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CoachBright Primary

Evaluating the effects of a maths coaching programme on Year 6 pupil premium pupils

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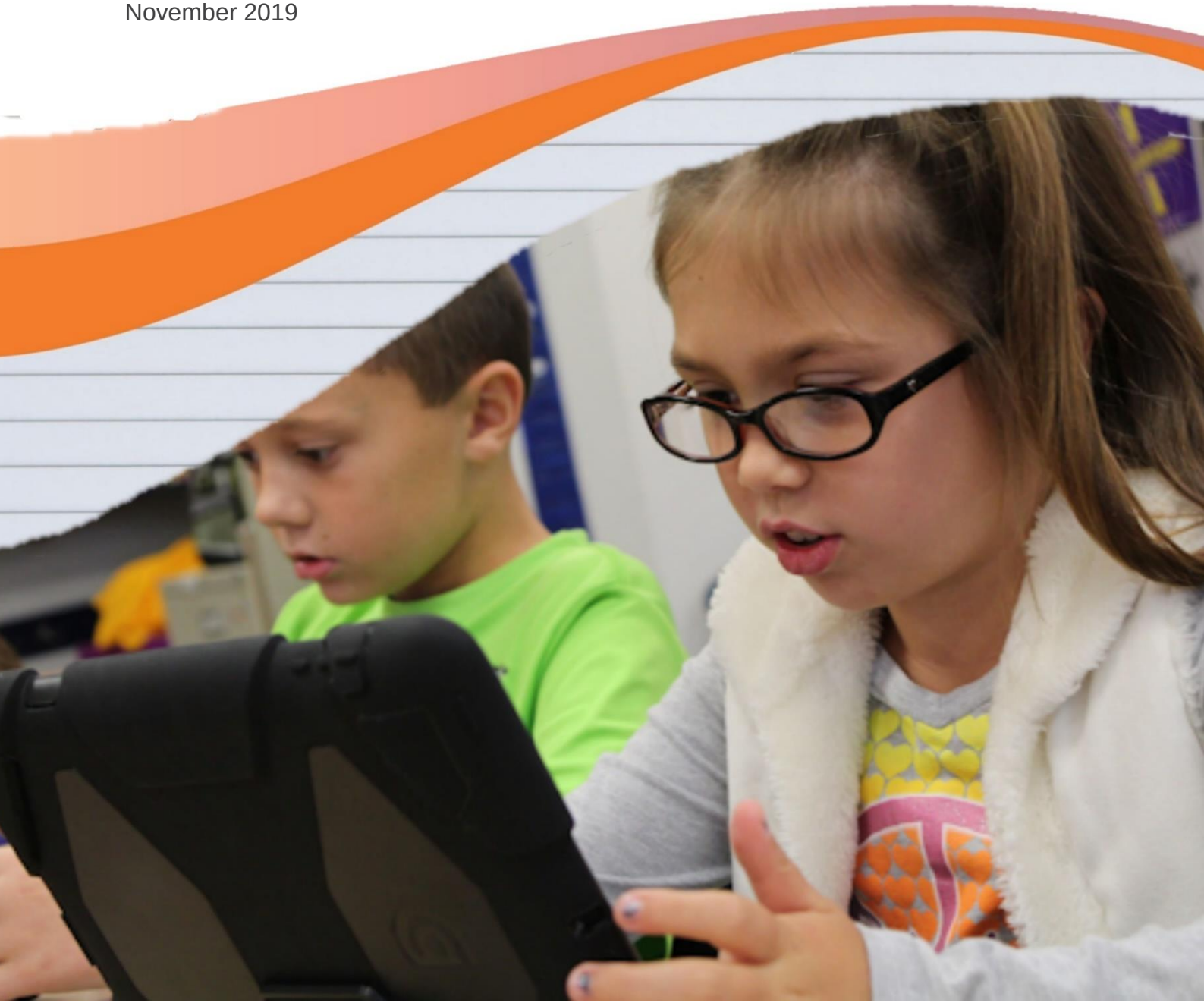

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Expanding to work with primary schools, the CoachBright maths coaching programme supports middle to high prior-attaining disadvantaged pupils, ensuring they reach the higher standard in their SATs and leave Key Stage 2 (KS2) with the confidence and metacognitive skills to excel in secondary school from the word go. The programme involves university students coaching small groups of pupils through self-directed learning activities for six weekly, hour-long sessions.

