



Education  
Endowment  
Foundation

# ‘Literacy Octopus’ Dissemination Trial

Evaluation report and executive summary

December 2017

Addendum added January 2019

## Independent evaluators:

Pippa Lord, Adam Rabiasz, Ben Styles, Joana Andrade (addendum report)



# NFER

National Foundation for  
Educational Research



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- Evaluating these innovations to extend and secure the evidence on what works and can be made to work at scale;
- Encouraging schools, government, charities, and others to apply evidence and adopt innovations found to be effective.

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## About the evaluator

The project was independently evaluated by a team from the National Foundation for Educational Research (NFER). The evaluation team was led by Trial Manager Pippa Lord, Senior Research Manager in NFER's Centre for Evaluation and Consultancy. Dr Ben Styles was Trial Director and Principal Investigator. They were supported by Adam Rabiasz and Palak Roy (statisticians), and Jennie Harland and Katherine Fowler who worked on the IPE.

The team were supported by Dr. Joana Andrade (statistician) for the addendum report.

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## Executive summary

### The project

The *'Literacy Octopus' Dissemination Trial* aimed to test the impact on pupil outcomes of disseminating research summaries and evidence-based resources to schools. The materials aimed to support teaching and learning of Key Stage 2 literacy and were created by leading organisations with experience of engaging schools in evidence use. The EEF funded this alongside a smaller trial which included more proactive support from these organisations to learn about the impact on both attainment and, in the smaller evidence-based support trial, on teachers' use of research.

The materials included:

- an evidence-based printed booklet *Improving Reading: A Guide for Teachers* (CEM, part of Durham University);
- printed copies of *Better Evidence-based Education* magazine, fortnightly 'Best Evidence in Brief' email summaries, and access to a searchable database, Evidence 4 Impact (IEE, based at the University of York);
- a link to the archived webinar and materials relating to a conference on research evidence relating to KS2 literacy (ResearchEd, in collaboration with NatCen); and
- a subscription to the Teaching How2s website which focuses on evidence-based techniques and step-by-step visual guides for teachers (delivered by the Campaign for Learning in partnership with Train Visual).

A sample of 12,500 primary schools was identified by the evaluator, NFER, and randomised into five groups of 2,500. In spring term 2015, each of the four providers sent evidence-based materials to their 2,500 primary schools. The remaining 2,500 schools were in the control group. Given the trial did not require any active engagement or consent from the schools, the materials were simply sent to the schools with a brief note about the trial. The evaluation did not aim to collect information about schools' use of the materials, but to provide a large-scale study of the impact of disseminating literacy-related evidence-based materials on pupils' outcomes in KS2 English in summer 2016.

The trial was funded by the Education Endowment Foundation (EEF), the Department for Education, and the Mayor's London Schools Excellence Fund as part of a round of funding exploring Research Use in Schools. It was accompanied by *Evidence-based Literacy Support—the 'Literacy Octopus' Trial*, which tested the impact of similar interventions when accompanied by more pro-active support.

### Key conclusions

1. The project found no evidence that Literacy Octopus passive dissemination interventions improved pupils' Key Stage 2 English scores compared with the control group. The five padlock security rating means we have very high confidence in this result.
2. These findings suggest that simply disseminating research summaries and evidence-based resources to schools is not an effective way for research organisations to support schools to improve pupil outcomes.
3. It is likely that these materials formed a small part of the information received by schools during this time. It is possible that if schools had support to navigate and prioritise that information, greater impact could be achieved. Alternatively, schools may need more support in transforming such materials into actual change in the classroom. The accompanying *Evidence-based Literacy Support—the 'Literacy Octopus' Trial* helps us to assess this.
4. The evaluator will analyse the following year's Key Stage 2 results from these schools to explore if there is a longer-term effect of the interventions.

## EEF security rating

These findings have very high security. The trial was a large-scale effectiveness trial involving a sample of 12,500 primary schools—over 80% of the primary school population. It was well-powered, and since the primary outcome was obtained from the National Pupil Database, the proportion of data missing was low: just 1% of schools, and 6% at the pupil level. Pupils in schools in each intervention arm were similar to those in control schools.

## Additional findings

There was no evidence that any of the Literacy Octopus passive communication approaches impacted on pupil attainment in literacy. This was the case for all pupils and for the sub-group of pupils who have ever been eligible for free school meals.

The extent to which schools engaged with or used the materials in this dissemination trial is not known as it was not monitored. However, we can say from this trial that attempting to reach a large number of schools and teachers through fairly light-touch and inexpensive approaches does not impact in a measurable way on pupil attainment outcomes in the year following the dissemination activities. This is not to say that schools did not use or engage with the materials in any way: we know from the accompanying *Evidence-based Literacy Support—the ‘Literacy Octopus’ Trial* that just under three-fifths of schools did engage, at least to some extent, in passive-arm activity. However, any engagement, or otherwise, did not result in impacts on pupil attainment.

The findings show that even where materials are designed to be evidence-informed and practical, as was the case in all of the Literacy Octopus providers’ materials (for example, they were well structured and included examples for practice), simple passive dissemination is insufficient to make a difference to learning outcomes.





The Literacy Octopus materials would likely have been additions to the range of research and commercial information received by schools, particularly by headteachers—the recipients of communication in this trial. Schools and heads may need support to navigate this information and make best use of it.

Follow-up analyses will be conducted in 2017/2018 of the 2017 KS2 English scores, with an addendum report to be published in 2018.

## Cost

All of the materials were inexpensive to provide at scale. Costs to schools in terms of time to engage, or not, were not monitored on this dissemination trial. However, we do know from the Literacy Octopus evidence-based literacy support trial that it was inexpensive for schools to engage with the materials provided, though they did require time to implement any practices suggested by the materials. That report provides further details about the per-school and per-pupil costs.

Table 1: Summary of impact on primary outcome (Key Stage 2 English)

Group	Effect size (95% confidence interval)	Estimated months' progress	No. of pupils*	P value**	EEF security rating	EEF cost rating
<b>CEM Passive Arm 1 vs control</b>	0.01 (-0.01, 0.03)	0	88,088	0.48		£ £ £ £ £
<b>IEE Passive Arm 2 vs control</b>	0.01 (-0.01, 0.03)	0	86,742			£ £ £ £ £
<b>ResearchEd Passive Arm 3 vs control</b>	0.01 (-0.01, 0.03)	0	86,155			£ £ £ £ £
<b>How2s Passive Arm 4 vs control</b>	0.01 (-0.01, 0.03)	0	87,701			£ £ £ £ £
<b>CEM Passive Arm 1 everFSM vs control everFSM</b>	0.00 (-0.03, 0.03)	0	26,319			
<b>IEE Passive Arm 2 everFSM vs everFSM control</b>	-0.01 (-0.04, 0.02)	0	26,243			
<b>ResearchEd Passive Arm 3 everFSM vs everFSM control</b>	-0.00 (-0.03, 0.03)	0	25,059			
<b>How2s Passive Arm 4 everFSM vs everFSM control</b>	0.00 (-0.03, 0.03)	0	26,489			

\*Number of pupils refers to the number of pupils' results analysed in the primary outcome multi-level model. Note, the model included results from 89,509 control group pupils. The everFSM model contained results from 26,799 control group pupils.

\*\*The p-value results from a single likelihood ratio test (LRT) across all trial arms. The hypothesis for this test was that there is no difference in mean score, adjusted for baseline, between each arm and control.

## Introduction

### Intervention

The *'Literacy Octopus' Dissemination Trial* was commissioned by the Education Endowment Foundation (EEF) and funded by the EEF, the Department for Education (DfE), and the London Schools Excellence Fund. It involved a range of communication approaches to disseminate research evidence and evidence-based materials to schools. The passive methods mirrored the passive approaches used by providers in the accompanying *Evidence-based Literacy Support—the 'Literacy Octopus' Trial* (Lord *et al*, 2017). In total, the trial consisted of five arms (four intervention arms and one control arm). The four providers were each given a randomly-allocated list of 2,500 unique primary schools and headteacher contact details so that they could send their materials to these schools by post or email. A total of 10,000 schools were sent materials in 2015/2016. There was a single control arm of 2,500 schools that were not sent any materials. The trial set out to measure the effect on pupil attainment. As discussed in the section on background evidence, previous research has suggested that 'push' dissemination approaches may only have small effects on pupil attainment, but because these methods are low-cost they are worth testing at scale. For two of the providers (Arms 2 and 4), the communication approach mirrored that used in their passive arm of the *Evidence-based Literacy Support – the 'Literacy Octopus'* trial, while Arms 1 and 3 differed slightly (see below). Further details of each approach are set out below.

#### Trial Arm 1

The Centre for Evaluation and Monitoring (CEM) at Durham University sent each of their schools the evidence-based booklet, *Improving Reading: A Guide for Teachers*. In the accompanying trial, schools also received materials including a 'Top Tips' card (to act as a cue to the booklet), a staffroom poster (to act as a cue to the evidenced-based materials and increase awareness of the project throughout the school), and monthly classroom activity display posters. These additional materials were not sent to schools as part of this Dissemination Trial.

#### Trial Arm 2

The Institute for Effective Education at the University of York sent each of their schools regular print issues of the IEE magazine, *Better Evidence-based Education* (which brings together evidence on particular topics and included some literacy specific volumes for schools taking part in the Literacy Octopus), its fortnightly email, 'Best Evidence in Brief', which summarises new research findings and contains links to relevant articles, and access to Evidence 4 Impact, a searchable database of evidence-based education intervention programmes (note, neither 'Best Evidence in Brief' nor Evidence 4 Impact were specifically adapted for the Literacy Octopus). Schools received these materials from February 2015 to July 2016.

#### Trial Arm 3

ResearchEd and NatCen worked together to provide schools with a one-day conference, using the ResearchEd approach, on research evidence for Key Stage 2 (KS2) literacy. The conference involved presentations from a number of high profile academics and practitioners. ResearchEd and NatCen sent the headteacher in each of their dissemination trial schools an invitation for them and their staff to view the website of archived webinar and live materials relating to ResearchEd Literacy Octopus conference activity. Note that attendance at the ResearchEd conference was not part of this trial (unlike the equivalent passive arm in the accompanying trial where schools were invited to attend a conference—see Lord *et al.*, 2017).

#### Trial Arm 4

Teaching How2s runs a subscription website designed for school and further education college CPD. Schools and colleges that subscribe to the website gain access to visual guides for particular teaching



and CPD techniques. The focus is on supporting teachers to implement evidence-based techniques through step-by-step guides; the theory is available separately. The dissemination trial arm was managed by the Campaign for Learning on behalf of Train Visual (the organisation that owns Teaching How2s). The existing Teaching How2s were updated to include content applicable to primary schools and literacy. Schools were given a free subscription to the Teaching How2s website from February 2015 to July 2016 and were able to access all content, including content developed for the Literacy Octopus.

### **The control group (Arm 5)**

The control group (Arm 5) of 2,500 randomly-allocated primary schools was not sent any materials by these providers during January 2015 to July 2016, but their pupils' attainment results were included in the analysis.

