

Nottingham Pupils Improve Mathematics Achievement with Accelerated Maths®

Source: David J. Knock, head of mathematics department
Elliott Durham School, Nottingham, UK

Study Description

Elliott Durham School is an urban secondary school serving pupils who face many challenges to learning. The school has a high mobility rate and over half the pupils are eligible for free school meals. The school's performance on national curriculum tests and on public examinations is well below national averages. Many pupils enter the secondary school without having mastered the necessary skills at the primary level.

In an effort to improve the mathematics achievement of their pupils, the school implemented a pilot programme to test a new way to give pupils more time and opportunities to learn mathematics. Nine pupils in year seven participated in a Maths Club during two terms of the 1999–2000 school year. Pupils in the Maths Club met for 30 minutes a day during their lunch hour to practice maths using the Accelerated Maths maths management software. Accelerated Maths facilitates maths practice by printing individualised practice assignments and tests for each pupil; automatically scoring practice assignments and tests; and printing individual and class reports to help teachers monitor progress and diagnose difficulties.

Each day pupils began the lunch session by completing a 10-minute practice sheet, scanning their answers, and then discussing the resulting TOPS™ Report¹ with a volunteer tutor. After receiving individual help from the tutors, the pupils completed a second practice sheet. The

second practice sheet included additional problems on any objectives that pupils failed to achieve on the first sheet to ensure that by the end of the session, pupils had mastered those objectives.

The school recruited volunteers to help with the programme from local businesses, parents, and older pupils. They tried to have one tutor for every two pupils each day so that each pupil would receive individual attention every day.

Results

Prior to the start of the Maths Club, the school pretested all year seven pupils using the National Foundation for Educational Research Mathematics 12 (NFER 12) tests. Nine pupils with a range of pretest scores were selected to participate in the Maths Club. Nine additional pupils with pretest scores matching the scores of pupils in the Maths Club were selected to form a parallel, or comparison, group. These pupils received only their regular daily mathematics instruction.

After two terms, the NFER 12 tests were administered again to pupils in the Maths Club and pupils in the parallel group. Pupils in the Maths Club showed substantially more improvement than pupils in the parallel group. The mean score for pupils in the Maths Club increased by 11.2 while the mean score for the pupils in the parallel group increased by only 4.7. The graph that follows shows the pretest and post-test means for each group.

continued on reverse side

School Profile

Elliott Durham School
Nottingham, UK

Pupils: 463,
ages 11 to 16 years
Socio-Economic Status:
Urban
Free school
meals: 60%
Mobility: 21%
Minority ethnic
background: 30%
First language
not English: 8%

Educator Background

David J. Knock is the
head of the mathematics
department of Elliott
Durham School.

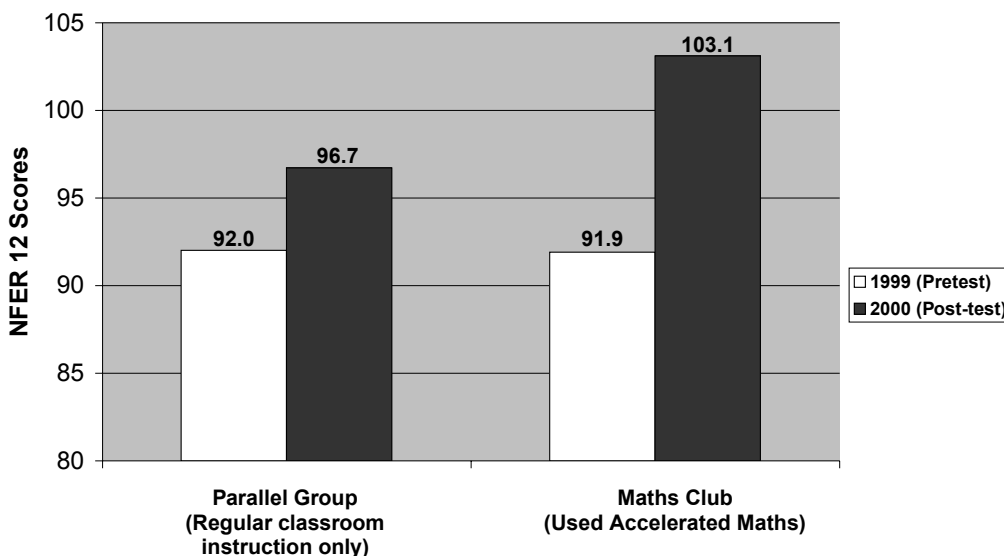
¹TOPS stands for The Opportunity to Praise a Student. This report shows the objectives that the pupil's practice sheet covered and how the pupil performed on each practice problem related to each objective. The report gives both the pupil and the teacher immediate feedback on the pupil's strengths and weaknesses.

When examining differences between two groups of pupils, statistical tests indicate the likelihood that the differences can be explained by the special programme that one group received. That is, they indicate the likelihood that the same differences would be found if different pupils were selected for each group. Typically, statistical tests require that the two groups of pupils be randomly selected from the population of pupils in a school or district. While the two groups of pupils in this study were not randomly selected, they were selected to be representative of a wide range of prior mathematics abilities and the groups were designed to be similar except for Maths Club participation. While the results should be interpreted cautiously due to the lack of random selection, statistical tests indicate that the difference in improvement

in test scores between the Maths Club pupils and the parallel group pupils is statistically significant. Since the study consists of two small groups of pupils matched on pretest scores, the Wilcoxon signed rank test is appropriate. The Wilcoxon signed rank test indicates that the difference in test score gains is statistically significant with $p < .05$.

While this pilot project involved only a small number of pupils, overall the data indicate that pupils who used Accelerated Maths during daily 30 minute sessions experienced greater improvement in their mathematics skills than a group of similar pupils who did not participate in the Maths Club and received only their regular mathematics instruction.

**Elliott Durham School, Nottingham, United Kingdom
Change in Mean NFER 12 Scores**



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