This project enabled six schools to each identify two groups of up to four underachieving disadvantaged Year 6 pupils (up to eight pupils in total in each school) with high to middle prior-attainment to receive the CoachBright programme before their SATs tests in May 2019.

As part of this project, CoachBright collaborated with the South East London Maths Hub to ensure the teaching sequence their coaches used matched the mastery approach currently being promoted as best practice in mathematics by the Department for Education (DfE). The intervention was also adapted to use the Learning by Questions app, building its sequences of maths questions into the learning programme for the coaching sessions, and enabling coaches and teachers to immediately access assessment data and set relevant homework.

Summary of the evaluation

Forty-seven Year 6 pupils from six primary schools across London were involved in the intervention. A further 48 Year 6 pupils from six other, comparable, primary schools acted as controls. According to 2018–19 data, both intervention and control schools had relatively high levels of disadvantage in their pupil population. Two intervention schools and five control schools had higher than national average levels of pupils eligible for free school meals (using FSM Ever 6). All but one intervention and one control school had higher than national average levels of pupils whose first language is not English.

Both intervention and control pupils completed the epiSTEMe Maths Attitude Questionnaire pre- and post-intervention. They also sat the 2018 Maths SATs Paper 2 reasoning test pre-intervention so that scores could be compared to the scores they obtained on their 2019 Maths SATs Paper 2 reasoning test post-intervention. Year 6 teachers of intervention pupils also provided attainment predictions and outcomes data and wrote short assessments of their eight pupils' learning, confidence and motivation in maths pre-, during and post-intervention.

Summary of findings

This very short intervention (six hours per pupil) had a small but positive impact (effect size +0.06) on mathematics attainment as measured by pre- and post-test data. Teacher assessment data appears to support these findings, since 68% of pupils met ambitious targets set by their teachers, with 6% exceeding their target, and 62% of pupils exceeding teacher's predictions of their likely attainment without the intervention. However, control group teachers were not asked to provide teacher assessments, target data or descriptions of pupil progress so it is not possible to know how similar pupils who did not receive the intervention progressed against these targets.

Teachers' qualitative feedback also supported the positive effect of the project, with 64% of pupils being seen to make positive progress. Although the intervention had no measurable impact on pupil attitudes towards mathematics, as measured by the pupil attitudes questionnaire, teachers' qualitative feedback did identify perceived improvements to resilience and confidence.

The process evaluation suggests that the intervention ran as intended, with no significant concerns about the quality of provision. Observations of coaching sessions by the evaluation team indicated only minor concerns and these were mainly around session management (eg, pace and managing diverse learning needs) and behaviour management. Coaches identified small tweaks to lesson planning and resources which were tackled mid-way through the programme in order to ensure the learning needs of less confident pupils were better met.

Limitations of the study include non-randomisation of intervention and control groups, teacher assessment data being less reliable than standardised tests and an unclear gap in terms of time between baseline and impact testing.

Costs

Cost per pupil: £114.89. Included in this cost: six schools benefit from two CoachBright groups of four pupils over six weeks = £4,200 total; time to release teachers to meet with coaching session leaders = £1,200 total.

Introduction

Description of the problem

Research shows that there is an enduring gap between the performance of deprived pupils and their peers across the UK. A recent Education Endowment Foundation (EEF) report (*The Attainment Gap, 2017*) describes how the gap begins in the early years and more than doubles to 9.5 months by the end of primary school, and then more than doubles again, to 19.3 months by GCSE year. The report argues that this shows the importance of intervening early. An analysis conducted in 2013 estimated that, if the UK had, in recent decades, taken action to close the attainment gap at age 11 so that the poorest pupils achieved the same levels as others by the end of primary school, GDP in 2020 would be around £30 billion, or 1.8%, higher. (Save the Children, 2013) The same EEF report states that the transition between primary and secondary school is a risk-point for vulnerable learners and that primary schools need to diagnose pupils' needs as soon as possible in order to put in place effective support to help those falling behind to catch up.

