

Times Tables – Business as usual, a new approach or a better balance?



There are different conceptions of what it means to be fluent with times tables. We might, for the sake of discussion, term the two contrasting approaches “conceptual” and “procedural”.

The National Curriculum takes a broadly “conceptual” approach. It suggests that children become fluent “...so that pupils have conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems” (DfE, 2013) and says of times tables that children should learn how they are connected to each other and to other mathematical ideas such as place value.

It also states that pupils should have ‘**memorised** their multiplication tables up to and including the 12 multiplication table’ by the age of 9” (DfE, 2013).

Politicians, including previous Secretaries of State for Education, have hit upon this aspect of understanding multiplication facts with one arguing that, as part of the “war on innumeracy ... We will expect every pupil by the age of 11 to know their times tables off by heart” (Sunday Times, 2015).

The compulsory national times tables test for children in Year 6 has been shelved... for now.

But haven’t we always concentrated on speed and memory in teaching times tables? From weekly (and in the run up to the SAT tests, sometimes daily!) tables tests, to “speedy tables”, to website games, to “product partners”, to posters on the wall, games like “POW” and, yes, even chanting – they all play their part.

But some teachers have a sneaking suspicion that these, “speed and memory” approaches only work well for some children. Quite a lot of children just don’t seem to be able to commit these facts to memory.

Jo Boaler, Professor of Mathematics Education at the Stanford Graduate School of Education (2015), suggests that speed and memory activities are not the best way for children to become fluent in their understanding of multiplication facts.

She quotes research which suggests that it is more important to develop “number sense” rather than memory (Gray and Tall, 1994, Supekar et al, 2013) and even suggests that timed tests can discourage children from learning in maths for life (Beilock, 2011).

She suggests developing a more conceptual approach by replacing timed tests with games based around seeing the patterns and connections involved in times tables such as a “Snap” type game (where children are asked to link the same number fact e.g. 3×8 with the same fact shown in different ways e.g. as an array, a 3×8 table, $24 \div 3$, $24 \div 8$, 24, 3 jumps of 8 on a number line, 8 jumps of 3 etc), a game based on arrays called “How close to 100” and a dice game called “Pepperoni Pizza” where children are asked to multiply the number of pizzas by the number of pieces of pepperoni on each and to say the tables fact that it represents.

We think that this is worth looking into and we are recruiting for a small research study to aimed at exploring if a more conceptual approach to teaching times tables leads to at least as good “recall” of the facts as well as a greater conceptual understanding and ability to apply them to problems.

We intend to carry out a randomised control trial in Year 3 in a range of schools for one term, with some “intervention” schools using the above approach in place of timed tests and memorisation activities and the other “control” group doing “business as usual”.

Before commencing, we will carry out a timed tables test and a more “conceptual” test which asks children to recognise multiplication facts in a range of representations and to apply that recognition in a reasoning context. At the end of one term, we will carry out the same tests and see what the possible effects are.

Teachers in Year 3 from intervention schools will be trained in the approach by the project lead and each school will be visited by the project lead at least twice in the term.

The “control” schools will be given the training and materials after the trial.

All of the usual ethical safeguards, outlined in the Aspirer ethical guidelines for research, will be followed.

If you would like your school to be involved, contact Mark Avis at markavis@aet.cheshire.sch.uk or ring for a chat on 07450 565648

References

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