### **Background evidence**

Over the past two decades there has been a growing recognition of the value of research in informing understanding about what works in ensuring the best educational outcomes for young people. The government is keen to develop a more evidence-informed teaching profession and set out a number of plans to support this in the White Paper, 'Educational Excellence Everywhere' (2016). The current policy agenda for an evidence-informed teaching profession has ramifications not only for the teaching profession itself, but importantly for producers of research evidence, for example academic and other educational research institutes. Indeed, a range of challenges have been noted in relation to research-use in education practice including the generalizability of research findings to other contexts and the often inaccessible nature of findings to a non-academic audience (for example, CUREE, 2011; Goldacre, 2013; Becheikh *et al.*, 2009; Durbin and Nelson, 2014; and See *et al.*, 2016). Research literature posits that effective knowledge mobilisation requires some translated or interactive support, for example guidance on how to apply the evidence in practice (for example, Becheikh *et al.*, 2009; Durbin and Nelson, 2014; Nelson and O'Beirne, 2014; and Sharples, 2013).

This study explored the nature of large-scale dissemination strategies through relatively inexpensive approaches to disseminating research evidence to teachers and schools. It was a large-scale effectiveness trial of communication strategies. In order to address some of the challenges highlighted above, all of the passive communication methods were selected for trial as they had some element of applicability beyond pure dissemination. For example, IEE materials include recommendations for practice, How2s include interactive visual guides and encourage teacher peer-to-peer learning, the CEM booklet includes top tips for action, and the ResearchEd conference webinar archive included video clips from school-presenters that had applied evidence in practice. A study by Tymms and Merrell (2006) indicated that combining a widespread 'push' dissemination approach with translation of research evidence for practical application could be effective: distributing a practical guidance booklet to schools on evidence-based strategies to address inattentive, hyperactive, and impulsive pupil behaviour led to positive impacts on pupil behaviour and teacher morale. That said, the approaches trialled here were all part of the passive dissemination end of the spectrum of other approaches also tested out in the sister *Evidence-based Literacy Support—the 'Literacy Octopus' Trial*. Appendix D sets out the overall Theory of Change for passive communication, highlighting this inexpensive approach.

### **Evaluation objectives**

The Education Endowment Foundation (EEF) commissioned a number of providers to use a range of different methods of communicating research findings and evidence to teachers and schools. The EEF wishes to determine the impact that these different approaches have on pupils' literacy.

### **Primary research question**

The primary research question was: What are the effects of different ways of communicating research evidence and findings to teachers and schools—and different ways of engaging them with research—on pupil attainment for the 2015/2016 Year 6 cohort?

### **Secondary research question**

The secondary research question was identical, but focused on the 2016/2017 cohort.

NFER and the providers attempted to answer this question by running, in parallel, two multi-armed RCTs, one which assessed the impact of passive means of communication (this trial) and a second which assessed the impact of active and passive means of communication (*Evidence-based Literacy Support—the ‘Literacy Octopus’ Trial*, Lord *et al.* 2017).

To determine the impact that different approaches to communicating research evidence have on attainment, we measured the development of pupil literacy using KS1 attainment as a baseline and KS2 literacy attainment as the outcome measure.

There were no secondary outcomes specified for this trial.

### **Ethical review**

This study obtained approval from NFER’s Code of Practice Group on 3 July 2014. This study planned to use de-identified pupil administrative data, that is, use anonymous Pupil Matching Reference (aPMR) numbers from the Department for Education (DfE) National Pupil Database (NPD) in relation to KS1 and KS2 attainment data. There were no special ethical concerns regarding this.

Schools in the dissemination trial did not need to provide consent to be sent materials. The project team and Code of Practice Group gave specific consideration to the nature of the intervention and real-world trial—that is, sending materials to schools and then independently analysing NPD data from those schools. However, it was agreed with the EEF and providers that providers would insert a footnote into their e-materials or websites so that schools could see that the materials they received had been funded as part of a trial.

### **Project team**

The principal investigator was Dr Ben Styles, Head of NFER’s Education Trials Unit. The day-to-day trial manager was Pippa Lord, Senior Research Manager in NFER’s Centre for Evaluation and Consultancy. They were supported by NFER statistician Adam Rabiasz and, earlier in the study, by Dr Anneka Dawson (who was working at NFER during the school sampling stage).

The communication strategies were delivered by four organisations or partnerships referred to as ‘Literacy Octopus providers’. These were the Centre for Evaluation and Monitoring (CEM) at Durham University, the Institute for Effective Education (IEE) at The University of York, NatCen working with ResearchEd, and Campaign for Learning on behalf of Train Visual (the organisation that owns Teaching How2s).

NFER was responsible for sampling schools, randomising schools, pupil-data analysis, and reporting. Literacy Octopus providers were responsible for communicating their passive research materials to schools in their arm. NFER put in place a data sharing agreement with each provider to cover how the relevant allocated list of schools would be shared (per arm).

The project was supported and guided by EEF staff Eleanor Stringer, Professor Jonathan Sharples, and, from 2016 onwards, Dr Anneka Dawson.

### **Trial registration**

The Literacy Octopus Trial is registered at <http://www.isrctn.com/ISRCTN84508118>. This registration relates to both the dissemination and evidence-based literacy support trials – known in the protocol, statistical analysis plans and analysis syntax as the Passive and Active Trials respectively.

## Methods

### Trial design

The Literacy Octopus Dissemination Trial was a large-scale school randomised effectiveness trial. There was no recruitment phase as schools in the dissemination trial were not aware that they were part of the dissemination trial in advance of receiving the materials. Materials and emails were simply sent by providers, en masse, to schools. Schools were randomised to one of five groups—four intervention groups where providers used ‘passive’ means of communicating with schools, or to a ‘business as usual’ control group. The trial followed a many-to-one comparison scheme (each group mean was compared to the control group mean and only the control group mean).

### Participant selection

The sampling frame of the dissemination trial was defined to include all state primary schools in England that had a Year 6, that had not been recruited to the *Evidence-based Literacy Support—the ‘Literacy Octopus’ Trial*, and which were not already in receipt of research communications from the providers. From this population, a sample of 12,500 schools was drawn and split into five equal-sized groups, one for each provider and one control group. After randomisation, the providers were given their list of schools and proceeded to implement their passive communication methods.

### Outcomes measures

#### Primary outcome

The primary outcome was 2015/2016 Key Stage 2 attainment in English. We used the sum of READSCORE (scaled score in reading) and GPSSCORE (scaled score in grammar, punctuation, and spelling). Writing was not included as this was teacher assessed and is therefore vulnerable to bias.

#### Secondary outcome

The secondary outcome was the same as the above but for the 2016/2017 Year 6 cohort. Results from this analysis will be reported in an addendum report in 2018.

### Sample size

Power calculations performed in the protocol indicated that with four passive arms and a control group, each containing 2,500 schools, the estimated minimum detectable effect size (MDES) would be 0.024. Sample size calculations were based on KS2 outcomes with KS1 as a baseline using the following assumptions

- average of 34 pupils per cohort per school;
- ICC = 0.15 (reduced from 0.2 through the use of KS1 as a covariate);
- correlation between KS1 and KS2 = 0.7;
- power = 80%; and
- significance = 5%.

Minimal and unbiased attrition was anticipated as this trial used administrative NPD data only.

### Randomisation

Simple randomisation was used to allocate 12,500 schools to one of four passive arms or a control group (all groups had 2,500 schools). Randomisation was carried out by an NFER statistician. Once

randomisation was completed, providers received their list of schools and implemented their passive communications strategies with them. The randomisation syntax is included in Appendix C.

## Analysis

The statistical analysis plan (SAP) for the dissemination trial is available online:

[https://educationendowmentfoundation.org.uk/public/files/Projects/Evaluation\\_Protocols/SAP\\_Literacy\\_Octopus\\_-\\_Passive.pdf](https://educationendowmentfoundation.org.uk/public/files/Projects/Evaluation_Protocols/SAP_Literacy_Octopus_-_Passive.pdf)

### Primary intention-to-treat (ITT) analysis

The primary outcome analysis was 'intention to treat'. A multilevel model with two levels (school and pupil) was used for the analysis to account for the cluster randomisation. The first step was to determine if different methods of communicating research had had any significant effect on KS2 attainment. This was ascertained by fitting two models to the data: one which had KS2 attainment as the dependent variable and KS1 attainment as an independent variable, and a second model identical to the first but including four dummy variables that indicated which group an individual was in (the default being control). A likelihood ratio test between these models provided a global test for the impact of the passive communication strategies used within this trial.

Analysis continued in terms of presenting effect sizes and confidence intervals for each arm versus control, regardless of the outcome of the global test. No *post hoc* tests were made between the trial's intervention arms as the emphasis of the study was to determine the effectiveness of each individual passive approach to the control group.

When calculating confidence intervals, the two-sided form of Dunnett's Test (1955) was used to control the family-wise error rate. This test is specifically designed to handle the scenario of multiple comparisons being made to a common control group and is an exact test (that is, its family-wise error rate is exactly equal to alpha) and can be used in balanced and unbalanced designs.

All multilevel analyses were carried out using the R package nlme. Dunnett's Test was used to control the family-wise error rate using the R package multcomp.

### Imbalance at baseline

As the primary outcome was available from administrative NPD data and there was no opportunity for schools to withdraw it was anticipated that the level of missing data would not exceed 5% at either the school or pupil level. However, since pupil-level missing data was at 6%, baseline imbalance was explored for 'percentage everFSM' and mean KS1 attainment (see 'Missing data').

### Missing data

As this analysis used administrative NPD data, it was anticipated that the number of pupils missing would be very small and that any such cases could be excluded from the analysis without risk of bias. It was anticipated that the level of missing would not exceed 5% at either the school or pupil level so no missing data analysis was planned.

In the event, however, 103 randomised schools could not be located on administrative NPD data due to school closure, merger, or organisational changes such as academisation.<sup>1</sup> Missing schools were spread across the arms. Since these represented just under 1% of all 12,500 schools in the sample, no analysis of schools missingness was required.

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<sup>1</sup> Both the NPD team and NFER statisticians addressed the issue of URN changes at academisation through the use of link files supplied by DfE. The missing schools are as a result of very recent academisation that 'fall through the gap' between NPD records and Edubase records.

Pupil-level missing data, however—through individuals not having a full complement of test scores at baseline and follow-up—accounted for 6% of the total: 28,604 pupils of the 466,799 pupils matched via Unique Pupil Numbers (UPNs) to the NPD. We therefore explored the means of the analysed groups using school-level ANOVAs on 'percentage everFSM' and KS1 school mean scores. We do not believe data was missing for any reason that might indicate bias as Literacy Octopus dissemination would not interfere with a school's ability to administer KS2 tests in the usual way.

### **On-treatment analysis**

No on-treatment analysis was specified or required for this trial. The only monitoring of delivery was a statement from each provider that they had sent their materials as planned.

### **Secondary outcome analysis**

Follow-up outcomes using Key Stage 2 English attainment data for the 2016/2017 cohort will be analysed and reported in an addendum report in 2018. The same analysis as that outlined in the primary intention-to-treat analysis for the 2016 cohort will be used.