Southwark is the local authority district with the 17th highest proportion of children in income deprivation in England (DCLG, 2015). Pupils eligible for free school meals (FSM) eligible perform less well compared to their non-eligible counterparts. The gap in performance is largest for maths (12.3 percentage points in 2018 and 8.4 in 2017).

Review of existing research

The EEF states that targeted small group and one-to-one interventions have the potential for the largest immediate impact on attainment for pupils from deprived backgrounds (EEF, 2017). Some whole-class and whole-school interventions have shown promise but may take longer to show results. As stated above, it is crucial to intervene in Year 6 (before transition into secondary school), should pupils be identified as underperforming.

The EEF report *Improving Mathematics in Key Stages 2 and 3* corroborates the need for catch up interventions for some pupils:

> "Schools should focus on improvements to core classroom teaching that support all children in the class. With this in place, the need for catch up intervention should decrease. Nevertheless, some high-quality, structured intervention may still be required for some pupils to make progress."

However, the report also acknowledges that few evaluations of maths catch-up interventions have been conducted. Several key features of effective interventions are listed in the same report:

1. Effective implementation including careful planning and use of school resources, including staff, given that teaching staff are often unavailable, excessively overburdened, or not adequately trained to deliver the programme.
2. Connections should be made between intervention and whole-class instruction so that learning in interventions is consistent with, and extends, work inside the classroom and that pupils understand the links between them. It should not be assumed that pupils can consistently identify and make sense of these links on their own.
3. Manipulatives and representations should be used as scaffolds to develop understanding.

4. Pupils should be supported to explore the many connections between mathematical facts, procedures, and concepts.
5. It should motivate pupils and prevent or counteract the association of mathematics with boredom or anxiety.
6. It should include explicit and systematic teaching, including providing models of proficient problem solving, verbalisation of thought processes, guided practice and corrective feedback.

Description of the innovation

CoachBright have been working with secondary schools in London and beyond to provide academic coaching to FSM pupils, helping them become more independent and more resilient as well as improving GCSE grades. CoachBright pupils on FSM improve their GCSE grades by twice as much as non-coached peers (CoachBright Annual Report 2016–17) and the programme also improves attitudes to learning.

Expanding their work into primary schools, the CoachBright maths coaching programme supports middle to high prior-attaining disadvantaged pupils, with the aim of ensuring they reach the higher standard in their SATs and leave Key Stage 2 (KS2) with the confidence and metacognitive skills to excel in secondary from the word go.

This project enabled six schools to each identify two groups of up to four underachieving Year 6 pupil premium pupils (up to eight pupils in total in each school) with higher/middle prior attainment to benefit from the CoachBright programme before their SATs tests in May 2019. Schools were explicitly asked not to select pupils with special education needs and disability (SEND) who were significantly underachieving due to an identified need in mathematics. Pupils worked in small groups with a university student as a coach for six weekly, hour-long sessions.

The project also gave CoachBright the opportunity to work with Redriff Primary, the South East London Maths Hub to ensure the teaching sequence followed during the coaching sessions matched the mastery approach currently being promoted as best practice in mathematics by the Department for Education (DfE) and with Learning by Questions, building sets of maths practice questions from their recently developed app into the sequence of learning for the coaching sessions.

Research questions

What effect will the CoachBright / Learning by Questions six-week mathematics coaching programme have on underachieving high to middle prior-attaining Year 6 pupil premium pupils' mathematical reasoning and attitude to maths, when compared with similar pupils in similar schools?

What effect will the programme have on their performance against teacher expectations, and their teachers' assessment of their learning, confidence, and motivation?

Method

Sample

There were six intervention schools and six control schools. All primary schools were in either the London boroughs of Southwark, Westminster or Enfield, all of which are home to considerable numbers of pupils from deprived backgrounds. Consent to participate in the study was obtained from the headteachers of each school. Eight pupils in each school were identified to take part by their class teachers (in all but one school, where seven pupils were identified) and parental permission was sought by the schools as some sessions took place outside the school day.

