Evidence-based literacy support: the 'Literacy Octopus' trial

Evaluation report and executive summary
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Education Endowment Foundation

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Executive summary

The project

The *Evidence-based Literacy Support—'Literacy Octopus' Trial* tested a range of dissemination interventions and resources, all of which aimed to engage schools in using evidence-based materials to improve teaching and learning in Key Stage 2 literacy. Four delivery partners provided interventions. These included light-touch, 'passive' approaches—such as emailing materials to schools—and more 'active' support such as face-to-face events about putting research into practice. Separately, the '*Literacy Octopus' Dissemination Trial* (a sister trial which did not include a support element) tested the impact of some of the former, more passive approaches in a large-scale trial. This report concerns a trial of the latter, more active approaches, but also included 'passive' elements.

The delivery partners were 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 different interventions are outlined below:

Delivery partner	Trial arm	Active/ passive	Description
IEE	Arm 1	Passive	Regular printed and electronic materials, including the magazine *Better Evidence-based Education* and 'Best Evidence in Brief' email, and access to a searchable database, Evidence 4 Impact.
	Arm 2	Active	Arm 1 plus invitation to an evidence-based literacy programmes event.
Campaign for Learning/ Train Visual	Arm 3	Passive	Access to Teaching How2s website, including evidence-based visual guides on CPD.
	Arm 4	Active	Arm 3 plus invitation to a one-day introduction to using the Teaching How2s website, and updates on using the visual guides.
CEM	Arm 5	Passive	Hard copy evidence-based KS2 literacy teaching materials, including a teacher's guide and monthly classroom activity posters.
	Arm 6	Active light	Arm 5 plus invited to one twilight CPD session.
	Arm 7	Active advanced	Arm 6 plus invited to one further twilight CPD session, use of pupil diagnostic tools, and teacher peer observation between sessions.
NatCen/ ResearchEd	Arm 8	Passive	Invitation to free Saturday conference on research evidence relating to Key Stage 2 literacy.
	Arm 9	Active	Arm 8 plus invitation to two webinars to provide support on applying the research from the conference in their schools.

The evaluation was designed to assess the impact of the different interventions on pupil outcomes and teachers' use of, and engagement with, research. The interventions began in spring 2015 with a range of materials and light-touch support offered through to the following academic year. Key Stage 2 English

results from the summer 2016 were used to assess the impact on pupils. This was a large-scale effectiveness trial. The evaluator, NFER, recruited 823 primary schools; 60 were allocated to each of the nine intervention arms and 283 to the control group. The qualitative evaluation included observations of activities, interviews, and case studies. 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.

Key conclusions
1. The project found no evidence that any of the interventions improved pupils' Key Stage 2 English scores. The five padlock security rating means we have high confidence in this result.
2. There was no evidence of impact on any of the six teacher Research Use Measures used in this trial. However, we have limited confidence in this result given the low response rate to the questionnaires designed to capture these outcomes, and some measures were only moderately reliable.
3. Schools' level of engagement varied: six out of ten schools did not engage to the level expected by the providers, although a small proportion engaged to a greater extent than expected (for example by hosting CPD sessions). Reasons for not engaging included lack of time, the timing and location of events, and a preference for face-to-face support rather than online or remote formats only.
4. Teachers felt research evidence was most effectively communicated when it was interactive, accessible, relevant, included a balanced and credible discussion of the evidence, and focused on how to apply the evidence in practice. Where schools went on to implement changes in light of Literacy Octopus engagement, these came about through mechanisms such as in-school collaboration, further enquiry, and trying out, reviewing, adapting, and embedding approaches.
5. The lack of impact across the different interventions suggests that simply communicating research evidence to schools is not enough to improve outcomes. How easily the presented evidence can be used in practice—and the conditions in schools for implementing evidence-based change—might be just as important. Further research should assess whether interventions can transform evidence into practical action, and develop supportive implementation conditions in schools.

EEF security rating

These findings have very high security. The trial was a large effectiveness trial which tested whether the interventions worked in large numbers of schools. It was a well-powered, school-level, randomised controlled trial involving 823 primary schools. Pupils in schools in each intervention arm were similar to those in control schools. The primary outcome—pupil attainment in Key Stage 2 literacy—was based on data accessed from the National Pupil Database. Only four schools' data was not used in the final analysis due to being unable to match these four schools to the NPD data. In the remaining schools, 6% of pupils did not have test scores for both Key Stage 1 and Key Stage 2 but this did not affect balance at baseline.

Additional findings

There was no evidence that any of the interventions had an impact on pupils' English results at KS2 (2015/2016). This was also true when considering only pupils who have ever been eligible for free school meals (FSM). Schools' different levels of engagement with the Literacy Octopus interventions made no difference to these results. Literacy Octopus interventions made no difference to teachers' research use as measured by a validated Research Use Outcomes Survey: when each intervention arm was compared to the control group there was no evidence of any impact on any of the six Research Use Measures.

Monitoring data showed that schools' levels of engagement with the interventions were relatively low: just over four in ten of the 540 intervention schools did not engage, and only four in ten engaged as much as, or more than, was expected. The other schools engaged a little, though less than expected. Teachers engaged where they felt the materials or support were communicated in an accessible way (such as posters that were easy to display, or easy event location) and that the content of materials was relevant (for example, linked to an existing need). The passive or active nature of support did not appear to be the key determinant in whether schools engaged or took further action.

Where schools went on to implement changes in light of Literacy Octopus engagement, these came about through mechanisms such as in-school collaboration, schools undertaking further enquiry or follow-up activity with the provider, schools trying out, reviewing, adapting, and embedding approaches, and having a planned approach to implementation. In addition, having a 'research champion' to drive the change was key in case-study schools. Where teachers did engage, most perceived that participating in the Literacy Octopus had led to positive impacts on their practice enabling them to reflect on, reinforce, and change their classroom practice, as well as discuss best practice with colleagues in their school.

Literacy Octopus interventions were all reasonably light touch, and as, overall, these had no impact on the primary and secondary outcomes measured in this trial, providers of research evidence need to consider the findings from the Implementation and Process Evaluation of this study. This highlighted the need to focus on transforming the research so that it can easily be applied in practice, and to consider implementation factors such as the conditions within the school for engaging with evidence and adopting new approaches. This recommendation fits with the findings from the *'Literacy Octopus' Dissemination Trial* which showed that simply disseminating research evidence to large numbers of schools does not impact on attainment.

Cost

All interventions were very low cost for schools—between £0.09 and £10.77 per pupil per year over three years. This included real-world costs relating to photocopying materials, subscriptions, event fees, and so on. School and teacher time (rather than monetary cost) was not measured, but was a challenge for some of the schools involved—both in terms of initial engagement and time to implement evidence-based strategies.

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

Group	Effect size (95% CI)	Est. months' progress	Per pupil per year cost	No. of pupils*	P value**	EEF security rating	EEF cost rating
IEE Passive Arm 1 vs control	-0.02 (-0.14, 0.10)	0	£0.31	2,291		🔒🔒🔒🔒🔒	£ £ £ £ £
IEE Active Arm 2 vs control	-0.04 (-0.15, 0.08)	0	£0.73	2,203		🔒🔒🔒🔒🔒	£ £ £ £ £
How2s Passive Arm 3 vs control	0.00 (-0.12, 0.11)	0	£3.90	2,337		🔒🔒🔒🔒🔒	£ £ £ £ £
How2s Active Arm 4 vs control	-0.03 (-0.14, 0.09)	0	£4.11	2,448		🔒🔒🔒🔒🔒	£ £ £ £ £
CEM Passive Arm 5 vs control	0.00 (-0.12, 0.11)	0	£0.09	2,174	0.98	🔒🔒🔒🔒🔒	£ £ £ £ £
CEM Active Light Arm 6 vs control	0.03 (-0.09, 0.14)	0	£0.39	2,080		🔒🔒🔒🔒🔒	£ £ £ £ £
CEM Active Arm 7 vs control	0.03 (-0.09, 0.14)	0	£10.77	2,386		🔒🔒🔒🔒🔒	£ £ £ £ £
ResearchEd Passive Arm 8 vs control	0.00 (-0.11, 0.12)	0	£0.26	2,474		🔒🔒🔒🔒🔒	£ £ £ £ £
ResearchEd Active Arm 9 vs control	0.01 (-0.11, 0.13)	0	£0.26	2,122		🔒🔒🔒🔒🔒	£ £ £ £ £
IEE Passive Arm 1 everFSM vs control everFSM	-0.03 (-0.19, 0.12)	0		526			
IEE Active Arm 2 everFSM vs everFSM control	-0.05 (-0.19, 0.10)	-1		747			
How2s Passive Arm 3 everFSM vs everFSM control	-0.07 (-0.22, 0.08)	-1		553			
How2s Active Arm 4 everFSM vs everFSM control	-0.01 (-0.15, 0.14)	0		764			
CEM Passive Arm 5 everFSM vs everFSM control	-0.02 (-0.17, 0.14)	0		574			
CEM Active Light Arm 6 everFSM vs everFSM control	0.05 (-0.11, 0.20)	1		588			
CEM Active Arm 7 everFSM vs everFSM control	0.04 (-0.11, 0.19)	0		668			
ResearchEd Passive Arm 8 everFSM vs everFSM control	0.04 (-0.11, 0.18)	0		794			
ResearchEd Active Arm 9 everFSM vs everFSM control	0.02 (-0.13, 0.18)	0		537			

* 'Number of pupils' refers to the number of pupils' results analysed in the primary outcome multi-level model. Note, the model included results from 10,280 control group pupils. The everFSM model contained results from 3,094 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

Interventions

The *Evidence-based Literacy Support – the 'Literacy Octopus' Trial* was a multi-armed trial commissioned by the Education Endowment Foundation (EEF) focused on a range of different methods of communicating and disseminating evidence-based materials and support to schools. The trial set out to measure their effect on pupils' Key Stage 2 (KS2) literacy attainment and on teachers' research use and engagement. Interventions were organised by four separate providers brought together under a common protocol to form a multi-armed trial. As discussed in the section on background evidence, there is a range of both 'push' and more 'transformational' approaches to supporting research engagement in schools. Each provider communicated their materials to schools using both approaches. 'Push methods' (known as the 'passive intervention arms') involved information being sent to schools by various means. The 'supported' or 'transformed methods' (known as the 'active intervention arms') involved the same information being sent to schools (as in the respective passive arm) but with additional support such as continuing professional development (CPD) or webinars.

In total, the trial consisted of ten arms (nine intervention arms and one control arm). Three of the Literacy Octopus providers each offered two interventions (active and passive); one of the providers offered three interventions (active, active light, and passive—a design feature commissioned by the EEF in order to allow this provider to trial three levels of support). The providers were asked to focus on literacy in KS2, and were also asked to include an element of co-operative learning in their materials to ensure a common theme across the provision. Intervention activities took place from March 2015 to July 2015. Active support sessions were provided within this period in locations in the north and south of England appropriate to the geographical randomisation allocation of schools (see Methods: Randomisation). Where interventions involved sending materials to schools, providers continued to disseminate their materials to their Literacy Octopus schools during the following academic year (September 2015 to July 2016).

Each intervention had a slightly different Theory of Change (ToC). Some aimed to directly engage teachers with evidence-based teaching methods; some aimed to influence school-leaders and school-level decisions about taking on evidence-based interventions; and others aimed to encourage peer-to-peer discussion about research findings. All of the interventions hypothesised that active intervention alongside the materials would support greater changes in practice. The ToCs for each provider are presented in Appendix D.

The IEE interventions

The Institute for Effective Education at the University of York[1] provides printed and electronic materials for schools focusing on educational research evidence and recent research findings. Their interventions for the Literacy Octopus involved:

- **Passive intervention (Arm 1)**: schools received regular printed and electronic materials from February 2015 to July 2016, including regular issues of the IEE magazine *Better Evidence-based Education*[2] (which brings together evidence on particular topics, and included some literacy-specific volumes for schools taking part in the Literacy Octopus), its usual fortnightly email, 'Best Evidence in Brief',[3] summarising new research findings and containing links to relevant articles, and access to Evidence 4 Impact, a searchable database of evidence-based education intervention programmes. (Neither 'Best Evidence in Brief' nor Evidence 4 Impact were specifically adapted for the Literacy Octopus.)

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[1] The Institute for Effective Education (IEE) at the University of York: https://the-iee.org.uk/
[2] Better Evidence Based Education: http://www.betterevidence.org/
[3] Best Evidence in Brief: http://www.beib.org.uk/

- **Active intervention (Arm 2)**: as well as receiving the same materials as schools in the passive arm, teachers from schools in the active arm were invited to attend a one-day evidence fair to hear about particular literacy interventions from developers of evidence-based programmes and from schools that had used the interventions. The evidence fairs took place in April 2015 in York for schools in the north of England, and in May 2015 in London for schools in the south of England. Places were offered to several senior leaders from each school. Pre- and post-conference support was also offered to schools taking part in this arm.

Teaching How2s interventions

Teaching How2s[4] runs a subscription website designed for school and further education college CPD. Schools or 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, with theoretical underpinnings available separately. The arms for this trial were 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 additional content specifically applicable to primary schools and literacy.

- **Passive intervention (Arm 3)**: 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 including an online learning centre.

- **Active intervention (Arm 4)**: as well as the above, a senior leader from each school in the active arm was invited to a one-day event introducing the website. The day included a presentation by a school already subscribing to the service. Schools in the north were invited to a one-day session in Manchester in February 2015; schools in the south were invited to a one-day session in London in February 2015. In addition, schools received updates that supported schools to use the visual guides. This included blog posts that showcased how project schools were using How2s for their professional development.

CEM

The Centre for Evaluation and Monitoring at Durham University[5] developed evidence-based materials which focused on strategies for teaching literacy at Key Stage 2. The materials included a booklet, *Improving Reading: A Guide for Teachers*, a 'Top Tips' card (to act as a cue to the booklet), a staffroom poster (to act as a cue to the evidence-based materials and increase awareness of the project throughout the school), and monthly classroom activity display posters. Some schools were also offered additional CPD sessions and a diagnostic assessment for pupils. Their Literacy Octopus interventions involved:

- **Passive intervention (Arm 5)**: in March 2015, schools received the evidence-based materials, including the *Improving Reading: A Guide for Teachers*, a 'Top Tips' card, a staffroom poster, and monthly classroom posters.

- **Active intervention (light touch, Arm 6)**: in addition to the evidence-based materials, schools in the light-touch active arm were invited to a twilight CPD session where they were guided by a CEM researcher through the booklet and its evidence base. Twilight CPD sessions took place from March to April 2015 in a number of locations in the north and south of England. Around five to eight schools were invited to each session in anticipation of two to four teachers or senior leaders attending from each school.

- **Active intervention (Arm 7)**: schools in this active arm received the materials and were also invited to the first twilight CPD session alongside schools in the active light-touch arm. Following

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[4] Teaching How2s: https://teachinghow2s.com/
[5] The Centre for Evaluation and Monitoring (CEM) at Durham University: http://www.cem.org/

the first CPD session, schools were also given access to a computer-based diagnostic profiling tool (InCAS) of reading and spelling to enable KS2 teachers to pinpoint pupils' individual literacy strengths and weaknesses. These schools were offered a further CPD session in May and June 2015 to discuss the strategies in *Improving Reading: A Guide for Teachers* in relation to the profiles of their pupils. Teachers were also expected to undertake peer-learning observations in between the two CPD sessions.

ResearchEd and NatCen interventions

ResearchEd[6] and NatCen worked together to provide schools with a one-day conference, using the ResearchEd approach, on research evidence for Key Stage 2 literacy. The conference was held on a Saturday, was free of charge for participants, and involved presentations from a number of high-profile academics and practitioners.

- **Passive intervention (Arm 8)**: individual teachers and senior leaders from schools received an invitation to the literacy conference in April 2015 (held in York for schools in the north of England and in London for schools in the south of England).

- **Active intervention (Arm 9)**: as well as receiving the invitation to the literacy conference, schools in the active arm were offered the opportunity to become involved in two online webinars: the first supported them to prepare for the conference and the second encouraged them to use the research-based practice in their schools.

Control group

There was a single control group (known as Arm 10) for all the interventions. Schools in the control group carried on 'business as usual', although they were occasionally approached by members of the evaluation team to provide information on their current levels of research engagement and their KS2 literacy activities.

The section on Process Evaluation: Fidelity provides information on any changes made by providers during implementation to these intended plans.

Background evidence

Historically, the education sector has lagged behind other professions, such as medicine and social care, in being considered as evidence-informed (Nutley *et al.*, 2007 cited in Nelson and O'Beirne, 2014; Hargreaves, 1996 cited in Nelson and O'Beirne, 2014). In 1998, a review of educational research in England concluded that there was little evidence of the use and impact of research on educational policy or practice (Hillage *et al.*, 1998). More recently, authors in the field continue to highlight an enduring misalignment in the production of evidence and its use in policy and practice (Becheikh *et al.*, 2009; Nutley *et al.*, 2007 cited in Griggs *et al.*, 2016; DfE's March 2016 White Paper; Greany, 2015). In 2013, less than half of a sample of 1,577 teachers and school leaders reported using research evidence to inform decision-making about approaches to improve pupil outcomes (Ager and Pyle, 2013).

A range of challenges has been noted in relation to research-use in education practice. These include: the scale and generalizability of research findings, the often inaccessible nature of findings to a non-academic audience, practitioners' scepticism of the value of research evidence, and teachers' capacity for interpreting findings (CUREE, 2011; Goldacre, 2013; Becheikh *et al.*, 2009; Durbin and Nelson, 2014; See *et al.*, 2016). The Department for Education's March 2016 White Paper, 'Educational Excellence Everywhere'*,* outlines the challenges that teachers often face in accessing, interpreting, and translating research evidence to inform their teaching practice and highlights issues concerning the relevance of much research to the needs of teachers and schools.

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[6] ResearchEd: http://www.researched.org.uk/

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). Goldacre (2013) asserted that 'by collecting better evidence about what works best and establishing a culture where this evidence is used as a matter of routine, we can improve outcomes for children, and increase professional independence' (p. 7). In an increasingly autonomous, decentralised, and self-improving school system, research evidence is becoming ever more important in informing local professional judgements to improve outcomes for children. There is thus mounting impetus to ensure greater alignment between the supply and use of research evidence.

There is a range of approaches to supporting schools' use of research: from 'push' approaches—disseminating and distributing research findings to schools—to more transformational and interactive forms involving, for example, practical guidance and participatory research. The former may be the most common and low cost approach, but evidence indicates that transformative and interactive approaches more effectively address the challenges that teachers face in using research evidence (Marshall and Drummond, 2006 cited in CUREE, 2011). Nelson and O'Beirne (2014) highlight the importance of both transforming research findings into teacher-specific resources and of social interaction between researchers and teachers to help mediate research messages and lead to the implementation of research-based strategies. For instance, Tymms and Merrell (2006) mediated research findings by producing a practical guidance booklet for schools on evidence-based strategies to address inattentive, hyperactive, and impulsive pupil behaviour that led to positive impacts on pupil behaviour and teacher morale.

Becheikh *et al.* (2009) distinguished four models of knowledge transformation: diffusion and dissemination of research findings; using researchers to identify solutions to identified problems; translating evidence into useable guidance for practice; and researchers and teachers co-producing and using research knowledge. Sharples (2013, based on Shepherd 2007) suggested that effective mobilisation of evidence involves a cycle of 'production' by research organisations, 'synthesis' and 'transformation' into accessible and useable outputs, and 'implementation' in policy and practice to develop pupil outcomes. Various strategies are aiming to enhance different aspects of this 'eco-system' to improve the synergy and interaction between these different aspects of the cycle. The government's plans to build capacity for evidence-informed teaching (set out in the White Paper, 'Educational Excellence Everywhere', 2016) include: a portal for teachers to post research questions and access educational journals; the expanding role of the Education Endowment Foundation (EEF) in exploring and sharing robust evidence on what works in education; and the establishment of an independent 'College of Teaching' which will encourage the use of evidence from research to inform practice and provide evidence-informed professional development for teachers. There is also greater emphasis on research producers and intermediary organisations synthesising research findings and transforming evidence into usable guidance for practice.

Despite these efforts, there is insufficient understanding of how evidence is most effectively disseminated, communicated, and mobilised to influence practice—or of the relative effectiveness of different approaches to knowledge production, transformation, and implementation (Nelson and O'Beirne, 2014; Greany, 2015). The Literacy Octopus trial aims to shed light on this by exploring the effects and effectiveness of different approaches to communicating research findings to schools. The evaluation explores the impact of these approaches on teachers' awareness and understanding of research and their subsequent action and practice. Existing evidence from studies of effective approaches to teachers' CPD suggests that this may be a hierarchical process whereby awareness and understanding are necessary prerequisites for changes to action and practice (Harland and Kinder, 1997)—although some of the theories of change in the Literacy Octopus study challenge this notion (see Appendix D).

Whilst all the dissemination approaches in this study could be described as reasonably 'light touch', the study design ensured a range of more- and less-supported activity in order to explore the hypothesis

that more 'active' approaches to communicating research findings to schools (for example, interactive forms of communication and knowledge-sharing and findings translated into guidance for practice) will be more effective than simple 'passive' approaches (such as sending a research summary document to schools). As discussed above, elsewhere in the literature this distinction has also been posited as being important for effective knowledge mobilisation (Becheikh *et al.*, 2009; Durbin and Nelson, 2014; Nelson and O'Beirne, 2014; Sharples, 2013). The Literacy Octopus process evaluation also investigates examples of *how* research evidence is then implemented in schools to improve teachers' practice and pupil outcomes providing valuable insights about how the mechanisms and conditions underpinning effective knowledge mobilisation can best be supported and recreated.

