

Evaluation Summary	
Age range	Primary (age 9 – 11)
Number of pupils	2,500
Number of schools	37
Design	Cluster randomised controlled trial, with school level randomisation
Primary Outcome	Reading and maths

## Protocol for a randomised controlled trial of a teacher training intervention to promote the attainment of disadvantaged primary school pupils (Hampshire Hundreds)

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### Abstract

**Background:** Pupils from disadvantaged backgrounds continue to underperform relative to their peers in state primary schools in England, obtaining test results at age 11 0.5 SD lower. Promoting teacher awareness of pupils' barriers to learning and teaching them strategies to overcome these may help to close the gap.

**Study Design:** A cluster randomised controlled trial evaluating the effectiveness of a toolkit and training for teachers on the attainment of disadvantaged children (aged 9-11). The unit of allocation is the school. The trial follows a wait-list control design, with control schools being offered the intervention at least two terms after the intervention schools. The primary outcome is the change in attainment of disadvantaged pupils on the InCAS standardised computer-adaptive test (combined reading and maths). Secondary outcome measures will assess impact on mathematics and reading separately, the impact on non-disadvantaged pupils, and heterogeneity of impact by pupil characteristics (subgroup analysis).

**Discussion:** As of February 2013, all 37 schools (n=2,500) had been recruited, had completed baseline assessments, and had been allocated into intervention or control. The intervention schools had begun the programme. Post-intervention assessments were due to be completed in June-July 2013.

### Background

- An explanation of the scientific background, policy context and rationale for the evaluation.

Pupils from disadvantaged backgrounds continue to underperform relative to their peers in state schools in England. Recent results indicate that only 33.9 per cent of disadvantaged

pupils achieved five A\*-C grade GCSEs including English and maths, compared to the national average of 58.2 per cent in maintained schools (Department for Education, 2012). Indeed, this is a long-running and well documented issue (Sutton Trust, 2009; Chowdry, et al, 2010)

There are a number of evidence-based ways of improving attainment. One promising approach involves using effective feedback and metacognitive strategies to increase the internal motivation of pupils. Intrinsic motivation has been shown to be a valid construct and is positively related to achievement, IQ, and perception of competence, and inversely related to anxiety (Gottfried, 1990). Evidence shows that the de-motivated and well-motivated groups of pupils can be identified using basic cognitive theories of motivation, and these theories can in turn be used to mediate such motivation - such as through effective teacher feedback (Lens and Decruyenaere, 1991).

Hampshire Local Authority has developed a programme to help teachers improve their support for disadvantaged pupils, with the aim of decreasing the attainment gap between disadvantaged pupils and their peers. The programme consists of identifying disadvantaged pupils, providing teacher training, and teacher observation and feedback. The programme is delivered at a whole-class level, so all pupils in the intervention group (including those not deemed deprived) will receive the intervention.

## **Methods and design**

### **Aim of the study**

There are two main aims in this evaluation:

1. To assess whether the attainment (standardised test scores and Key Stage 2 results) of deprived pupils in the intervention schools improves relative to that of similar pupils in the control schools.
2. To assess whether the attainment of non-targeted pupils (in the same class as targeted pupils) changes as a result of the intervention compared to similar pupils in the control schools.

### **Design**

The study is a cluster randomised controlled trial comparing the effectiveness of the programme in improving pupils' academic attainment, relative to usual school provision (standard teaching practice in the control group schools). The study uses a wait-list control design, with control group schools offered the programme at least two terms after the intervention group schools. However, note that not all control group pupils will receive the programme: those who are in Year 6 during the wait-list period will have left before schools can implement the programme, so will act as 'pure' controls if further follow-up through the National Pupil Database is required. Assessments will be carried out at baseline (September

2012), and post-intervention (June/July 2013), with Key Stage 2 exams being sat in summer 2013.

### **Participants and Eligibility**

The intervention aims to change the way teachers deliver the standard school curriculum. Thus the intervention will not affect the curriculum being followed in the intervention schools, but aims to change how it is taught. All pupils in Years 5 and 6 in the intervention schools in autumn 2012 and spring 2013 will receive the intervention, including those who are not deemed deprived, since the intervention is delivered to whole classes. All teachers who were scheduled to teach a Year 5 or Year 6 class in autumn 2012 or spring 2013 were to be involved in the project.

