Education Endowment Foundation

# ‘Literacy Octopus’ Dissemination Trial

## Evaluation report and executive summary

December 2017


**Independent evaluators:**

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Evidence for Excellence in Education

The Education Endowment Foundation (EEF) is an independent grant-making charity dedicated to breaking the link between family income and educational achievement, ensuring that children from all backgrounds can fulfil their potential and make the most of their talents.

We aim to raise the attainment of children facing disadvantage by:

- Identifying promising educational innovations that address the needs of disadvantaged children in primary and secondary schools in England;
- 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.

Founded by the education charity the Sutton Trust, as lead charity in partnership with Impetus Trust, the EEF is funded by an initial £125m grant from the Department for Education. With investment and fundraising income, the EEF intends to award as much as £200m by 2026.

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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.

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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 |
|---|---|---|---|---|---|---|
| **CEM Passive Arm 1 vs control** | 0.01 (-0.01, 0.03) | 0 | 88,088 | 0.48 | 🔒🔒🔒🔒🔒 | £ £ £ £ £ |
| **IEE Passive Arm 2 vs control** | 0.01 (-0.01, 0.03) | 0 | 86,742 | | 🔒🔒🔒🔒🔒 | £ £ £ £ £ |
| **ResearchEd Passive Arm 3 vs control** | 0.01 (-0.01, 0.03) | 0 | 86,155 | | 🔒🔒🔒🔒🔒 | £ £ £ £ £ |
| **How2s Passive Arm 4 vs control** | 0.01 (-0.01, 0.03) | 0 | 87,701 | | 🔒🔒🔒🔒🔒 | £ £ £ £ £ |
| **CEM Passive Arm 1 everFSM vs control everFSM** | 0.00 (-0.03, 0.03) | 0 | 26,319 | | | |
| **IEE Passive Arm 2 everFSM vs everFSM control** | -0.01 (-0.04, 0.02) | 0 | 26,243 | | | |
| **ResearchEd Passive Arm 3 everFSM vs everFSM control** | -0.00 (-0.03, 0.03) | 0 | 25,059 | | | |
| **How2s Passive Arm 4 everFSM vs everFSM control** | 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

### 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.[1] 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.

[1] 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').[2] 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.

[2] 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 *Evidence-based literacy support – the 'Literacy Octopus' trial* sampling frame).<br>Sample schools.<br>Randomly allocate schools to one of five groups (Dec 2014). |
| Spring term 2015 | *Providers send intervention materials to schools.* |
| Autumn term 2016 | Write and agree SAP. |
| Spring term 2017 | Intention-to-treat analysis using NPD data (primary outcome 2015/2016).<br>Sub-group analysis (everFSM).<br>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).<br>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