### **Subgroup analyses**

Sub-group analysis on the primary outcome was carried out on the FSM group only as per the protocol and the most recent EEF analysis guidelines—that is, whether a pupil has ever received free school meals ('everFSM').<sup>2</sup> This was done using a model identical to the primary outcome model but including everFSM and everFSM\*intervention as covariates too. Analysis proceeded as per the original primary outcome modelling, that is, the first model was identical to the primary outcome model but with everFSM as a covariate. The second model contained a further eight covariates: four dummies for randomised group and four interaction terms. A likelihood ratio test was performed between the two models.

A second model was also run including only everFSM children, as per EEF analysis guidelines. Analysis conformed to the original primary outcome model.

### **Effect size calculation**

All effect sizes were calculated using total variance from a multilevel model, without covariates, as the denominator—equivalent to Hedges' *g*. Confidence intervals for each effect size were derived from Dunnett's Test (see above) to take into account multiple comparisons. Dunnett's Test applied to the model coefficients themselves. These were then converted to effect size confidence intervals using the same formula as the effect size itself.

### **Implementation and process evaluation**

There was no implementation and process evaluation (IPE) specified for this trial—except for providers to confirm that they had indeed sent their materials and emails as planned.

### **Costs**

There was no cost evaluation specified for this trial. We did not collect any cost data from schools and the EEF do not require providers' costs to be reported.

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<sup>2</sup> We used the NPD EVERFSM\_ALL variable which entails a flag to indicate if a pupil has ever been recorded as eligible for free school meals on the census day in any spring census up to the pupil's current year (not including nursery).

## Timeline

**Table 2: Timeline**

Date	Activity
Summer term 2014	Write, agree, and register protocol.
Autumn term 2014	Devise sample strategy (after <i>Evidence-based literacy support – the 'Literacy Octopus' trial</i> sampling frame). Sample schools. Randomly allocate schools to one of five groups (Dec 2014).
Spring term 2015	<i>Providers send intervention materials to schools.</i>
Autumn term 2016	Write and agree SAP.
Spring term 2017	Intention-to-treat analysis using NPD data (primary outcome 2015/2016). Sub-group analysis (everFSM). Write report.
Autumn term 2017	Publish main report.
Further activities to be undertaken (2017–2018)	
Autumn term 2017	
Spring term 2018	Intention-to-treat analysis using NPD data (follow-up 2016/2017). Write addendum report.
Summer term 2018	Publish addendum report .

*NFER timetable for the Literacy Octopus Dissemination Trial. Evaluation activity shown in normal font. Provider/intervention activity shown in italics.*

## Impact evaluation

### Participants

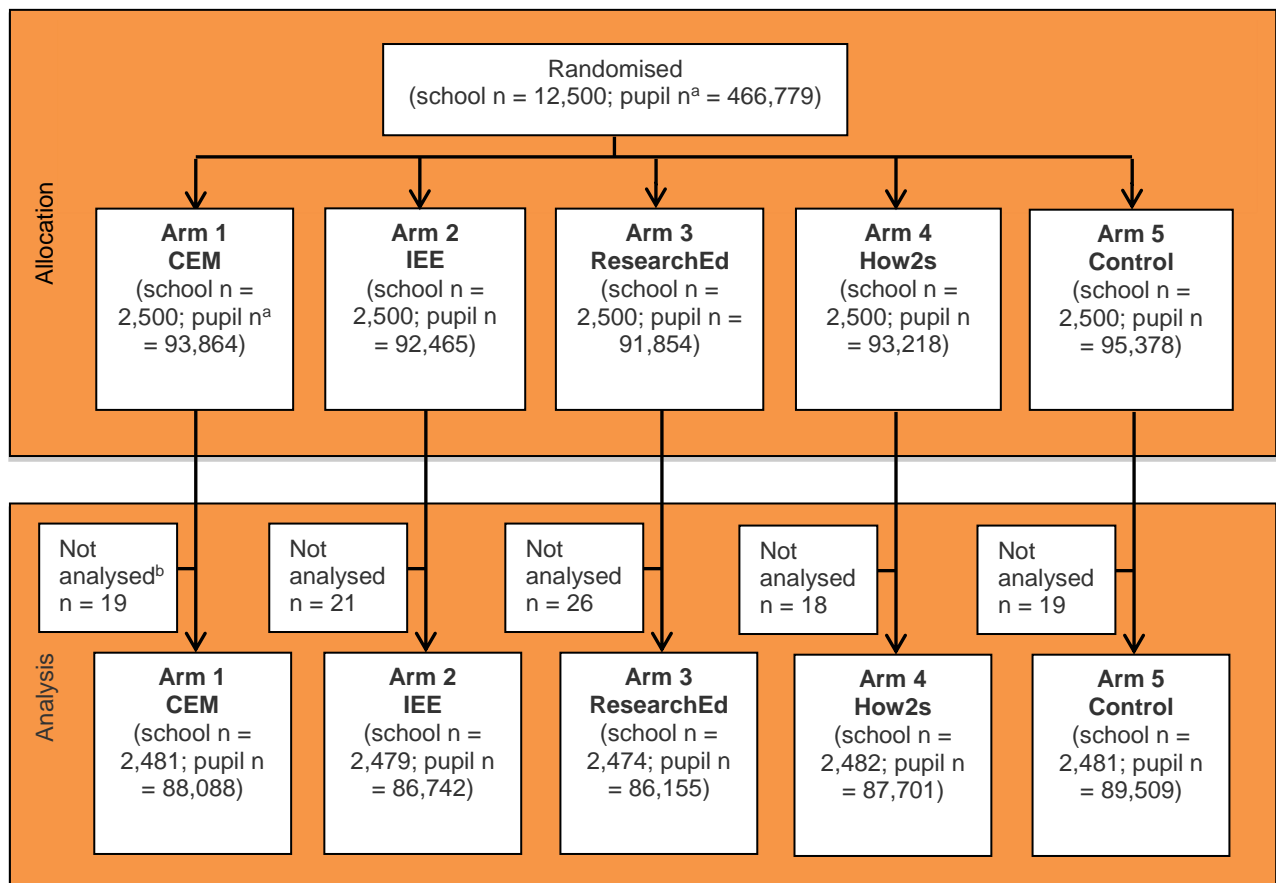
Figure 1 provides details of the participant flow through each stage of the ‘Literacy Octopus’ Dissemination Trial.

As Figure 1 illustrates, 12,500 schools were randomised for the this trial of which 103 could not be matched from our randomised list to the NPD dataset provided by the DfE NPD team. Reasons were entirely down to changes in school organisation such as closures, mergers, or academisation. There were no biased reasons. This represented just under 1% of the randomised schools and hence no further analysis was required to address this.

In terms of pupil attainment results used in the trial, we were unable to match KS1 and KS2 cases for 28,604 of the 466,799 pupil results in the trial—6% of cases. ANOVAs on baseline means for KS1 pupils and everFSM pupils, reported under Table 4, suggested that this level of missingness was unbiased.

Table 3 provides details of minimum detectable effect sizes at different stages in the trial.

**Figure 1: Participant flow diagram—‘Literacy Octopus’ Dissemination Trial**



<sup>a</sup> Determined from the match to NPD, using data from the 12,397 schools that could be matched to NPD.

<sup>b</sup> Could not be matched back to NPD for reasons such as school closure or merger: 103 of the 12,500 randomised schools could not be matched to NPD.



**Table 3: Minimum detectable effect size (MDES) at different stages**

Stage	n schools (n = each arm) n pupils (n = each arm)	Correlation between pre-test & post-test	ICC	Blocking/ stratification or pair matching	Power	Alpha	MDES
<b>Protocol</b>	12,500 (2,500) 437,500 (85,000)	0.70	0.15	n/a	80%	0.05	0.024
<b>Randomisation</b>	12,500 (2,500) 466,779 (minimum 91,854)	0.70	0.15	n/a	80%	0.05	0.024
<b>Analysis (i.e. available pre- and post-test)</b>	12,397 (minimum 2,474) 438,195 (minimum 86,155)	0.68	0.14	n/a	80%	0.05	0.024

Source: NFER Literacy Octopus Dissemination Trial, 2016

### Pupil characteristics

Randomised schools that could not be matched to the NPD for reasons such as closures and mergers accounted for less than 1% of the original 12,500. This was a very small fraction of a large number of schools and occurred for reasons very unlikely to be due to bias. We have therefore omitted school-level factors from the baseline comparison table. Pupil-level missing data, however, through individuals not having a full complement of test scores at baseline and follow-up, accounted for 6%. We have therefore included two comparisons of school means on analysed groups (percentage everFSM and KS1) in Table 4. To interpret this table it is helpful to know that the overall standard deviation of the percentage everFSM and KS1 school mean measures were 20.8 and 2.55, respectively.

**Table 4: Baseline comparison**

Pupil-level variable  (analysed at school-level)	CEM: advice booklet only (Arm 1)		IEE: evidence material only (Arm 2)		Research Ed: invitation to webinar materials only (Arm 3)		Teaching How2s: login only (Arm 4)		Control	
	n (missing)	mean	n (missing)	mean	n (missing)	mean	n (missing)	mean	n (missing)	mean
<b>Percentage everFSM</b>	2,481 (19)	29.1	2,479 (21)	29.2	2,474 (26)	28.2	2,482 (18)	29.3	2,481 (19)	29.6
<b>KS1 school mean</b>	2,481 (19)	31.12	2,479 (21)	31.14	2,474 (26)	31.18	2,482 (18)	31.10	2,481 (19)	31.14

Source: NFER Literacy Octopus Dissemination Trial, 2016

An ANOVA on 'percentage everFSM' ( $df = 4$ ,  $F = 1.495$ ,  $p = 0.201$ ) suggested that the differences we see were due to chance. The ANOVA on KS1 school means ( $df = 4$ ,  $F = 0.335$ ,  $p = 0.854$ ) also suggested that any differences were due to chance. In terms of a pre-test effect size on analysed groups, the largest was -0.017 between Teaching How2s and control (a small difference when interpreting effect sizes).

## Outcomes and analysis

### Primary outcome and sub-group analysis

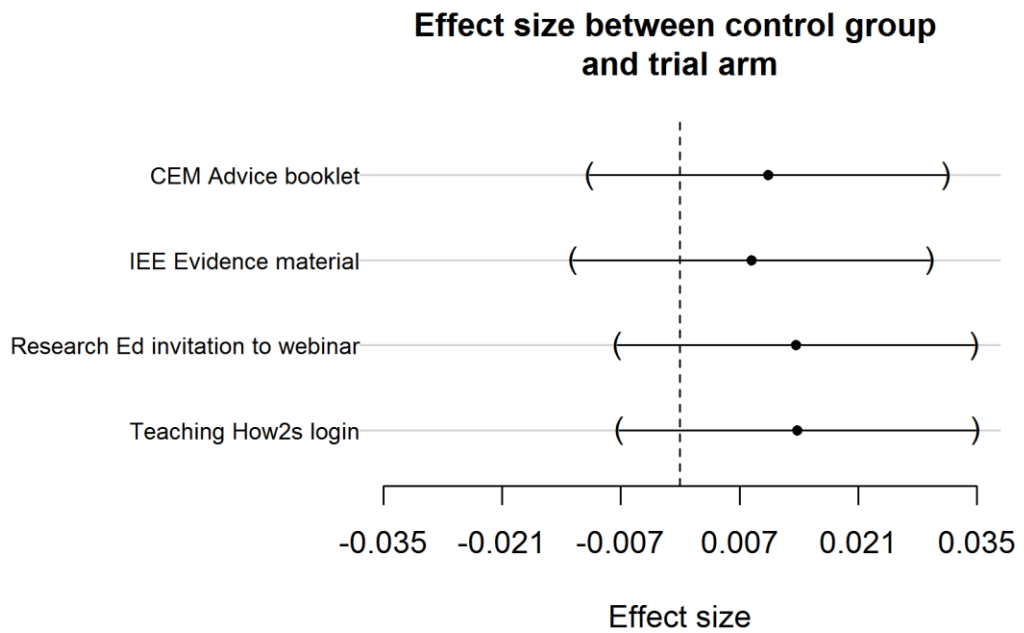
The main result was from a likelihood ratio test between a multi-level model containing just baseline and one containing baseline plus all the intervention groups as covariates. This yielded a likelihood ratio of 3.45 ( $p = 0.48$ ) meaning that we do not reject the null hypothesis and there is no evidence of any effect of the various interventions. In order to present effect sizes, confidence intervals were calculated using Dunnett’s Test to correct for multiple inference: the results are presented in Table 5a and Figures 2a and 2b; these show results for the primary outcome (KS2 literacy attainment for the 2015/2016 cohort) and for the everFSM subgroup.

