamund Sutherland*

It seems to me that dividing software for the mathematics classroom into 'small programs' and 'generic software' is both misleading and unhelpful. Most of the new exciting computer environments fall into neither of these categories. One such environment is Cabri-Géomètre which allows you to construct and explore geometric figures using objects such as points, lines and circles, and operations such as parallelism and perpendicularity. This environment is exciting because the constructed figure is dynamic and general, although it has been constructed without the use of any algebraic programming code. You can interact with the geometric figure by dragging the mouse on the computer screen.

Another such environment is Function Analyser, a graph-plotter in which you can manipulate the algebraic code and the graphs change, or you can manipulate the graphical representation and the algebra changes. This environment is exciting because multiple representations of a func-

tion can be manipulated and presented simultaneously.

Neither of these environments easily falls into category 'generic software' or 'small program' and continuing to use these categories will restrict the ways in which we think about computers for mathematics. I also believe that we should stop discussing software in the absolute. Whether Logo, a spreadsheet package or the program Monty is experienced by pupils as controlling depends just as much on how the teacher sets up the computer activity as on an inherent property of the software. The most important thing is for pupils to use the software to actively construct and express their mathematical ideas. Only teachers can decide whether or not this is how the computer environment is being used in their classrooms.

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