Along with the 47 total pupils selected to take part in the intervention, a further 48 Year 6 pupils from six other, comparable primary schools acted as controls. According to 2018–19 data, both intervention and control schools have relatively high levels of disadvantage in their pupil population, with two intervention schools and five control schools having higher than national average levels of pupils eligible for free school meals (FSM) at any time during the past six years (FSM Ever 6, national percentage 24.3%) and all but one intervention and one control school having higher than national average levels of pupils whose first language is not English (EAL, national percentage 21.2%).

TABLE 1: SCHOOL CONTEXTUAL DATA

School	Ofsted grade	Pupil nos	FSM Ever 6%	SEN/EHCP %	EAL%
Intervention A: BP	Good	460	50.6	7.2	51.5
Intervention B: EP	Good	457	22.9	14	60
Intervention C: GE	Requires Improvement	426	41.5	1.9	75.8
Intervention D: HP	Good	417	17.3	2.6	29.3
Intervention E: IP	Good	537	23.8	1.5	12.3
Intervention F: GG	Requires Improvement	439	20.8	0.5	26.2
Control A: AB	Outstanding	404	40.6	1	46
Control B: CD	Outstanding	455	37.3	1.8	33
Control C: DH	Outstanding	390	12.1	2.8	2.3
Control D: GR	Good	382	49	1.6	50.3
Control E: RE	Outstanding	521	32.7	3.8	57
Control F: SP	Good	467	29.5	1.5	37.3

In terms of attainment, all intervention and control schools for which data is available are at or above the national average for pupils achieving the expected standard in maths. When looking exclusively at the results of disadvantaged pupils, only two intervention and two control schools are at or above the national average for pupils achieving the expected standard in maths. One intervention school is performing below national average in their progress score for all pupils in

maths, while all others are at or above average. All pupils in the intervention and control groups for this intervention were in Year 6 (aged 10–11).

Of the 47 total intervention pupils:

- 57% (27) were female and 43% (20) were male
- 57% (27) were eligible for free school meals (FSM)
- 53% (25) had English as an additional language (EAL)
- 15% (7) pupils had either special educational needs (SEN) support or an Education, Health and Care Plan (EHCP)

Assignment to condition

Intervention schools volunteered to take part and schools from our local contacts were invited to act as controls. Both control and intervention schools agreed to refrain from using the Learning by Questions app in Year 6 during the impact evaluation.

Innovation

The innovation involved university students (recruited and trained by CoachBright) coaching groups of four pupils (one group of three) identified by the school, through self-directed learning activities. The session began with pupils reflecting on their week of maths learning and, during activities, peer coaching and collaboration was encouraged. Every session included a 'stretch question' which took the concept one step further to challenge the highest achievers. Pupils were asked about why they knew an answer to be true and how they could show someone else. They were encouraged to verbalise their methods as they worked through problems and to reflect on what strategies were more effective. They also summarised in the plenary exactly what had been learnt.

This teaching process matched several recommendations from the EEF report *Improving Mathematics in Key Stages 2 and 3: Evidence Review* (2018) in that it encouraged collaborative learning and structured discussions, developed mathematical thinking through the careful selection of problem-solving tasks, revealed and explored misconceptions through discussion and developed metacognition.

The topics in the six-week programme matched the Year 6 curriculum and addressed common difficulties in Year 6 SATs tests:

- place value
- number (addition, subtraction, multiplication and division)
- measurement
- fractions, decimals and percentages
- algebra.

The Learning by Questions app was used to carry out a quick assessment of knowledge and understanding in relation to the chosen topic at the start of the session. It was also used to identify practice questions for use during the session and as follow up homework for the pupils.

Year 6 teachers met regularly with coaches to review learning and progress for intervention pupils.

Outcome measures

Schools created pupil codes for each participating pupil to identify them without breaching safeguarding protocols when sharing data.

Both intervention and control pupils completed a short pupil maths attitude survey (see Appendix 1), based on the University of Cambridge Effecting Principled Improvement in STEM Education (epiSTEMe) Maths Attitudes Survey for secondary pupils pre- and post-intervention. Questions from the original survey were removed if it was felt that they were inappropriate for primary school pupils; eg, questions about future study beyond school and career choices. They also sat the 2018 Maths SATs Paper 2 reasoning test pre-intervention so that scores could be compared to the scores they obtained in May (post-intervention) on their 2019 Maths SATs Paper 2 reasoning test.