**Table 5a: Primary analysis—effect size versus control (Dunnett’s multi-level confidence intervals); numbers of schools (n) and numbers of pupils (N)**

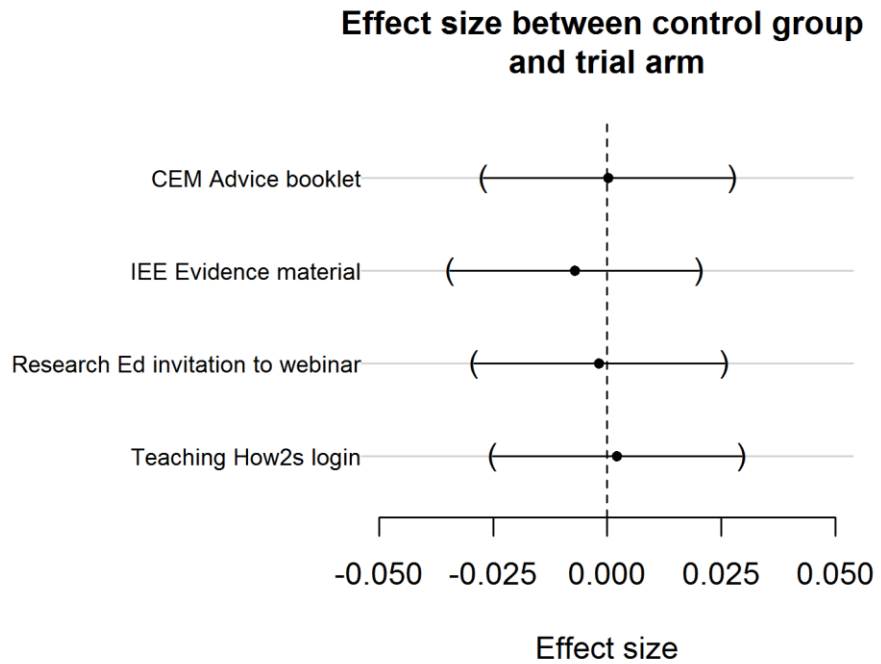
Outcome	CEM: advice booklet only (Arm 1)		IEE: evidence material only (Arm 2)		Research Ed: invitation to webinar only (Arm 3)		Teaching How2s: login only (Arm 4)		Control (Arm 5)
	n N (missing)	ES (95% CI)	n N (missing)	ES (95% CI)	n N (missing)	ES (95% CI)	n N (missing)	ES (95% CI)	n N (missing)
KS2 English	n 2,481 (19)	0.01	n 2,479 (21)	0.01	n 2,474 (26)	0.01	n 2,482 (18)	0.01	n 2,481 (19)
	N 88,088 (5,776)	(-0.01, 0.03)	N 86,742 (5,723)	(-0.01, 0.03)	N 86,155 (5,699)	(-0.01, 0.03)	N 87,701 (5,517)	(-0.01, 0.03)	N 89,509 (5,869)
KS2 English (everFSM only)	n 2,346 (154)	0.00	n 2,335 (165)	-0.01	n 2,343 (157)	0.00	n 2,354 (146)	0.00	n 2,361 (139)
	N 26,319 (1,708)	(-0.03, 0.03)	N 26,243 (1,764)	(-0.04, 0.02)	N 25,059 (1,664)	(-0.03, 0.03)	N 26,489 (1,709)	(-0.03, 0.03)	N 26,799 (1,725)

Source: NFER Literacy Octopus Dissemination Trial, 2016

**Figure 2a: Primary analysis—effect size versus control (Dunnett’s multi-level confidence intervals)**



**Figure 2b: FSM-only analysis—effect size versus control (Dunnett’s multi-level confidence intervals)**



We also explored raw unadjusted means using Key Stage 2 English attainment data for all pupils in dissemination trial schools in the NPD 2015/2016 KS2 dataset (that is, those with KS2 scores, but prior to the analysed KS1-KS2 match used in the main analysis reported in Table 5a). The results are shown in Table 5b enabling the reader to see the raw results prior to complex modelling. Missing data relates to the number of pupils missing KS2 data on the NPD list provided by DfE. Note: the participant flow diagram provides numbers of pupils in the main primary outcome analysis (that is, those shown in Table 5a).

**Table 5b: Raw means—unadjusted confidence intervals, numbers of pupils (N)**

Outcome	CEM: advice booklet only (Arm 1)		IEE: evidence material only (Arm 2)		Research Ed: invitation to webinar only (Arm 3)		Teaching How2s: login only (Arm 4)		Control (Arm 5)	
	n N (missing)	ES (95% CI)	n N (missing)	ES (95% CI)	n N (missing)	Outcome	n N (missing)	ES (95% CI)	n N (missing)	ES (95% CI)
<b>KS2 English</b>	91,842 (2,022)	205.98 (205.87, 206.10)	90,395 (2,070)	205.98 (205.86, 206.10)	89,662 (2092)	206.19 (206.07, 206.30)	91,216 (2,002)	206.11 (205.99, 206.23)	93,341 (2,037)	205.95 (205.84, 206.07)
<b>KS2 English (everFSM only)</b>	27,090 (937)	200.32 (200.08, 200.55)	27,048 (959)	200.25 (200.01, 200.49)	25,754 (969)	200.55 (200.31, 200.79)	27,294 (904)	200.45 (200.22, 200.69)	27,609 (915)	200.63 (200.40, 200.86)

Source: NFER Literacy Octopus Dissemination Trial, 2016

## Process evaluation

All providers confirmed that they sent their materials as planned to the headteacher contacts at each of their 2,500 allocated schools. The '*Literacy Octopus*' Dissemination Trial did not require any monitoring of sent or received items.

## Conclusion

### Key conclusions

1. The project found no evidence that Literacy Octopus passive dissemination interventions improved pupils' attainment in English Key Stage 2 scores compared with the control group. The five padlock security rating means we have very high confidence in this result.
2. These findings suggest that simply disseminating research summaries and evidence-based resources to schools is not an effective way for research organisations to support schools to improve pupil outcomes.
3. It is likely that these materials formed a small part of the information received by schools during this time. It is possible that if schools had support to navigate and prioritise that information, greater impact could be achieved. Alternatively, schools may need more support in transforming such materials into actual change in the classroom. The accompanying *Evidence-based Literacy Support—the 'Literacy Octopus' Trial* helps us to assess this.
4. The evaluator will analyse the following year's Key Stage 2 results from these schools to explore if there is a longer-term effect of the interventions.

### Interpretation

There was no evidence that any of the Literacy Octopus passive communication approaches impacted on pupil attainment in literacy. This was the case for all pupils, and for the everFSM subgroup of pupils.

The extent to which schools engaged with or used the materials in this dissemination trial is not known as it was not monitored. However, we can say from this trial that attempting to reach a large number of schools and teachers through fairly light-touch and inexpensive approaches does not impact on teaching and learning in a measurable way according to pupil attainment outcomes. This is not to say that schools did not use or engage with the materials in any way: we know from the *Evidence-based Literacy Support – the 'Literacy Octopus'* trial that just under three-fifths of schools did engage, at least to some extent, in passive arm activity. However, any engagement, or otherwise, did not result in impacts on pupil attainment.

The findings answer the main question in the Theory of Change which asked if it might be worth sending inexpensive materials to a large number of participants as a way of initiating practice-change and improving learning. For researchers, and indeed schools, the findings suggest that this is not a worthwhile effort, at least, not on its own. Furthermore, even where materials include some elements of applicability that are known to be effective (Durbin and Nelson, 2014; Sharples, 2013), as was the case in all of the Literacy Octopus providers' materials (for example, they were well structured and included examples for practice), simple passive dissemination is insufficient to make a difference to teaching and learning.

It is also worth noting that all of the communication in this trial was direct to the headteacher of each school. Research literature indicates that senior leader buy-in is key to school-wide knowledge mobilisation (Nelson and O'Beirne, 2014; Speight *et al.*, 2016). But again, despite targeting communication at the most relevant level, simple 'push' dissemination approaches as trialled in this study seem insufficient to affect change (at least, in terms of pupil attainment outcomes as measured on this trial). Furthermore, headteachers are likely to be targeted by other information too, and may need support to navigate this.

Control school 'business as usual' was not monitored on this dissemination trial. However, it is clear from policy and practice changes during the trial period (2014–2016) that schools are increasingly being encouraged to make evidence-informed decisions (DfE, 2016) and it is highly likely that all schools in

this trial were receiving research and commercial product marketing information as a matter of course. The Literacy Octopus materials were probably light touch additions to a schools' usual information receipts. The question remains—What level of supported research engagement activity would help schools to use and engage with research, to improve pupil outcomes?

## Limitations

The primary outcome analysis for this study had no limitations in terms of bias and precision as it used administrative NPD data and there were only minor incidences of missing data: just under 1% of schools (103) could not be found on the NPD-supplied data—purely for reasons such as school academisation, amalgamation, or school name changes. Pupil-level missing data, however, through individuals not having a full complement of test scores at baseline and follow-up, accounted for 6%, but this was not found to affect balance at baseline.

Because of the scale of the dissemination trial, involving 12,500 schools—over 80% of all primary schools in England—the results can be generalized to the whole school population in England. However, study limitations include the fact that actual usage and engagement with the materials was not monitored, neither was control group 'business as usual'. That said, we know from the existing school market landscape that all schools receive posted and emailed materials as a matter of course and hence it seems entirely reasonable not to require monitoring of this.

## Future research and publications

The impact on pupils' literacy attainment in Key Stage 2 for the successive cohort (2016/2017) will be analysed and reported in an addendum report in 2018. This reflects the Theory of Change—that changes in pupil attainment may take time to surface making it pertinent to explore two cohorts' worth of attainment data.