Evaluation objectives

Primary research question

The primary research question for the impact evaluation was: What are the effects of different ways of communicating research evidence and findings to teachers and schools on pupil attainment (in terms of Key Stage 2 literacy for the 2016 Year 6 cohort)?

Secondary research questions

The main secondary research question for the impact evaluation was: What are the effects of different ways of communicating research evidence and findings to teachers and schools on pupil attainment (in terms of Key Stage 2 literacy for the 2015 and 2017 Year 6 cohorts)?

The aim of this analysis was to measure the differential progress in literacy development between pupils in each arm of the trial in order to measure the effect different approaches to disseminating evidence-based materials have on literacy attainment over three Year 6 cohorts (those of 2014/2015, 2015/2016, and 2016/2017 respectively). Analysis relating to the latter two academic years will be reported in the 2018 Literacy Octopus addendum report.

Other secondary research questions for the impact evaluation were: What is the effectiveness of different communication approaches in terms of schools' and teachers' dispositions towards research, and to what degree does research information inform teaching and learning? (The latter measured by factor scores calculated from a standard Research Use Outcomes Survey; Poet *et al.*, 2015, unpublished.) This involved exploring impact in terms of teachers' awareness, understanding, and actions (changes in practice) in relation to the evidence-based materials or activity they were allocated to.

Other aims included the exploration of whether the level of school engagement in the Literacy Octopus interventions had any impact on the primary outcome (2016 cohort's KS2 literacy attainment) using Complier Average Causal Effect (CACE) analysis.[7] A further aim is to explore which aspects of research use, according to survey results, are associated with pupil attainment outcomes—that is, whether certain measures of research use within trial arms are associated with improved pupil attainment (this is outlined in the Path analysis in the SAP; see footnote 7). The Path analysis will be reported in the 2018 Literacy Octopus addendum report.

Subgroup analysis

Sub-group analysis on the primary outcome (2016 cohort KS2 literacy attainment) was explored for pupils who have 'ever received free school meals' ('everFSM').

Process evaluation questions

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[7] The statistical analysis plan (SAP) for this trial can be found at:
https://educationendowmentfoundation.org.uk/public/files/Projects/Evaluation_Protocols/SAP_Literacy_Octopus_-_Active.pdf

For the process evaluation, the main questions were: *How* are these outcomes achieved? What are the mechanisms that bring about improved research use for teachers and schools? What actions have they taken, and is this perceived to improve teaching and learning, and ultimately pupil outcomes?

The evaluation objectives are set out in the published protocol:

https://educationendowmentfoundation.org.uk/public/files/Projects/Evaluation_Protocols/EEF_Project_Protocol_TheLiteracyOctopusActiveTrial.pdf.

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—anonymized Pupil Matching Reference (aPMR) from the Department for Education (DfE) National Pupil Database (NPD) in relation to Key Stage 1 and Key Stage 2 attainment data. There were no special ethical concerns regarding this; consent to access NPD was obtained during the recruitment process via the headteacher out of courtesy, although note that as anonymized pupil data would be used, data access permissions were not needed.

The project team and Code of Practice Group gave specific consideration to the issues of recruiting schools to a range of possible activities—in particular, that some arms would require more resources in terms of teacher time and monetary cost than others. Where a conference fee was going to be charged (reflecting real-world conditions), the Group felt this was substantially over and above reasonable expectations for research participation, and the Literacy Octopus provider reduced the fee for this arm (a small fee was still charged as it was felt this was part of teachers' valuing and securing their place on an event, as per the real world). Invitation materials were careful to set out the range of possible activities each school might be allocated to, from the most intensive (for example, CPD sessions and online help) to the least intensive, such as receiving regular mailings of new reports about teaching literacy. In addition, the dedicated NFER Literacy Octopus website[8] provided an overview of each of the ten arms.

Schools opted into the trial by the headteacher (or their designated deputy) signing a memorandum of understanding (MoU) during recruitment. On this form, they also provided the name and job title of the member of staff allocated to be the main contact throughout the study. The information sheet, dedicated NFER Literacy Octopus website, invitation letter, reply form, and online surveys all contained relevant information about consent and how the survey data and NPD data would be used—in particular, that teachers completing the survey consented for their contact details to be shared with their allocated delivery partner for the purposes of the project, and for their survey data to be used in analysis of DfE NPD data (the path analysis described in the evaluation aims above). It was also made clear that while the EEF and Fischer Family Trust data archives would contain NPD matched data, no individual school, teacher, or pupil would be identified in any report arising from this evaluation.

Appendix C provides the project information sheet, recruitment invitation letter to schools, and school MoU and reply form.

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 a team of researchers including: Adam Rabiasz and Palak Roy (project statisticians), Katherine Fowler and Jennie Harland (implementation and process evaluators), Dave Hereward (survey operations lead) and in the recruitment stage, Dr Anneka Dawson (school recruitment lead, then NFER).

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[8] https://www.nfer.ac.uk/schools/taking-part-in-our-research/EEFA/

The projects were delivered by four organisations or partnerships referred to as 'Literacy Octopus providers'. These were: the Institute for Effective Education (IEE) at The University of York (in charge of delivering two arms); the Campaign for Learning on behalf of Train Visual (the organisation that owns Teaching How2s; two arms); the Centre for Evaluation and Monitoring (CEM) at Durham University (three arms); and NatCen working with ResearchEd (two arms).

NFER was responsible for recruiting schools, overseeing the baseline survey, randomising schools, conducting the implementation and process evaluation, overseeing the outcomes survey, pupil data analysis and reporting. Literacy Octopus providers were responsible for all project delivery communications with schools, including initial welcome information, disseminating their materials to schools in the passive and active arms, and delivering support to schools in the active arms. NFER put in place a data sharing agreement with each provider to cover how the relevant allocated list of schools and teacher contact details would be shared (per arm), and how providers' would share monitoring information with NFER.

The project was supported and guided by EEF staff Eleanor Stringer and Professor Jonathan Sharples, joined, from 2016 onwards, by 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 *Evidence-based Literacy Support – the 'Literacy Octopus'* trial was commissioned as a multi-armed trial of four providers' evidence-based literacy materials and support for schools. Schools were randomised into one of ten groups or arms—nine intervention arms and a 'business as usual' control arm. Each provider communicated evidence-based materials in two ways, passive and active, with each school in the trial only experiencing one of these means of intervention. Three of the four providers each delivered one passive and one active arm (IEE, Teaching How2s, and ResearchEd/NatCen). The fourth, CEM, delivered three arms (passive, active light, and active).

Since many of the research communication strategies involved whole-school 'receipt' of materials (rather than specific or selected teacher involvement), school-level (rather than teacher-level) randomisation was employed. This included stratification by geographical area using a binary variable that indicated whether the school was situated in the north or south of England. This was a necessary part of the design as some interventions involved travel to set locations in the north (York) and south of England (London).

The trial was designed so that each arm would be compared to the control group, that is, a many-to-one comparison design where each group mean is compared to the control group mean. No comparisons were planned between the trial's intervention arms (see section on Analysis).

Control schools continued 'business as usual' for the duration of the trial. They were not permitted to take part in, or access, the Literacy Octopus materials during the trial (although for some freely available resources this was impossible to guarantee) but could take part in other literacy improvement interventions or research-engagement activities as part of their normal school development plans. The process evaluation captured the range of 'business as usual' activities. Control group schools received a £30 book token or Amazon token as acknowledgement of their commitment to participate in the outcomes survey. All teachers completing the outcomes survey, in both intervention and control schools, were offered a £5 voucher or a donation to charity to acknowledge their contribution to the survey.

Following publication of the trial protocol, a change to the Key Stage 2 NPD data source was made after advice from the DfE concerning the use of data obtained from the new KS2 tests. The DfE's preference is for amended, rather than unamended, NPD data from these new assessments to be used in 2016. A protocol amendment was published in June 2016 to reflect this change in data source and timetable. The results from analysis of 2014/2015 KS2 data (the interim data for this trial) will be reported in the 2017/2018 addendum report. A small number of control group interviews were added to the process evaluation design in order to capture examples of any increased activity relating to research engagement—as it was felt this had become a rapidly growing environment during the course of the trial period. As an addition to the protocol, the teacher survey included some implementation and process evaluation (IPE) questions to ascertain views on the communication approaches, perceived outcomes, and formative recommendations.

Participant selection

The main sample consisted of English primary schools with a Year 6, excluding special schools, independent schools, and local authorities (LAs) that were classed as too far from York and London for travel within one day (which would be required for several of the arms of the intervention). A total of 19 LAs were excluded. Any school expressing an interest from one of these 19 LAs was allowed to take part provided they met all the other criteria in the sampling frame and understood that events (if applicable) would be in London and a location in the north of England, for example Leeds (although in

the event, York was the northern location). In addition, schools were excluded that were already taking part in research engagement programmes run by the EEF or the providers involved. These included:

- schools involved in two evaluations already being run by NatCen as part of the EEF's Research Use programme, namely the Inspirational Professional Learning Community Network (IPLCN) and the Ashford Teaching Alliance (ATA) Research Champion projects;

- schools known to be receiving the IEE's evidence-based emails and materials and also known to the EEF as being involved in research-engagement projects;

- those involved in other current EEF Research Use projects;

- those involved in the Institute of Education's Research Learning Communities project; and

- schools that were part of the National College's Evidence Based Teaching projects' Teaching Schools Alliances.

Schools were recruited by NFER's Research Operations Department in the autumn term of 2014. An initial sample of 7,884 schools was approached followed by a top-up sample of 2,922 schools. Samples were stratified by percentage FSM band and Key Stage 2 ability band. Local authorities were informed which schools in their authorities were being approached. All schools were approached with an initial invitation letter to the headteacher. NFER's telephone unit then telephoned schools to engage them in the trial and support them to complete baseline data. In order to join the trial, and prior to randomisation, schools needed to complete the consent and reply form (outlined in the ethics section and included in Appendix C); this provided consent for NFER to access anonymized NPD data for Year 6 pupils in the school. Prior to randomisation, schools also needed to complete, if possible, at least two teacher baseline questionnaires (this was planned as five, but was reduced to help recruitment at scale—in the event some schools did not return baseline surveys but still joined the trial as they had completed the reply form). The questionnaires were targeted at senior leaders, literacy co-ordinators, and Key Stage 2 teachers. Schools were asked to nominate a Literacy Octopus lead as the main contact for the trial.

The geographical location of schools was monitored during recruitment to ensure that targets were met for each region. Each of the nine arms of the trial required 60 recruited schools (30 from the north of England and 30 from the south) and the control group required 240 schools—a planned total of 780 schools. Once this target had been met, and indeed exceeded (823 schools were recruited), schools were randomly assigned to one of the nine intervention arms of the trial or to the control group (which was expanded in size to 283 schools). After randomisation, the providers were each given a list of their allocated schools, and where teachers consented on the baseline survey to provide their name and contact details for the purposes of the trial, these were also passed to the relevant provider. Each provider then proceeded to implement their communication methods (outlined in the Intervention section earlier in this report).

Outcomes measures

Primary outcome

The primary outcome was 2016 Key Stage 2 attainment in English, using administrative data available on the NPD, to obtain 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.[9] Key Stage 1 attainment in literacy was used as a baseline. The development of pupil literacy was selected as the primary outcome in order to determine the impact of different approaches to communicating research evidence on attainment (note that all of the Literacy Octopus interventions related to evidence-based support for KS2 literacy).

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[9] *We considered using raw test scores as opposed to scaled scores since some information is lost in the scaling process. However, raw scores in the December 2016 version of NPD tables were not available: https://www.gov.uk/guidance/scaled-scores-at-key-stage-2.*

Secondary outcomes

In addition to the KS2 results of the 2016 cohort, the KS2 results from 2015 and 2017 will also be analysed and reported in the 2018 addendum report. As 2015 was the last year of the old KS2 tests, this outcome will therefore be KS2_ENGTOTMRK: total marks achieved in English test (sum of reading and writing tests). For 2017 data, the outcome measure will be the same as for 2016 and will be reported in an addendum report in 2018. We will measure the effect that different approaches to disseminating research evidence has on attainment over three Year 6 cohorts.

Other secondary outcomes

Other secondary outcomes that the trial has studied are degree of research use—in terms of awareness, understanding, and action. The Theories of Change for the Literacy Octopus interventions refer to these three areas of change at both individual teacher and school-wide levels. As all of the interventions aimed to involve teachers engaging in evidence-based materials, it was important to study Research Use outcomes as part of this trial. These have been measured by calculating the factor scores based on the teacher responses to the standard validated Research Use Outcomes Survey (Poet *et al.*, 2015, unpublished) administered in spring term 2016. Each teacher's score for a given factor is formed by summing together the responses of the survey items that have loaded onto that factor. The following six factors are measured by the Research Use Outcomes Survey:

- Measure 1: positive disposition to academic research in informing teaching practice;

- Measure 2: uses academic research to inform selection of teaching approaches;

- Measure 3: perception that academic research is not useful in learning;

- Measure 4: perception that own school does not encourage use of academic research;

- Measure 5: active engagement with online evidence platforms; and

- Measure 6: your knowledge about research.

The Research Use Outcomes Survey was in development while the trial protocol was being written (when the six measures were not yet fully specified), so, at the time of writing the protocol, we anticipated that the secondary outcome questions could cover the effectiveness of the different communication approaches in terms of schools' dispositions towards research and the degree to which research information is informing teaching and learning. Measures 1 and 2 clearly met our suggested outcome questions and were therefore specified in the statistical analysis plan as the main Research Use outcomes for this trial. Measures 3–6 were explored as additional secondary outcomes. (See 'Secondary outcomes analysis—research use' section below for more detail.)

Sample size

The power calculations performed in the protocol indicated that with nine arms, each having 60 schools, and a control group of 240 schools, the estimated minimum detectable effect size (MDES) of this trial would be 0.121. Assumptions underpinning this calculation were: an average cohort size of 36 pupils per school, ICC = 0.15 (reduced from 0.2 through the use of KS1 attainment data as a covariate), correlation of 0.7 between KS1 performance and KS2 performance, power = 80%, and significance = 5%. This trial was originally designed to detect effect sizes of 0.2 in the active arms but this was revised down due to likely treatment dilution—when schools either send limited staff or no staff to attend the conferences. Furthermore, we introduced a large control group which reduces the MDES from 0.153 (for a control group of 60) to 0.121 (for a control group of 240). Data attrition was not anticipated to be a problem in this trial as the primary outcome data would be anonymized NPD data and therefore did not rely on schools providing pupil data.

Randomisation

In this trial, 823 schools were randomly allocated to either one of the trial's nine arms (60 schools per arm) or the control group (283 schools) via school-level stratified randomisation. The stratum used was geographical area, a binary variable indicating north or south location. School-level randomisation was used due to many of the communication strategies being evaluated involving whole-school 'mobilisation'. As described in the section on Participant Selection, NFER's Research Operations Department recruited schools to the trial. An NFER statistician undertook the randomisation to ensure independent allocation. Appendix E details the randomisation syntax used.

Analysis

The analysis followed EEF guidelines[10] and the published SAP for this trial. This section provides an overview of the analysis undertaken. The SAP provides further detail (see footnote 7 above).

Primary intention-to-treat (ITT) analysis

The primary outcome analysis was 'intention to treat' (that is, the analysis of KS2 literacy attainment data from all schools that were randomly allocated to the intervention and control arms in the trial, regardless of level of compliance). 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 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 the independent variable—in addition to a dummy variable identifying if the school is in the north to account for the stratified randomisation; and a second model identical to the first but including nine dummy variables that indicated which group an individual is in (the default being control). A likelihood ratio test (LRT) between these models provided a global test for the impact of the 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 approach when compared to the 'business as usual' 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 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 data, it was anticipated that the level of missing data would not exceed 5% at either the school or pupil level. However, this was the case at pupil level (6%) so baseline imbalance was explored for 'percentage everFSM' and mean KS1 attainment (see 'Missing data').

Missing data

As this analysis used administrative data, it was anticipated that the number of pupils missing would be very small and so these cases could be excluded from the analysis without risk of bias. It was anticipated

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that the level of missing data would not exceed 5% at either the school or pupil level so no missing data analysis was planned.

In the event, missing data occurred at a school level for reasons relating to matching during the NPD request and data release process.[11] These included school closures and mergers and accounted for less than 1% (four schools) of the original 823. This was a very small fraction of a large number of schools and occurred for reasons very unlikely to be due to bias, entirely related to matching and administrative problems. Pupil-level missing data, however, through individuals not having a full complement of test scores at baseline and follow-up, accounted for 6%. We therefore explored the means of the analysed groups using school-level ANOVAs on percentage everFSM and mean KS1 to see if differences were due to chance or for some potentially biased reason. We do not believe data was missing for any biased reasons—Literacy Octopus communication strategies did not interfere with a school's ability to administer KS2 tests in the usual way.

CACE analysis

Fidelity analysis was conducted on individual models containing data from each arm, in turn, with control schools—nine models. To do this, a variable that measured each school's level of engagement with trial activity was matched with the attainment data. This variable measured four levels of engagement: none, low, mid, and high. While the quantitative and qualitative characteristics of each level of engagement were specific to the trial arm, we adopted an overall consistent approach to categorisation, namely:

Level of engagement	Description of engagement according to monitoring information (MI) data
None	No engagement
Low	Engaged less than expected for that arm
Mid	Engaged as expected for that arm
High	Engaged more than expected for that arm

Each provider adopted a pre-agreed MI data tool, with pre-specified fields, in order to capture the qualitative and quantitative data required. Providers submitted this data at three time-points (April 2015, July 2015, and April 2016). NFER researchers carried out the categorisation. Appendix F provides the detailed engagement schemes applied to each arm.

In order to obtain a more accurate measure of the 'pure' dosage effect of each communication method on attainment, the CACE impact estimate was calculated. Because schools may potentially have unobserved characteristics that have an influence on both compliance with the trial and academic attainment, a two-stage least squares model was used to calculate the CACE estimate (Angrist and Imbens, 1995).

Secondary outcome analyses—attainment

Interim and follow-up outcomes using the KS2 English attainment data for the 2014/2015 and 2016/2017 cohorts will be analysed and reported in the 2018 addendum report. The same analysis as that outlined in the primary intention-to-treat analysis for the 2015/2016 cohort will be applied.

Secondary outcome analyses—research use

All models using research use data were affected by the substantial levels of attrition experienced at follow-up survey administration. Each model was therefore proceeded by a multilevel logistic model consisting of two levels (school and teacher)—relating to whether or not an individual was missing at

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[11] Both the NPD team and NFER statisticians addressed the issue of URN (school Unique Reference Number) 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.

follow-up—regressed on the covariates of the main model. This helped to determine the extent of bias. As some teachers at follow-up completed the survey who did not complete one at baseline, multiple imputation was used.[12] The completers model described in the next paragraph was compared with one following imputation of the baseline measure.

Each of Measures 1 and 2 from the Research Use Survey was the dependent variable in a separate multilevel model containing two levels (teacher and school). As we used this model only to estimate coefficients and their standard error, the variable cluster size apparent during the teacher survey should not be a problem, assuming missing at random (Snijders, 2005). The covariates that were entered into each model were the equivalent baseline research use measure and a dummy variable to identify schools in the north, as per the stratified randomisation. Analysis proceeded as for the primary outcome.

The remaining Measures 3–6 were analysed at the school-level using ANOVA on follow-up data only.

Path analysis

Path analysis is planned as an attempt to uncover any link between the extent of research use and attainment via a multilevel model containing two levels (school and teacher). This will be conducted for the 2018 report. Each of the six measures of research use at follow-up will be entered into the model as teacher-level covariates along with the school mean for KS1 baseline. The dependent variable will be the school mean of the primary outcome variable. The model will be checked for tolerance as the research use measures are likely to be correlated.

Subgroup analyses

In accordance with the protocol for this trial and the most recent EEF analysis guidelines, subgroup analysis on the primary outcome was carried out for those pupils who had ever received free school meals—'everFSM'.[13] 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 18 covariates: nine dummies for randomised group and nine interaction terms. A likelihood ratio test (LRT) was performed between the two models.

Following EEF guidelines, a second model was also run including only everFSM children. Analysis proceeded as per the original primary outcome model.

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) that takes into account multiple comparisons. Dunnett's Test applied to the model coefficients themselves. These were converted to effect-size confidence intervals using the same formula as the effect size itself.

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[12] The SAP specified multilevel multiple imputation. The imputation was run on a multilevel model but the imputation model itself was single level as it was not possible to converge the multilevel model. MLwiN macros available from missingdata.org were used for this purpose.

[13] 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).