Year 6 teachers in intervention schools generated two estimated attainment scores for end Year 6 attainment in maths for the intervention pupils:

1. a target indicating what they thought the pupil was capable of (full potential)
2. a prediction indicating what they felt they were at risk of achieving without an intervention (ie the anticipated underachievement).

They then told us what was actually achieved at the end of Year 6 (late June / early July), based on teacher assessment. In this way, we could calculate what percentage of pupils met or exceeded both predictions and targets.

Year 6 teachers in intervention schools also wrote a short assessment of the eight pupils' learning, confidence and motivation in maths pre-, during and post-coaching sessions.

Process evaluation

Both teachers and coaches provided qualitative feedback on the intervention throughout. Each participating teacher observed the coaching sessions once and provided formative feedback to the coach in relation to their teaching, but not the content of the session, which was pre-planned. The evaluation team also observed all but one school's provision (one set of coaches was not observed due to staff illness) to ensure quality implementation in relation to behaviour for learning, management of the session eg, pace, etc, and subject knowledge, eg, identifying and dealing with misconceptions, asking questions, etc.

Analyses

Outcomes

We sought to compare evidence from both qualitative and quantitative data. Test data enabled us to calculate an effect size.

An analysis of predictions/targets met, when read alongside teacher observations of learning might help give a sense of teachers' views on the impact of the intervention.

We also analysed the difference in median pre/post pupil attitude survey response scores.

Process analyses

Should any of the quality assurance observations have led us to believe that there was a quality issue with one or several of the coaches, it would have been possible to analyse the data with this in mind, however, this was not the case. Some minor concerns were fed back to the

CoachBright team and dealt with immediately (see results below) so as to maximise the impact of the intervention as planned.

We carried out a thematic analysis of the feedback from teachers, whereas feedback from coaches was not systematically gathered and analysed, simply being used iteratively to inform the intervention as it developed.

Timeline

Late February / early March	Pre-tests and pupil attitude surveys taken Teacher sets targets and predictions
March-May	Intervention
May	Post-test
Late June	Pupil attitude surveys taken Teacher assessments completed

Cost

Total project costs:	**£18,775**
Total evaluation costs: • Recruitment of and introduction to schools – £1,750 • Developing primary maths materials to be mastery aligned, two days' time from CoachBright consultant and mastery lead teacher - £1,000 total • Developing baseline data gathering tools - £1,350 • Visits to schools to gather baseline data - £1,050 • Analysis of baseline data - £500 • Observations to review quality of implementation - £1,650 • Developing impact gathering tools - £450 • Visits to schools to gather impact data - £1,050 • Analysis of impact data - £750 • Report writing - £900 • Dissemination workshop - £450	**£13,375**
Total intervention delivery costs • Six schools benefit from two CoachBright groups of four pupils over six weeks - £4,200, total • Time to release teachers to meet with coaching session leaders - £1,200 total	**£5,400**
Total intervention delivery costs per pupil	**£114.89**

Results

Outcome findings

Test data

Effect sizes were calculated by comparing results on the 2018 Maths SATs Paper 2 (Reasoning) Test with results for the 2019 Maths SATs Paper 2 (Reasoning) Test (Tables 2, 3 and 4 below).

TABLE 2: INTERVENTION GROUP: TEST DATA BASELINE-IMPACT COMPARISON

Intervention group (n=47)			
Group mean	**Pre-test maths SATS paper 2 score**	**Post-test maths SATS paper 2 score**	**Progress**
	15.7	21.9	6.2

TABLE 3: CONTROL GROUP: TEST DATA BASELINE-IMPACT COMPARISON

Control group (n=48)			
Group mean	**Pre-test maths SATS paper 2 score**	**Post-test maths SATS paper 2 score**	**Progress**
	16.0	21.8	5.8

TABLE 4: OVERALL EFFECT SIZE CALCULATION

Whole sample standard deviation (progress)	6.3
Effect size	+0.06

As can be seen from Tables 2 and 3, the intervention group started with a slightly lower pre-test score than the control group and ended up with a slightly higher post-test score than the control group meaning they made more progress between the two tests. Bearing in mind that this represents a very small sample, there is a need to be cautious in conclusions about effect size, however, +0.06 is a small but positive effect size for a six hour intervention.

