

Plus 1 and Power of 2 books: Investigating Impact of Non-Teacher led One-To-One Math Coaching



NOTTINGHAM
TRENT UNIVERSITY



Abstract

The school-level analyses shown in this document suggest that using the 'Plus 1' and 'Power of 2' coaching manuals is improving attainment (and by implication progress) of children in maths.

The results suggest that those schools using Power of 2 show higher levels of maths attainment than those which do not, in 6 key school performance measures:

- percentage reaching expected standard in reading, writing, maths
- percentage achieving high score in reading, writing, maths
- percentage reaching expected standard in maths
- percentage achieving high score in maths
- average scaled score in maths
- percentage reaching expected standard in maths: Teacher Assessment

The significance is to a 99% confidence limit.

Plus 1 and Power of 2 books: Investigating Impact of Non-Teacher led One-To-One Math Coaching

Introduction

The 'Plus 1' and 'Power of 2' books support TAs, peers, parents and volunteers to lead individualised one-to-one mathematics support. Through the use of the 'Plus 1' and 'Power of 2' books, TAs, volunteers, parents and peers are able to work one-to-one with learners, reducing teacher workload.

The 'Plus 1' and 'Power of 2' books have been successfully used in a range of schools across England over 19 years to improve students' mathematics attainment for children from the age of 5 up to adulthood. In this study, the recipients of 'Plus 1' and 'Power of 2' books are KS2 pupils who have been identified by their schools as working below age-expected standard. However, there is also evidence suggesting that the 'Plus 1' and 'Power of 2' books approach can help students working at age-expected standard.

The materials consist of coaching manuals – Plus 1 (Sharp, 2005) and Power of 2 (Sharp, 2001) - which provide a framework for the one-to-one mathematics support. The 'Plus 1' and 'Power of 2' books can be delivered by a range of non-teaching coaches. For example, both peers and parents have successfully coached children through the 'Plus 1' and 'Power of 2' books.

The 'Plus 1' and 'Power of 2' books have worked most successfully with 4 to 5 sessions per week between coach and learner, where each session lasts for around 10 - 15 minutes.

Schools have consistently identified the self-contained nature of the tool as a significant strength of the 'Plus 1' and 'Power of 2' books approach. The only training or development required by the coach is outlined in the opening pages of the resource. Each work page of the resource has a narrative which supports both the coach and learner to explore, unpick and understand specific mathematical concepts. The 'Plus 1' and 'Power of 2' books pedagogy is therefore extremely learner and coach facing.

The 'Plus 1' and 'Power of 2' books have a support system through resources on the 123 Learning website. However, as discussed, the 'Plus 1' and 'Power of 2' books have proved to be a self-contained approach which requires little or no ongoing support - a benefit which both reduces costs to schools as well as signalling the scalability of the approach.

The Background

123 Learning is led by David Sharp. David is a qualified and experienced mathematics teacher who has taught in secondary schools in London and the East Midlands, in both classroom teaching and student support roles.

David formed 123 Learning in 2001, as he was concerned that children were missing opportunities to learn mathematics - a situation often resulting from a lack of time available for teachers to work one-to-one with children. To address this, David designed a coaching system and tools that have successfully been used by Teaching Assistants (TAs), peers, parents and volunteers over the last 19 years <https://www.123learning.co.uk/>.

Dr Andrew Clapham has been responsible for the data analysis at Nottingham Trent University

Plus 1 and Power of 2 books: Investigating Impact of Non-Teacher led One-To-One Math Coaching

The Books

Over the 18 years coaches have been using the 'Plus 1' and 'Power of 2' books, a key point made by schools regarding their decision to use the approach was the positive personal recommendations from other schools. 123 Learning has not pursued large scale advertising to promote 'Plus 1' and 'Power of 2' books: schools have approached 123 Learning themselves. Anecdotal evidence suggests that because the 'Plus 1' and 'Power of 2' books is designed to work as a self-contained approach, schools require no additional support to successfully implement the approach. The first pages outline how to use the tools, there are clear instructions on each page and the coach is guided as to what to do and read. Of course, The 'Plus 1' and 'Power of 2' books are often employed by TAs working with learners. According to the 2017 School Workforce Survey most schools have TA support, so The 'Plus 1' and 'Power of 2' books does not require new TA support but a refocusing of existing TA support, so additional costs for TAs will only apply in a minority of cases. Similarly, the resource required for peers, parents and other coaches to work one-to-one with learners is most often a quiet learning space currently part of the school estate, or at home.

Total delivery time of the intervention is unique to each learner. In some cases, a learner might only require a few sessions to build confidence and make the subject connections required to be able to attain at age-expected standards. Other learners might benefit from a longer time period working with their coach.

The Evidence

What is the evidence for the principles behind the programme?