The '*Literacy Octopus*' Dissemination Trial had no impact on attainment. The materials were light touch and used passive dissemination methods. The findings raise two key questions: first, how to better attract schools' attention to the value of research evidence among the surfeit of disseminated information they receive, and second—in combination with findings from the *Evidence-based Literacy Support – the 'Literacy Octopus'* trial —to consider what level of additional supported research engagement activity would help schools to use and engage with research in order to improve pupil outcomes.

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## Appendix A: EEF cost rating

Cost ratings are based on the approximate cost per pupil per year of implementing the intervention over three years. More information about the EEF's approach to cost evaluation can be found [here](#). Cost ratings are awarded as follows:

Cost rating	Description
£ £ £ £ £	<i>Very low:</i> less than £80 per pupil per year.
£ £ £ £ £	<i>Low:</i> up to about £200 per pupil per year.
£ £ £ £ £	<i>Moderate:</i> up to about £700 per pupil per year.
£ £ £ £ £	<i>High:</i> up to £1,200 per pupil per year.
£ £ £ £ £	<i>Very high:</i> over £1,200 per pupil per year.

## Appendix B: Security classification of trial findings

Rating	Criteria for rating			Initial score	Adjust	Final score
	Design	Power	Attrition			
5	Well conducted experimental design with appropriate analysis	MDES < 0.2	0-10%	5		5
4	Fair and clear quasi-experimental design for comparison (e.g. RDD) with appropriate analysis, or experimental design with minor concerns about validity	MDES < 0.3	11-20%		Adjustment for Balance [ 0 ]	
3	Well-matched comparison (using propensity score matching, or similar) or experimental design with moderate concerns about validity	MDES < 0.4	21-30%			
2	Weakly matched comparison or experimental design with major flaws	MDES < 0.5	31-40%		Adjustment for threats to internal validity [ 0 ]	
1	Comparison group with poor or no matching (E.g. volunteer versus others)	MDES < 0.6	41-50%			
0	No comparator	MDES > 0.6	over 50%			

- **Initial padlock score:** lowest of the three ratings for design, power and attrition = 5 padlocks
- **Reason for adjustment for balance** (if made): N/A
- **Reason for adjustment for threats to validity** (if made): N/A
- **Final padlock score:** initial score adjusted for balance and internal validity = 5 padlocks

## Appendix C: Randomisation Syntax

```
title 'EEFA: Passive Trial'.
```

```
set printback=on.
```

```
GET DATA /TYPE=XLSX
```

```
  /FILE='K:\EEFA\FINAL list for passive trial.xlsx'
```

```
  /SHEET=name 'FINAL passive list 221214'
```

```
  /CELLRANGE=full
```

```
  /READNAMES=on
```

```
  /ASSUMEDSTRWIDTH=32767.
```

```
* Check for duplicate nfer_no.
```

```
sort cases by nfer_no.
```

```
match files file=*/first=f1/last=l1/by nfer_no.
```

```
cross f1 by l1.
```

```
* Check for duplicate contact_id.
```

```
sort cases by contact_id.
```

```
match files file=*/first=f2/last=l2/by contact_id.
```

```
cross f2 by l2.
```

```
set rng=mt, mtindex=12.
```

```
compute random=rv.uniform(0,1).
```

```
print formats random (F15.13).
```

```
exe.
```

```
sort cases by random.
```

```
list vars random/cases=from 1 to 20.
```

```
*Freq random.
```

```
compute lineno=$casenum.
```

exe.

numeric group (F2.0).

if \$casenum le 2500 group=1.

if \$casenum ge 2501 and \$casenum le 5000 group=2.

if \$casenum ge 5001 and \$casenum le 7500 group=3.

if \$casenum ge 7501 and \$casenum le 10000 group=4.

if \$casenum ge 10001 group=5.

freq group.

sort cases by group.

add value labels group 1 '1: CEM - Advice booklet only' 2 '2: IEE - Evidence material only' 3 '3:  
Research Ed - Invitation to webinar only'

4 '4: Teaching How2s - Login only' 5 '5: Control group'.

SAVE TRANSLATE OUTFILE='K:\EEFA\Passive trial randomisation.xlsx'

/TYPE=XLSX

/VERSION=12

/MAP

/REPLACE

/FIELDNAMES

/CELLS=VALUES

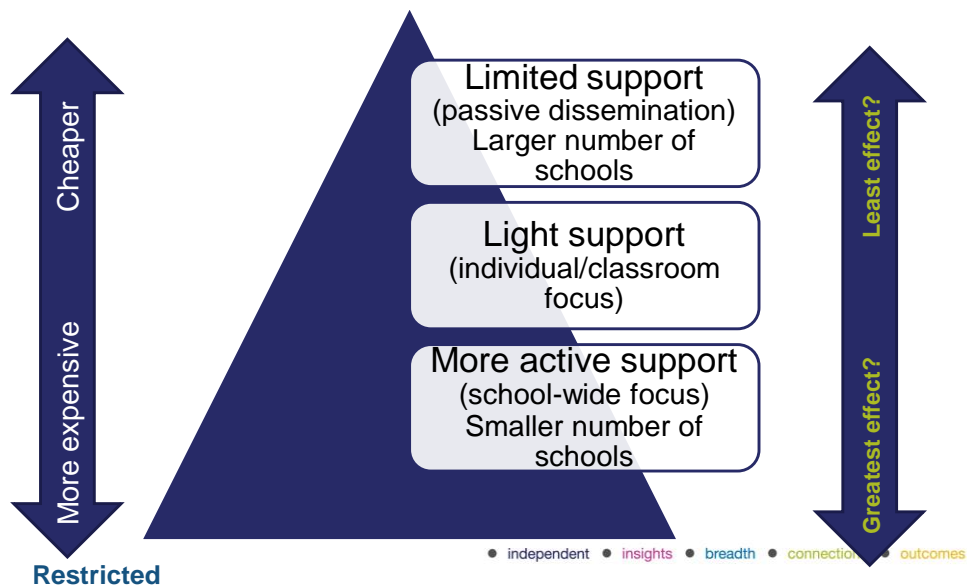
/KEEP=Contact\_ID NFER\_No group Region Northwithformula Southwithformula.

## Appendix D: A Theory of Change

The Theory of Change for the Literacy Octopus Dissemination Trial posits the question whether inexpensive 'push' dissemination approaches will have an effect. Inexpensive materials can be sent to a large number of schools/teachers to test out this question.



### What does active support look like?



# Addendum – added January 2019

## Executive summary

### The project

The *'Literacy Octopus' Dissemination Trial* aimed to test the impact on pupil outcomes of disseminating research summaries and evidence-based resources to schools. The materials aimed to support teaching and learning of Key Stage 2 (KS2) literacy and were created by organisations with experience of engaging schools in evidence use. A sample of 12,500 primary schools was randomised into five groups of 2,500 – four intervention arms and one control group. In spring term 2015, the following four providers sent evidence-based materials to the 2,500 schools in each of their groups: the Institute for Effective Education (IEE) at the University of York, the Campaign for Learning in partnership with Train Visual, the Centre for Evaluation and Monitoring (CEM) at Durham University, and NatCen in collaboration with ResearchEd.

The initial analysis measured KS2 literacy attainment outcomes for the 2015/16 cohort of Year 6 pupils in 12,500 trial schools (Lord *et al.*, 2017a). The addendum analysis measured KS2 literacy attainment outcomes for the following year's Year 6 cohort using 2016/17 data from the National Pupil Database (NPD).

### Summary of previous results

The main project found no evidence that Literacy Octopus passive dissemination interventions had an impact on pupils' English results at KS2 (2015/2016). This was also true when considering only pupils who had ever been eligible for free school meals (FSM). The lack of impact across the different interventions suggested that simply disseminating research summaries and evidence-based resources to schools was not an effective way for research organisations to support schools to improve pupil outcomes, or certainly not in the timescale measured (one academic year).

### Summary of new results

The addendum project found no evidence that Literacy Octopus dissemination interventions had an impact on pupils' English results at KS2 in 2016/17 (i.e. one year later than the main trial). The results suggest that, rather than taking time to embed into teaching and learning, simple passive dissemination is insufficient to make a difference to pupil outcomes in the longer term. As suggested in the main report, the Literacy Octopus materials would likely have formed a small part of the research and commercial information received by schools, and so may have been too light touch or not sufficiently sustained to effect change in the longer term.

No further dissemination activities took place beyond July 2016 in the dissemination trial. Costs to schools in terms of time to use the materials further were not monitored on this dissemination trial. However, we know from the Literacy Octopus evidence-based literacy support trial that it was inexpensive for schools to engage with the materials. Hence, costs can be taken as nil in 2016/17, or very low, as they were for the 2015/16 cohort.

Tables 1a and 1b present a summary of the results for the 2015/16 and 2016/17 cohorts respectively.

**Table 1a: Summary of impact on primary outcome (Key Stage 2 English) 2015/16<sup>3</sup>**

Group	Effect size (95% CI)	Estimated months' progress	No. of pupils*	P value**	EEF cost rating
CEM Passive Arm 1 vs control	0.01 (-0.01- 0.03)	0	87,405	0.36	£££££
IEE Passive Arm 2 vs control	0.01 (-0.01- 0.03)	0	86,078		£££££
ResearchEd Passive Arm 3 vs control	0.02 (-0.00- 0.04)	0	85,509		£££££
How2s Passive Arm 4 vs control	0.02 (-0.01- 0.04)	0	87,051		£££££

\*Number of pupils' refers to the number of pupils' results analysed in the primary outcome multi-level model. Note, the model included results from 88,831 control group pupils.

\*\*The p-value results from a single likelihood ratio test (LRT) across all trial arms. The hypothesis for this test was that there is no difference in mean score, adjusted for baseline, between each arm and control.

**Table 1b: Summary of impact on secondary outcome, Key Stage 2 English attainment 2016/17**

Group	Effect size (95% CI)	Est. months' progress	No. of pupils*	P value**	EEF Cost Rating
<b>CEM Passive Arm 1 vs control</b>	-0.00 (-0.03- 0.02)	0	89,537	0.86	£££££
<b>IEE Passive Arm 2 vs control</b>	-0.00 (-0.03 -0.02)	0	87,899		£££££
<b>ResearchEd Passive Arm 3 vs control</b>	0.00 (-0.02- 0.03)	0	88,153		£££££
<b>How2s Passive Arm 4 vs control</b>	0.00 (-0.02- 0.02)	0	88,890		£££££

\*Number of pupils' refers to the number of pupils' results analysed in the primary outcome multi-level model. Note, the model included results from 91,145 control group pupils.

\*\*The p-value results from a single likelihood ratio test (LRT) across all trial arms. The hypothesis for this test was that there is no difference in mean score, adjusted for baseline, between each arm and control.

<sup>3</sup> As noted in the section on Analysis, results presented in this addendum report are based on a model that includes only those pupils that have both a reading and a GPS score at KS2. This differs slightly to the model run in the main report for 2015/16, which included pupils that had one of reading or GPS score missing.