Teacher assessment data

The tables below show the number of intervention pupils who exceeded, met or were below the teacher-assessed target (what they thought the pupil was capable of) or prediction (what they felt they were at risk of achieving without an intervention) at the end of Year 6 (July 2019):

TABLE 5: ANALYSIS OF TARGETS VERSUS ACTUALS

Total no of pupils	Nos (%) exceeding target	Nos (%) meeting target	Nos (%) below target
47	3 (6%)	32 (68%)	12 (26%)

TABLE 6: ANALYSIS OF PREDICTIONS VERSUS ACTUALS

Total no of pupils	Nos (%) exceeding prediction	Nos (%) meeting prediction	Nos (%) below prediction
47	29 (62%)	17 (36%)	1 (2%)

Pupil attitude questionnaire

The difference in median pre/post pupil attitude survey response scores was 0 across both intervention and control pupils:

	Median pre	Median post	Change
Overall	3.00	3.00	0
Intervention pupils	3.00	3.00	0
Control pupils	3.00	3.00	0

It should be noted that only 64 out of a possible 163 participating pupils completed the final pupil attitude survey. This was because of difficulties engaging control schools in the gathering of outcome data; absence on the day the test was administered; long term absences for several pupils who left school early once they had completed their SATs tests and before the term ended. Some control schools did not successfully engage the full pupil cohort in the final online survey, despite several reminders. We cannot be sure that the pupils for whom we do have data are a representative sample.

Teacher qualitative feedback

At the start of the project, it was clear that a large number of intervention pupils were motivated and worked hard in maths classes (15 out of 47), but many of them were struggling with a range of issues affecting their performance. Most commonly these included:

- A lack of confidence (15 out of 47) eg, “Chd is not a particularly resilient learner”, “Chd has a lack of motivation and self-belief”.
- Passivity (8 out of 47) eg, “Chd is very quiet during lessons”, “Chd is very passive during lessons”.

- Struggling to apply reasoning/problem-solve (8 out of 47) eg, “Chd finds reasoning very challenging”, “Her current focus is applying arithmetic ability to contextual problems where many steps are needed”.
- Calculation mistakes (6 out of 47) eg, “Chd becomes anxious and then makes calculation errors”, “Chd requires strategies to check her understanding and answers are correct”.
- Retaining learning (7 out of 47) eg, “Chd often rushes through work, eager to complete the activity, but struggles to retain information”, “Chd has trouble retaining strategies and methods and flitting between the different areas of maths in one session”.
- Behaviour problems (5 out of 47) eg, “Chd is easily distracted by his peers and requires prompts to return to his work”, “Chd can struggle to listen to inputs”.

Midway through the project, teachers observed that 11 out of 47 pupils had made strong progress (eg, “She has made very good progress. She is tackling reasoning problems with more rigour”, “Chd is doing well in maths and has been more confident in sharing his thoughts and ideas in class”) while 19 had made some progress but still had a way to go (eg, “She still needs to focus on what a question is asking”, “[There are] more lessons when he’s motivated but this is still inconsistent”) and 22 had made no progress (eg, “Still very quiet and still making careless errors”, “Chd still lacks a lot of confidence with maths in general. The impact cannot be seen so much with Chd, as he still seems nervous to answer in fear of making mistakes, even in the CoachBright sessions themselves”, “Still a lack of motivation. Times tables and division are major issues”.)

By the end of the project, teachers observed that 30 out of 47 pupils had made positive progress eg, “He has made a lot of progress and is keen to tackle new challenges”, “Chd’s confidence continued to improve, and she was better at tackling trickier problems, which she would have shied away from at the start of the year”.

Control teachers were not asked for the same information so it is not possible to know how the learning, motivation and confidence changed in the pupils who did not receive the intervention.

Process evaluation findings

Session observations

The evaluation team and teachers in the school observed one session by each coach and wrote qualitative feedback on the strengths and areas for development, which were shared with the individual coaches to provide formative feedback.