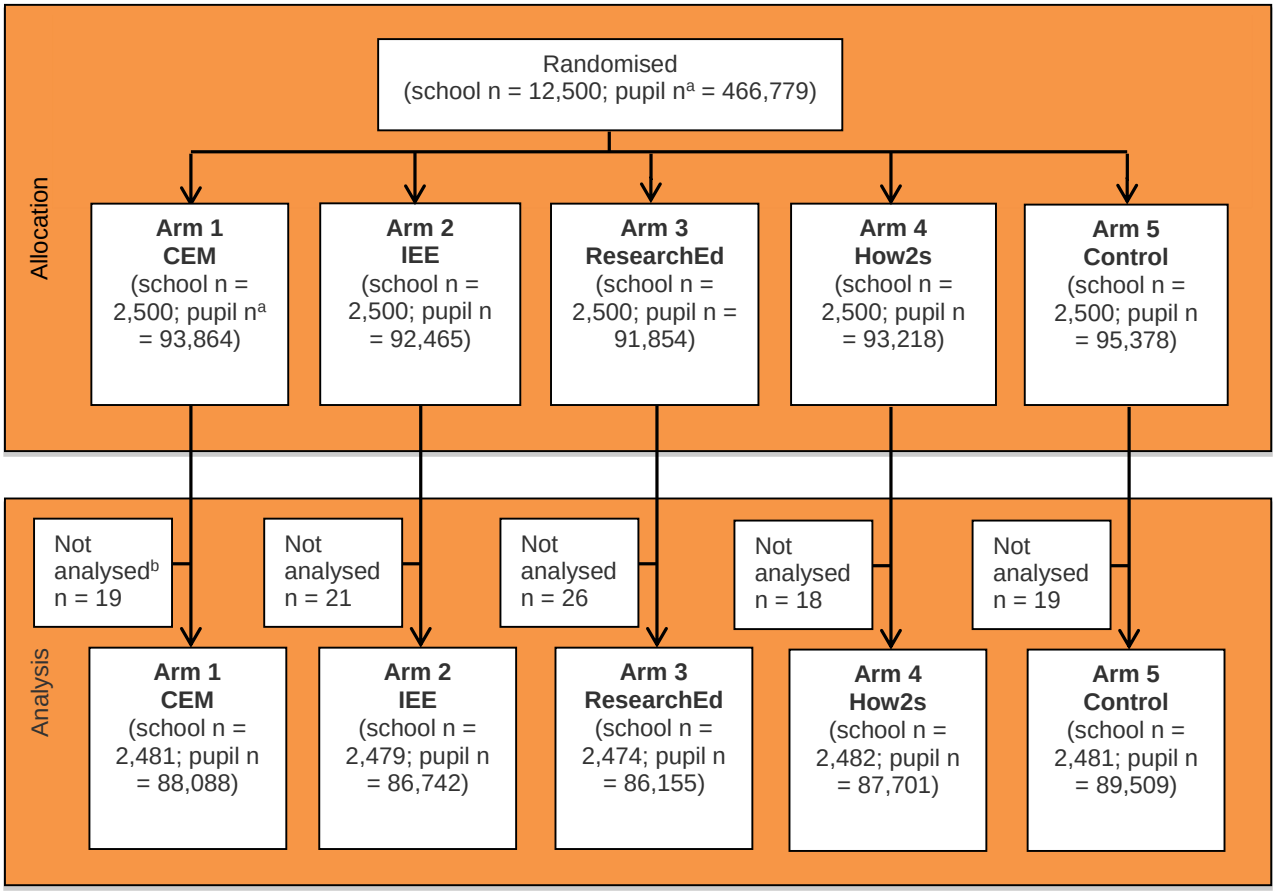
Figure 1 provides details of the participant flow through each stage of the *'Literacy Octopus' Dissemination Trial.*

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**




[a] Determined from the match to NPD, using data from the 12,397 schools that could be matched to NPD.
[b] 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)<br>*n pupils (n = each arm)* | Correlation between pre-test & post-test | ICC | Blocking/ stratification or pair matching | Power | Alpha | MDES |
|---|---|---|---|---|---|---|---|
| **Protocol** | 12,500 (2,500)<br>*437,500 (85,000)* | 0.70 | 0.15 | n/a | 80% | 0.05 | 0.024 |
| **Randomisation** | 12,500 (2,500)<br>*466,779 (minimum 91,854)* | 0.70 | 0.15 | n/a | 80% | 0.05 | 0.024 |
| **Analysis (i.e. available pre- and post-test)** | 12,397 (minimum 2,474)<br>*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 | 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 | |
|---|---|---|---|---|---|---|---|---|---|---|
| (analysed at school-level) | n (missing) | mean | n (missing) | mean | n (missing) | mean | n (missing) | mean | n (missing) | mean |
| **Percentage everFSM** | 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 |
| **KS1 school mean** | 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)**

| | 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) |
|---|---|---|---|---|---|---|---|---|---|
| Outcome | 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)<br>N 88,088 (5,776) | 0.01<br>(-0.01, 0.03) | n 2,479 (21)<br>N 86,742 (5,723) | 0.01<br>(-0.01, 0.03) | n 2,474 (26)<br>N 86,155 (5,699) | 0.01<br>(-0.01, 0.03) | n 2,482 (18)<br>N 87,701 (5,517) | 0.01<br>(-0.01, 0.03) | n 2,481 (19)<br>N 89,509 (5,869) |
| **KS2 English (everFSM only)** | n 2,346 (154)<br>N 26,319 (1,708) | 0.00<br>(-0.03, 0.03) | n 2,335 (165)<br>N 26,243 (1,764) | -0.01<br>(-0.04, 0.02) | n 2,343 (157)<br>N 25,059 (1,664) | 0.00<br>(-0.03, 0.03) | n 2,354 (146)<br>N 26,489 (1,709) | 0.00<br>(-0.03, 0.03) | n 2,361 (139)<br>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)**