Implementation and process evaluation

Overall Implementation and Process Evaluation

The implementation and process evaluation (IPE) for the Literacy Octopus[14] involved a focus on understanding if and how teachers and schools engaged with the interventions, and crucially, what they did next, if anything, in terms of practice. We explored perceived impacts in terms of any changes in awareness, understanding, or action relating to KS2 literacy and research use, and we examined the mechanisms underpinning those changes. The IPE involved:

1. facilitating two developer workshops: the first pre-protocol to discuss the detail of each intervention arm, to inform NFER's recruitment strategy, and the second—during the recruitment phase—for providers and NFER to discuss next steps, communication strategies between NFER, providers and schools, and data sharing protocols;
2. developing a Theory of Change for the trial and for each arm: to set out how the dissemination activities would be implemented and how they would support change; these were developed by NFER collaboratively with each provider through a telephone interview and email exchanges (see Appendix D);
3. specifying an engagement data-collection tool for each provider, with pre-agreed engagement descriptors to signify 'high', 'mid' and 'low' engaged schools, and conducting independent analysis of the engagement data submitted by providers for each arm—to inform the on-treatment analysis (the engagement schemes are set out in Appendix F; NFER specified the detailed quantitative cut off points for each engagement level);
4. reviewing cost data provided to NFER by schools and developers relating to each intervention arm—to understand the costs to schools in terms of resources and time, in the trial and as would be in the real world, and calculating a cost per pupil per arm (see Methods: Costs);
5. observing events (one event in each of the active arms) including post-observation interviews with event deliverers and carrying out a review of intervention materials in order to understand delivery and inform fidelity;
6. carrying out telephone interviews with schools (approximately three teachers per arm; 29 conducted in total) to explore engagement and fidelity, views on implementation, dissemination method, and content, and initial perceived outcomes on teaching, learning, and schools;
7. carrying out telephone interviews with providers in summer 2015 (four interviews) and again in summer 2016 (four interviews) to explore implementation, fidelity, perceived outcomes, sustainability, and scalability;
8. carrying out case-study visits and light touch interviews with a sub-sample of schools (ten, including six in-depth and one light-touch case-study with schools engaged in the active arms, and one in-depth and two light-touch case-studies with schools engaged in the passive arms) to understand in more detail implementation, barriers, conditions for success, perceived outcomes, and the perceived mechanisms for change (we conducted 28 interviews in total—see Appendix H for details of the process interview samples achieved); from these we produced examples of detailed impact trails—one per provider exploring mechanisms for change (see Appendix I);
9. interviewing a small number of control-group schools (six) to explore KS2 literacy improvements and research engagement with the control group; and
10. including, as an addition to the protocol, some IPE questions in the Research Use Outcomes Survey—for both intervention and control group teachers—to ascertain extent of engagement, views on the materials and dissemination approaches, perceived outcomes, and formative recommendations (see Perceived Outcomes section).

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[14] The IPE for the Literacy Octopus was designed and implemented before the EEF's IPE guidance was published. Hence we have not attempted to map the design to the guidance. We have, however, highlighted how we approached issues of fidelity, compliance, heterogeneity, engagement, and perceived outcomes.

All observations, telephone interviews, and case-study visits were conducted by NFER researchers (including the Trial Manager and members of the Literacy Octopus IPE team). Further details of the above methods are outlined in appendices as indicated.

Implementation and Process Evaluation sampling approach

Telephone interviews

Schools for telephone interview were sampled to provide:

- three schools per arm;

- one school from each category of high, medium, and low engagement with the Literacy Octopus arm they were assigned to (see Appendix F for categorisation schemes); where there were no or very few cases of a particular engagement category from which to sample, the closest alternative category was chosen (for example, where there were few schools with 'high' engagement, we selected 'medium' engagement);

- a spread of schools in the north and south of England;

- a spread of schools with varying proportions of FSM pupils; and

- a spread of schools with varying numbers of pupils (school size).

An initial sample was drawn to meet these criteria and subsequently a further top-up sample was identified to boost recruitment. In addition, to boost recruitment, schools were invited to feedback their views via either a telephone interview or a short online survey. We approached the named Literacy Octopus lead member of staff in each school and invited them to feedback about their experiences of the intervention they were assigned to. We achieved a sample of 29 respondents (18 telephone interviews and 11 responses to the same questions via Survey Monkey) and largely met the above specification wherever possible.

Case-study schools

Case-study schools were sampled to enable us to investigate examples of a Literacy Octopus intervention leading to impacts on practice. These were selected on the basis of:

- 'high' (as defined above) levels of engagement with the Literacy Octopus intervention they were assigned to (although we did approach some mid-engaged schools where we had exhausted the list of high engagement); and

- endpoint survey responses indicating that there had been changes to practice, including:

  o respondent indicating that they had taken part in the Literacy Octopus Arm the school was allocated to;

  o reporting some perceived impacts (for example, to discuss best practice, share learning, reflect on practice, change classroom practice, reinforce existing practice, conduct own research, influence colleagues' practice, improve knowledge of KS2 literacy);

  o indicating that they had sought further evidence, research, or information about KS2 literacy or other topics; or

  o that they would recommend the intervention to other schools, and their reasoning.

In addition, we took into account telephone interview responses indicating that there had been changes to practice (it was not a prerequisite that the schools had taken part in the previous round of telephone interviews). In our selection we also took into account providers' information about schools that they knew had made changes to practice (although we avoided a number of providers' case-study schools so as to minimise burdening schools with evaluation requests).

We selected a mixture of schools based in the south and north of England. We initially approached the Literacy Octopus named co-ordinator in each school to invite them to tell us more about what they had implemented as a result of engaging with the intervention, and how the changes had come about. To boost recruitment, we added to the initial sample, sometimes selecting schools where there was less overt evidence of impact (though still evidence of engagement with the programme). We aimed to achieve a sample of 14 case studies in total (ten in active arms; four in passive arms). We conducted a total of ten case studies (seven active; three passive) which was fewer than planned due to challenges in identifying and recruiting sufficient schools that had both engaged to a high level in the interventions and that had indicated through telephone and survey responses some changes in practice. Although we approached mid-engaged schools where the list of high-engaged schools was exhausted, we experienced challenges to recruitment, including no response or schools declining to take part as they did not feel there had been sufficient impact to participate as a case study. Where possible, we conducted interviews with the literacy co-ordinator, headteacher (or other senior leader), and a class teacher who had used the materials or implemented changes as a result of the intervention. Where possible, we also observed evidence of the change to practice (such as teaching resources, pupils' work, and planning documents).

Control group schools were selected for telephone interview based on their responses to the endpoint survey to enable us to find out more about how schools engaged with evidence-based strategies. We selected control schools that appeared to be research-engaged based on their endpoint survey responses, that they either:

- identified academic research, online evidence platforms, and CPD-based on research as sources of evidence; or

- had engaged with support for KS2 literacy in the previous 12 months which they rated as 'quite' or 'very' good; or

- recommended the use of research evidence, or similar, to other schools as a way of supporting improvements in KS2 literacy.

We selected a mixture of schools based in the south and north of England. Where more than one member of staff from a school responded to the survey, we selected the most senior respondent to approach regarding a follow-up telephone interview. To boost recruitment, we drew a top-up sample which included schools demonstrating less engagement with research-evidence based on their survey responses. We aimed to conduct five telephone interviews with control schools; we achieved six.

Costs

Information on the costs to schools of taking part in the interventions was collected via a standard proforma as well as during interviews in the ten case-study schools, supported by discussion with an NFER researcher. This information covered all four Literacy Octopus providers, however we were not able to collect this cost information directly for Arm 2 (IEE Evidence Fair) and Arm 5 (CEM booklet) as we were unable to recruit case-study participants for these arms. In these cases we have provided a cost estimate based on supplementary information from schools regarding other arms and similar activities, as well as from the providers. (The original intention to collect this data via the outcomes survey was not possible as the Research Use Survey used was a standard instrument with limited space for additional process questions other than those already specified.) We also asked the Literacy Octopus providers for information about costs to schools in the real world (for example, subscription fees and conference fees) to help estimate the continuing costs to schools of engaging in Literacy Octopus activity in subsequent academic years. (The original intention to collect delivery costs borne by the provider is not a requirement of the subsequently published EEF cost guidance, and was not gathered or reported.) As the information on the costs to schools of taking part in the interventions is based on a small number of cases, it provides indicative information only.

The standard proforma for case-study schools collected information for two time periods: (1) the intervention delivery period (spring and summer term 2015), and (2) follow-up activity (autumn term 2015 to summer term 2016). The questions included in the proforma are presented in the box below.

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(1) What <u>resources</u> did you need to enable your school to engage with the materials/activities as part of the Literacy Octopus? (e.g. computer hardware/software, technology, printing, paper/card/materials, etc)?

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2 (a) Please tick if these resources were additional to any resources you already have.

(b) If resources were additional, what <u>costs and expenses</u> did you incur financially over the course of the trial for these resources? (e.g. cost of new software to enable participation, fees for services; any travel expenses; any staff <u>cover costs</u>; etc).

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(3) How much <u>time</u> did your school invest in engaging with the materials/activities as part of the Literacy Octopus? (e.g. reading materials, attending events, planning and preparation, running and attending meetings/training, CPD, lesson planning, etc) (for all staff involved, not just you)

4(a) Please tick if this time was over and above any time you would normally spend on such activities (e.g. additional preparation time, additional time for which cover had to be arranged)

(b) If time was additional, how much <u>additional time</u> did you/your staff contribute (and/or how much cover time did you have to arrange)?

The questions asked of delivery partners about costs to schools are set out in the box below.

DELIVERY PARTNER INTERVIEW SCHEDULE (SUMMER 2016)

D. COSTS TO SCHOOLS

1. As part of the evaluation for EEF, we need to report how much it would cost a school to be involved in your activities, in the real world. Could you summarise any costs to schools for each of your arms?

    1.1. Direct costs to schools, e.g. fees/subscription/buying-in training/purchasing resources/travel/subsistence/supply cover/other?

    1.2. Extra staff time, e.g. any additional staff time schools have had to spend on Octopus activity this year?

Probes: *are these essential to Octopus activity? or optional costs for schools?*

As the Literacy Octopus protocol was published prior to the EEF guidance on cost evaluations, no provisions were made in the protocol to calculate a cost per pupil of a school taking part in each type of intervention. In addition, as all of the interventions were anticipated to be 'light touch' and inexpensive (in terms of monetary cost), reporting descriptive information on costs at a school level (rather than costs per pupil) was felt to be more appropriate. However, in line with EEF guidance, we attempt to calculate a cost per pupil in each of the intervention arms. This involved three steps:

- Collate information on resource and monetary costs to a school from case-study schools for taking part in the 'intervention' (assume engagement as expected, i.e. mid levels of engagement) (i.e. spring/summer term 2015) – create an average estimate = Arm A, year 1 estimate (provide qualitative description of time input at expected levels of engagement)

- Collate information on resource and monetary costs to a school from case-study schools for ongoing engagement/follow-up implementation activity (i.e. autumn term 2015 – summer term 2016) – create an average estimate = Arm A, year 2 estimate (provide qualitative description of time input at expected levels of engagement)

- Estimate ongoing activity (e.g. annual subscription fees etc) – Arm A, year 3 estimate.

The interventions are KS2 literacy interventions. For the sake of simplicity, we have assumed that the interventions are KS2-wide, rather than focused on specific year groups, classes' or individuals. Based on the school and pupil numbers in our study, we have calculated an average number of pupils in KS2 primary schools to be 160 (four year groups with on average 40 pupils per year group).[15]

In addition, for each arm, we have provided a description of the actual costs to intervention schools during the trial, and the time that teachers and schools put into engaging with Literacy Octopus.

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[15] Note, there was data for 32,613 Year 6 pupils from the 819 identifiable Literacy Octopus schools (according to NPD data used); on average, 40 pupils in each Year 6 group.

Timeline

Table 2: Timeline

	Activity
Summer term 2014	Write, agree, and register protocol. Devise sample and recruitment strategy. Develop ToC(s) with providers; evaluation workshop with providers.
Autumn term 2014	Recruit schools; MoUs; teachers complete Research Use baseline survey. Randomly allocate schools to 1 of 10 groups (Dec 2014).
Spring term 2015	*Providers start interventions and host events.* Observe events in active arms (N = 4); post-observation interviews with providers (N = 4). Collect interim monitoring data from providers.
Summer term 2015	Telephone interviews with sub-sample of participants (N = 29). Collect end of evaluation Year 1 monitoring data. Interviews with providers (N = 4).
Autumn term 2015	Interim process analysis; engagement data coding.
Spring term 2016	Teachers complete Research Use outcomes survey. Collect end of Year 2 monitoring and costs data from providers. Engagement data coding.
Summer term 2016	*Providers continue interventions.* Follow-up interviews with providers (N = 4). School case studies (N = 10). Control group interviews (N = 6).
Autumn term 2016	*Providers continue passive elements of support to schools (e.g. sending regular materials) and respond to requests from schools.* Process analysis. Write and agree SAP.
Spring term 2017	Intention-to-treat analysis using NPD data (primary outcome 2015/2016). Survey analysis (secondary outcome). CACE analysis (primary outcome/engagement data on-treatment analysis). Sub-group analysis (everFSM). Write report.
Autumn term 2017	Publish main report.
Further activities to be undertaken (2017–2018)	
Autumn term 2017	Feedback to schools.
Spring term 2018	Intention-to-treat analysis using NPD data (interim 2014/2015 and follow-up 2016/2017). Path analysis. Write report.
Summer term 2018	Publish addendum report.

NFER timetable for the Literacy Octopus. 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 *Evidence-based Literacy Support – the 'Literacy Octopus' Trial*. High levels of school and pupil-level follow-up were guaranteed for the primary outcome through the use of NPD data. This is described in the section on pupil characteristics.

In terms of the secondary Research Use outcomes, the follow-up survey response rate was lower than expected. NFER put in place additional reminding strategies, sent paper versions of the surveys to teachers and schools who had not yet completed the follow-up survey, and extended the time period that the survey was open. A total of 2,041 teachers from 688 schools completed baseline surveys and 557 teachers from 386 schools completed endpoint surveys. Attrition in terms of school-completion of surveys between baseline and endpoint was higher than anticipated at 44% (we anticipated 30% attrition). A total of 335 teachers completed surveys at both time-points.

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

Figure 1: Participant flow diagram
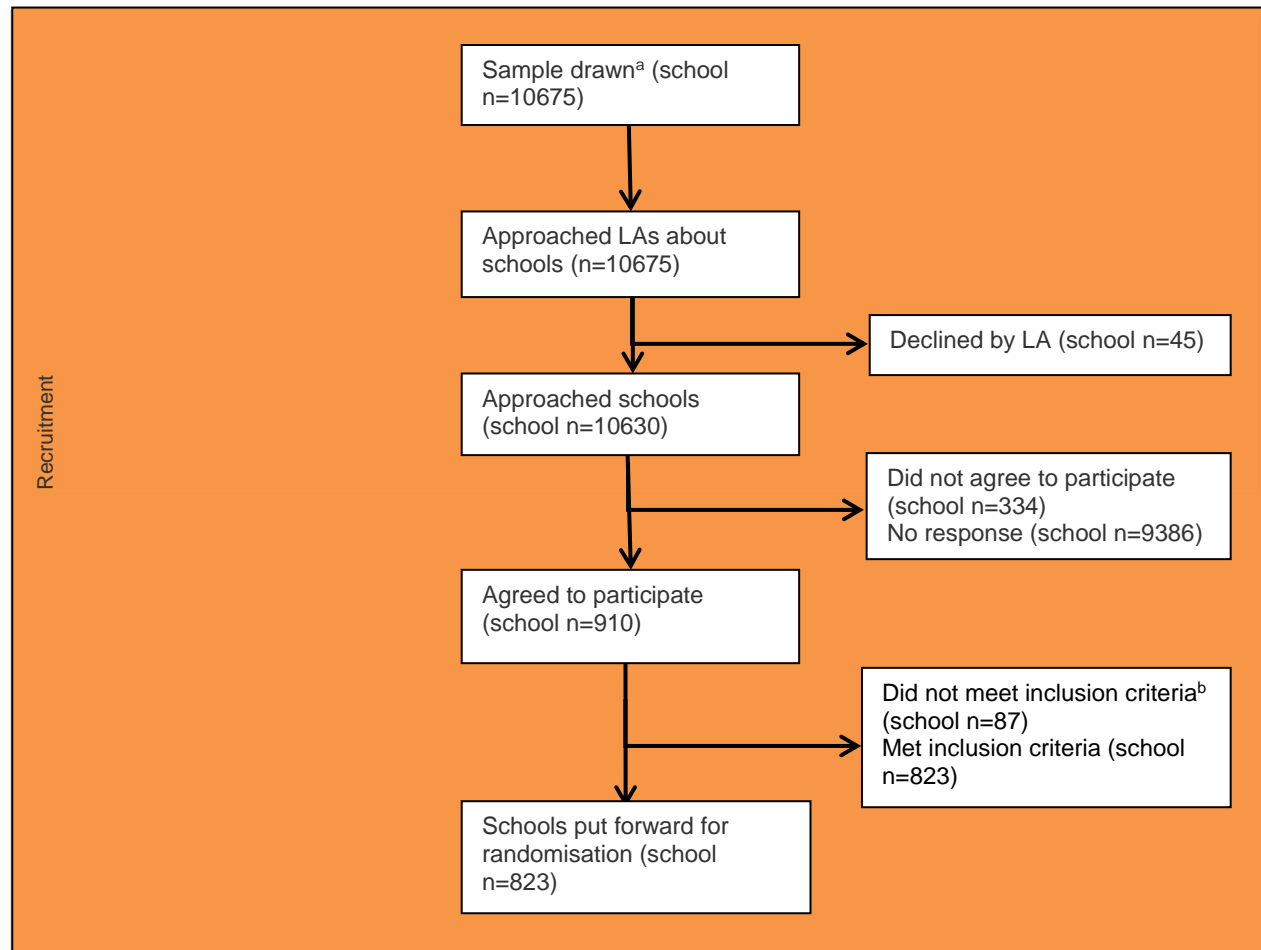
[a] The total sample was constructed of a main sample drawn initially and a further top-up sample to increase recruitment of schools to the trial.
[b] The criteria for including schools in the trial and putting them forward for randomisation was the completion of a Memorandum of Understanding (MoU) reply form giving the Headteacher's consent to participate.

					Randomised[c] (school n=823)					

Allocation

| Arm1 IEE passive (school n=60; bl survey school n=51; teacher n=167)[d] | Arm 2 IEE active (school n=60; bl survey school n=55; teacher n=162) | Arm 3 How2s passive (school n=60; bl survey school n=51; teacher n=161) | Arm 4 How2s active (school n=60; bl survey school n=51; teacher n=170) | Arm 5 CEM passive (school n=60; bl survey school n=48; teacher n=141) | Arm 6 CEM active (school n=60; bl survey school n=55; teacher n=166) | Arm 7 CEM active (school n=60; bl survey school n=49; teacher n=123) | Arm 8 ResearchEd passive (school n=60; bl survey school n=41; teacher n=128) | Arm 9 ResearchEd active (school n=60; bl survey school n=50; teacher n=141) | Arm 10 Control (school n=283; bl survey school n=237; teacher n=682) |

NPD 2015/16 KS2 match

| Arm1 (school n=60) (pupil n=2384)[e] | Arm 2 (school n=60) (pupil n=2373) | Arm 3 (school n=59)[f] (pupil n=2474) | Arm 4 (school n=60) (pupil n=2570) | Arm 5 (school n=60) (pupil n=2297) | Arm 6 (school n=60) (pupil n=2231) | Arm 7 (school n=60) (pupil n=2515) | Arm 8 (school n=60) (pupil n=2632) | Arm 9 (school n=60) (pupil n=2220) | Arm 10 (school n=280 pupil n=10917) |

| Not analysed[g] n=93 | Not analysed n=170 | Not analysed n=137 | Not analysed n=122 | Not analysed n=123 | Not analysed n=151 | Not analysed n=129 | Not analysed n=158 | Not analysed n=98 | Not analysed n=637 |

NPD 2015/16 Analysis

| Arm1 Analysed: NPD n=2291 | Arm 2 Analysed: NPD n=2203 | Arm 3 Analysed: NPD n=2337 | Arm 4 Analysed: NPD n=2448 | Arm 5 Analysed: NPD n=2174 | Arm 6 Analysed: NPD n=2080 | Arm 7 Analysed: NPD n=2386 | Arm 8 Analysed: NPD n=2474 | Arm 9 Analysed: NPD n=2122 | Arm 10 Analysed: NPD n=10280 |

[c] This sample comprised 402 schools in the North and 421 schools in the South. Schools were randomised to the intervention arms within their North and South group to give an equal, or almost equal, spread of each location per arm.

[d] Sixty schools were randomly allocated to each intervention arm. Some schools that returned an MoU reply form did not subsequently return any baseline teacher surveys so the number of schools returning at least one baseline teacher survey is lower than the number allocated in the randomisation process.

[e] The number of pupils with KS2 data on NPD list provided by DfE.

[f] One school in Arm 3, and three schools in the control could not be found on the NPD list provided by DfE, possibly due to changes in school name (for example due to mergers, academisation, or closure).

[g] Not analysed as pupils did not have a full complement of test score (that is, missing attainment data on the NPD at either KS1 or KS2).

| Withdrew[h] n=3 | Withdrew n=0 | Withdrew n=0 | Withdrew n=1 | Withdrew n=9 | Withdrew n=6 | Withdrew n=10 | Withdrew n=1 | Withdrew n=2 | Withdrew n=9 |

Teacher Outcomes Survey

| **Arm1** (ep survey school n=26; teacher n=31) | **Arm 2** (ep survey school n=22; teacher n=26) | **Arm 3** (ep survey school n=23; teacher n=38) | **Arm 4** (ep survey school n=23; teacher n=30) | **Arm 5** (ep survey school n=22; teacher n=29) | **Arm 6** (ep survey school n=24; teacher n=28) | **Arm 7** (ep survey school n=21; teacher n=29) | **Arm 8** (ep survey school n=14; teacher n=18) | **Arm 9** (ep survey school n=20; teacher n=23) | **Arm 10** (ep survey school n=191; teacher n=305) |

Teacher Outcomes Survey Analysis

| **Arm1** Analysed: Matched surveys teacher[i] n=22 | **Arm 2** Analysed: Matched surveys teacher n=20 | **Arm 3** Analysed: Matched surveys teacher n=23 | **Arm 4** Analysed: Matched surveys teacher n=16 | **Arm 5** Analysed: Matched surveys teacher n=14 | **Arm 6** Analysed: Matched surveys teacher n=21 | **Arm 7** Analysed: Matched surveys Teacher n=20 | **Arm 8** Analysed: Matched surveys teacher n=14 | **Arm 9** Analysed: Matched surveys teacher n=13 | **Arm 10** Analysed: Matched surveys teacher n=172 |

[h] This is the number of schools that actively withdrew during the course of the trial. Where given, reasons for withdrawing included staff changes and being too busy with other priorities (such as Ofsted inspection). A further proportion of schools/teachers did not respond at follow-up and did not complete the endpoint survey.
[i] Analysis of survey outcome Measures 1 and 2 was conducted on matched baseline and endpoint teacher surveys (N shown in section 'teacher outcome survey analysis').
Analysis of survey outcome Measures 3 to 6 was conducted on total teacher endpoint (ep) survey responses (N shown in section 'teacher outcomes survey').