In strong sessions:

- Teacher management of learning: Coaches scaffolded the learning helpfully to make it accessible to all, giving clear explanations of the work and modelling the strategies they were explaining. Coaches moved the learning on when it was needed. They were clear in their setting of expectations and questioning and sought justification to clarify pupils’ reasoning.
- Behaviour management: Coaches were calm, patient, enthusiastic, and had a positive manner with the pupils, engaging and encouraging them well, using positive praise effectively. They were aware of pupils disengaging from the task and attempted to get them back on track when this happened.
- Meeting all pupils’ needs: The problems set for pupils were suitably challenging eg using subject specific vocabulary, practising reasoning skills. Coaches showed good awareness

of the pupils' strengths, abilities and levels of understanding. They moved around the group and 1:1, personalised support was available to those who needed it.
- Resources: Coaches were well-prepared for the lesson in terms of resources. Pupils enjoyed the use of laptops/tablets during the sessions, and especially Learning by Questions (LbQ), which allowed them to take ownership of their learning. Use of a mix of resources – both paper and tools available on the LbQ app – was encouraged.

The evaluation team graded all observations according to whether there were 'no concerns', 'some concerns' or 'significant concerns'. Where there were concerns, these were classified according to whether they were about handling of subject matter, session management (eg pace and managing diverse learning needs) or behaviour management. There was no session in which a 'significant concern' was identified. Where minor concerns were identified:

- two were about the handling of subject matter
- seven were about session management
- six were about behaviour management.

Suggestions for improvement included:

- **Handling of subject matter:** To model more and to explain in a more organised way and with a clearer structure, representing tricky scenarios and showing the correct strategies. Some teachers felt some questions were very tricky for pupils to attempt independently and would have benefited from further scaffolding/modelling and been better suited to group work. To notice and address misconceptions and to ensure pupils are corrected properly. Some teachers also felt that the pitch of the resources should be considered to ensure all pupils can access the session ie, starting off slightly easier and progressing to more challenging questions.
- **Session management:** To begin on time. To check on and better manage the progress of individual pupils, for example whilst pupils were using the LbQ app, some coaches did not interact with them despite their visibly finding questions difficult and needing support. To manage pace more effectively so as to reach an appropriate level of challenge. It was also noted that separate rooms should be used for separate coaching sessions to ensure pupils are better engaged and get more individual attention.
- **Behaviour management:** To more effectively deal with off-task behaviours. This was particularly for more able pupils when they were not using the laptops/tablets, as some were disengaged and not performing at the level usually seen in class.

Coach feedback

Coaches provided email feedback to the central CoachBright team on the programme. They noted that pupils enjoyed working with the app and found it a useful tool alongside the worksheets. Coaches really enjoyed the sessions, said schools were friendly and warm, and that sessions were 'fun' and pupils worked hard:

> "Our session today was great! All of the kids were focused on their work and helping each other too. Some of them didn't understand the second exercise in LbQ but eventually managed to complete it."

They felt a developing rapport as sessions proceeded. However, there did seem to be a slight discrepancy between what pupils at some schools had covered before the project started and others had not not (ie, mixed fractions or converting fractions to percentages). This meant that

sessions were harder for pupils at some schools than others, with coaches taking more of a tutoring role. This was also the case for the Learning by Questions content, which was very challenging for some pupils, so a decision was taken to use a question set from Year 5 work instead for these groups.

Discussion/ conclusion

Interpretation of findings

The intervention had a small but positive effect size (+0.06) on mathematics attainment as measured by pre- and post-test data, for this very short intervention (six hours per pupil). Teacher assessment data for intervention groups only, shows that around 68% of intervention pupils met ambitious targets set by their teachers, with 6% exceeding their target, and 62% of pupils exceeding teacher's predictions of their likely attainment without the intervention. However, there is no comparison to a control group for these teacher-reported progress measures.

Teachers' qualitative feedback also supported a positive effect of the project, with 64% of pupils being seen to make positive progress. Although the intervention had no measurable impact on pupil attitudes towards mathematics, as measured by the pupil attitudes questionnaire, teachers' qualitative feedback did identify perceived improvements to resilience and confidence.