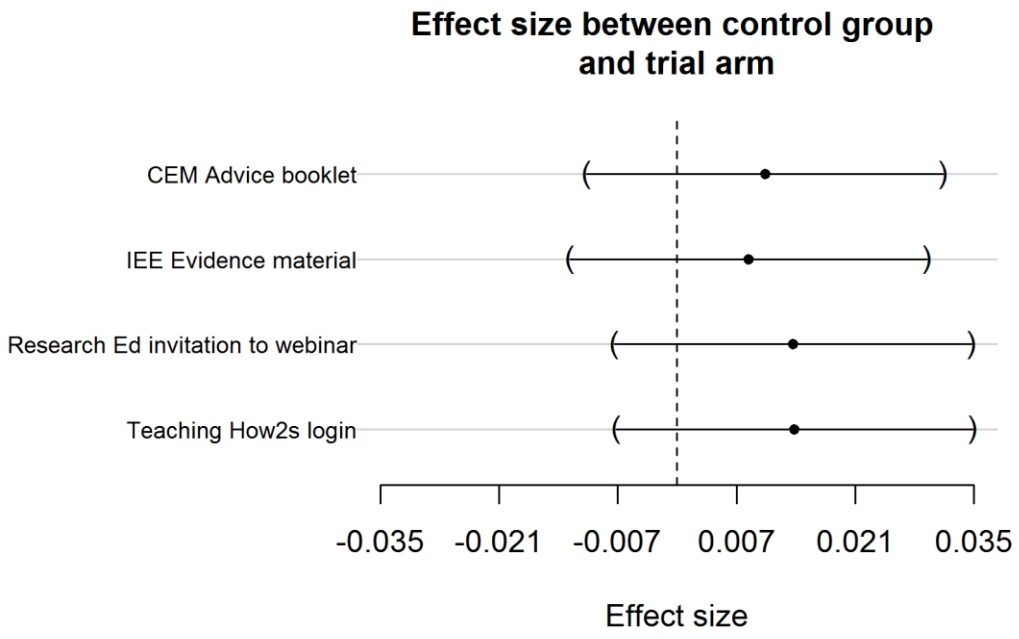
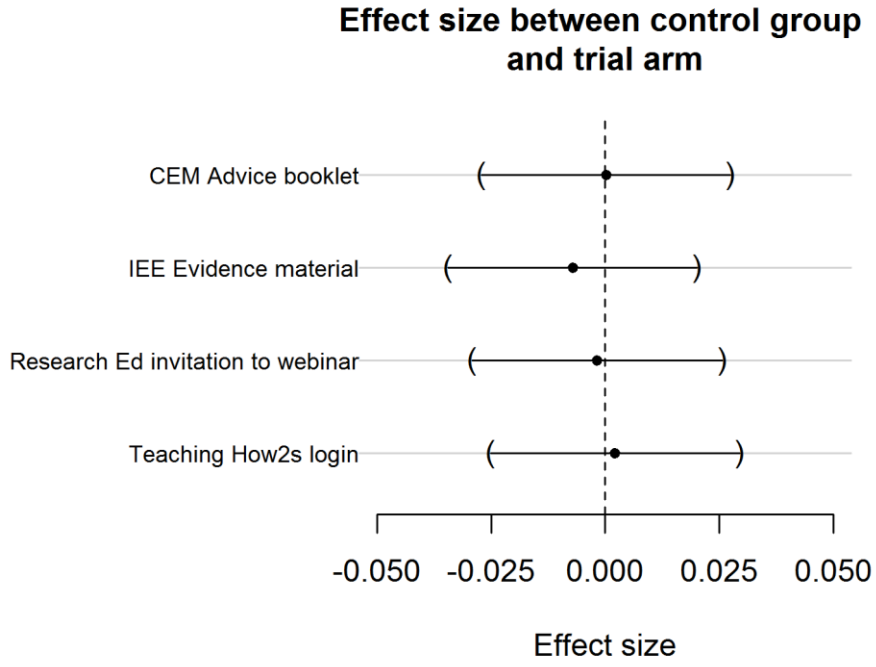