Table 3: Minimum detectable effect size 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
Protocol	780 (60 per intervention; 240 control) *28,080*	0.70	0.15	Stratified by region (north/south)	80%	0.05	0.121
Randomisation	823 (60 per intervention; 283 control) *32,613 (minimum 2,220; 10,917 control)*	0.70	0.15	Stratified by region (north/south)	80%	0.05	0.121
Analysis (i.e. available pre- and post-test)	819 (60 per intervention aside from one with 59; 280 control) *30,795 (minimum 2,080; 10,280 control)*	0.68	0.13	Stratified by region (north/south)	80%	0.05	0.115

Source: NFER Literacy Octopus Evidence-based Literacy Support 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 0.5% (four schools) of the original 823—a very small fraction of a large number of schools. We used Edubase to try to identify these schools and explore possible reasons for being missing at school level. Reasons were entirely down to changes in school organisation, such as closures, mergers, or academisation. There were no biased reasons. 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% (1,818 of the 32,613 pupil results in the trial). We have therefore included two comparisons of school means on analysed groups 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 was 20.7 and 2.53, respectively.

An ANOVA on percentage everFSM ($df = 9$, $F = 0.991$, $p = 0.446$) suggested that the differences we see were due to chance. The ANOVA on KS1 school means ($df = 9$, $F = 1.321$, $p = 0.222$) also suggested that any differences were due to chance. In terms of a pre-test effect size on analysed groups, the largest was 0.370, between the 'ResearchEd conference and online community' and control. While this seems large, it is probably due to chance imbalance at baseline exacerbated by the fact that there were nine groups to be compared to control.

Table 4: Baseline comparison

Pupil-level variable (analysed at school-level)	IEE materials (Arm 1)		IEE evidence fair (Arm 2)		How2s website access (Arm 3)		How2s support and website (Arm 4)		CEM booklet (Arm 5)	
	n (missing)	mean	n (missing)	mean	n (missing)	mean	n (missing)	mean	n (missing)	mean
Percentage everFSM	60 (0)	26.3	60 (0)	31.7	59 (1)	26.0	60 (0)	31.9	60 (0)	26.9
KS1 school mean	60 (0)	31.39	60 (0)	30.80	59 (1)	31.76	60 (0)	31.13	60 (0)	31.18

	CEM booklet and light CPD (Arm 6)		CEM booklet and advanced CPD (Arm 7)		ResearchEd conference (Arm 8)		ResearchEd conference and online community (Arm 9)		Control	
	n (missing)	mean	n (missing)	mean	n (missing)	mean	n (missing)	mean	n (missing)	mean
Percentage everFSM	60 (0)	26.3	60 (0)	29.4	60 (0)	29.8	60 (0)	25.0	280 (3)	30.0
KS1 school mean	60 (0)	31.42	60 (0)	31.16	60 (0)	31.31	60 (0)	31.97	280 (3)	31.03

Source: NFER Literacy Octopus Evidence-based Literacy Support Trial, 2016.

Outcomes and analysis

Primary outcome and analysis—Key Stage 2 literacy attainment outcomes 2015/2016 cohort

The main result was from a likelihood ratio test (LRT) between a multi-level model containing just baseline and region and one containing baseline and region plus all the intervention groups as covariates. This yielded a likelihood ratio of 2.66 (df = 9, p = 0.98), meaning that we accept 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 and the results are presented in Table 5a and Figure 2a.

The interaction between intervention group and everFSM was explored in a similar way using a likelihood ratio test between a model containing just baseline, region, and everFSM and one with these variables plus all intervention groups and interaction terms. This yielded a likelihood ratio of 11.1 (df = 18, p = 0.89) meaning that we accept the null hypothesis and there is no evidence of any interactions. In order to present effect sizes, models were run on only everFSM children. Confidence intervals were calculated using Dunnett's Test to correct for multiple inference and the results are presented in Table 5a and Figure 2b.

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

Outcome	IEE materials (Arm 1)		IEE evidence fair (Arm 2)		How2s website access (Arm 3)		How2s support and website (Arm 4)		CEM booklet (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)	ES (95% CI)
KS2 English	n 60 (0) N 2,291 (93)	-0.02 (-0.14, 0.10)	n 60 (0) N 2203 (170)	-0.04 (-0.15, 0.08)	n 59 (1) N 2,337 (137)	0.00 (-0.12, 0.11)	n 60 (0) N 2,448 (122)	-0.03 (-0.14, 0.09)	n 60 (0) N 2,174 (123)	0.00 (-0.12, 0.11)
KS2 English (everFSM only)	n 57 (3) N 526 (28)	-0.03 (-0.19, 0.12)	n 58 (2) N 747 (55)	-0.05 (-0.19, 0.10)	n 57 (3) N 553 (39)	-0.07 (-0.22, 0.08)	n 59 (1) N 764 (44)	-0.01 (-0.15, 0.14)	n 56 (4) N 574 (37)	-0.02 (-0.17, 0.14)

Outcome	CEM booklet and light CPD (Arm 6)		CEM booklet and advanced CPD (Arm 7)		ResearchEd conference (Arm 8)		ResearchEd conference and online community (Arm 9)		Control	
	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 60 (0) N 2,080 (151)	0.03 (-0.09, 0.14)	n 60 (0) N 2,386 (129)	0.03 (-0.09, 0.14)	n 60 (0) N 2,474 (158)	0.00 (-0.11, 0.12)	n 60 (0) N 2,122 (98)	0.01 (-0.11, 0.13)	n 280 (3) N 10,280 (637)	
KS2 English (everFSM only)	n 53 (7) N 588 (44)	0.05 (-0.11, 0.20)	n 59 (1) N 668 (42)	0.04 (-0.11, 0.19)	n 55 (5) N 794 (38)	0.04 (-0.11, 0.18)	n 58 (2) N 537 (34)	0.02 (-0.13, 0.18)	n 270 (13) N 3,094 (219)	

Source: NFER Literacy Octopus Active Trial, 2016.

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

Effect size between control group and trial arm
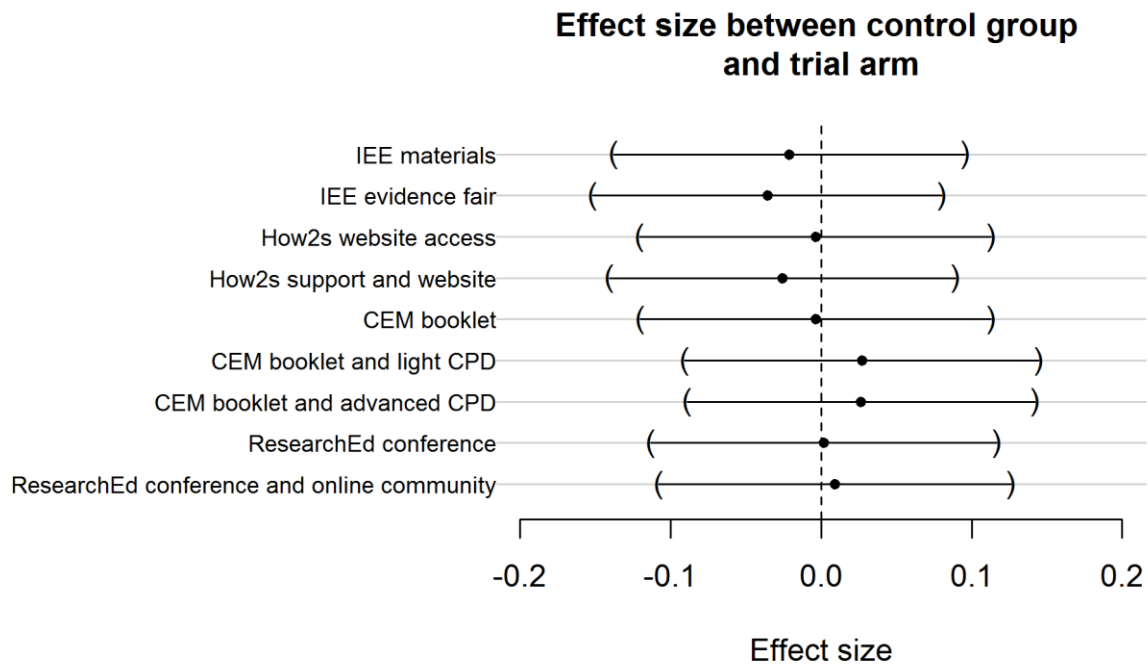
Figure 2b: FSM-only analysis—effect size versus control (Dunnett's multi-level confidence intervals)

Effect size between control group and trial arm
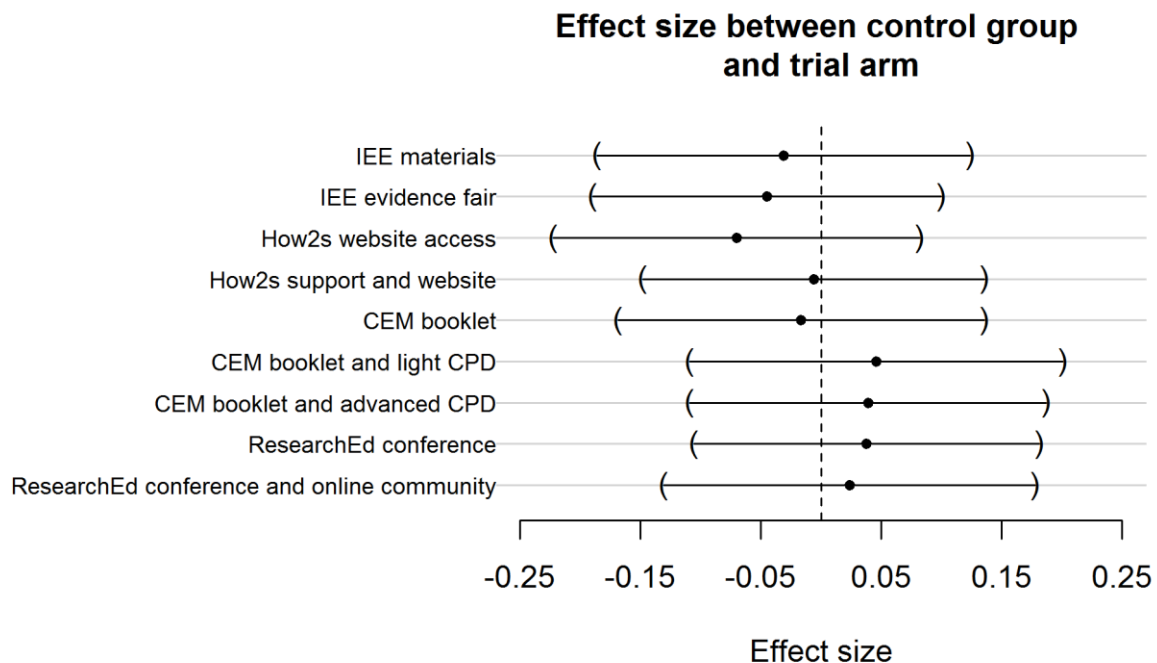
We also present the raw unadjusted means using KS2 English attainment data for all pupils in trial schools in the NPD 2015/16 KS2 dataset (i.e. prior to KS1-KS2 match) – so that the reader can see the raw results prior to complex modelling. The results are shown in Table 5b. Missing data relates to the number of pupils missing KS2 data on the NPD list provided by DfE.

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

Outcome	IEE materials (Arm 1)		IEE evidence fair (Arm 2)		How2s website access (Arm 3)		How2s support and website (Arm 4)		CEM booklet (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)
KS2 English	2,350 (34)	207.3 (206.6, 208.1)	2,314 (59)	204.5 (203.8, 205.2)	2,421 (53)	207.0 (206.3, 207.7)	2,519 (51)	205.7 (204.9, 206.4)	2,245 (52)	206.4 (205.7, 207.4)
KS2 English (everFSM only)	536 (18)	199.6 (197.9, 201.3)	768 (34)	199.4 (198.0, 200.8)	566 (26)	198.2 (196.4, 200.0)	781 (27)	199.2 (197.7, 200.7)	587 (24)	199.4 (197.8, 200.9)

Outcome	CEM booklet and light CPD (Arm 6)		CEM booklet and advanced CPD (Arm 7)		ResearchEd conference (Arm 8)		ResearchEd conference and online community (Arm 9)		Control (Arm 10)	
	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)
KS2 English	2,173 (58)	206.3 (205.6, 207.0)	2,470 (45)	207.0 (206.3, 207.7)	2,583 (49)	206.3 (205.6, 207.0)	2,182 (38)	207.3 (206.5, 208.0)	10,677 (240)	205.7 (205.4, 206.1)
KS2 English (everFSM only)	612 (20)	200.6 (199.1, 202.0)	689 (21)	200.7 (199.3, 202.2)	811 (21)	202.0 (200.7, 203.2)	549 (22)	201.9 (200.2, 203.6)	3,186 (127)	199.9 (199.2, 200.6)

Source: NFER Literacy Octopus Evidence-based Literacy Support Trial, 2016

Figure 3 summarises the results of the CACE analysis. Separate models were constructed for each comparison with control. These should be viewed in the context of the descriptive statistics concerning intervention delivery intensity in Figures 5 and 6 (see Process Section). The numbers of schools upon which the analysis is based are the same as those in Figures 5 and 6 aside from for the How2s Passive group which is based on 59 schools rather than 60 as one school was lost in this group during the match to NPD. The control group contained 280 schools.

It is interesting to note the wider confidence interval found for the intervention involving the ResearchEd conference and webinar support. This arm in particular had relatively low and relatively distinct levels of engagement—schools either attended the conference or did not. While other active arms involved receiving information (like booklets, research emails, and posters) even where schools did not attend the active element of that intervention (for example, a CPD session or an evidence fair), the ResearchEd active arm did not involve any ongoing dissemination activity to schools. Hence, schools that did not attend the conference or webinar did not receive any other material. The wider confidence interval could be indicative of this more dichotomous intervention approach.

Figure 3: CACE analysis—effect size versus control (multi-level confidence intervals)

CACE estimate of effect size between control group and trial arm
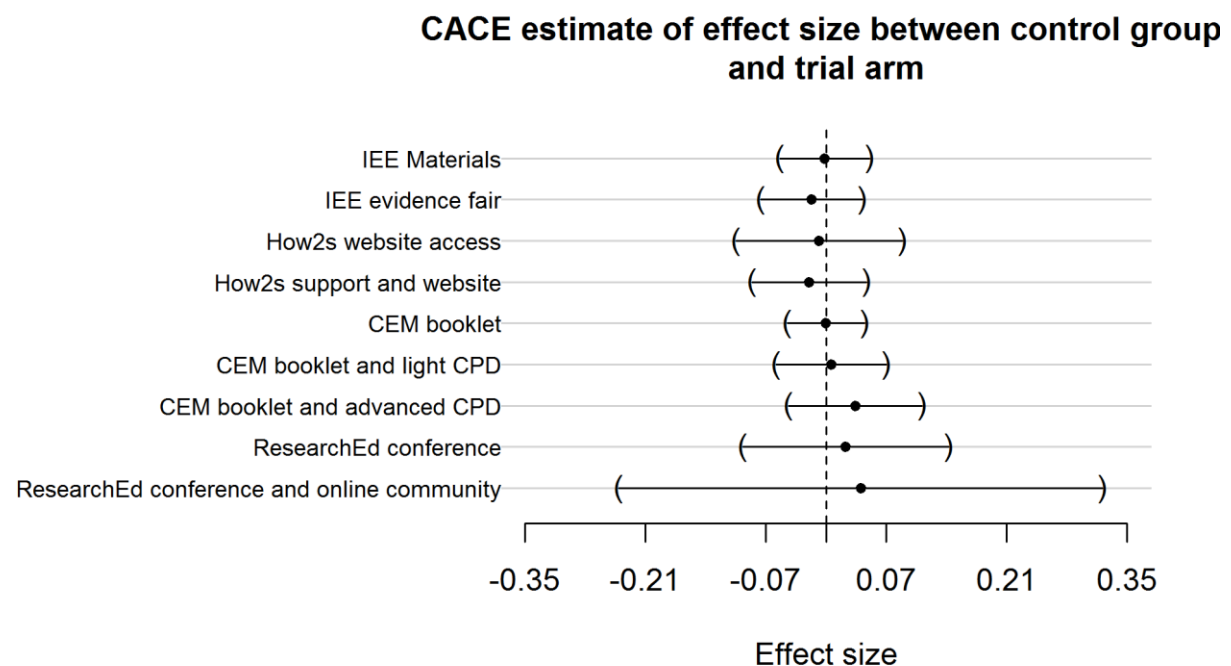
Secondary outcomes—research use

The trial also explored, as a secondary outcome, the impact of the Literacy Octopus interventions on teachers' and schools' degree of research use in terms of awareness, understanding, and action. Degree of research use was measured by creating the factors (or measures) based on teacher responses to the standard Research Use Outcomes Survey (Poet *et al.*, 2015) incorporated into the teacher baseline and endpoint questionnaires. Each teacher's score for a given factor is formed by summing together the responses of the survey items that have loaded onto that factor (or measure). We explored the following six measures of research use:

- Measure 1: positive disposition to academic research in informing teaching practice;

- Measure 2: uses academic research to inform selection of teaching approaches;

- Measure 3: perception that academic research is not useful in learning;

- Measure 4: perception that own school does not encourage use of academic research;

- Measure 5: active engagement with online evidence platforms; and

- Measure 6: your knowledge about research.

A total of 2,041 teachers from 688 schools completed baseline surveys and 557 teachers from 386 schools completed endpoint surveys. The achieved response rate was lower than expected (we aimed to achieve a baseline response from all signed-up schools) and attrition, in terms of school-completion of surveys between baseline and endpoint, was higher than anticipated at 44% (we anticipated 30% attrition). A total of 335 teachers completed surveys at both time-points. In accordance with the SAP, the main analysis of research use involved Measures 1 and 2 and was conducted using a multilevel model using the matched baseline and endpoint teacher responses (N = 335). These measures most closely related to the outcome areas highlighted in the protocol and were hence the main secondary outcomes. Measures 3 to 6 were additional secondary outcome measures, and, as specified in the SAP, were analysed using ANOVA on the endpoint teacher survey responses only (N = 557). Constituent items, and the reliability of the measures used in the analyses, are presented in Appendix G. Note that the reliability of these measures, as indicated by Cronbach's alpha, is in line with the reliability as found in the original Research Use Survey (Poet *et al.*, 2015, unpublished) and is moderate for Measures 2–6 (0.63, 0.55, 0.55, 0.69, and 0.62, respectively) and reasonably high for Measure 1 (0.83).

We conducted multilevel modelling of Measures 1 and 2 to ascertain the impact of the intervention over control Arm on teachers' research use. Each model contained two levels (school and teacher) to account for the clustering. Model covariates included the school location (North or South of England) to account for the stratified randomisation, pre-test measure (score for the given outcome measure at baseline), and nine dummy variables to indicate randomisation arm (control arm being the base case). Analysis was then carried out as for the primary outcome measure.

Like the primary outcomes analysis, the main result was from a likelihood ratio test (LRT) which suggests that there is no evidence of an effect of being in the Literacy Octopus intervention arms (Likelihood Ratio (*LR*) = 5.21, df = 9, p = 0.82) for Measure 1 ('positive disposition to academic research in informing teaching practice'). In order to present effect sizes, confidence intervals were generated using the two-sided Dunnett's Test for the multiple comparisons. For Measure 1, these results are presented in Table 6 and Figure 4a.

The above model, the 'completers model', included teachers who responded to the surveys at both time-points (n = 335). Outcomes from this model were compared with a multiply-imputed model which includes *all* the teachers who responded at follow-up (n = 557). Hence, 'the imputed model' included 222 respondents who had an outcome measure at follow-up but did not have a baseline measure. This comparison indicated that the effects of the interventions were attenuated in the imputed model. For

instance, when considering intervention Arm 9 (ResearchEd conference and online community), the raw coefficient reduced from 0.67 in the completers model to 0.21 in the imputed model.

Similar models were run for outcome Measure 2 ('use of academic research to inform selection of teaching approaches'). Results from the LRT indicated that the model with and without the intervention arms as covariates were significantly different—LR = 19.49, df = 9, p = 0.02—suggesting that there were some between-intervention-arm differences in using academic research to inform selection of teaching approaches. However, outcomes from the two-sided Dunnett's Test indicated that the confidence intervals straddle zero and therefore there is no evidence of impact of any intervention, when compared to control, for this measure. Further comparison between the completers model and the imputed model suggested that the effects of the interventions were attenuated by the imputation. For instance, looking at the largest effect size for the intervention Arm 7 (CEM booklet and advanced CPD), the raw coefficient reduced from 0.78 in the completers model to 0.56 in the imputed model. For Measure 2, these results are presented in Table 6 and Figure 4b.