The 'Plus 1' and 'Power of 2' books draws upon a wide range of professional practices and research evidence. For example, the EEF's work charting the impact of TAs and work which suggests that with appropriate tools, TAs can have a significant impact upon attainment (see Richards and Armstrong, 2016). Similarly, the 'Plus 1' and 'Power of 2' books have drawn on the literature base exploring TA support especially in relation to mathematics education (Drake, 2005). This evidence informs the 'Plus 1' and 'Power of 2' tools which TAs and others can work with without having to rely on detailed pedagogical or subject

knowledge - an approach which maps to Drake's work. The 'Plus 1' and 'Power of 2' books also maps to research exploring the benefits of peer coaching and one-to-one tuition and interactions. Similarly, studies exploring the impact of parents-as-teachers (see for example McMullen and de Abreu, 2011) have informed the 'Plus 1' and 'Power of 2' books tools. Finally, the 'Plus 1' and 'Power of 2' books maps to current work exploring curriculum design and framework led by Cambridge Mathematics. Research evidence outlined by Cambridge Mathematics which resonates with the 'Plus 1' and 'Power of 2' books design are (i) the relationship between interleaving and blocking mathematics with learner and coach able to mobilise The 'Plus 1' and 'Power of 2' books through either approach and (ii) the importance of patterns of variation.

Plus 1 and Power of 2 books: Investigating Impact of Non-Teacher led One-To-One Math Coaching

The strongest evidence that the proposed programme is likely to have an impact on attainment, or an outcome closely linked to attainment is based on a Quasi-experimental design trial which in this instance is matched control.

Evidence for your programme's impact on attainment

We have analysed the Key Stage 2 maths performance of 1071 schools in England that have used the Power of 2 programme with more than 5 children. We have compared attainment measures with those of all other primary schools using two-tailed t-tests to estimate significance levels. **The results suggest that those schools using Power of 2 show higher levels of maths attainment than those which do not, in 6 key school performance measures:**

| Measure | Used PO2 n=1071 | All others n=13686 | Significance |
|---|--------------------|-----------------------|--------------|
| % reaching expected standard in reading, writing, maths | 67.30 | 65.30 | ++ |
| % achieving high score in reading, writing, maths | 10.93 | 9.84 | ++ |
| % reaching expected standard in maths | 77.79 | 76.36 | ++ |
| % achieving high score in maths | 24.80 | 23.11 | ++ |
| Average scaled score in maths | 104.62 | 104.27 | ++ |
| % reaching expected standard in maths TA | 81.45 | 80.12 | ++ |

[+ / - significance to 95% confidence limit; ++ / -- significance to 99% confidence limit]

In addition, in those schools using Power of 2 higher proportions of pupils are able to access the tests and teacher assessments:

| Measure | Used PO2 | All others | Significance |
|--|----------|------------|--------------|
| % absent or not able to access the test in maths | 0.32 | 0.38 | |
| % absent or disapplied in maths TA | 0.12 | 0.16 | - |

[+ / - significance to 95% confidence limit; ++ / -- significance to 99% confidence limit]

These school-level analyses suggest that using power of 2 coaching is improving attainment (and by implication progress) of children in maths.

Notes on the above evidence

The above evidence is focusing upon the n=1071 schools in England that have used the Power of 2 programme with more than 5 children. These schools might have used a different combination of coaches; however, schools all retained the fundamental principles that the 'Plus 1' and 'Power of 2' book intervention is led by TAs, peers, parents or others. From the evidence base we have provided and the number of schools who are participating, or have previously participated in the 'Plus 1' and 'Power of 2' books this is already a project already with significant reach and impact. Having n=1071 as a sample, represents a significant population for our evaluation, and also signals the scalability of the 'Plus 1' and 'Power of 2' books.

Plus 1 and Power of 2 books: Investigating Impact of Non-Teacher led One-To-One Math Coaching

Ways that the proposed programme could be taken to scale

The 'Plus 1' and 'Power of 2' books lends itself to scaling as evidenced by the 5,000 schools who have already employed the tools. The step-by-step instructions outlining the approach coaches should take, are clear and easily followed. Anecdotal evidence suggests that, for schools, one of the key aspects of the 'Plus 1' and 'Power of 2' books approach is the stand-alone nature of the tools. Our analysis indicates that scalability can be achieved across a not only a large sample size of TAs, but also peers, parents and other coaches.

References to quoted research

Drake, P. 2005. A Case of Learning Mathematics the Hard Way as a Teaching Assistant, Research in

Mathematics Education, 7:1, 19-31, DOI: 10.1080/14794800008520143

McMullen, R and G. de Arbeau. 2011. Mothers' Experiences of Their Children's School Mathematics at Home:

The Impact of Being A Mother-Teacher. Research in Mathematics Education. 13:1 59-74.

<https://doi.org/10.1080/14794802.2011.550727>

Richards, G. and Armstrong, F. (Eds). 2016. Key Issues for Teaching Assistants. Working in Diverse and Inclusive Classrooms. Key Issues for New Teachers, Abingdon: Routledge

Sharp, D. 2001. Power of 2. The one-to-one Coaching System for Maths Success. Nottingham. Power of 2 Publishing Limited

Sharp, D. 2005. Plus 1. The Introductory Coaching System for Maths Success. Nottingham. Power of 2 Publishing Limited