**Figure 2b: FSM-only analysis—effect size versus control (Dunnett's multi-level confidence intervals)**



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)**

| | 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) | |
|---|---|---|---|---|---|---|---|---|---|---|
| Outcome | 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) |
| **KS2 English** | 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) |
| **KS2 English (everFSM only)** | 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 |
|---|---|
| £ £ £ £ £ | *Very low:* less than £80 per pupil per year. |
| £ £ £ £ £ | *Low:* up to about £200 per pupil per year. |
| £ £ £ £ £ | *Moderate:* up to about £700 per pupil per year. |
| £ £ £ £ £ | *High:* up to £1,200 per pupil per year. |
| £ £ £ £ £ | *Very high:* 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 | | Adjustment for Balance [ 0 ] | | 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% | | | | | |
| 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

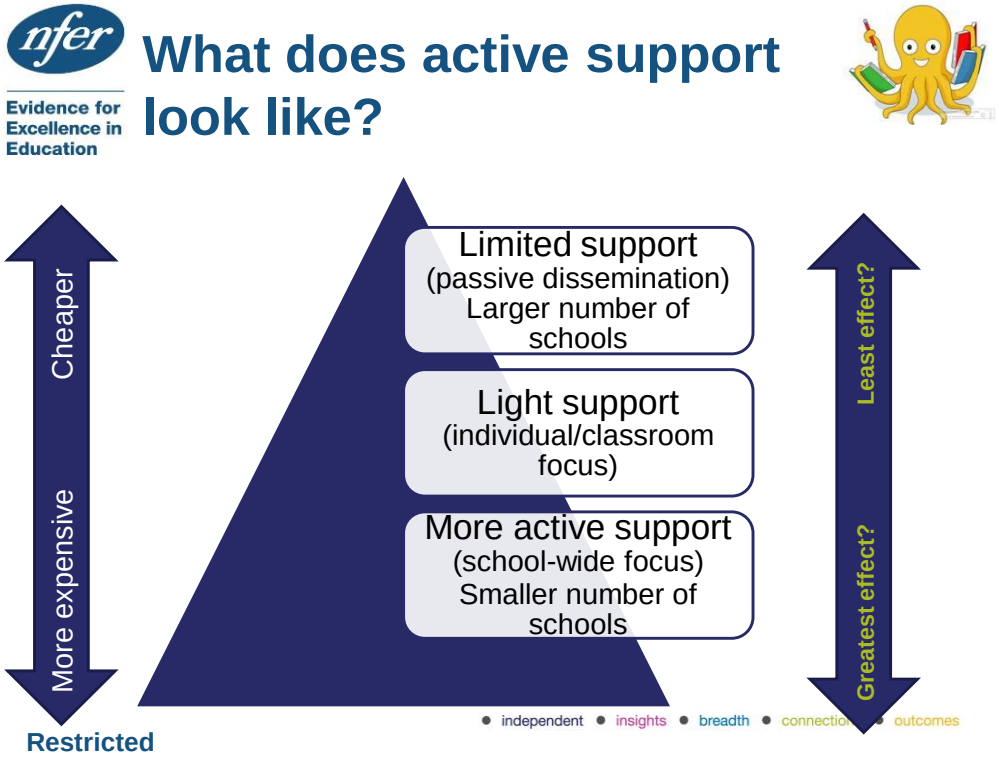
# Appendix C: Randomisation Syntax

```
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.



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