Table 6: Secondary outcomes analysis, Measures 1 and 2—effect size versus control (Dunnett's multi-level confidence intervals; numbers of teachers)[16]

Outcome	IEE materials (Arm 1)		IEE evidence fair (Arm 2)		How2s website access (Arm 3)		How2s support and website (Arm 4)		CEM booklet (Arm 5)	
	n (missing)	ES (95% CI)	n (missing)	ES (95% CI)	n (missing)	ES (95% CI)	n (missing)	ES (95% CI)	n (missing)	ES (95% CI)
Measure 1	22 (9)	0.19 (-0.31, 0.69)	20 (6)	0.1 (-0.42, 0.62)	23 (15)	0.19 (-0.3, 0.68)	16 (14)	0.12 (-0.46, 0.69)	14 (15)	-0.24 (-0.85, 0.37)
Measure 2	22 (9)	0.38 (-0.17, 0.92)	20 (6)	0.38 (-0.18, 0.95)	23 (15)	-0.06 (-0.59, 0.47)	16 (14)	0.18 (-0.44, 0.8)	14 (15)	-0.17 (-0.83, 0.48)

Outcome	CEM booklet and light CPD (Arm 6)		CEM booklet and advanced CPD (Arm 7)		ResearchEd conference (Arm 8)		ResearchEd conference and online community (Arm 9)		Control (Arm 10)
	n (missing)	ES (95% CI)	n (missing)	ES (95% CI)	n (missing)	ES (95% CI)	n (missing)	ES (95% CI)	n (missing)
Measure 1	21 (7)	0.11 (-0.4, 0.62)	20 (9)	0.16 (-0.36, 0.68)	14 (4)	-0.03 (-0.64, 0.58)	13 (10)	0.21 (-0.43, 0.84)	172 (133)
Measure 2	21 (7)	0.39 (-0.16, 0.94)	20 (9)	0.54 (-0.03, 1.11)	14 (4)	-0.06 (-0.72, 0.59)	13 (10)	0.53 (-0.15, 1.21)	172 (133)

Source: NFER Literacy Octopus Evidence-based Literacy Support Trial, 2016.

Figures 4a and 4b show the effect size between the control arm and intervention arms for Measures 1 and 2 (respectively). As discussed above, it can be seen from the charts that the confidence intervals straddle zero and therefore that there is no difference in the effect size of the control arm and any of the intervention arms for either of the measures. While there appear to be some variations in effect size across the intervention arms, it was beyond the scope of the current analysis to investigate this more thoroughly.

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[16] The n for each arm is those with both baseline and follow-up data (across all arms, n = 335) and number of missing is those who were only found to be at end-point (across all arms 557-335 = 222).

Figure 4a: Secondary outcomes analysis, Measure 1—effect size versus control (Dunnett's multi-level confidence intervals)

Effect size between control group and trial arm for positive disposition to academic research in informing teaching practice (measure 1)
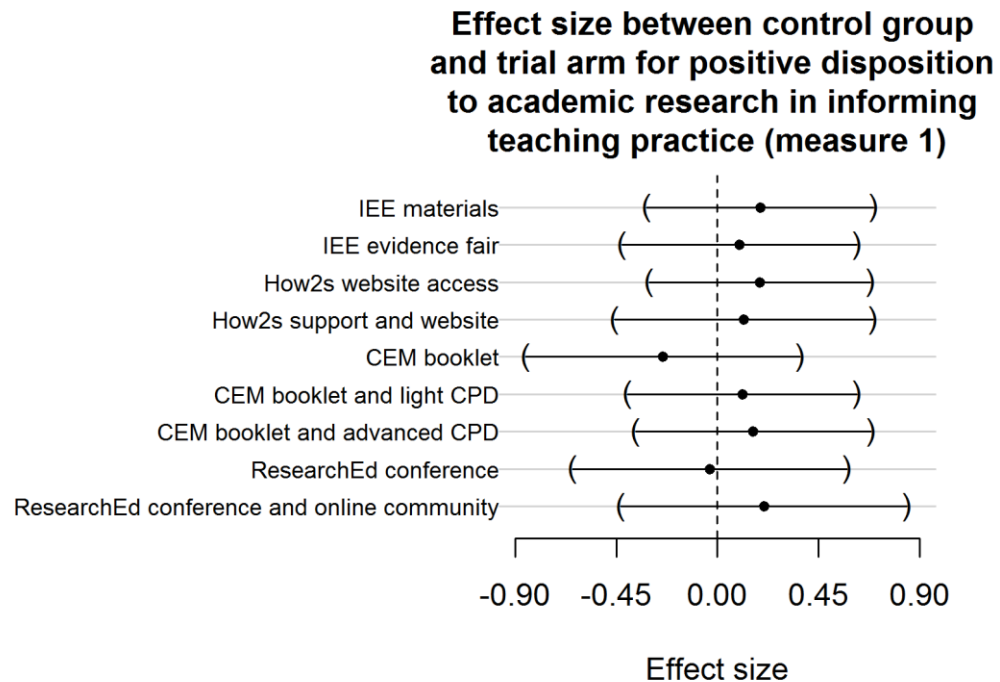
Figure 4b: Secondary outcomes analysis, Measure 2—effect size versus control (Dunnett's multi-level confidence intervals)

Effect size between control group and trial arm for uses of academic research to inform selection of teaching approaches (measure 2)
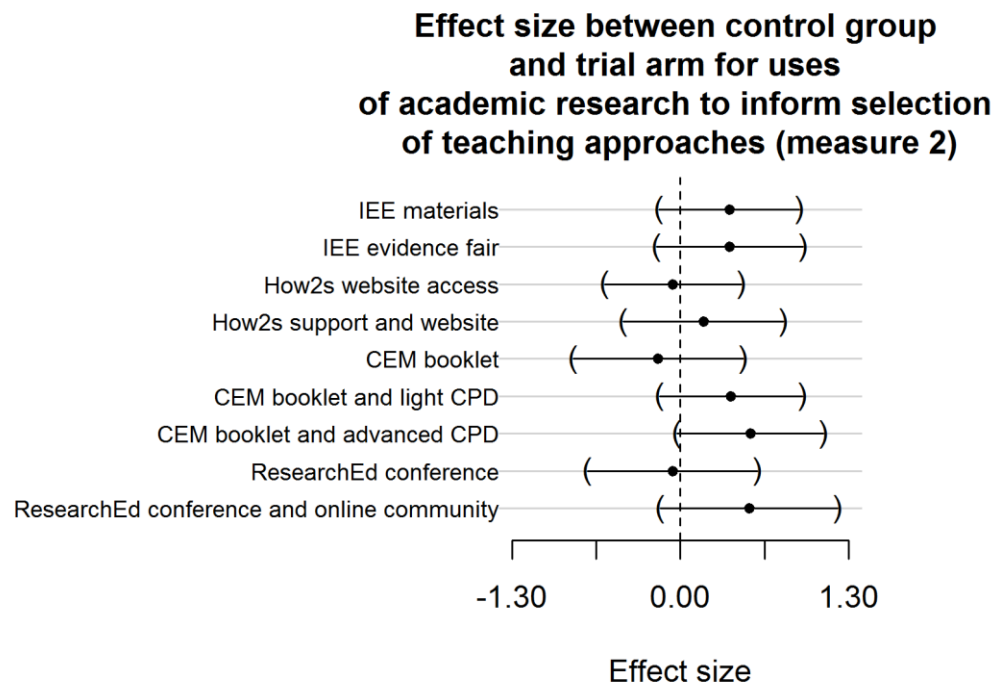
Measure 1 was scored on a scale of 6–29 with a higher score reflecting a more positive disposition to academic research. Table 7 below displays the raw mean scores for Measure 1 and shows that across all arms and the control, teachers score highly on this Measure, indicating their positive disposition to research.

Measure 2 was scored on a scale of 2–9 with a higher score reflecting greater use of academic research to inform teaching. Table 7 below displays the raw mean scores for Measure 2 and shows that across all arms and the control, teachers score slightly below the middle point of this measure. This indicates that, while teachers may have a highly positive disposition to research, it is actually *used* to inform the selection of teaching approaches to a lesser extent.

Table 7: Secondary outcomes analysis, Measures 1 and 2—raw means (unadjusted confidence intervals; numbers of teachers at follow-up)

Outcome	n	IEE materials (Arm 1) Mean (95% CI)	n	IEE evidence fair (Arm 2) Mean (95% CI)	n	How2s website access (Arm 3) Mean (95% CI)	n	How2s support and website (Arm 4) Mean (95% CI)	n	CEM booklet (Arm 5) Mean (95% CI)
Measure 1	31	21.6 (20.44, 22.75)	26	21.04 19.69, 22.39	38	21.21 (19.94, 22.48)	30	21.8 (20.65, 22.95)	29	21.24 (19.82, 22.66)
Measure 2	31	4.77 (4.13, 5.42)	26	4.58 (4.03, 5.13)	38	4.47 (4.05, 4.90)	30	5.1 (4.48, 5.72)	29	4.41 (3.93, 4.9)

Outcome	n	CEM booklet and light CPD (Arm 6) Mea (95% CI)	n	CEM booklet and advanced CPD (Arm 7) Mean (95% CI)	n	ResearchEd conference (Arm 8) Mean (95% CI)	n	ResearchEd conference and online community (Arm 9) Mean (95% CI)	n	Control (Arm 10) Mean (95% CI)
Measure 1	28	21.61 (20.52, 22.7)	29	21.72 (20.4, 23.05)	18	21 (19.12, 22.88)	23	21.85 (20.32, 23.37)	305	21.66 (21.31, 22.01)
Measure 2	28	5 (4.43, 5.57)	29	5.03 (4.39, 5.68)	18	4.56 (3.81, 5.30)	23	4.83 (4.06, 5.59)	305	4.6 (4.45, 4.74)

Source: NFER Literacy Octopus Evidence-based Literacy Support Trial, 2016.

The remaining outcome measures (3–6) from the Research Use Outcomes Survey were also included in the analysis. These were analysed at the school-level using ANOVA using the endpoint survey responses. This enabled us to explore any differences between the Literacy Octopus intervention arms and the control arm.

The results of the ANOVA for Measure 3 ('perception that academic research is not useful in learning') revealed that the differences between any of the intervention arms compared to the control arm were probably due to chance (F = 0.544, df = 9, p = 0.842). Measure 3 was scored on a scale of 2–10; the scale was negatively worded so scores at the lower end of the scale indicate a more positive disposition. Table 8 below displays the raw means for Measure 3 and shows that across all groups of respondents, teachers tend to be reasonably positive about the usefulness of academic research in learning.

The results of the ANOVA for Measure 4 ('perception that own school does not encourage use of academic research') indicate that the differences between any of the intervention arms compared to the control arm were probably due to chance (F = 0.458, df = 9, p = 0.902). Measure 4 was scored on a scale of 2–10, again, negatively worded: scores at the higher end of the scale indicate a more negative

disposition. The mean scores for this measure are presented in Table 8 and show that across all groups of respondents, teachers are slightly positive about their schools' encouragement for the use of academic research.

The results of the ANOVA for Measure 5 ('active engagement with online evidence platforms') indicate that the differences in the mean scores for the randomisation arms were probably by chance (F = 0.892, df = 9, p = 0.532). Measure 5 was scored on a scale of 2–7; a higher score indicates more engagement with online evidence platforms. The mean scores for this measure are presented in Table 8 and show that across all groups of respondents, teachers tend to score slightly above the middle of the scale, indicating that they engage with online evidence platforms to a moderate extent.

The results of the ANOVA for Measure 6 ('your knowledge about research') suggest that there is a difference between the mean scores between the randomisation arms (F = 1.996, df = 9, p = 0.039). Since this difference was found to be statistically significant, we ran multiple comparisons using the two-sided Dunnett's Test. This post-hoc test compared each intervention arm with the control arm as a reference category. P-values for each comparison were found to be greater than 0.05 suggesting that there is no evidence that the mean score for each intervention arm is different from that of the control arm. Measure 6 was scored on a scale of 0–11; this measure is scored on the number of correct answers given to factual questions about research. The mean scores for this measure are presented in Table 8 and show that all groups of respondents tended to score fairly low on the scale, indicating a moderate level of knowledge about research.

Table 8: Secondary outcomes analysis, Measures 3–6—school means

Outcome	n	IEE materials (Arm 1) Mean (95% CI)	n	IEE evidence fair (Arm 2) Mean (95% CI)	n	How2s website access (Arm 3) Mean (95% CI)	n	How2s support and website (Arm 4) Mean (95% CI)	n	CEM booklet (Arm 5) Mean (95% CI)
Measure 3	26	4.42 (3.92–4.93)	22	4.25 (3.82–4.68)	23	4.33 (3.75–4.91)	23	4.34 (3.90–4.78)	22	4.46 (3.85–5.07)
Measure 4	26	5.13 (4.49–5.68)	22	5.25 (4.57–5.93)	23	5.32 (4.51–6.13)	23	5.03 (4.33–5.73)	22	5.31 (4.54–6.09)
Measure 5	26	4.91 (4.53–5.30)	22	4.86 (4.34–5.39)	23	4.86 (4.39–5.34)	23	5.29 (4.86–5.71)	22	4.89 (4.49–5.28)
Measure 6	26	4.63 (3.67–5.60)	22	4.84 (3.88–5.80)	23	3.51 (2.67–4.34)	23	4.99 (3.72–6.27)	22	3.09 (2.25–3.93)

Outcome	n	CEM booklet and light CPD (Arm 6) Mean (95% CI)	n	CEM booklet and advanced CPD (Arm 7) Mean (95% CI)	n	ResearchEd conference (Arm 8) Mean (95% CI)	n	ResearchEd conference and online community (Arm 9) Mean (95% CI)	n	Control (Arm 10) Mean (95% CI)
Measure 3	24	4.39 (3.89–	21	4.04 (3.59–	14	4.32 (3.5 –	20	4.48 (3.95–	191	4.52

		4.91)		4.48)		5.08)		5.00)		(4.37–4.67)
Measure 4	24	4.98 (4.3 – 5.58)	21	4.84 (4.32–5.37)	14	5.57 (4.68–6.46)	20	4.98 (4.43–5.53)	191	5.04 (4.84–5.23)
Measure 5	24	5.32 (4.87–5.78)	21	5.21 (4.65–5.77)	14	5.16 (4.6 – 5.70)	20	4.96 (4.47–5.45)	191	4.93 (4.80–5.06)
Measure 6	24	4.06 (3.19–4.93)	21	4.56 (3.71 – 5.40)	14	4.32 (3.11–5.53)	20	4.25 (3.01–5.49)	191	4.01 (3.75–4.27)

Source: NFER ANOVA—Research Use Outcomes Survey analysis (Spring/Summer 2016 survey).

Costs

Table 9 presents details of how much it would cost a school to participate in each of the Literacy Octopus intervention arms. The table presents the cost per pupil per year over three years, as described in the EEF cost-evaluation guidance (and is accompanied by notes explaining the assumptions underpinning these calculations). The table also summarises any prerequisite resources and requisite staff time associated with participating in the interventions in 2015, and in any ongoing engagement in 2016 and 2017. As the information on the costs to schools of taking part in the interventions is based on a small number of cases, it provides indicative information only.

Following Table 9, we briefly describe how much the Literacy Octopus interventions actually cost schools which took part in the evaluation, and explore case-study schools' reports of their financial and time investment in these interventions. We have also included some description from case-study schools of the time they invested in resultant implementation activity.

Table 9: Summary of costs to schools

Group	Year	Marginal costs	Prerequisites	Staff time (estimate requisite for expected intervention engagement; *italics for additional implementation*)	£ per pupil per year
1. IEE: materials	Year 1 (2015)	Subscription fees: £19.50 per person per year or £50 per institution per year.[a]	Computer with internet.	Intervention engagement: small amount of time to read materials, e.g. 1 hour per month per person; staff preparation time (reviewing and planning approaches): e.g. 2 hrs.	£0.31[b]
	Year 2 (2016)	As previous year.		Ongoing engagement: small amount of time to read materials, e.g. 1 hour per month per person.	
	Year 3 (2017)	As previous year.		As Year 2.	
2. IEE: evidence fair[j]	Year 1	Subscription fees: £19.50 per person per year or £50 per institution per year; event fees: no charge; travel to event, two members of staff to attend: £200.[c]	Computer with internet.	Intervention engagement: small amount of time to read materials, e.g. 1 hour per month per person; attending event: 1 day per person (2 days total); supply cover time/costs: as applicable; staff preparation time (reviewing and planning approaches): e.g. 2 hrs.	£0.73[d]
	Year 2	Subscription fees: £19.50 per person per year or £50 per institution per year		As Year 2, Arm 2.	
	Year 3	As Year 2.		As previous year.	
3. Teaching How2s: website access	Year 1	Subscription fees: £624 (inc. VAT) per school per year.[e]	Computer with internet.	Intervention engagement: small amount of time to initially acccess and use website, e.g. 2 hours per person; build into existing CPD: e.g. 0.5 day per school.	£3.90
	Year 2	As previous year.		Ongoing engagement: small amount of time to continue to build into existing CPD: e.g. 0.5 day per school.	
	Year 3	As previous year.		As previous year.	
4. Teaching How2s: support and website access	Year 1	Subscription fees: £624 (inc. VAT) per school per year; travel to introductory event, one member of staff to attend: £100.	Computer with internet.	Intervention engagement, attend introductory event: 1 day per person (1 day total); supply cover time/costs: as applicable; small amount of time to initially access and use website: e.g. 2 hours per person; in-house cascaded CPD: e.g. 1 hour; staff preparation time (reviewing and planning approaches): e.g. 2 hours;	£4.11

				coaching observations: e.g. (3 x 15 mins to 1 hr observations); build into existing CPD: e.g. 0.5 day per school.	
	Year 2	Subscription fees: £624 (inc. VAT) per school per year.		Ongoing engagement: small amount of time to continue to build into existing CPD: e.g. 0.5 day per school.	
	Year 3	As year 2.		As previous year.	
5. CEM: booklet[j]	Year 1	Printing: booklet, £2 per booklet; posters, £1 per poster x 12 per year.	Computer with internet; printer.	Intervention engagement, staff preparation time (reading booklet): e.g. 1.5 hrs per person; staff preparation time (reviewing and planning approaches, using posters): e.g. 2 hrs.	£0.09
	Year 2	As previous year.		Ongoing engagement: small amount of time to continue to read/use materials: e.g. 0.5 hour per month per person.	
	Year 3	As previous year.		As previous year.	
6. CEM: booklet and light CPD	Year 1	Printing costs (as Arm 5) plus training fees (one event): £54 for 3 teachers to attend;[f] travel to training (one event): £90 for 3 teachers to attend.[g]	Computer with internet; printer; resources (e.g. workbooks).	Intervention engagement, attend training: 2 hrs per person (6 hrs total); staff preparation time (reading booklet): e.g. 1.5 hr per teacher; staff preparation time (reviewing and planning approaches, using posters): e.g. 2 hrs per person; *in-house cascaded CPD: e.g. 2 hrs per school.*	£0.39
	Year 2	Printing costs only (as above).		Ongoing engagement: staff preparation time to read/use materials: e.g. 0.5 hour per month.	
	Year 3	Printing costs only (as above).		As previous year.	
7. CEM: booklet and advanced CPD	Year 1	Printing costs (as above) plus training fees (two events): £108 for 3 teachers to attend; travel to training (two events): £180 for 3 teachers to attend; INCAS subscription: £10.08 (inc. VAT) per pupil.[h]	Computer with internet; printer; software (e.g. PowerPoint).	Intervention engagement, attend training: 2 x 2 hr sessions per person (12 hrs total); INCAS peer observations: e.g. 2 hrs per school; staff preparation time (reading booklet): e.g. 1.5 hr per teacher; staff preparation time (using posters, reviewing and planning strategies): e.g. 2 hrs per person; in-house cascaded CPD: e.g. 2 hrs per school.	£10.77
	Year 2	Printing costs (as above) plus INCAS subscription (as above).		Ongoing engagement: staff preparation time (to read/use materials: e.g. 0.5 hour per month per person.	
	Year 3	As Year 2.		As previous year.	
	Year 1	Event fees for regional conferences: £25;[i] travel to event, one member of staff attending: £100.	Resoures (e.g. books).	Intervention engagement, attend event: 1 day per person; in-house cascaded CPD: e.g. 1 hr;	£0.26

8. ResearchEd: conference				staff preparation time (planning and implementing approach, coaching colleagues): e.g. 1 day.	
	Year 2	None.		Ongoing engagment: none/minimal.	
	Year 3	None.		As previous year.	
9. ResearchE: conference and online community	Year 1	As Year 1, Arm 8.	Computer with internet; resources (e.g. books).	Intervention engagement, attend event: 1 day per person; attend webinars: 2 x 1 hr sessions per person; in-house cascaded CPD: e.g. 1 hr; *staff preparation time (implementing approach, coaching colleagues): e.g. 1 day.*	£0.26
	Year 2	None.		Ongoing engagement: none/minimal.	
	Year 3	None.		As previous year.	

Notes on Table 9

[a] For the purposes of the per-pupil calculation, we have assumed the subscription cost would be £50 for the whole institution. As the trial was focused on literacy across KS2, we have assumed that a typical primary school in the trial sample will have more than one teacher of this Key Stage.

[b] The per-pupil calculations are based on the marginal costs detailed in the table. The calculation is based on: total cost of the intervention over three years; divided by three; divided by 160 pupils in KS2. For the purposes of the calculation, we calculated an average number of pupils in KS2 primary schools to be 160 based on the sample of primary schools participating in the trial (four year groups, with an average 40 pupils per year group).