### **Ethical Approval and Consent**

The study was approved by the Education Endowment Foundation. Eligible schools were provided with information about the project through means of a one-day conference, and required to sign up in writing, confirming that the school wished to be part of the project.

### **Recruitment**

Approximately 65 schools in Hampshire (with reasonable numbers of deprived pupils) were invited to send staff to a one-day conference about promoting the attainment of deprived pupils, which also introduced the project. Staff from 60 schools attended. 39 schools signed up.

### **Randomisation**

2 schools dropped out after baseline but before randomisation, so 37 schools were randomised. 5 schools formed federations of schools which were grouped together. Schools were paired based on the basis of Key Stage 2 test results in 2012. This made 17 pairs. Randomisation was conducted within pairs of schools, using random number generators in STATA.

### **Participant Classification**

All pupils within the year group receive the assigned intervention (programme or control). However, the primary purpose of the trial was to establish the impact of the programme on deprived children, so class teachers were asked to rank their pupils in terms of need. This occurred after schools signed up but before baseline. Teachers were provided with a grid (Table 1), and for each child in their class were asked to specify if the child was eligible for free schools meals, was in local authority care, came from an ethnic minority background, had English as an additional language, or had other characteristics which acted as a barrier to learning. They were also asked to say whether a series of statements was typical of the child. For each child, teachers were then asked to add together the number of positive

responses to these questions (e.g. FSM, EAL, child thinking they do not fit in) to get a total score, which was used to rank pupils within the class. This resulted in every pupil having a score from 0-24+ and a corresponding rank within their class. This allows a flexible specification of 'deprivation' beyond which pupils are eligible for free school meals, and allows us to compare the most and least disadvantaged pupils between intervention and control schools.

## **Intervention**

The Hampshire Hundreds toolkit aims to help teachers to identify the pupils who need more support, and give them techniques to improve their performance. Teachers of the relevant year groups are trained to address the specific needs of disadvantaged pupils. The focus is on increasing the internal motivation and self-esteem of disadvantaged pupils, for example by developing effective feedback and metacognitive and self-regulation strategies. Working collaboratively, teachers observe each other teaching and track the engagement with learning of the identified pupils (disadvantaged pupils). Teachers meet regularly to discuss progress and impact in their own school and meet in network clusters (4 in different geographical locations across the county) to discuss with the project lead and other project schools, thus sharing impact and agreeing what works well. The project lead also meets with the project lead in each school at 6 week intervals to monitor progress and capture outcomes.

The intervention is being led by Helen Fenton, a Teaching & Learning Adviser from the Children's Services Department of Hampshire County Council. Having a single person leading the intervention should ensure consistency in the treatment and compliance among the treatment schools.

## **Usual Provision**

Teachers in the controls schools will not receive the training or toolkit until after the post-intervention measures have been administered, and will continue to teach control group pupils as before.

## **Teachers**

Teachers are all teachers who will be teaching the relevant year groups in schools during the academic year 2012-13. Having such staff available and willing to participate in the project was a precondition of joining.

## **Data collection**

Pupils will sit computer adaptive attainment tests in literacy and numeracy during normal school hours, supervised by school staff who have full instructions from the software developers. Baseline assessments were carried out prior to randomisation, so staff did not know which group they would be assigned to. Post-intervention tests will be sat under the

same conditions in May 2013. At this point supervisors will not be blind to intervention allocation. We will match in pupil data into demographic data from the National Pupil Database, providing a richer set of information about pupils.

### **Outcome measures**

All outcome measures come from the InCAS (Interactive Computerised Assessment System) package of measured developed by the Centre for Evaluation and Monitoring at Durham University (CEM, 2012). This is a standardised assessment system that is designed to monitor pupils' educational progress throughout primary school, and for which national norms are available.

#### ***Primary Outcome***

Disadvantaged pupils' progress in reading and maths (combined), as measured by InCAS.

#### ***Secondary Outcomes and Subgroup Analyses***

Disadvantaged pupils' progress in reading and maths separately, as measured by InCAS tests. Non-disadvantaged pupils' progress in reading and maths. Subgroups to be defined by baseline developed ability score (IQ score), gender, ethnicity, and alternative measures of disadvantage.

### **Economic Evaluation**

We will assess the cost-effectiveness of the intervention by comparing the effect size with that produced by similar interventions, with the respective costs of the interventions.

