



10 minutes of Rockstar app every day improves speed of times table recall in a rural primary school in England.

A small scale study

Purpose of the research:

Mathematical fluency is an area of high priority this year at Downton C of E VA primary school with progress in maths falling behind that of reading and writing, as seen in the 2017 SATS results. Askew (2015) claims that children are hampered moving through primary mathematics if they are not fluent in six different areas; one of which includes recalling rapidly the multiplication facts up to 10x10 and if need be the 11 and 12 times table. Furthermore, with the introduction of the mandatory multiplication tables check in 2020 by the DFE it was important, for us as a school, to find a way to help support children in becoming fluent in the recall of their times tables. The purpose of this research was to identify a more effective way for children to engage in learning their times tables.

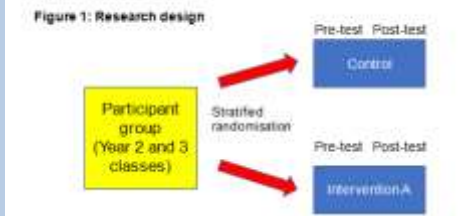
The research design:

A pre- and post-test between-participant design was used.

•IV level 1: **Control condition** (existing provision)

•IV level 2: **Intervention** (10 minutes Monday-Friday spent on the Times Table Rockstars app over the course of 3 weeks)

[Pre- and post-test case-controlled stratified randomisation design (with two levels to the IV)]



The research design:

Participants, sample size and randomisation

One class of 28 pupils aged between 6-7 (year 2) and one class of 25 pupils aged between 7-8 (year 3) participated. This gave us a sample size of 53. Stratified randomisation was used. Pupils in each class were grouped according to whether they were working above, at or below age related expectation based on current maths attainment and gender. They were then randomly allocated from within those groups to either the control or intervention condition.

Procedures

The times tables practised by the intervention group and measured in the pre- and post-test were matched to the expectation as set within the National Curriculum (2014).

Control condition: Nothing was changed during this period. Children received their 'normal' maths provision with no additional input on times tables.

Intervention condition: Year 2 and Year 3 intervention group were tasked with using the Times Table Rockstars app on the iPad for 10 minutes daily for 3 weeks to practise 2, 5 and 10 times tables (year 2) and 2,5,10,3 and 4 times tables (Year 3).

Materials (and apparatus)

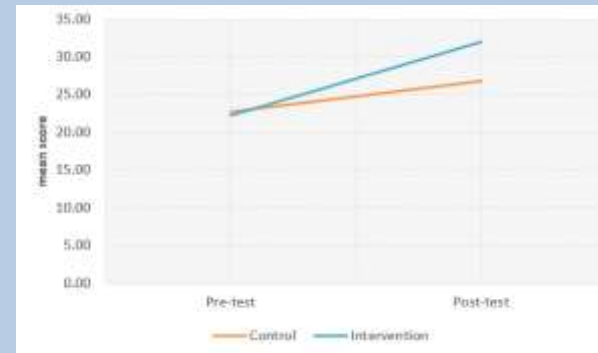
Pre- and post-tests were identical for each child in Year 2 and for each child in Year 3. The children were presented with a grid of mixed multiplication and divisions based on their year group expectations from the National Curriculum (2014). They were all given 2 minutes to complete as many as possible.

Conclusions:

Overall all pupils exposed to the intervention benefitted from it, this was true for both Year 2 and Year 3 pupils. However, there were differential effects for some subgroups, in particular all girls seem to benefit more than boys on average. Although there seems to be a gender reversal effect in Year 2 there was a greater effect on the boys' progress than on the girls and the opposite was true for Year 3. The intervention appears to have a marginally more positive effect for children who are working towards the expected level for their year than for those who are working at the expected level.

The results:

Figure 1: Mean pre-and post-test results following daily use of the TTRS app



Gain scores were first calculated from pre- and post-test scores (Figure 1)

A two-tailed Mann Whitney U test indicated that the intervention had a significant ($p = 0.005$) moderate positive effects (0.374) compared to the control condition. This was followed by a series of sub-group analyses (Table 1).

Table 1: inferential test result and effect sizes

	All pupils	Year 2	Year 3	Working towards Year 2	Working at Year 2	Working towards Year 3	Working at Year 3	Working towards Year 2/3	Working at Year 2/3	Girls Year 2	Boys Year 2	Girls Year 3	Boys Year 3	All girls	All boys
r	0.374	0.351	0.398	0.117	0.350	NA	0.286	0.392	0.331	0.048	0.481	0.385	0.184	0.430	0.169
p	0.005	0.030	0.076	0.829	0.111	0.063	0.216	0.517	0.035	0.643	0.220	0.210	0.515	0.067	0.254

Limitations and considerations for future research

The study had a number of limitations which may have affected the results. Firstly the sample size was small and the two classes were not equal in size. Secondly the app was not always accessed at the same time every day. In addition, there was a difference in time between the pre- and post-test for both groups.



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