[c] Travel costs varied depending on the mode of travel and proximity to venues. In some cases, other costs relating to travel may be incurred, such as an overnight stay to enable timely arrival at the venue and subsistence costs during travel. To take account of these costs we have assumed a typical cost of £100 per person per return journey to events, unless otherwise stated.

[d] The per-pupil calculation includes travel costs for two members of staff to attend this event as IEE encouraged a senior leader and class teacher to attend from each school. In all other cases, unless stated otherwise, per-pupil calculation costs are based on one member of staff attending events/training (who may subsequently cascade the information to their colleagues within school as part of general CPD activity).

[e] The subscription fee was waived for Literacy Octopus trial schools in the first and second years of the trial (2014/2015 and 2015/2016). Trial schools were subsequently offered the annual subscription at £520 + VAT per year, or a discounted rate if they subscribed for two years to get a free third year, totalling £1,040 + VAT for three years subscription. The subscription structure varies with the size of the school. For the purposes of the per pupil calculation, we have assumed an annual subscription charge of £520 + VAT (£624).

[f] We were informed by the provider that the costs of the training varied according to the event location and number of teachers attending. Venue costs were £130 outside of London, £500 within London, and £450 to buy in training delivered at a host school. This pricing structure is based on sharing these costs among an assumed 20 teachers attending. This gives an average event cost of £360 and an average cost per teacher (assuming 20 attend) of £18. We were informed by the provider that, on average, two to four teachers from a school attended training and, hence, for the calculation we have assumed that an average of three teachers attended each training event.

[g] Events run by CEM tended to be small, localised events (often hosted in participating schools) and so travel costs to the training tended to be low and were estimated by CEM to average £30 per teacher. Arm 6 involved one twilight training event, while Arm 7 involved two twilight training events and hence the average cost of travel per teacher has been doubled in the per-pupil cost for Arm 7. We have estimated the per-pupil cost based on three teachers from a school attending the training event/s.

[h] We were informed by the provider that the cost of INCAS was £8.40 per pupil plus VAT. These charges were waived for trial schools during the first year of the trial (2015).

[i] The cost of attending ResearchEd conferences varies depending on the location, numbers attending, and sponsorship funding for each event. We were informed by the provider that the average event charge is £25. This charge was reduced to £15 for teachers attending the events as part of the Literacy Octopus trial (2015) and was reimbursed upon attendance.

[j] We were not able to collect cost information directly for Arms 2 and 5 as we were unable to recruit case-study participants for these arms. In these cases, we have provided a cost estimate based on supplementary information from schools regarding other arms and similar activities, as well as from the providers.

The following paragraphs briefly describe in turn how much each Literacy Octopus intervention cost for the schools that took part in the evaluation. It also explains the views of case-study schools on whether any additional costs were incurred or additional time required to participate in the interventions and any resultant implementation activity.

Costs of participating: IEE materials and evidence fair

Schools participating in these interventions were not charged any subscription fees for paid-for materials (some of the IEE materials are freely available to schools anyway). The evidence fair was free to participating schools. A case-study school reported that there were no *additional* costs, resources, or time-demands associated with engaging with the materials, as reading and discussing them was considered part of normal CPD activity (such as discussing ideas at staff meetings) and any resulting modifications to practice used existing resources. Supply cover costs could be incurred by schools to attend events, and were seen as additional or not, as applicable to each school's supply cover practices.

Costs of participating: Teaching How2s teaching and learning website and introductory event

Schools participating in these interventions had free access to the Teaching How2s website during the first and second years of the evaluation (spring and summer terms of 2015, and academic year 2015/2016). The introductory event was also free to schools. Subsequent to this evaluation, schools faced the normal subscription charges to continue to use the website if they wished, but with a discounted rate of 'buy two years, get three' as described in the notes above. Case-study schools expressed concern about meeting this cost and suggested that it may prohibit their longer-term use of the resource. Both case-study schools were exploring the possibility of offsetting the cost of subscription by becoming How2s 'hub' schools and supporting neighbouring schools to use the resource. Participating schools identified the cost of travel to the introductory event as *additional* to normal expenditure. The schools did not have to purchase any additional resources to use How2s. Engaging with this intervention required teachers to spend time attending the induction, cascading information to colleagues, planning how to implement ideas, and conducting peer-observations. However, this was generally regarded as being commensurate with normal teaching and teacher-development activities, and though it may have displaced time spent on other development activities with a different focus, overall, it required little *additional* time investment. Using the How2s website as part of the trial was considered by case-study interviewees as a relatively low-cost intervention, particularly given it is school-based (but note, the subscription fee was waived for the trial).

Costs of participating: CEM materials, training and INCAS diagnostic tool

Schools participating in these interventions received the printed booklet and posters free in the post (so did not incur printing costs) during the first year of the evaluation (spring and summer terms 2015). The training events and access to INCAS were also free to schools during the first year of the evaluation (2015/2016). The case-study schools reported either no, or very minimal, travel costs to attend the training events as these were either hosted by the school or were very local. Schools did not have to purchase any *additional* resources as part of the intervention as existing resources could be used (such as a computer with internet access, software such as PowerPoint, printing and laminating, and workbooks). Engaging with this intervention required teachers to spend time attending training, cascading information to colleagues, discussing and reviewing approaches at staff meetings, planning how to implement ideas, and creating and collating teaching and learning resources. Interviewees views varied as to whether this time was considered as additional—the twilight CPD sessions were considered as *additional* time by one teacher—though generally these activities were considered to be a reasonable investment of time and part of normal practice for teachers.

Costs of participating: ResearchEd and NatCen conference and webinars

Schools participating in these interventions paid a nominal charge of £15 to attend a conference during the first year of the evaluation (2015/2016) which was reimbursed upon attendance. The pre- and post-conference online webinars were free for participating schools to access. The case-study schools incurred small *additional* costs for travel to attend a conference. Schools did not have to purchase any *additional* resources to engage with the intervention itself as these already existed in the school (for example, a computer with internet access). However, case-study schools did incur *additional* costs associated with implementing some of the practices introduced at the conference (such as purchasing books suitable for reciprocal reading, buying an additional external training day on Fischer Family Trust reciprocal reading, or buying a one-to-one phonics tutoring kit, workbooks, or phonics-based games). Engaging with the Literacy Octopus intervention itself required a day of *additional* time to attend the conference (this was on a Saturday so was outside of normal working hours, though some schools gave teachers a working-day off in lieu) and online webinars. Teachers also reported that implementing new teaching strategies identified at the conference also involved their time to: cascade information to colleagues; attend additional training on the approach; plan how to implement the approach and trial in class; create and collate resources; and coach colleagues on using the new approach. Most of these tasks were considered to be part of normal teaching activity, and although this may have displaced a focus on a different approach, this did not represent substantial additional time burden.

Process evaluation

Summary of Process Evaluation findings

Engagement: schools' engagement with the Literacy Octopus interventions varied greatly: 42% of the 540 intervention schools did not engage with the Literacy Octopus materials according to monitoring data; 20% engaged a little; 22% engaged to the level planned for their arm; and 16% engaged to a greater extent than expected (for example, they hosted CPD sessions, or they requested further materials). Engagement also varied across the arms, with greatest engagement in Arms 1, 4, 5 and 6 (IEE passive, How2s active, CEM passive, and CEM active light). Least engagement occurred in Arms 8 and 9 (ResearchEd passive and active).

In terms of IPE outcome survey respondents, around a half of intervention respondents reported that they had been directly or indirectly (for example, through information received from colleagues) involved with the Literacy Octopus (the view of 52% (120) of 234 respondents who were shown this question). These respondents were routed on to answer more detailed questions about implementation. The remaining respondents either had not been involved or did not know.

Communication approaches: teachers were generally positive about the modes of communication used by the Literacy Octopus interventions and felt the amount of information provided was about right (70% of 120 survey respondents). Teachers showed no clear preference for a particular method —they engaged with both passive and active dissemination approaches—but wanted communication to be accessible and timely.

Research evidence nature: case study and survey responses indicated that research evidence is most effectively communicated when it is interactive, accessible, relevant to enhancing and developing practice, supports the implementation process, includes a balanced and credible discussion of evidence, and focuses on how to apply the evidence to practice.

Perceived outcomes and impacts: the majority of the 120 teachers responding to survey questions about perceived outcomes thought that participating in the Literacy Octopus had led to positive, practical impacts—such as enabling them to reflect on classroom practice (36% 'a lot', 56% 'a little'), reinforce it (32% 'a lot', 57% 'a little'), or change it (24% 'a lot', 56% 'a little'), or to discuss best practice with colleagues in their school (32% 'a lot', 53% 'a little').

Mechanisms for further implementation: where schools had gone on to implement changes to KS2 literacy or research use, such changes were facilitated by activities such as: in-school collaboration; undertaking further enquiry and follow-up activities with providers; trying out, reviewing, adapting and embedding approaches; consulting research champions; and having a planned approach to implementation. Appendix I presents examples of impact trails in four schools.

Fidelity: while the core communication mode and content in each intervention arm was delivered as planned, providers adapted their implementation in two main ways: (1) all providers found the initial response to advertised events lower than expected and so put in place additional measures to encourage attendance, and (2) a number of providers delivered alternative 'active' sessions, for example webinars, where the planned in-person dates and venues were not convenient to teachers.

Formative findings: for future development, organisations involved in supporting teachers' evidence-use need to consider whether to put efforts into increasing initial engagement (for example, through greater lead-in time, local rather than regional events, or hub-led events), and/or into transformation and implementation (through collaborative, planned, and championed approaches). It was found that one-third of survey respondents would not recommend the Literacy Octopus intervention they were assigned to, mainly due to a perceived lack of fit with their school's current priorities, hence initial engagement and matching of evidence foci to schools' needs (rather than the random allocation tested in this trial) may be an important consideration.

Control group activity: control group schools were positive about the support they had received for KS2 literacy from external providers (not involved in the Literacy Octopus) during the trial period and indicated varying levels of research engagement. We found no evidence of resentful demoralisation or compensation rivalry among control schools and they appeared to continue with 'business as usual' in terms of their literacy practices and research engagement during the trial.

This section draws on data from the process evaluation, including:

- the teacher outcomes surveys for the intervention and control groups (N = 252 and 305 respectively);
- early telephone interviews with 29 teachers;
- case study interviews with 21 teachers in ten schools;[17]
- six interviews with control group teachers;
- interviews with providers in 2014, 2015, and 2016 and their ToCs;
- observations of events and review of materials; and
- engagement data provided by Literacy Octopus providers.

Levels of engagement with the interventions

Literacy Octopus providers supplied information to NFER on schools' engagement with the resources and activities in each arm using a monitoring specification developed by NFER (see Methodology for further details). NFER then applied a coding scheme to categorise schools' engagement levels as 'high', 'mid', 'low', or 'non'-engaged. These schemes were based broadly on levels of engagement being 'none at all', 'less than expected', 'as expected', or 'more than expected' for each arm. For each arm, the expected level of engagement (for the activity that teachers were invited to engage in) was categorised as the 'mid' or 'norm' in order to provide some comparability across arms. Both teacher- and school-level monitoring were taken into account to categorise level of engagement per school (see Appendix F for details of the coding schemes).

Fig. 5: Overall level of school engagement in Literacy Octopus as at July 2015
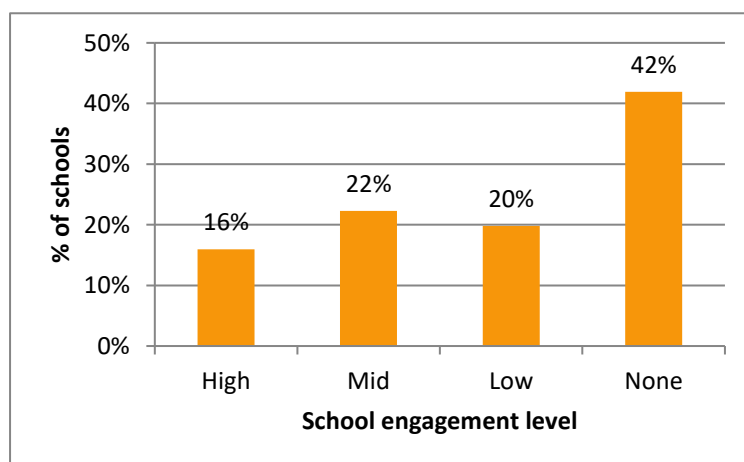
As Figure 5 shows, schools' overall levels of engagement varied greatly: 42% of the 540 intervention schools did not engage with the Literacy Octopus materials, according to monitoring data; 20% engaged a little; 22% engaged to the level planned for their arm; and 16% engaged to a greater extent than expected (for example, they hosted CPD sessions, or they requested further materials).[18]

Source: NFER Literacy Octopus monitoring data.

As shown in Figure 6, level of engagement varied across the arms, with greatest engagement (the highest 'mid' and 'high' levels) in Arms 1, 4, 5 and 6 (How2s active, IEE passive, CEM passive and CEM active light) and least in Arms 8 and 9 (ResearchEd passive and active). Interestingly, it was not necessarily the case that the more active the arm, the higher the schools' engagement.

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[17] By 'teachers' we mean class teachers, school leaders, and literacy co-ordinators in primary schools. Where different respondents contributed differently, we identify their job role.

[18] For Arm 8, the criteria for categorising 'none' and 'low' engagement were the same (that is, if no teachers from the school attended the conference, for analysis purposes, these were categorised as 'none').

Providers supplied a further round of monitoring data in April 2016 to help measure longer-term activity and engagement. Most schools remained at the same level of engagement as in the previous year, although some levels changed in either direction reflecting schools' changeable circumstances and priorities.

Senior leaders' and teachers' reasons for taking part in the Literacy Octopus and engaging with their arm focused mainly on wanting to improve KS2 literacy—to benefit from what they felt would be the latest expertise in literacy support without themselves having to spend time finding those resources or assessing the relevance and accessibility of the materials or activities. Reasons for not engaging tended to relate to a lack of time, the timing and location of events, a perceived lack of relevance of the content of the materials or activities, and a preference for an alternative mode of communication to that offered.

Fig. 6: Level of engagement as at July 2015
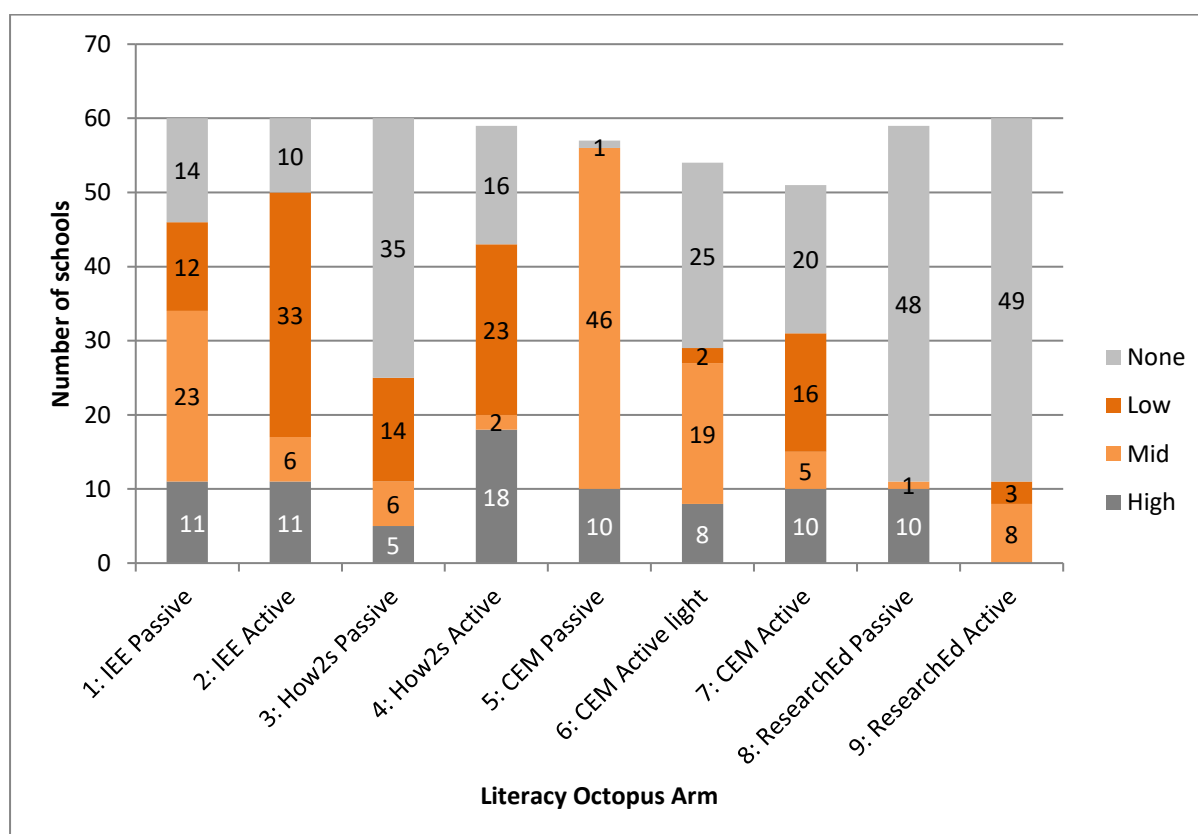
Source: NFER Literacy Octopus monitoring data.
Numbers per arm may not sum to 60 as in some arms schools have withdrawn from the trial and their data being used.

In addition to the MI data, we also asked survey respondents about the extent to which they had taken part in the Literacy Octopus arm they were allocated to. Table 10 shows these responses and that around a half of intervention respondents reported that they had been directly or indirectly (through colleagues) involved—52% of 234 respondents who were shown this question. These 120 respondents were routed on to answer more detailed questions about implementation. The remaining respondents either had not been involved or did not know.

Table 10: Extent of school involvement in Literacy Octopus according to survey respondents

Did your school take part in the Literacy Octopus arm you were allocated to?	% (N) (N = 234)
Yes, and I had first hand involvement.	34% (79)
Yes, my colleague/s were involved, and they shared the learning with me.	18% (41)
Yes, my colleague/s were involved, but I don't know any more about it.	11% (26)
No, my school did not take part.	18% (41)
I'm not sure.	20% (46)
Missing.	0% (1)

A series of single response items.

A total of 252 teachers completed the intervention survey. A total of 234 teachers saw this question; 233 gave a response.

Source: NFER Literacy Octopus teacher outcomes survey, intervention arms, 2016.

Implementation

Communication approaches

Teachers were generally positive about the modes of communication used by the Literacy Octopus interventions and felt the amount of information provided was 'about right' (70% of 120 survey respondents). Teachers showed no clear preference for a particular method (they engaged with both passive and active dissemination approaches) indicating that a multitude of methods is required to allow teachers to engage in a way that best suits their needs. Table 11 shows that teachers were generally positive about all forms of communication of the materials—noticeably more teachers indicated that the mode of communication was either 'very good' or 'quite good', than those rating 'quite poor' or 'very poor'.

Table 11: Teachers' views on the modes of communication used Literacy Octopus providers

How would you rate the following elements of the LO materials and support? (Q18)	Very good %	Quite good %	Average %	Quite poor %	Very poor %	Did not use %	Total responding to item N
Posted materials	24	24	15	2	2	33	N = 116
Electronic materials	23	27	15	3	2	30	N = 115
Websites	18	22	18	1	1	40	N = 114
Evidence fairs/conferences	7	9	8	2	2	72	N = 112
CPD/training sessions	17	11	10	3	1	59	N = 113
Online events e.g. webinars	5	9	5	2	3	76	N = 114
Teacher observation/teacher peer learning	10	14	7	1	1	67	N = 113
Pupil assessment tools	6	13	7	4	1	68	N = 113

A series of single response items.

A total of 252 teachers completed the intervention survey. A total of 120 teachers saw this question; 117 gave at least one response and 3 did not respond. A filter was applied to this question to only analyse responses from teachers who indicated that they had direct involvement with the Literacy Octopus.

Source: NFER Literacy Octopus teacher outcomes survey, intervention arms, 2016

Teachers reported that **'effective'** and 'very effective' modes of communication related to opportunities for face-to-face contact and direct communication and support from the providers and other teachers. Some form of ongoing communication (as opposed to one-off) was also reported by teachers and providers to be effective, for instance a series of activities with preparation and follow-up or regularly communicated materials. Location and timing of activities were also important factors for teachers; events needed to be proximate and at accessible times. Access to hard copies of materials was also valued by teachers.

The nature of the research evidence

Interviewed teachers were divided in their views on the usefulness of the content of the materials and support they had received; a similar proportion found them useful as those who found them not useful. Teachers found the materials and activities useful when relevant to their practice (for example, a breadth and variety of content, innovative ideas and strategies, and details of how strategies could be applied and adapted in practice). Teachers also said it was important that content was presented in an accessible, engaging, and easy-to-follow style.

Teachers and providers suggested that the materials and activities needed a balanced focus on evidence, with explicit reference to evidence on the impact of the strategy and how to effectively implement it, yet without overloading the user by providing too much detail about individual studies. This headteacher explained:

> *It gives you evidence, and you can't dispute evidence; it gives you some onus and impetus that it's not just a whim. The fact that there is evidence behind this, there is a reason, so staff are more like 'oh right, we'll give that a go'.*

As well as empirical research, teachers also clearly valued teacher endorsement and practical examples of how teaching strategies had been effectively used.