## Key conclusions

1. There was no evidence that any of the approaches to disseminating evidence-based materials to schools improved pupils' Key Stage 2 English scores (2016/17), two years on from when schools received the materials.
2. The same was the case one year earlier (in 2015/16) as described in the main report. One suggestion was that one academic year after receiving materials was too soon to achieve outcomes; but this addendum analysis exploring outcomes with the next Year 6 cohort one year on has also found no effect.
3. As suggested in the main report, the Literacy Octopus materials would likely have formed a small part of the research and commercial information received by schools, and schools may need more support in navigating and prioritising evidence-based materials to improve teaching and learning.
4. In addition, it could be that a more sustained approach to communicating research and evidence-based materials to schools would be valuable. Schools received materials in spring 2015 and some arms continued light touch dissemination (for example, email updates) to July 2016. There was no further dissemination activity beyond July 2016.
5. Research organisations need to find other more effective ways of communicating and engaging schools with research evidence, in order to improve pupil outcomes.



# Introduction

## Intervention

The main report for this trial summarised the findings from the *Literacy Octopus Dissemination Trial* on the 2015/16 Year 6 cohort's KS2 English outcomes (the primary outcome) (Lord *et al.*, 2017a). The trial was a school-randomised trial, involving five arms (four intervention and one control) and 12,500 schools in total. The trial tested a range of dissemination approaches, all of which aimed to provide schools with evidence-based materials to improve teaching and learning in Key Stage 2 (KS2) literacy. The same organisations as those in the accompanying trial on *Evidence-based Literacy Support* (Lord *et al.*, 2017b) provided the materials to schools, namely: the Institute for Effective Education (IEE) at the University of York, the Campaign for Learning in partnership with Train Visual running Teaching How2s, the Centre for Evaluation and Monitoring (CEM) at Durham University, and NatCen in collaboration with ResearchEd.

Providers sent materials *en masse* to their allocated schools. For two of the providers (IEE and Teaching How2s), the communication approaches mirrored those used in their respective passive arms of the *Evidence-based Literacy Support Trial*. The IEE sent regular research summaries and emails to schools from spring 2015 to July 2016, and How2s provided schools with a free subscription to the How2s website during this time. The dissemination from CEM and ResearchEd differed slightly to their respective passive arms in the evidence-based support trial. For this larger dissemination trial, CEM sent schools an evidence-based booklet in spring 2015, but no other materials; and in summer 2015 ResearchEd invited schools to view archived webinar and conference material, but were not invited to the conference. No further dissemination activity occurred after July 2016 in any of the arms. The main report (Lord *et al.*, 2017a) provides further details of the dissemination interventions.

## Evaluation objectives

As per the protocol<sup>4</sup>, the purpose of the addendum analysis was to investigate KS2 literacy outcomes for the following year's cohort (2016/17), using the same outcome measure and analysis method as for primary outcome for the 2015/16 cohort<sup>5</sup>. The project aimed to find out whether attainment outcomes were achieved one year on, after a period of time in which schools could embed any learning or changes in practice since receiving materials in 2015/16. No sub-group analyses were specified for this secondary addendum outcome.

## Project team

The principal investigator was Dr Ben Styles, head of NFER's Education Trials Unit. The trial manager was Pippa Lord, Senior Trials Manager in NFER's Centre for Statistics. They were supported by Dr Joana Andrade, Statistician, for the addendum analysis and reporting.

As set out in the main report, the projects were delivered by four organisations or partnerships referred to as 'Literacy Octopus providers', each delivering one passive arm in this large dissemination trial. These were: the Institute for Effective Education (IEE) at The University of York; the Campaign for

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[https://educationendowmentfoundation.org.uk/public/files/Projects/Evaluation\\_Protocols/EEF\\_Project\\_Protocol\\_TheLiteracyOctopusPassiveTrial.pdf](https://educationendowmentfoundation.org.uk/public/files/Projects/Evaluation_Protocols/EEF_Project_Protocol_TheLiteracyOctopusPassiveTrial.pdf)  
and amended here:

[https://educationendowmentfoundation.org.uk/public/files/Projects/Evaluation\\_Protocols/EEF\\_Project\\_Protocol\\_Research\\_use\\_-\\_communicating\\_research\\_findings\\_passive\\_trial\\_update\\_June\\_2016.pdf](https://educationendowmentfoundation.org.uk/public/files/Projects/Evaluation_Protocols/EEF_Project_Protocol_Research_use_-_communicating_research_findings_passive_trial_update_June_2016.pdf)

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[https://educationendowmentfoundation.org.uk/public/files/Projects/Evaluation\\_Protocols/SAP\\_Literacy\\_Octopus\\_-\\_Passive.pdf](https://educationendowmentfoundation.org.uk/public/files/Projects/Evaluation_Protocols/SAP_Literacy_Octopus_-_Passive.pdf)

Learning on behalf of Train Visual (the organisation that owns Teaching How2s); the Centre for Evaluation and Monitoring (CEM) at Durham University; and NatCen working with ResearchEd.

The addendum was supported and guided by Triin Edovald at the EEF and Anneka Dawson on behalf of the EEF.

## Methods

### Trial design

The *Literacy Octopus Dissemination Trial* was a large-scale school randomised effectiveness trial. Schools were randomised to one of five groups – four intervention groups where providers used ‘passive’ means of communicating with schools, or to a ‘business as usual’ control group. The trial followed a many-to-one comparison scheme (each group mean was compared to the control group mean and only the control group mean).

### Participant selection and sample size

The Methods section of the main report provides details of the sampling approach. In summary, a total of 12,500 primary schools in England that had a Year 6 were sampled and randomised into five equal-sized groups. The main primary analysis was conducted on the 2015/16 Year 6 cohort in these schools. The addendum analysis involved the 2016/17 Year 6 cohort in the same schools.

### Addendum outcome measures

The Literacy Octopus trials aimed to improve pupils’ literacy skills in KS2. The primary outcome for the dissemination trial was KS2 literacy attainment scores in 2015/16 – using the sum of READSCORE (scaled score in reading) and GPSSCORE (scaled score in Grammar, Punctuation and Spelling) from the DfE National Pupil Database (NPD). (As stated in the SAP, writing was not included as this is teacher assessed and is therefore vulnerable to bias.) We used amended KS2 data, available on the NPD from December 2016. This outcome was for pupils in Year 6, one whole academic year after Literacy Octopus dissemination had started.

Secondary outcomes for the trial included KS2 literacy attainment scores for the cohorts one year after (2016/17) the cohort involved in the primary analysis, to explore longer-term outcomes at a school-level (i.e. not tracking the same pupils). We used amended KS2 data from the DfE NPD for the 2016/17 cohort. The same outcome variables were used, i.e. the sum of READSCORE and GPSSCORE. The 2016/17 outcomes were measured after Literacy Octopus dissemination had finished, and are designed to measure the outcome of any longer-term embedding or change in schools.

The outcome measure criteria in this addendum report are different to that in the main reports. The results presented in this addendum report for 2015/16 and 2016/17 are based on KS2 variables computed only if a pupil had a score for both reading, and for grammar, punctuation and spelling (GPS). This criteria is different to that used in the 2015/16 main analysis, as the inclusion of pupils with only one score may violate the assumption of normally distributed residuals in the model<sup>6</sup>.

## Analysis

### Primary and secondary attainment outcome analyses

The primary outcome analysis conducted for the main trial (Lord *et al.*, 2017a) was ‘intention to treat’. A multilevel model with two levels (school and pupil) was used for the analysis to account for the cluster randomisation. The first step was to determine if different methods of communicating research had had any significant effect on KS2 attainment. This was ascertained by fitting two models to the data: one which had KS2 attainment as the dependent variable and KS1 attainment as an independent variable,

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<sup>6</sup> Both approaches to the analysis fall within the published SAP, which stipulates the sum of reading and GPS scores, but does not stipulate exclusions. A check of the distributions of the 2015/16 data both with and without the criteria of inclusion of pupils with only one score, showed that the bimodal distribution was due only to pupils with only one score, that the number of pupils was small, and when removed from the model results are similar..

and a second model identical to the first but including four dummy variables that indicated which group an individual was in (the default being control). A likelihood ratio test between these models provided a global test for the impact of the passive communication strategies used within this trial.

Analysis continued in terms of presenting effect sizes and confidence intervals for each arm versus control, regardless of the outcome of the global test. No *post hoc* tests were made between the trial's intervention arms as the emphasis of the study was to determine the effectiveness of each individual passive approach to the control group.

When calculating confidence intervals, the two-sided form of Dunnett's Test (1955) was used to control the family-wise error rate. This test is specifically designed to handle the scenario of multiple comparisons being made to a common control group and is an exact test (that is, its family-wise error rate is exactly equal to alpha) and can be used in balanced and unbalanced designs. All multilevel analyses were carried out using the R package.

The secondary outcome analyses presented in this addendum used the same modelling approaches for the 2016/17 data. However, as noted in the section on Outcome Measures above, the measure criteria differ slightly to those used in the 2015/16 main analysis. The 2015/16 and 2016/17 analysis presented here, takes into account only observations where scores for both reading and GPS are present, as outlined below. No sub-group analyses were specified for the 2016/17 cohort.

### **Computation of KS1 and KS2 attainment scores**

The KS1 attainment variables were computed as the sum of two KS1 attainment variables, KS2\_KS1READPS<sup>7</sup> and KS2\_KS1WRITPS<sup>8</sup>, in the main trial (2015/2016 primary analysis) and in the addendum (for 2016/17 cohort).

In the main trial (Lord *et al.*, 2017a), the KS1 attainment variables were computed even if one of the terms of the sum was not defined (taking the value of the non-missing term). Only in the cases where both KS2\_KS1READPS and KS2\_KS1WRITPS were missing was the aggregated variable assigned as missing. In the addendum analysis for, 2015/16 and 2016/17, the KS1 attainment variable was computed as non-missing only for the cases where both KS2\_KS1READPS and KS2\_KS1WRITPS were present, and was computed as missing if at least one of the terms of the sum was missing.

Similarly the KS2 attainment variables were computed as the sum of two attainment variables, KS2\_READSCORE<sup>9</sup> and KS2\_GPSSCORE<sup>10</sup>. In the main trial, 2015/16, the KS2 attainment variable was computed even if one of the terms of the sum was missing. In the addendum analysis for 2015/16 and 2016/17, we have included pupil attainment results only where both scores (reading and GPS) are present on the NPD. Exploration of the 2015/16 KS2 data showed that children with only one score gave rise to a bimodal distribution (although the vast majority of scores looked normally distributed). Modelling such data would result in violation of the assumption of normally distributed residuals (albeit in a small way due to the numbers involved). This means that the results presented for the 2015/16 cohort in this addendum report are based on a slightly smaller sample than that in the main report, as only those with both scores are included.

As in the main trial, pupils are only included in the analysis where they have both KS1 and KS2 scores; and, with the new criteria applied in the addendum analysis, they are only included if all parts of the scores are present. Both the main report analysis and addendum report analysis are consistent with the SAP, which was not specific on this point.

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<sup>7</sup> Described in the NPD codebook as **KS1 reading point score**

<sup>8</sup> Described in the NPD codebooks as **KS1 writing point score**

<sup>9</sup> Described in the NPD codebook as **Scaled score in reading**

<sup>10</sup> Described in the NPD codebook as **Scaled score in GPS** (grammar, punctuation and spelling)

The observations included in the addendum analysis correspond to the observations with non-missing values of all of the following variables: KS1 and KS2 attainment scores, unique school identifier (composite of the identifiers of the local authority and Establishment attended by a pupil), and Group (identifier of the trial arm assigned to a pupil's school).