### **Power Calculation**

We performed the power calculations for the trial using Optimal Design Software (Raudenbush et al., 2011), based on a cluster size of 20 'targeted' disadvantaged pupils per school (assuming 5 per class; 2 classes per year group; 2 year groups per school). We estimated the intra class correlation coefficient (ICC) as 0.1-0.2 based on similar tests in similar contexts (e.g. Spybrook et al., 2008, find this is typically between 0.05 and 0.15 for US data sets on school achievement). Based on the baseline tests having a predictive power of 0.80 on the same tests one year later; assuming high consent and retention rates of pupils (>90%); and an ICC of 0.2, an effect size of about 0.25 SD is detectable with 80% power and 5% two-sided alpha with 42 clusters (schools). With an ICC of 0.15 we would need 38 schools. The trial is thus potentially underpowered for the small effects we are likely to obtain.

### **Statistical analysis**

We will present raw pre- and post-test scores for each groups. We will estimate the following equation for each group  $g$  (i.e the targeted pupils; the non-targeted pupils within the class):

$$Y_{igst} = \beta_1 T_s + \beta_2 Y_{igst-1} + \varepsilon_{igst}$$

where  $Y$  is the test outcome for person  $i$  in group  $g$  and school  $s$  at time  $t$  (and  $Y_{igst-1}$  is their test outcome in the baseline),  $T$  is whether the school gets the treatment and  $\varepsilon$  is a random error term. All analyses will take into account the clustered structure of the data (condition assignment at the school level). We will also present specifications which include pupil characteristics such as gender and ethnicity, obtained from the National Pupil Database, and allow for interactions of condition assignment with these variables. Analyses of secondary outcomes will follow the same pattern.

It is important to look at the outcome of the programme on both targeted and non-targeted pupils because both groups' attainment may be affected by it. For example, the change in teaching style could also benefit non-targeted pupils. Alternatively, the focus on disadvantaged pupils might take the class teacher's attention away from other groups of students. The ranking of pupils within each class will allow us to look at any such differences in impact.

### **Study Status**

School sign-up was finalised in June 2012. Baseline tests were completed in September-October 2012, and randomisation was carried out in November 2012, with project implementation beginning shortly after. The post-intervention measures are scheduled to take place in June-July 2013.

### **Qualitative evaluation**

The qualitative element of the research has several aims:

- To provide a description and overview of the intervention and its implementation, providing a context in which the quantitative findings may be better understood
- To give an account of variation in implementation between and within schools, and therefore of variation in the intervention being studied
- To identify informants' views on the key mechanisms for change
- To identify salient differences in modes of implementation including opportunities and challenges posed by different models

The main sources of qualitative data will be interviews with project participants, observation and documentary evidence. Interviews will be carried out focusing on the origins and development of the project and on project implementation within 12 schools including at least two control group schools. Project schools will be visited twice during the intervention period.

## **MANAGEMENT AND ORGANISATION**

### **RESEARCH GROUPS**

Centre for Economic Performance (CEP), London School of Economics.

Education Research Group (ERG), Department of Social Policy, London School of Economics

### **PERSONNEL**

The quantitative research (impact evaluation) will be led by Professor Sandra McNally (Director of the Education and Skills Programme, CEP), with Ms. Amy Challen and Dr. Gill Wyness.

The qualitative research (process evaluation) will be led by Professor Anne West (ERG; and Department of Social Policy), with Dr. Philip Noden.

### **TIMELINE, TASKS AND RESPONSIBILITIES**

See also Table 2: Timeline

#### **April-September 2012**

CEP, ERG, Hampshire Council: Plan a detailed methodology and protocol. In particular, the protocol will deal include how students are ranked within class for any special assistance. This ranking to be done in all participating schools prior to randomisation.

Hampshire Council: Recruitment of schools and development of toolkit etc.

CEP, Hampshire Council. Some data will be needed on students in all participating schools prior to randomisation. This will be the pupil names, their Unique Pupil Numbers (for matching with the National Pupil Database) and the index constructed as part of the ranking process. CEP will liaise with the Department for Education to match these pupils to the National Pupil Database.

CEP: School randomisation into the treatment and control groups (after the above stages)

ERG: Visit to Quilley School of Engineering.

ERG: Design of semi-structured interview and other research instruments.

ERG: Observation of initial teacher training conference.

#### **September 2012**

CEP, Hampshire Council. Organise for tests to take place in schools. CEP will liaise with the testing company. Hampshire Council will agree with schools that all tests take place at particular times (ideally on the same day or week in all participating schools).