Mechanisms for successful implementation of research-evidence in schools

The process evaluation also explored *how* teachers and school leaders implemented the strategies presented within the Literacy Octopus materials and support in their schools. Although overall we found no evidence of the impact of the Literacy Octopus arms on schools, we did find a small number of schools that had successfully implemented the evidence-based strategies. Analysis suggested that in these cases there were a range of facilitating mechanisms (and conversely, the absence of such mechanisms inhibited the impact). These mechanisms pertain to both the provider (such as how the information and support is provided; the content of the materials and support; and the 'transformation' of evidence for practice) and the school (how they engage with the evidence, the implementation processes, and pre-existing contextual and cultural factors). The mechanisms are summarised in Table 12 below in the order of frequency with which they were identified in the analysis.

Table 12: Mechanisms used in the provision of Literacy Octopus interventions

Mechanism	Provider considerations (transformation approaches)	School considerations (implementation approaches)
Relevance	Provides relevant research evidence on topics of concern to schools and 'whether' and 'how' a particular strategy works. Provides guidance and materials to support implementation in practice.	Identifies areas for development and uses research to explore solutions. The evidence-based practice/approach fits with school priorities/values about teaching and learning. Culture of engagement with and valuing research evidence. Senior leadership endorses a focus on the strategy (as part of initial decision-making) and makes time and resources available to support implementation
Collaborative	Facilitates and promotes professional discussion and interaction, ideally face-to-face.	Engages in professional discussion, collaborative decision-making, and sharing with colleagues through meetings, training, and other activities to disseminate research-informed practices.
Status of evidence	Provides synthesised but clear and explicit research evidence and discussion of theories underpinning the practices considered by credible experts, as well as examples from practice/practitioners.	Considers and uses evidence to inform, justify, or challenge the implementation of a strategy.
Further enquiry and follow-up	Provides ongoing (or initial and follow-up) input and contact, with further information, support and guidance.	Undertakes further enquiry, information-gathering, and training (to extend knowledge and deepen understanding) of the strategy.
Embedded	Encourages schools to consider how strategies will be embedded long-term.	Embeds evidence-based strategies within ongoing practices (e.g. within policy).
Try-out and review	Encourages schools to try out and review strategies in practice and shares insights from experiences of implementation across schools.	Tries out a new evidence-based strategy in practice and reviews its effectiveness to inform subsequent action.
Champion	Encourages schools to identify appropriate staff well-placed to engage with, support, and implement the evidence-based strategies considered.	Identifies an appropriate member of staff, with enthusiasm and relevant knowledge and skills, to lead and support the implementation process and activities, and gives them capacity and authority to implement strategies.
Adaptation	Provides information on a range of approaches or considers issues of adaptation to practice to enable knowledge-users to customise information to their own needs.	Adapts strategies to meet school, teacher, and pupil needs and contexts.

Accessibility	Offers accessible information, different modes of engagement (e.g. printed materials, face-to-face training, webinars) and flexibility (e.g. timing and location). Minimal cost for schools to access.	A lead member of staff engages with a breadth of information and filters for colleagues to provide accessible information. Minimal cost for schools to implement.
Planned	Encourages schools to plan the implementation process step-by-step and consider the resources required in implementation.	Creates a formalised action plan to map out the route to implementation and resourcing required.

Source: NFER analysis of how providers transformed and teachers implemented Literacy Octopus evidence (NFER Literacy Octopus evaluation 2016)

This typology builds on previous literature exploring effective knowledge mobilisation. For instance, Becheikh *et al.* (2009) also identified the relevance of knowledge and practitioners' organisational culture as being important factors of effective knowledge mobilisation. The 'collaborative' mechanism reflects the importance of social interaction identified by others in the field (Durbin and Nelson, 2014). The 'relevance' mechanism highlights the value of research evidence that has been 'transformed' into implementable strategies, also highlighted by Nelson and O'Beirne (2014). In addition, these more interactive implementation approaches reflect the existing evidence that more socially interactive and collaborative forms of research engagement are more effective (Becheikh *et al.*, 2009; Nelson and O'Beirne, 2014; Sharples, 2013). In addition, having a research champion to drive the change was key in case-study schools (reflecting other recent literature: Lord *et al.*, 2017 and Griggs *et al.*, 2016). Detailed examples of how these mechanisms have facilitated the impact of the Literacy Octopus materials and support in four case-study schools are provided in Appendix I.

Challenges and barriers

In many cases, teachers reported challenges in engaging with, and using, the Literacy Octopus materials and support where the effective features and facilitating mechanisms, discussed throughout the sub-sections above, were not in place. In summary, the challenges and barriers that teachers experienced predominantly related to:

- contextual factors within the school (such as a lack of time and the pressure of other priorities);

- the mode of communication (such as inaccessible events);

- the content of the materials and support (for example, not being relevant for experienced teachers or particular pupil groups;

- limited evidence of the impact of the strategy in practice—and insufficient information to enable implementation in practice; and

- implementation factors in school (such as staff changes, lack of senior management support and resources to implement new strategies, and colleagues' reluctance to engage with the evidence or the strategy).

In addition, all of the providers identified challenges in initially engaging schools. Often the providers' initial email approaches were screened out as junk email or failed to reach the most appropriate member/s of staff in schools. Some providers felt that the focus of the materials and activities on Key Stage 2 literacy did not have sufficiently wide appeal to schools. Providers also identified issues with their profile and credibility with the Literacy Octopus sample of schools: where the provider was not known to the schools, some providers felt that the school was less likely to participate in the intervention offered. Providers also found it challenging to engage schools where they perceived there was no, or only a low level of, previous engagement with research evidence.

Fidelity

While the core communication mode and content involved in each Literacy Octopus arm was delivered as planned, providers' adapted their implementation in two main ways:

- all providers found the initial take up of event places lower than expected and so put in place additional rounds of initial contacting and invitation to engage schools in events; and

- a number of providers delivered alternative 'active' sessions, for example webinars, where the planned in-person dates and venues were not convenient to teachers.

Furthermore, some school staff who attended the events seemed to be uncertain about, or unaware of, their participation in a research study. Where appropriate, therefore, the events had to incorporate an extra session explaining the research study to the teachers (including, in some instances, support from NFER researchers) and helping them to understand why they were at the event. Below are individual issues with fidelity reported by the providers.

The Institute for Effective Education at York University

Interest in the activities on offer to schools in the active arm was lower than expected. As a consequence, the initial conference day had lower numbers than anticipated, and it was decided to cancel the post-conference webinar due to the lack of interest. Instead, all schools in IEE's active arm were invited to another conference run by IEE in the summer, opened up to teachers outside of the research project to make sure that suitable numbers attended for the event to be viable. This second event also focused more on theory and evidence rather than a marketing pitch for individual interventions, as, through a round of follow-up telephone calls with schools, the providers realised that this aspect had not been received well by all at the initial conference day.

Teaching How2s

As well as the common issues mentioned above regarding low engagement and the need to provide delegates with further information about the research project at the training day, some schools in the active arm for this provider took part in the provider's own case studies (separate from the independent NFER evaluation). Schools selected as case studies were visited by members of the Teaching How2s team and spent the day discussing how the How2s materials were currently being used in the school. This applied to only six schools in the active arm—those most engaged with the materials, and indeed also categorised as highly engaged by NFER according to monitoring data.

Centre for Evaluation and Monitoring at Durham University

While the active arms of CEM's intervention experienced the same problems with low engagement, CEM felt that this was actually a benefit to those in the active arms, as the smaller than anticipated CPD sessions allowed teachers more time to share ideas with each other and made the sessions more interactive.

The schools in the active group that offered a second CPD session were given the opportunity to either attend the second session in person, or in a revised approach to the original plan, to attend via a webinar. This was due to the large distances some schools would have had to have travelled to attend the second CPD session.

ResearchEd and NatCen

The take up for the pre- and post-conference webinars was very low. While the original intention had been to have separate webinars for those attending the south (London) and north (proposed location of Leeds, actual location York) conferences, for the post-conference webinar, only one was run to try and increase numbers—as the content of the two conferences had been identical. However, uptake remained very low for these, meaning that there was ultimately very little difference between the active and passive arms in terms of actual activity.

The low engagement, and therefore low numbers that signed up for the conference day, meant that extra schools were invited from outside the research project to both the conference days and the webinars to make them viable events.

Perceived outcomes and impacts

Perceived impact on teachers

Although we found no effect of the Literacy Octopus interventions in terms of the outcome measures used for this study, the majority of the engaged teachers who completed our survey (N = 120) perceived that participating in the Literacy Octopus had led to positive impacts on their practice. Table 13 displays these responses (the four strongest impacts are highlighted).

Table 13: Teachers' views of the impact of Literacy Octopus on practice

To what extent did the information from the LO arm you were allocated to enable you to… (Q15)	A lot %	A little %	Not at all %	Total responding to item (N)
… discuss best practice with colleagues in my school	**32**	**53**	15	118
… share the learning with people or organisations outside my school	3	37	60	117
… reflect on my own practice	**36**	**56**	8	118
… change classroom practice (this could be starting, developing or discontinuing an approach)	**24**	**56**	20	118
… reinforce existing practices	**32**	**57**	11	118
… conduct my own research or enquiry	7	26	67	117
… influence colleagues in my school to change their classroom practice (this could be starting, developing or discontinuing an approach)	24	41	35	116
… improve my knowledge of KS2 literacy	15	52	33	116

A series of single response items.
A total of 252 teachers completed the intervention survey. A total of 120 teachers saw this question; 118 gave at least one response and 2 did not respond. A filter was applied to this question to only analyse responses from teachers who indicated that they had direct involvement with the Literacy Octopus.
Source: NFER Literacy Octopus teacher outcomes survey, intervention arms, 2016.

Perceived impact on literacy teaching

Interviewed teachers provided examples of where engaging with the interventions had increased their awareness and understanding of literacy strategies, approaches, and practices. For instance, the interventions provided awareness of an alternative approach and perspective, as one headteacher put it: 'it's broadened people's exposure to new strategies'. Often the strategies were familiar and served to remind, refresh, and reinforce existing thinking and practice, as one assistant headteacher explained:

> '*The* [CEM] *posters reinforce what we've been doing, particularly metaphors and riddles. They also talk about things we sometimes have less time to focus on, like anagrams and they reinforce vocabulary.*'

The interventions helped teachers to understand more about *how* to effectively implement and refine literacy approaches, as this deputy headteacher describes:

> '*By going to the* [CEM] *CPD events the staff have more knowledge and can enthuse you to think about practical ways that you could introduce it and how other schools have done it.*'

Where mechanisms to support research engagement and implementation were in place (for example, there was relevance to an identified need; convincing evidence of impact; and scope and capacity within school to implement the approach), we found instances of the Literacy Octopus interventions impacting on teachers' literacy practices (or other aspects of practice depending on the focus of the materials).

Interviews revealed that impacts on teachers' practice ranged from small 'tweaks' to existing practices to more substantial whole-school or key stage reforms of a particular approach. One literacy co-ordinator explained the impact of using a new pupil self-assessment marking strategy from the Teaching How2s Website (Arm 4) in their school:

> '*This is now incorporated into the whole school marking policy—used by the whole of Key Stage 2. I trialled it for a few weeks with the Year 6s, then we evaluated it before changing the marking policy and rolling it out. That's going well—Ofsted and everybody else are keen on the children knowing what they need to do, so that's a good example of one of the ways the pupils' self-assess.*'

A Year 5 class teacher outlined changes their school had made to group reading as a result of attending a ResearchEd conference:

> '*It's been really good to try something different and reflect upon it. It's what we were missing with group reading; now we're tackling both sides—the children reading on their own and at home and learning to read—which was being neglected. Getting good ideas from the conference was the fuse.*'

Among the case-study and telephone interview schools, perceived impacts appeared to be strongest on the individual teachers directly involved in the interventions, though spread more widely to impact on colleagues and the wider school where there was some form of collaborative activity (such as multiple staff from the school attending a conference, staff meetings and training to disseminate information, or whole-school implementation of strategies) and where the senior leadership team had supported the implementation of the approaches at a whole-school level.

Perceived impact on research use

Interviewed teachers also occasionally identified impacts of engaging with the interventions on their awareness, understanding and use of research evidence. Predominantly, this was a general awareness and appreciation that the strategies presented were evidence-based. However, several teachers described how, as a result of the intervention, they were more aware of the research evidence on *whether* and *how* a particular approach was effective, or understood more about the theory underpinning a particular approach, as one senior leader summarised:

> '*What the newsletter does is the hard work for you, it has helped management decrease their workload because it's already raised the questions and provided links to things that we would have had to put the effort in to do. It's relevant, a lot of the topics are things schools are looking at anyway and it gives another viewpoint* [and] *a much bigger picture … of your profession. I always look at it because I value research. It's become part of the improvement plan; it's embedded in our school.*'

In some cases, teachers had been persuaded by the evidence to try out the strategy in their own practice and used the research-evidence to convince colleagues to explore the approach. For instance, this senior leader who participated in a ResearchEd conference explained, '…we were convinced that the research shows that even in KS2 the more you're teaching phonics all the way through, the better results are'.

Several case-study teachers described how they would be more likely to participate in future research projects or conduct their own action-research because they were convinced of the importance of exploring the impacts of different approaches on pupils' learning and using evidence to inform professional discussion and decision-making. Trying out evidence-based strategies helped some schools to gain insights into some of the practicalities of action research and implementing new

initiatives. This finding may indicate that impacts on teachers' engagement with research are a result of successfully applying research in practice rather than a direct impact of simply being exposed to research evidence. One deputy headteacher explained that as a result of participating in a ResearchEd conference as part of the Literacy Octopus there was:

> '…*greater awareness of the need to refer to research and the process of making a change in the school amongst senior and middle leaders is clearer; you start from an area that needs improving and you look at research and come up with some ideas and possibilities, and the need to measure and monitor the impact as well. We would like to continue this development towards research-based strategies and evaluating our impact and looking at how we can improve children's attainment*.'

Several case-study teachers described how they were making more use of research-evidence (for example, by subscribing to IEE research briefings, using the EEF Teaching and Learning Toolkit website, or being part of the ResearchEd twitter community) or intended to do so in the future.

According to the case studies and telephone interviews, impacts on teachers' engagement with research appeared to be more likely in schools where there was an existing culture of valuing and using research evidence to inform practice, where the evidence-base was explicit and from a credible source, and where the evidence-based practices were perceived to have been successfully implemented (such as the explicit exploration of the evidence on effective peer-reading strategies as part of the CEM CPD, or a ResearchEd conference session on how to use and interpret findings within the EEF Teaching and Learning Toolkit).

Although the process evaluation draws on a relatively small number of cases and is therefore only suggestive of trends in responses, overall, we found more examples of perceived impact on teachers' action where the Literacy Octopus materials and support 'transformed' the research evidence into guidance, materials, and approaches that were readily applicable to practice. This finding is consistent with wider literature on effective knowledge mobilisation that highlights the importance of the 'transformation' of evidence for application in practice (Nelson and O'Beirne, 2014; Becheikh *et al.*, 2009; Durbin and Nelson, 2014; Sharples, 2013).

Related to this, we also found examples of teachers changing their practice as a result of the Literacy Octopus materials yet without having directly engaged with the research evidence themselves. For instance, a teacher had used the How2s website teaching and learning resources without referring to any of the additional information about the supporting evidence for the approaches. This finding may challenge the notion that using research evidence in practice is necessarily a linear process through awareness, understanding, and leading to action. Indeed, some providers predicted in their Theory of Change that it would be possible to change teachers' practice without them necessarily understanding the evidence underpinning the approach advocated. Providers noted how teachers were reassured by the authority of evidence-based strategies but felt that most teachers would be more concerned with understanding the strategy itself and how to apply it than with interrogating the evidence-base.

Perceived impact on pupils

Where teachers had implemented the evidence-based practices from the Literacy Octopus materials and support, they often reported (or anticipated) positive impacts on their pupils. They reported that the new or refined literacy approaches that they had implemented were helping to enhance pupils' literacy skills, confidence, and behaviour.

Examples of these impacts include:

- Teacher's noted improved collaborative learning, communication, and discussion skills in pupils as a result of implementing classroom management and pupil grouping strategies from the How2s teaching and learning website. A recently qualified teacher said: '*it helped me to put routines in place to help the children. [There has been] a huge difference in behaviour … because they have been focused.*'

- Teachers perceived that their pupils' vocabulary, reading comprehension, communication skills, confidence and motivation had improved as a result of implementing a peer-reading scheme and 'word of the day' activity from the CEM booklet and CPD sessions. For instance, a senior leader in one school commented on the impact of 'buddy reading' on children's confidence to read: '*the children love it,* [they] *see* [it] *as non-threatening and something* [they] *can enjoy; it's really motivational*.'

- Teachers also perceived enhanced progress for children not meeting expectations as a result of quicker and earlier interventions delivered by more effective deployment of teaching assistants based on evidence reviewed in research briefing newsletters from IEE.

- Teachers also felt that their pupils' spelling, reading, and phonics abilities had improved, as well as confidence, as a result of implementing new phonics-based spelling strategies and one-to-one phonics tutoring based on ideas and evidence discussed at a ResearchEd conference focused on literacy.

Appendix I provides detailed examples of the impacts of the Literacy Octopus interventions on teachers and pupils in four case-study schools.

Unintended and negative impacts

There were very few reports of unintended or negative impacts as a result of teachers' engagement with the Literacy Octopus interventions. Occasional comments identified adverse impacts of participation on teachers' time. One provider also gave an example of a teacher who had implemented a literacy strategy without replicating the conditions in which it was found in the research to be effective. There was no indication of whether this had led to negative impacts, though it highlights the potential for this where research evidence is misinterpreted.

Formative findings

Two-thirds (60%) of the 120 teachers surveyed said that they would 'definitely' or 'probably' recommend the Literacy Octopus intervention that they had been involved with to another school on the basis that it was useful, relevant, included suggestions for implementation of the practice/approach, had an impact on practice and pupils, was evidence-based, and was timely.

One-third of survey respondents would not recommend the Literacy Octopus intervention they were assigned to, mainly due to perceived lack of relevance or fit with current priorities, hence initial engagement and, indeed, the real-world matching of evidence priorities to schools (rather than the random allocation tested in this trial) may be an important consideration.

Teachers and providers also fed back in interviews how the Literacy Octopus interventions, as well as research dissemination approaches more generally, could be improved. Suggestions included:

- **improving the amount and type of communication**: for example, more communication and more lead-in time for activities and events, more ongoing contact to support implementation of approaches, and a more structured timetable of activities to support preparation, action and review phases;

- **considering the mode of dissemination**: such as more local, regional events and cluster working and offering a choice of dates to aid accessibility, digital and hard-copies of materials, more face-to-face support (providing opportunities for interaction and discussion and time to focus on the topic), optional online activities (to provide a flexible and easily accessible alternative to face-to-face activities) such as tutorials, presentations, and discussion forums, and easy-to-access collated and thematically organised research evidence and materials;

- **reviewing the content of materials**: for example, more differentiation for ages and abilities, more explicit evidence, including theory and evidence of impact of the approaches, practitioner experience of the approach, separate issues for primary and secondary phases, new

strategies/latest thinking/innovative practices, and teacher-led identification of relevant research evidence; and

- **improving the dissemination and implementation within schools**: for example by more practical guidance on how to implement strategies, support for teachers' own 'action research', trialling and evaluating approaches and research literacy, encouraging involvement of senior leaders, and designated teachers or research advocates in schools to support the use of research-evidence in practice.

For future development, organisations involved in supporting teachers' research use need to consider whether to put efforts into increasing initial engagement (for example, increasing participation by greater lead in time, local rather than regional events, and hub-led events), and/or into transformation and implementation (for example, through collaborative, planned, and championed approaches).

Control group activity

Surveys with control group schools at the beginning and end of the trial period revealed that teachers were generally positive about the support they had receive for KS2 literacy from external providers during the trial period (a higher proportion of teachers rate the support as 'very good' or 'quite good', than those rating 'quite poor' or 'very poor'—see Table 14).

The survey also asked teachers in the control condition what kind of support for improving KS2 literacy teaching and learning they would recommend to other schools. In the order of prevalence, the responses were: professional development (such as targeted CPD, peer-to-peer learning, and sharing good practice), specific literacy schemes and techniques, and other forms of information and support (for example, in-school support, online support, external support, and using evidence).

Table 14: Control teacher survey—control teachers' views about the mode of communication and dissemination of KS2 literacy support from external providers

How would you rate the following elements of the KS2 Literacy support received? (Q13)	Very good %	Quite good %	Average %	Quite poor %	Very poor %	Did not use %	Total responding to item (N)
Posted materials	4	16	29	4	1	45	281
Electronic materials	8	33	25	2	1	31	279
Websites	15	48	17	1	0	19	283
Evidence fairs or conferences	6	12	12	3	1	66	279
CPD/training sessions	31	42	8	1	0	18	283
Online events e.g. webinars	3	12	9	1	1	74	279
Teacher observation/teacher peer learning	38	36	8	0	0	19	284
Pupil assessment tools	17	41	15	2	1	24	282

A series of single response items.
A total of 305 teachers completed the control survey; 287 gave at least one response and 18 did not respond to these items.
Source: NFER Literacy Octopus teacher survey, control, 2016.

In interviews with teachers and senior leaders from control schools (six interviews conducted), we found that while the schools had signed up to the project because of the interventions on offer, there was a good understanding of the purpose of the control group and there was no evidence of resentful

demoralisation or compensation rivalry. Indeed, in most schools, the staff we interviewed tended to be unaware that their school was even involved in a research project if they had not been the initial staff member to sign up for the Literacy Octopus.