## Impact evaluation

### Attrition

As in the main trial, high levels of school and pupil-level follow-up were guaranteed for the primary and secondary outcomes through the use of NPD data. The use of a revised outcome measure criteria, i.e. pupils having both scores present on NPD, means we re-present the 2015/16 attrition here, as well as that for the 2016/17 cohort. Participant flow diagrams for 2015/16 and 2016/17 are shown in Figures 1 and 2.

For the 2015/16 cohort, randomised schools that could not be matched to the NPD or were not able to be included in the analysis accounted for less than 1% (104 schools<sup>11</sup>) of the original 12,500. Pupil-level missing data, through individuals not having a full complement of all parts of the test scores at baseline and follow-up, accounted for 7% (31,905 of the 466,779 pupil results matched to NPD in the addendum 2015/16 trial cohort). These figures are slightly higher than those reported in the main trial, as pupils' KS2 attainment scores for this addendum were only included where they had both scores present (reading and GPS). They are still well within minimal attrition levels. Baseline comparison for the 2015/16 cohort (primary outcome cohort) in the main report, revealed that any differences in KS1 mean scores were likely due to chance. Missing data in the 2015/16 addendum analysis, and in the 2016/17 addendum analysis (see below) will very likely be similarly unrelated to group, so we have not embarked on any further analysis. Above all, it is extremely unlikely that being a member of a particular intervention arm in this trial is likely to have resulted in missing a statutory test sat by almost the entire cohort in England. Furthermore, any NPD matching issues resulting in whole schools missing would also have been unrelated to intervention arm. Most schools will not have even known they were part of a trial.

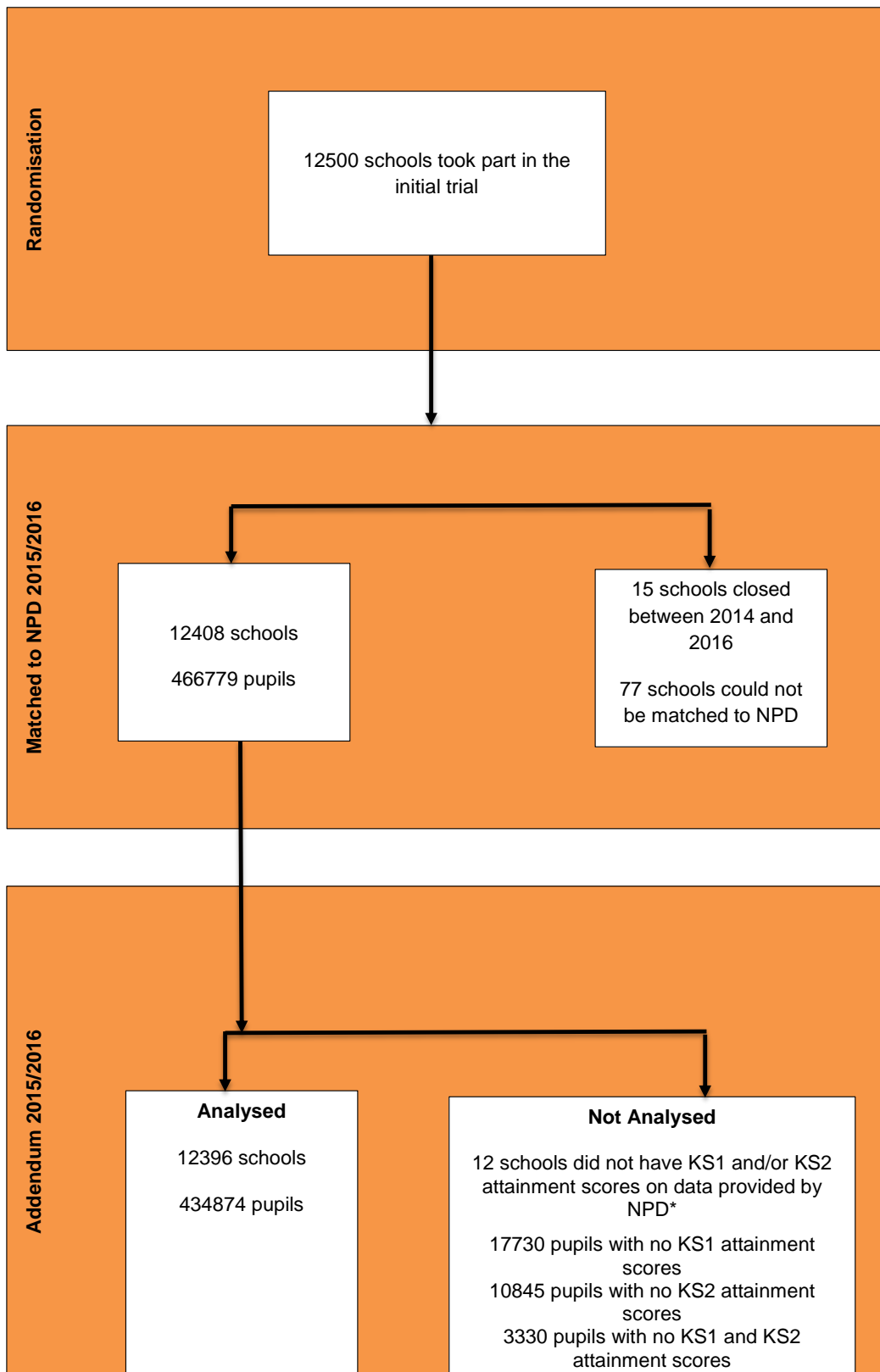
For the 2016/17 cohort, the school level attrition rate was less than 1% (76 schools<sup>12</sup> of the original 12,500). Pupil-level missing data, through individuals not having a full complement of all parts of the test scores at baseline and follow-up, accounted for 7% (32,727 of the 478,351 pupil results matched to NPD in the addendum 2016/17 trial cohort).

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<sup>11</sup> 92 of these schools could not be matched to NPD, either because they had been closed between 2014 and 2016 (15 schools), or could not be found on NPD (77 schools). A further 12 schools did not have KS1 and/or KS2 scores attainment scores.

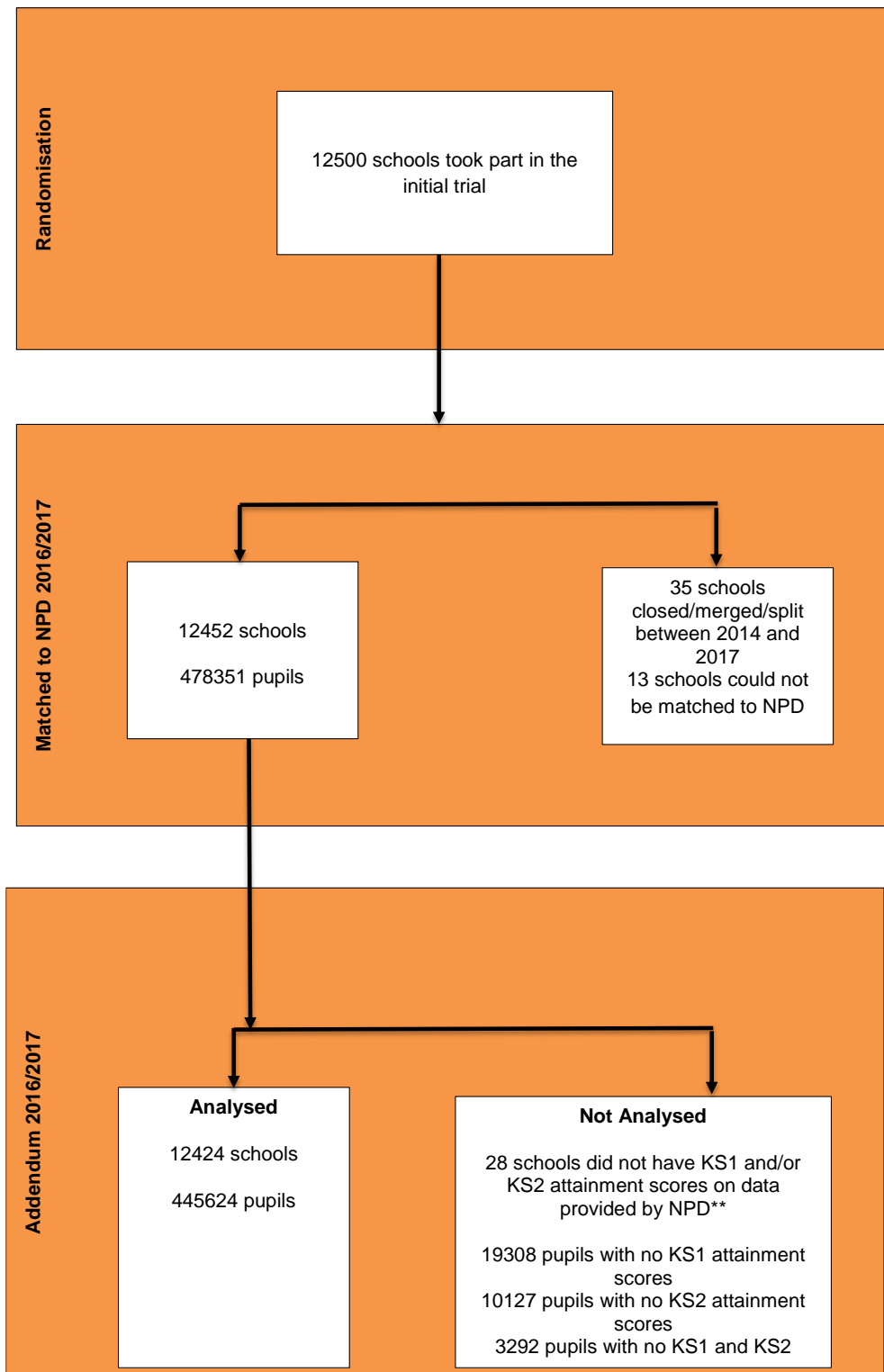
<sup>12</sup> 48 of these schools could not be matched to NPD, either because they had been closed/merged/split between 2014 and 2017 (35 schools), or could not be found on NPD (13 schools). A further 28 schools did not have KS1 and/or KS2 attainment scores.

**Figure 1: Passive Trial Flow for 2015/2016 addendum analysis**



\*Breakdown of schools with no KS1 and/or KS2 scores present on NPD: 2 schools in Arm 1, 3 schools in Arm 2, 5 schools in Arm 3, 1 school in Arm 4, and 1 school in arm 5 (control).

**Figure 2: Passive Trial Flow for 2016/2017 addendum analysis**



\*\*Breakdown of schools with no KS1 and/or KS2 scores present on NPD: 5 schools in Arm 1, 3 schools in Arm 2, 4 schools in Arm 3, 6 schools in Arm 4, and 10 schools in Arm 5 (control).



