



A systematic review of the use of ICTs in developing pupils' understanding of algebraic ideas

The in-depth review question set out to answer:

How have different information and communication technologies (ICTs) contributed to the development of understanding of functions for pupils up to the age of 16?

Who wants to know and why?

The review has been commissioned by the Training and Development Agency for Schools (TDA) and focuses on algebraic functions. The TDA were interested in how ICT could contribute to pupil's understanding of algebraic functions and under what conditions that understanding developed.

What did we find?

There is evidence of:

- pupils achieving general gains of understanding
- students successfully using visualisation with graphing software to fit graphs to datasets, to solve equations and to transform functions.
- pupils working in a computer environment reached higher levels of thinking and were able to explain their thinking better than pupils working in a paper and pencil medium.
- lower attaining students preferring to work arithmetically with tables of values and only later moving to integrate the tables of values with computer generated graphs.

- pupils having difficulty with moving between symbolic, tabular and graphical forms when solving equations.
- students not always knowing how to use the technology, interpret ambiguities in the output or exercising critical judgment when using some of the advanced calculators.
- That small group and interactively working with teachers enabled ICTs to be used more effectively.
- •students using ICT out of school being better able to use it effectively within school.

What are the implications?

- Teachers need to help pupils to use the technology critically so that they understand how to interpret mathematical output
- Teachers need to make links between functions represented symbolically, in tables and in graphs.
- Teachers need to negotiate a balance between the individual constructions which may develop when pupils work alone or in small groups with the technology, and common knowledge developed within the whole class.

How did we get these results?

Identifying relevant studies involved carrying out an electronic search, using keywords with bibliographic databases, and handsearching conference proceedings, citations and publications recommended by contacts. This resulted in 33 studies being identified for the systematic map and 14 for the in-depth review.







Where to find further information

For more information about the content of this review please contact:

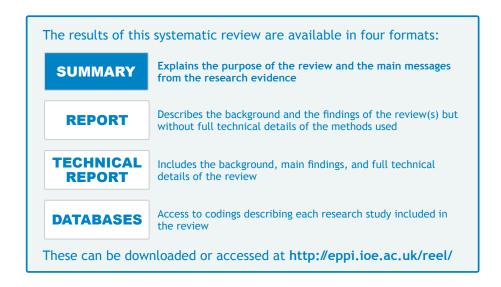
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TECHNICAL REPORT

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REPORT

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