### **October 2012 - July 2013**

Hampshire Council: Works with schools to apply strategies.

ERG: Visits to case study schools.

CEP, Hampshire Council. Organise for final test to take place in schools (before schools break up for the holidays). CEP will liaise with the testing company. Hampshire Council will agree with schools that all tests take place at particular times (ideally on the same day or week in all participating schools).

### **July 2013 – January 2014**

CEP, ERG: Data analysis and report writing.

Hampshire Council. Review of data and dissemination to treatment schools.

### **Post January 2014**

Hampshire Council continues with project and is informed by the evaluation. Dissemination continues but only to treatment schools (until after July 2014, when control schools can be targeted as well).

CEP. When the Key Stage 2 tests are available for 2014, CEP analyses whether any treatment effect is observed. In the longer term, CEP continues to track students in the National Pupil Database (as they progress through secondary school) to observe whether there are effects in the longer term (Key Stages 3 and 4).

### **RISKS**

1. It is proposed that training will be given to three to four teachers. To maximise the probability that the treatment has a high impact, it will be important that these teachers are the main class teachers for the treated classes.
2. The teachers in the treatment and control schools will need to identify the students who might benefit from the intervention before randomisation. Our evaluation will only address whether the methods used helped to improve the attainment of the targeted student, and not whether the methods helped with the targeting itself. There is a risk that teachers will target different students after they have been given training or that they target different groups of students through the year, so an intention-to-treat approach will be adopted.



3. Because of these risks, it will be important to have a ranking of students (and not only 5 names). This will enable us to expand the 'targeted group' of interest as outlined in the methodological section.
4. There is a possibility that the toolkit itself is less important than drawing teachers' attention to students in particular need of help. In this case, it is possible that treatment and control schools improve as a result of the identification process. The experimental evaluation will not help identify any such effect. However, we would compare schools involved in the project (treatment and control) to other schools in the National Pupil Database that look similar based on observable characteristics. This will enable us to consider whether the fact of doing the experiment in this group of schools had any overall effect (compared to another group of schools). Although one could use Key Stage 2 tests as an outcome measure, it would be helpful if the test provider (e.g. CEM) released information for similar schools (outside the experiment) already doing the same tests.

## References

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- Sutton Trust, The (2009) , *Attainment gaps between the most deprived and advantaged schools: A summary and discussion of research by the Education Research Group at the London School of Economics'*, The Sutton Trust, May 2009

## Tables

**Table 1a: Pupil ranking table**

<i>Pupils initials and year group</i>	<i>A Y5</i>	<i>B Y5</i>	<i>C Y5</i>	<i>D Y5</i>	<i>E Y5</i>	<i>F Y5</i>	<i>G Y5</i>	<i>H Y5</i>	<i>I Y5</i>	<i>J Y5</i>
<b>Are they FSM, EAL, CIC, from an ethnic minority or have other barriers to learning.</b>										
<b>Do they?</b>										
Lack equipment and resources for learning										
Rarely take part in school trip activities										
Lack regular counsel, feedback, support, and praise for the personal skills they acquire										
Lack resilience and the emotional support that they need to overcome difficulties										
Hide their emotions or true feelings										
Have limited language repertoire and rely almost entirely on informal modes of talk										
Be less tolerant of passive approaches to teaching and learning										
Mistrust authority and are influenced by any negative attitudes to school displayed by others										
Place a 'lid' on their aspirations and adopt restricted and un-ambitious view of their future										
Be concerned about the here and now of their experience in school and are unconvinced by the 'it will be good for you in the long term' type of argument										
Display symptoms of physical hardship (e.g. be listless through lack of sleep or an adequate breakfast, fail with homework through lack of a suitable work space or materials)										
<b>In addition, do they?</b>										
Think they do not fit in										
Seem to be resentful or alienated										
Think they are misunderstood										
Lack self esteem and confidence										
Be reluctant to ask for help										
Be evasive and slow to put themselves 'on the line'										
Feel that they have little to contribute to the school or the school has little to offer them										
Try too hard to be like everyone										

else; pretend to be what they are not in order to fit in									
Rebel or be deliberately different as a means of defense									
<b>Total</b>									
<b>Group ranking</b> (Please allocate a rank order for each pupil based on the total number of ticks – highest total = 1)									