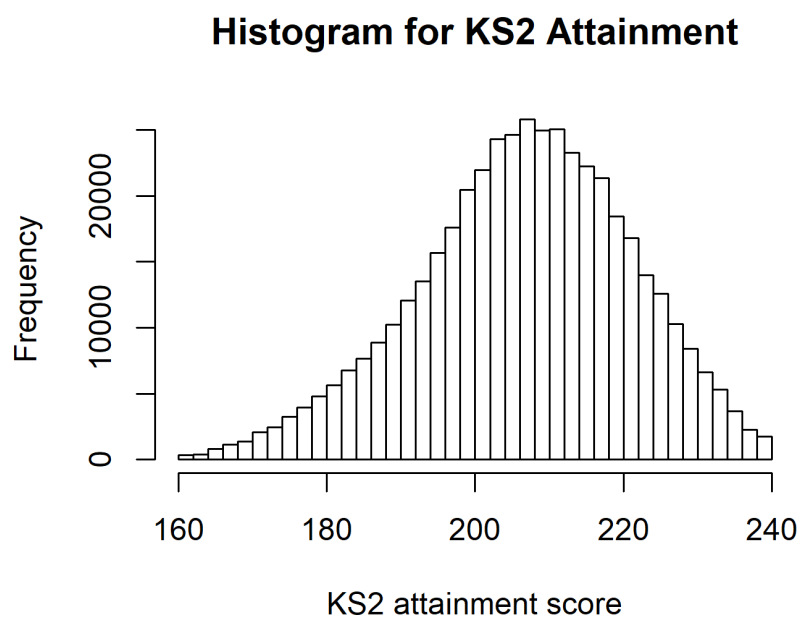
## Analysis

The main results for each of the 2015/16 and 2016/17 cohort analyses were from a likelihood ratio test between a multi-level model containing just baseline and one containing baseline plus all the intervention groups as covariates.

For the 2015/16 cohort, this yielded a likelihood ratio of 4.33 ( $p = 0.36$ ) meaning that we do not reject the null hypothesis and there is no evidence of any effect of the various interventions. In order to present effect sizes, confidence intervals were calculated using Dunnett's Test (1955) to correct for multiple inference. Figure 3 shows the distribution of KS2 outcome scores included in the 2015/16 model (overleaf). The distribution of the KS2 attainment scores is unimodal although slightly skewed to the left (skewness=-0.2). The range of the data is 160 to 240 with no outliers. The mean score for the 2015/2016 cohort is 207.0 with a standard deviation of 14.4.

For the 2016/17 cohort, this yielded a likelihood ratio of 1.26 ( $p = 0.86$ ) meaning that we do not reject the null hypothesis and there is no evidence of any effect of the various interventions. In order to present effect sizes, confidence intervals were calculated using Dunnett's Test (1955) to correct for multiple inference: the results are presented in Table 2. Figure 4 shows the distribution of KS2 outcome scores included in the 2016/17 model. The distribution shows a similar shape to the one observed in the 2015/2016 cohort with a unimodal distribution in the 160 to 240 range with a slight left tail (skewness=-0.3) but no outliers. The mean of the distribution is 210.4 and the standard deviation 14.9.

**Figure 3: Distribution of KS2 outcomes 2015/16 (using updated criteria)**

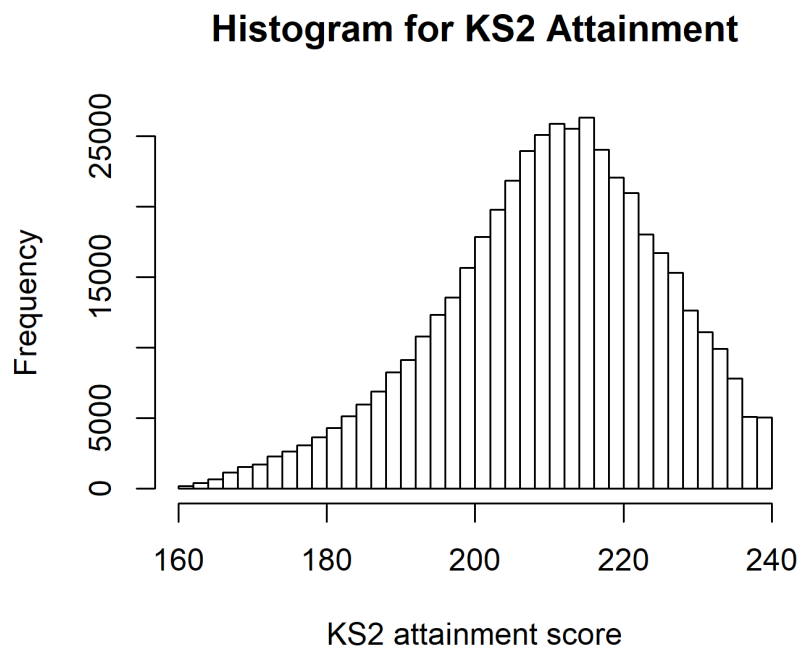


**Table 2: Additional analysis; number of Schools (n) number of pupils (N) – for English attainment 2016/17 data**

Outcome	CEM Passive (Arm 1)		IEE Passive (Arm 2)		ResearchEd Passive (Arm 3)		How2s Passive (Arm 4)		Control (Arm 5)
	n N (missing)	ES (95% CI)	n N (missing)	ES (95% CI)	n N (missing)	ES (95% CI)	n N (missing)	ES (95% CI)	n N (missing)
<b>KS2 English</b>	2,488 89,537 (5 6,711)	-0.00 (-0.03- 0.02)	2,487 87,899 (3 6,540)	-0.00 (-0.03- 0.02)	2,484 88,153 (4 6,229)	0.00 (-0.02- 0.03)	2,485 88,890 (6 6,462)	0.00 (-0.02- 0.02)	2,480 91,145 (10 6,785)

Source: NFER Literacy Octopus Dissemination Trial Addendum Analysis.

**Figure 4: Distribution of KS2 outcomes 2016/17**



We also present the raw unadjusted means using KS2 English attainment data for all pupils in trial schools in the NPD 2016/17 KS2 dataset (i.e. prior to KS1-KS2 match) – so that the reader can see the raw results prior to complex modelling. The results are shown in Table 3. Missing data relates to the number of pupils missing KS2 data on the NPD data set provided by DFE matched to the list of schools in the active trial.

**Table 3: Raw means—unadjusted confidence intervals; numbers of pupils (N) – for 2016/17 data**

Outcome	(CEM Passive (Arm 1))		IEE Passive (Arm 2)		ResearchEd Passive (Arm 3)		How2s Passive (Arm 4)		Control (Arm 5)	
	N (missing)	mean (95% CI)	N (missing)	mean (95% CI)	N (missing)	mean (95% CI)	N (missing)	mean (95% CI)	N (missing)	mean (95% CI)
<b>KS2 English</b>	93,501 (2,747)	210.4 (210.3-210.5)	91,828 (2,611)	210.3 (210.2-210.4)	91,837 (2,545)	210.6 (210.5-210.6)	92,639 (2,713)	210.5 (210.4-210.6)	95,127 (2,803)	210.5 (210.4-210.6)

Source: NFER Literacy Octopus Dissemination Trial Addendum Analysis.

## Conclusion

### Key conclusions

1. There was no evidence that any of the approaches to disseminating evidence-based materials to schools improved pupils' Key Stage 2 English scores (2016/17), two years on from when schools received the materials.
2. The same was the case one year earlier (in 2015/16) as described in the main report. One suggestion was that one academic year after receiving materials was too soon to achieve outcomes; but this addendum analysis exploring outcomes with the next Year 6 cohort one year on has also found no effect.
3. As suggested in the main report, the Literacy Octopus materials would likely have formed a small part of the research and commercial information received by schools, and schools may need more support in navigating and prioritising evidence-based materials to improve teaching and learning.
4. In addition, it could be that a more sustained approach to communicating research and evidence-based materials to schools would be valuable. Schools received materials in spring 2015 and some arms continued light touch dissemination (for example, email updates) to July 2016. There was no further dissemination activity beyond July 2016.
5. Research organisations need to find additional ways of engaging schools with research evidence, in order to improve pupil outcomes.

### Interpretation

The addendum project found no evidence that Literacy Octopus dissemination interventions had an impact on pupils' English results at KS2 in 2016/17 (i.e. one year later than the main trial, and two years on from initial dissemination activity). Extent of engagement and usage of the materials was not monitored as part of this large-scale dissemination trial. However, the results suggest that, rather than taking time to embed into teaching and learning, simple passive dissemination is insufficient to make a difference to pupil outcomes in the longer term. As suggested in the main report, the Literacy Octopus materials would likely have formed a small part of the research and commercial information received by schools, and so may have been too light touch or certainly not sufficiently sustained to effect change in the longer term. Schools received materials in spring 2015 and some arms continued light touch dissemination (for example, email updates) to July 2015, but there was no further dissemination activity beyond July 2016.

The results presented in this addendum report also include revised criteria for the 2015/16 and 2016/17 outcome measure, namely taking account of attainment scores only when both reading and GPS scores are present. This criteria is different to that used in the 2015/16 main analysis, as the inclusion of pupils with only one score may violate the assumption of normally distribution residuals in the model. Histograms and a sensitivity analysis of both model criteria for 2015/16, showed that only a small proportion of pupils dropped out of the analysis due to only having one score, and that the overall findings are the same, namely that there is no evidence of any impact on pupils' English results at KS2. Both model criteria are within the analysis specification, but the models run for the addendum report remove any bimodal distribution (albeit affected by a small number of cases) seen.

The findings are perhaps not surprising, given the complexities involved in school-wide change and also of increasing teacher and senior leader engagement in research evidence. Research organisations need to find other more effective ways of communicating research evidence to schools, and crucially, supporting them to use the evidence to improve pupil outcomes. This does not mean that these communication approaches are not valuable, but rather that they may need to be used in conjunction

with other approaches, with more sustained application, and perhaps with more targeted approaches tailored to support a school's or groups of schools' needs.

## **Limitations**

The addendum analysis for this study had no limitations in terms of bias and precision as it used administrative NPD data and incidences of missing data were low: less than 1% at school level (for each of 2015/16 and 2016/17) and 7% at pupil level for each cohort (i.e. individuals not having a full complement of all parts of the test scores at baseline and follow-up). In the main report, this was not found to affect balance at baseline, and is within minimal attrition limits.

In the main report, the five padlock security rating meant there was high confidence in the primary outcome. The low attrition rates reported in this addendum mean we can have similar confidence in the addendum outcomes. The revised outcome criteria to include only pupils with all parts of all test scores present removes any bimodal distribution; sensitivity checks between the two models reveal similar results.

Because of the scale of the dissemination trial, involving a random sample of 12,500 schools, over 80% of all primary schools in England, the results can be generalised to the whole school population in England. A limitation is that actual usage and engagement with the materials was not monitored, and so we do not know whether schools used or attempted to embed any changes as a result of the materials they had received. Certainly, it seems reasonable to assume that, as dissemination finished in July 2016 and there were no further ways to attract schools' attention to the materials beyond July 2016, unless a school had already started to use the materials they would not do so during 2016/17.

## **Future research and publications**

Further market research with schools on the extent to which they engage with research, and how they prefer to engage with research, could be valuable to support research organisations with their dissemination approaches. As part of this, understanding the extent to which schools do or don't use materials sent to them and why could be useful, in order to ascertain whether passive communication is a valuable part of the support that research organisations can offer to schools and what else could enhance these approaches.

## References

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