The process evaluation suggests that the intervention ran as intended, with no significant concerns about the quality of provision. Observations of coaching sessions by the evaluation team indicated only minor concerns and these were mainly around session management (eg, pace and managing diverse learning needs) and behaviour management. Coaches identified small tweaks to lesson planning and resources which were tackled mid-way through the programme in order to ensure the learning needs of less confident pupils were better met.

Overall the impact evaluation corroborates the evidence on effective mathematics interventions (see 2.2 above).

Limitations

Intervention and control schools were not matched or randomised so it is unclear to what extent the intervention and control pupils or schools were similar.

We cannot be sure of the exact date on which the pre-test was taken by pupils from different schools. This means there is a possibility that the time gap between baseline and impact testing was different for schools in the project.

Teacher assessment measures are very broad, allocating pupils only one of four possible attainment levels: greater depth, expected, working towards or has not met. This means small changes to attainment may not have been picked up in the analysis of teacher assessment data. It could also be the case that teachers understood the nature of the targets and predictions they set in different ways, as this was undertaken remotely, without the support of the evaluation team to moderate judgements. Since this data was not collected for control pupils, we have no way of knowing whether control pupils missed, met or exceeded similar targets.

Implications for practice

The CoachBright / Learning by Questions intervention seems to provide a cost-effective solution to underachievement for middle and high achieving pupils in mathematics. This is also a catch-up programme that has minimal workload implications for Year 6 teachers. We will share the

findings from the impact evaluation at an information session and promote the intervention to other schools.

Implications for further evaluation

After reviewing the findings, CoachBright plan to carry out further evaluations on similar primary programmes in other regions to gain a better understanding of impact across a variety of pupils.

Further evaluation could include research into the following questions:

- Does the beneficial effect of this intervention (a combination of CoachBright and Learning by Questions) derive from one or other of the constituent parts or the application of them both?
- Does the same intervention benefit pupils at other ages and/or subjects?
- Would the way in which Learning by Questions was utilised by the coaches affect the results - for example, if it were used to model the way of tackling a problem, would the intervention be more or less effective than our intervention in which pupils worked on the questions in a self-paced way on their tablets?

Conclusions

The evaluation suggests that a relatively small dose of coaching using technology can boost attainment for Year 6 pupils. It also suggests that schools considering introducing a coaching model like this, need to consider the support untrained teacher-coaches might benefit from if the school wants the coaching sessions to have maximum impact.

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This evaluation was carried out by London South Teaching School Alliance **londonsouthtsa.org.uk** in conjunction with CoachBright **coachbright.org**

Appendix

Maths attitudes survey

How much do you agree with the following statements? (please tick a box in each row)

	Strongly agree	Agree	Disagree	Strongly disagree
1. The maths we learn at school is useful in other subjects.	( )	( )	( )	( )
2. Understanding the maths we're doing is important to me.	( )	( )	( )	( )
3. Maths is boring.	( )	( )	( )	( )
4. I can usually manage the maths we do at school.	( )	( )	( )	( )
5. I'd like a job that involves using maths.	( )	( )	( )	( )
6. Many of the things we learn in maths are useful outside maths lessons.	( )	( )	( )	( )
7. I like learning maths.	( )	( )	( )	( )
8. I think things through in maths until they're clear to me.	( )	( )	( )	( )
9. I find maths difficult.	( )	( )	( )	( )
10. I might go on to do something mathematical after I leave school.	( )	( )	( )	( )
11. I think I could cope with harder maths lessons.	( )	( )	( )	( )
12. I look forward to doing maths.	( )	( )	( )	( )
13. I like to know the thinking behind the maths I'm studying.	( )	( )	( )	( )
14. I'm good at maths.	( )	( )	( )	( )
15. I can learn maths well without really understanding it.	( )	( )	( )	( )
16. Everybody will need to know some maths in their adult life.	( )	( )	( )	( )

	Strongly agree	Agree	Disagree	Strongly disagree
17. I find maths interesting	( )	( )	( )	( )
18. Even when it gets hard, I can do our maths work.	( )	( )	( )	( )
19. I want to make sense of what I'm learning in maths.	( )	( )	( )	( )
20. Learning maths is important for getting a job in the furture.	( )	( )	( )	( )
21. I enjoy studying maths.	( )	( )	( )	( )

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