**Table 1b: Worked example of pupil ranking table**

<b>Pupils initials and year group</b>	<b>AB Y5</b>	<b>CD Y5</b>	<b>EF Y5</b>	<b>GH Y5</b>	<b>IJ Y5</b>	<b>KL Y5</b>	<b>MN Y5</b>
<b>Are they FSM, EAL, CiC, from an ethnic minority or have other barriers to learning?</b>	FSM	CiC	None	Other	FSM, EAL	EM	FSM, EM
<b>Do they?</b>							
Lack equipment and resources for learning	√				√		√
Rarely take part in school trip activities							
Lack regular counsel, feedback, support, and praise for the personal skills they acquire					√		
Lack resilience and the emotional support that they need to overcome difficulties	√				√	√	√
Hide their emotions or true feelings	√	√			√		√
Have limited language repertoire and rely almost entirely on informal modes of talk	√				√		
Be less tolerant of passive approaches to teaching and learning	√						
Mistrust authority and are influenced by any negative attitudes to school displayed by others					√		
Place a 'lid' on their aspirations and adopt restricted and un-ambitious view of their future					√		√
Be concerned about the here and now of their experience in school and are unconvinced by the 'it will be good for you in the long term' type of argument					√	√	√
Display symptoms of physical hardship (e.g. be listless through lack of sleep or an adequate breakfast, fail with homework through lack of a suitable work space or materials)	√				√		√
<b>In addition, do they?</b>							
Think they do not fit in		√			√	√	
Seem to be resentful or alienated				√			√
Think they are misunderstood				√	√		√
Lack self esteem and confidence							√
Be reluctant to ask for help	√	√		√	√	√	√
Be evasive and slow to put themselves 'on the line'				√	√		√
Feel that they have little to contribute to the school or the school has little to offer them		√			√	√	√
Try too hard to be like everyone else;					√		

pretend to be what they are not in order to fit in							
Rebel or be deliberately different as a means of defense				√	√		√
<b>Total</b>	7	4	0	5	16	5	13
<b>Group ranking (Please allocate a rank order for each pupil based on the total number of ticks – highest total = 1)</b>	3	5	6	4	1	4	2

**Table 2: Timeline**

project and evaluation dates	April 2012	May 2012	June 2012	July 2012	August 2012	Sept 2012	Oct 2012	Nov 2012	Dec 2012	Jan 2013	Feb 2013	Mar 2013	April 2013	May 2013	June 2013	July 2013	August 2013	Sept 2013	Oct 2013	Nov 2013	Dec 2013	Jan 2014	Feb 2014	Mar 2014	April 2014	May 2014	June 2014	July 2014					
<b>HH PROJECT</b>																																	
Development of toolkit and recruitment of schools	[Gantt bar: April 2012 - May 2012]																												<b>Team responsible/attending:</b>				
Attend launch conference / disseminate toolkit (29th May)	[Gantt bar: May 2012]																												CEP				
Letter to parents advising of testing / opt-out	[Gantt bar: April 2012 - May 2012]																												Hampshire Council				
Work with schools to apply strategies in toolkit	[Gantt bar: August 2012 - July 2014]																												ERG				
Review of first year and dissemination	[Gantt bar: September 2013 - July 2014]																												CEP & Hampshire Council				
																													ERG & Hampshire Council				
																													All				
<b>EVALUATION</b>																																	
HC to provide CEP with schoolnames and yeargroups involved	[Gantt bar: April 2012 - May 2012]																																
Schools provide CEP with pupil rankings (by June 18th)	[Gantt bar: June 2012]																																
Randomize treatment and control groups and inform HC	[Gantt bar: June 2012]																																
ERG visit to Quilley School of Engineering	[Gantt bar: July 2012]																																
Planning for qualitative study	[Gantt bar: July 2012 - August 2012]																																
Baseline testing (June or Sept to be decided; not both)	[Gantt bar: August 2012 - September 2012]																																
Cleaning baseline data	[Gantt bar: September 2012 - October 2012]																																
Qualitative case study meetings and interviews	[Gantt bar: October 2012 - November 2012]																																
Post-programme testing	[Gantt bar: December 2012 - January 2013]																																
Analysis of first year of quantitative data and write-up	[Gantt bar: February 2013 - March 2013]																																
CEP feedback test results to schools	[Gantt bar: March 2013 - April 2013]																																
Matching and analysis of KS2 results from NPD (data available from March 2014)	[Gantt bar: April 2013 - May 2014]																																
<b>MILESTONES &gt;</b>																																	
		treatment and control schools selected project launched			baseline testing (June or Sept)																												