numicon

OXFORD IMPACT EVALUATED

Impact study summary report:

To what extent does Numicon help Primary learners improve their mathematical communication and use of mathematical vocabulary and language?

OUP wanted to know how teachers perceive the impact of Numicon on Primary children's mathematical communication and use of mathematical vocabulary and language. In January – February 2019, an impact study was undertaken to gain an in-depth understanding of how teachers perceive the impact of Numicon on their pupils. An impact study is research that investigates a particular change or outcome that a product or service has on the group of people it is intended to help or benefit. 245 UK primary teachers took part in an eSurvey, which comprised of both closed and open questions, allowing teachers to comment on Numicon more fully. Teachers were required to have been using at least one component from the Numicon range for longer than six months. The majority of respondents had more than ten years' teaching experience.

Research into the importance of Mathematical vocabulary and language

Language, communication and vocabulary have been key topics in recent educational discussion. Oxford University Press (OUP) highlighted these topics in a language report[1], where teachers reported that at least 40% of their pupils lacked the vocabulary to access their learning. Research[2] cited in the report suggests that vocabulary skills strongly predict both Maths and English Literature GCSE results more strongly than socio-economic background. The National Curriculum[3] also highlights the importance of fluency and communication in maths.

Key Evaluation Findings

The findings from the impact study show that Numicon is widely perceived to help pupils improve their mathematical communication and use of mathematical language and vocabulary.

Numicon helps children to use mathematical vocabulary to explain their mathematical thinking.

97% of respondents agree or strongly agree that it helps pupils improve their use of mathematical language and vocabulary, and 99% perceive that it helps children think and communicate mathematically. 98% report gains in developing fluency, reasoning and problem solving skills. 69% of respondents perceive the Numicon apparatus to be very effective at helping pupils develop their mathematical communication and use of mathematical language.

Numicon helps teachers to use correct vocabulary consistently.

70% of respondents perceive Numicon to have a positive impact on their own mathematical vocabulary and communication.

Numicon is beneficial for all children.

Whilst recognizing that Numicon is particularly beneficial for children with Special Educational Needs and Disabilities (SEND) and those working towards age related expectations (ARE) in maths, respondents widely acknowledge that Numicon is beneficial for all children, including those that are exceeding ARE.

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'The children can explain their understanding of mathematics because they can see what is happening with the practical resources.'

(Maths Coordinator, North West)

'It visually supports what you are saying and you can use Numicon to support your explanation to make it clearer.'

(Foundation Stage Leader, Yorkshire and Humber)

'It has produced consistency across the school in mathematical vocabulary.'

(Year 1 teacher, South East)

'Numicon can be differentiated so that all children can be challenged in their thinking.'

(Nursery teacher, North West)

'All children benefit from Numicon activities and resources. Children who are exceeding expectations use Numicon […] for problem solving activities.'

(Primary 1/2 teacher, Scotland)

'Even [the] more able are supported for new or extension activities, e.g. fractions using rods.'

(Assistant Head Teacher and Year 2 teacher, Yorkshire and Humber)

'The concrete resource is beneficial for all for the CPA approach and all children benefit from this [...] It helps those working above [ARE] to address misconceptions or gaps and gain a better understanding and progress to a firm understanding of a concept more quickly or to tackle higher level problems.'

(Maths Coordinator and Year 5/6 teacher, North East)

'Pupils across all abilities need to manipulate equipment to imbed their understanding and to allow them to explain their reasoning.'

(Maths Coordinator and Year 6 teacher, South East)

This study was planned and implemented using the Oxford Impact Framework.
The Framework is a systematic approach to evaluating the impact of Oxford University Press products and services, developed through a unique collaboration with the National Foundation for Educational Research (NFER) and supported by the Oxford University Department of Education.

OXFORD IMPACT FRAMEWORK

EVALUATING EDUCATIONAL PRODUCTS AND SERVICES FROM OXFORD UNIVERSITY PRESS

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[1]Oxford University Press, *Why Closing the Word Gap Matters* (2018)

[2]Sarah Spencer, Judy Clegg, Joy Stackhouse and Robert Rush, 'Contribution of spoken language and socio-economic background to adolescents' educational achievement at age 16 years', *International Journal of Language and Communication Disorders*, 52:2 (2017), 184–196

[3]Department for Education, *National curriculum in England: framework for key stages 1 to 4* (2014) (available at: https://www.gov.uk/government/publications/national-curriculum-in-england-framework-for-key-stages-1-to-4/the-national-curriculum-in-england-framework-for-key-stages-1-to-4#numeracy-and-mathematics)

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For more information about Numicon, visit
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