Interviews with control group teachers and senior leaders indicated that schools had continued with 'business as usual' in terms of their engagement with research evidence and KS2 literacy practices during the trial. With only one exception, the interviewed teachers said that they had carried on with the same literacy work and interventions that they had used prior to their engagement with the Literacy Octopus project.

The control group interviews showed varying levels of research engagement. Schools that appeared the most research-engaged reported having a research culture within the school that pre-dated the introduction of the Literacy Octopus project. Examples of this included having existing research links with other organisations, members of staff who had come from a research background (for instance, holding a Masters degree in education), and participating in research within school. When looking for research evidence to assist in their teaching practice, interviewees cited using the Department for Education's guidance, Google internet searches, social media sites such as Facebook and Twitter, and teacher forums such as the Times Educational Supplement (TES). Most teachers agreed that research evidence had become more available and accessible, for example through an increased volume of advertising materials and phone calls to schools. Some teachers felt that 'research evidence' was a 'buzz word' in education at present. However, several teachers pointed out that they were uncertain about the causality of their increased awareness: they were not sure whether research evidence really was becoming more available, or whether they were just more aware of it due to other factors such as being involved in Literacy Octopus.

Conclusion

Key conclusions
1. The project found no evidence that any of the interventions improved pupils' Key Stage 2 English scores. The five padlock security rating means we have high confidence in this result.
2. There was no evidence of impact on any of the six teacher Research Use Measures used in this trial. However, we have limited confidence in this result given the low response rate to the questionnaires designed to capture these outcomes, and some measures were only moderately reliable.
3. Schools' level of engagement varied: six out of ten schools did not engage to the level expected by the providers, although a small proportion engaged to a greater extent than expected (for example by hosting CPD sessions). Reasons for not engaging included lack of time, the timing and location of events, and a preference for face-to-face support rather than online or remote formats only.
4. Teachers felt research evidence was most effectively communicated when it was interactive, accessible, relevant, included a balanced and credible discussion of the evidence, and focused on how to apply the evidence in practice. Where schools went on to implement changes in light of Literacy Octopus engagement, these came about through mechanisms such as in-school collaboration, further enquiry, and trying out, reviewing, adapting, and embedding approaches.
5. The lack of impact across the different interventions suggests that simply communicating research evidence to schools is not enough to improve outcomes. How easily the presented evidence can be used in practice—and the conditions in schools for implementing evidence-based change—might be just as important. Further research should assess whether interventions can transform evidence into practical action, and develop supportive implementation conditions in schools.

Interpretation

Primary and secondary outcomes

Literacy Octopus interventions, whether passive or active, made no difference to pupils' literacy attainment at Key Stage 2. There was no evidence that any randomised trial arm contributed towards differences in academic progress of pupils in literacy at KS2 (2015/2016). Literacy Octopus interventions had no impact on literacy attainment at KS2 for everFSM children. When comparing the progress in literacy of everFSM intervention pupils with those in the control group, none of the Literacy Octopus arms made a difference. Schools' level of engagement, which varied greatly, also had no impact on differences in pupils' academic progress in literacy.

Literacy Octopus interventions made no difference to teachers' research use as measured on six outcomes on a validated research use survey. Measures 1 and 2—'positive disposition to academic research in informing teaching practice' and 'use of academic research to inform selection of teaching approaches'—were the main secondary outcomes and were analysed using a multilevel model that matched baseline and endpoint teacher responses. No statistically significant differences were found between either of these measures and the control group. Measures 3–6 ('perception that academic research is not useful in learning', 'perception that own school does not encourage use of academic research', 'active engagement with online evidence platforms', and 'your knowledge about research') were analysed using ANOVA on the endpoint teacher survey responses only, and no statistically significant differences were found for any of these measures when compared with the control group.

Engagement with the interventions and communication approaches

Schools' levels of engagement with the Literacy Octopus materials and support was relatively low: just over two-fifths of the 540 intervention schools did not engage according to monitoring data; providers had expected about one-fifth non-engagement with events. That said, just over one-fifth engaged to the level planned for their arm, and around one-eighth engaged to a greater extent than expected (for example, they hosted CPD sessions, or they requested further materials). Teachers engaged where they felt the materials or support were communicated in an accessible way (such as posters that were easy to display, or convenient event locations) and that the content of materials was relevant (for example, linked to an existing need). Time, the timing and location of events, relevance, the format of support (some teachers would have preferred some face-to-face support while others valued the flexibility of online activities), and the staff member's capacity and authority to implement strategies and learning from the materials were barriers to engagement (the latter indicating the importance of senior and middle leadership buy-in, which is supported by existing literature (Speight *et al.*, 2016 and Nelson and O'Beirne, 2014).

Teachers who would not recommend the Literacy Octopus intervention to others highlighted a lack of relevance and other priorities, which suggests the importance of matching research-based material and support to teachers' needs (this was not fully possible on this trial as schools were randomly allocated). This reflects recent research which reveals the importance of supporting teachers' own evidence-based queries and matching them to evidence-based support (Lord *et al.*, 2017), and helps to reinforce the importance of teacher-led problem-solving described in Becheikh *et al.*'s (2009) model of knowledge mobilisation.

All Literacy Octopus providers delivered mainly as planned (fidelity), but made two main changes: (1) additional invitation approaches (for example, additional phone calls to schools) were made where initial levels of response to invitations was low, and (2) alternative active support, for example webinars, was arranged for teachers who had wanted, but were unable, to attend an event. This shows that 'push' dissemination approaches required extra effort from researchers in order to facilitate initial engagement from teachers.

Further implementation and perceived impact

The preference in the qualitative findings for more supported activity (such as face-to-face contact or guidance on practical application) bears out in the quantitative evidence which generally shows more positive means for each provider's active arm compared with their passive counterpart across the Research Use outcomes. However, the passive/active nature of support did not appear to be the key determinant as to whether schools engaged and took further action—there were both high and low levels of engagement in both active and passive arms.

Where schools went on to implement changes in light of Literacy Octopus engagement, these came about through mechanisms such as in-school collaboration, schools undertaking further enquiry or follow-up activity with the provider, schools trying out, reviewing, adapting, and embedding approaches, and having a planned approach to implementation. These more interactive implementation approaches reflect the existing evidence that more socially interactive and collaborative forms of research engagement are more effective (Becheikh *et al.*, 2009; Nelson and O'Beirne, 2014; Sharples, 2013). Where teachers did engage, most perceived that participating had led to positive impacts on their practice, enabling them to reflect on, reinforce, and change their classroom practice, and discuss best practice with colleagues in their school.

Another factor in successful implementation, according to the case studies in this evaluation, was support from a within-school research champion or research lead who could cascade information, facilitate staff meetings, and, where they had authority, drive changes in the school. This reflects other recent research that highlights the importance of within-school research champions in driving research use in schools (Griggs *et al.*, 2016; Lord *et al.*, 2017).

Further development

Literacy Octopus interventions were all reasonably light touch, and as, overall, they had no impact on the primary and secondary outcomes measured in this trial, providers of research evidence need to consider the findings from the IPE of this study that highlight the need to focus on transformation and implementation factors. This recommendation fits with the findings from the sister 'passive trial' showing that simply disseminating research evidence to large numbers of schools does not impact on attainment. The trial also revealed that many control group schools were receiving support for KS2 literacy as part of business as usual, and in interviews some spoke about using research evidence to inform decisions. Like their intervention counterparts, control group schools would like more collaborative CPD opportunities to improve literacy strategies.

Providers of research evidence therefore need to consider where to focus their efforts. Two areas have been highlighted here: first, the need to increase initial engagement (for example, through greater lead-in time, hub-led or local rather than regional events, and more interactive communication approaches), and second, by supporting implementation (for example, with translated, applicable, and collaborative approaches). The former may reach more schools—and in a reasonable, affordable way (all interventions were very low cost in terms of cost per pupil per school); the latter might be more expensive to provide and hence, from provider-costs point of view, might need to focus on fewer schools.

Limitations

The primary outcome analysis for this study had almost no limitations in terms of bias or precision as it used administrative NPD data; there were only minor incidences of missing data where four schools (1%—three control and one intervention school) could not be found on the NPD supplied data purely for administrative reasons such as academisation, amalgamation, or school URN changes. Pupil-level missing data, however, through individuals not having a full complement of test scores at baseline and follow-up, accounted for 6%. Our exploration of any imbalance at baseline suggested that this did not impinge on results. Furthermore, it is unlikely that Literacy Octopus interventions interfered with pupils' tendency to complete a KS2 test.

The trial was powered to detect an MDES of 0.121; it may be that any changes in attainment were too small to detect or that insufficient time had elapsed to allow any changes in practice to become embedded in teaching and learning. Results for the 2016/2017 cohort, to be published in 2018, will investigate this second aspect further. That said, the sister passive trial which was designed with an MDES of 0.024 did not find any evidence of impact on pupils' literacy attainment of large-scale 'push' communication approaches to sharing research-evidence with schools.

The secondary outcomes analysis for this study was based on one-time-point school-level measures (Measures 3, 4, 5 and 6) and (for Measures 1 and 2) two-time-point teacher-level responses to the Research Use Survey (Poet *et al.*, 2015, unpublished). For one-time-point measures, results of the ANOVAs showed no effects for Measures 3, 4 and 5. The ANOVA for Measure 6 was statistically significant but when performing the post-hoc Dunnett's intervention versus control comparisons, no effects were seen. The completers' model used for the two-time-point measures had a reasonably low number of respondents (335). When further 'outcome survey' respondents' responses were used in multiple imputation, the results attenuated, suggesting bias in the completers sample (for example, they were perhaps more likely to be research-engaged, or were more closely involved with the Literacy Octopus). All survey measure results deserve this caveat: just over half of intervention survey respondents had had some direct engagement with the Literacy Octopus (themselves or cascaded via a colleague), hence there was a large minority of respondents who had not had direct engagement and whose responses were either a reflection of 'school wide reach' or indirect engagement, or they were unaware of any engagement.

While findings from the primary outcome are generalizable (that is, disseminating evidence-based materials does not in itself have an impact on pupil attainment), the two significant findings from the Research Use outcomes models (LRT for Measure 2 and ANOVA for Measure 6) need to be interpreted with caution as they are based on lower response rates than planned and seem to be related to between-intervention arm differences. The Dunnett's Tests showed no differences between each intervention and control.

Engagement levels in the Literacy Octopus were lower than expected (for example, providers anticipated around one-fifth non-participation in events and all providers had to put in place additional initial contacting in order to encourage participation). All results in the study, therefore, relate to lower levels of engagement than planned. Comments from both intervention and control schools suggest that this reflects the pressured, real world market place in which schools operate—in that they do not take up every intervention or CPD opportunity that lands through their door—and was not a reflection on the Literacy Octopus itself. That said, the CACE analysis, which explored schools' level of engagement, found no association between level of engagement and pupils' literacy attainment (the primary outcome).

Schools' low engagement and the limited effect on Research Use (according to Dunnett's Tests, which showed no effect on Research Use on any of the measures in any of the arms, compared with the control group) were borne out in the case-study sampling that aimed to explore examples of changes in practice and mechanisms for change. Even where engagement was high (according to MI data and interim survey responses), finding case studies where schools had gone on to implement KS2 literacy evidence-based strategies or engage with research evidence, proved challenging—it was a minority of schools that had progressed to implementing or using research evidence. Hence, all IPE data in this study needs to be interpreted with a minority of schools in mind, and is not generalizable to the whole school population. The case studies and detailed impact trails from those schools help us to understand better the mechanisms that support research engagement and implementation (such as leadership support, in-school collaboration, trying out and reviewing, and so on).

Finally, a noteworthy limitation in this multi-armed trial was that of multiple treatments. Although this design clearly brought benefits in recruiting and analysing all under one roof, for some schools, there was a perceived lack of fit in what they were allocated to. Their engagement in the dissemination and support activities may therefore have been compromised as compared to what might have been possible in a series of parallel group trials.

Future research and publications

The impact on pupils' literacy attainment in Key Stage 2 for the previous and successive cohorts (2014/2015 and 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, and hence we explore three cohorts' worth of attainment data. (Note, because of the 2015/2016 nil results, and because research evidence suggests that it takes time for pupil attainment impacts to surface through teacher-change activity, it is unlikely that we would find any impact on the 2014/15 cohort. We will discuss whether it is appropriate to conduct this analysis for the addendum report.)

The passive and active dissemination strategies used in the Literacy Octopus did not have an impact on pupil attainment and did not make a difference, when compared with the control group, to research use. However, the IPE found case-study examples of changes in awareness, understanding, and practice. Further quantitative and qualitative research is needed to explore whether further transformation and implementation factors, over and above dissemination approaches, impact on schools' or teachers' research use and pupil attainment. In particular, what other ingredients are needed in research-dissemination strategies that might work for the wider population, and how to support the development of the conditions for research engagement in schools.

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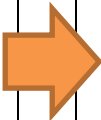
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Appendix A: EEF cost rating

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[19]**					
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

The design is a randomised controlled trial. MDES is 0.12 at randomisation, and pupil level attrition is approximately 6% for the primary analyses. No threats to validity or imbalance are present.

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[19] Attrition should be measured at the pupil level (even for clustered trials) and from the point of randomisation to the point of analysis.

Appendix C: Information sheets

Appendix A includes copies of the Literacy Octopus information sheet for schools, the invitation letter used in recruitment to the trial, and the reply and consent form that schools completed when signing up to the trial.

The Literacy Octopus: Improving Literacy at Key Stage 2

What are the purposes and aims of the project?

A major new initiative has been launched to help teachers to improve pupils' Key Stage 2 literacy, all based on the latest research evidence. The project is evaluating how best to support primary schools' literacy improvement.

Who is sponsoring this work?

Funded by the Education Endowment Foundation (EEF), Department for Education and the London Schools Excellence Fund, this initiative involves a number of high profile organisations helping schools to improve literacy in Key Stage 2 through evidence-based support and materials. International evidence shows a strong link between high performing education systems and the effective use of research evidence in schools. The project will explore different ways of engaging teachers and school leaders with best practice approaches and measure their effect on pupils' attainment.

What activities and resources are on offer?

Schools that take part will be randomly allocated to receive free support or materials via *one* of several different approaches, all designed to improve Key Stage 2 literacy by drawing on research evidence. Activities range from light touch engagement with materials, to more active support through CPD sessions and online help. Some schools will be invited to attend seminars and conferences about literacy and intervention programmes, and/or receive additional training on literacy strategies. Other schools will receive improvement materials through the post or online; this may include regular mailings of new reports about teaching and literacy, or access to interactive websites about teaching techniques.

What does taking part involve?

To participate in the project, a small number of school staff need to complete a 'baseline' survey during the autumn term 2014. Participating schools will then be randomly allocated to one of nine support groups, or a control group. Each group will receive a different type of evidence-based literacy support and/or materials, during the spring and early summer term of 2015. Staff will need to complete a follow-up survey in spring 2016.

How will schools benefit from taking part?

This is an exciting opportunity for schools to receive free support from high profile education organisations, to support school improvement. We are trying to find out the very best ways of supporting schools to improve literacy through evidence-based resources. So whichever activity you are involved with will be a highly valuable part of the project, and will enable your school to receive improvement support. Note in some cases, schools will need to organise and pay for supply cover for staff to attend training or events which will be taking place in London and Leeds/York.

If your school is part of the control group, this is also extremely valuable to the trial, and you can have access to many of the materials and resources after the trial has ended.

What will schools receive for participating in the project?

We will offer each teacher who takes part in the final survey in Spring 2016 a £5 'thank you' in the form of an e-Amazon voucher or a donation to charity. Each school in the control group will be sent a £30 book token for their school, in anticipation of their commitment to participate in the final survey. All schools will receive feedback on the results of the surveys after the final survey has been completed.

Do schools have to take part?

No, this is voluntary but primary schools (and those middle schools with Year 5/6 classes) in the North and South of England will be invited to take part. There will be 780 schools involved in the trial.

How will NFER use and protect the data collected?

All questionnaire responses will be treated with the strictest confidence and will be used for the purposes of this evaluation only. The study also involves NFER analysing end of Key Stage 2 national curriculum assessments in conjunction with baseline Key Stage 1 results, to see if there are any links between research engagement and pupils' performance in literacy. The enclosed reply form asks for your school's permission for NFER to access data about your pupils, using Pupil Matching Reference (PMR) numbers, from the National Pupil Database.

The data collected from the questionnaires will be matched to the National Pupil Database and will be passed onto EEF and the Fischer Family Trust (who manage EEF's data archive), and stored on the EEF data archive and UK Data Archive for research purposes. Whilst the EEF and FFT data archives will contain NPD matched data, no individual school, teacher or pupil will be identified in any report arising from this evaluation. The data kept by the UK Data Archive will be anonymised.

How will the findings be used?

The findings from the project will be freely available on the EEF's website. They will be used to inform the education sector about the most effective ways of engaging schools with research findings relating to literacy, to support schools' continuous improvement and development.

Which other organisations are involved?

Six partner organisations will deliver the support to schools: the Institute for Effective Education (at University of York); Campaign for Learning in partnership with Train Visual; the Centre for Evaluation and Monitoring (part of Durham University); and NatCen with ResearchEd. **www.nfer.ac.uk/octopus** provides further details about the organisations' activities. The NFER will carry out the independent evaluation. The NFER is not involved in the direct delivery of the support activities or materials.

What is a randomised controlled trial (RCT)?

Schools that sign up to a Randomised Controlled Trial (RCT) are allocated to a group in a random way (the equivalent of flipping a coin). This means that any characteristics that schools have should be evenly spread across the different groups taking part in the trial. Random allocation is essential to the evaluation as it shows that any difference seen in 'intervention' or 'treatment' schools is because of the intervention and not any other factors. Therefore, an RCT can be the best way of outlining what effect an intervention has on children's attainment. (Please see this link for more details on RCTs: **http://www.nfer.ac.uk/research/trials-unit/guide-to-trials.cfm**)

RPO/EEFA/41195/2

The Headteacher
«Description»
«Address1»
«Address2»   NFER No:
«Address3»
«Town»
«County»
«Post_Code»

6th October 2014

Dear Headteacher

Take part in activities to improve Key Stage 2 literacy

You are invited to take part in a major new initiative to help teachers to improve pupils' Key Stage 2 literacy, all based on the latest research evidence. The initiative is funded by the Education Endowment Foundation (EEF), Department for Education and the London Schools Excellence Fund, and is exploring a range of best practice approaches to supporting schools' literacy development and their impact on pupil attainment. Your school has been sampled for this project (known as the Literacy Octopus trial) and I am writing to invite your participation. This is a nationwide initiative involving a number of high profile education organisations offering literacy resources and/or support to schools. NFER has been funded to carry out the evaluation of the project, and we very much hope that taking part will support your school's continuous improvement and development.

Activities and resources on offer

Schools that agree to participate in the evaluation will be randomly selected to receive free support or materials via **one** of several different approaches, all designed to improve Key Stage 2 literacy by drawing on research evidence. Some schools will be invited to attend seminars and conferences about literacy and intervention programmes, and/or receive additional training on literacy strategies. Other schools will receive educational materials through the post or online, including regular mailings of new reports about teaching literacy, or access to interactive websites about teaching techniques. Some schools will be allocated to be part of a control group and will be asked to complete the staff surveys only. They will not receive information or participate in activities as part of the trial, but will have access to many of the materials and resources after the trial has ended. More information about the support being provided by the organisations involved is given on the enclosed information sheet.

What will it involve for your school?

To participate in this project, we would be grateful if you, your Key Stage 2 literacy coordinator, other Key Stage 2 teachers and leaders would complete a brief 15 minute online survey that asks for views about the different influences on decisions you make in your teaching and school policies. Questionnaire responses are needed by the 28th November 2014 from you and your staff to take part in the trial. Survey access details are given overleaf.

We also ask that you complete and return the enclosed reply form to provide your consent for your school to be involved in the evaluation and for NFER to access anonymised National

Pupil Data (details about the purpose of accessing the pupil data are given on the enclosed information sheet). Schools will be contacted in early January 2015 with information about next steps. Resources will be sent to schools and activities will take place in Spring and Summer 2015.

The final activity we would require is that staff at your school, such as the Key Stage 2 literacy coordinator and literacy teachers complete a follow-up survey during Spring 2016 giving their views. All individual teachers that take part in this final survey will be a given a £5 Amazon voucher as a token of our appreciation. Schools that are randomly selected to be in the control group will also receive a £30 book token alongside access to many of the materials and resources. In addition, all schools will be provided with feedback on the results of the surveys after the final survey has been completed.

How the data will be used

Please note that the name of your school and your staff contact details will be provided by NFER to one of the four delivery partners (see information sheet). This information will be used solely for the purpose of enabling the research partners to contact your staff with information regarding this research. In addition, all of the data collected by NFER and its research partners in this evaluation, including data from the National Pupil Database matched to named data from pupils in your school, will be provided to Fischer Family Trust (FFT, which is the organisation appointed to manage EEF's data archive) and stored in the EEF data archive and the UK Data Archive for research purposes. The overall findings will be included in a publicly available report used to influence practice nationally. Please note we will **not** use pupil names, staff names or the name of your school in any reports arising from the research.

To take part in this evaluation

Please complete the enclosed reply form as soon as possible and return it to the NFER in the pre-paid envelope provided. In addition, please complete the online survey and also pass on the website and login details (provided below) to a selection of your staff members.

We would be most grateful for your help with this research and hope you will be able to take part. In the case of local authority maintained schools, we have notified your local authority that we would be contacting you. I look forward to receiving the reply form and online survey responses from your school so that you can take part in the trial. If you have any queries about this evaluation, please do not hesitate to contact me by email to **octopus@nfer.ac.uk** or telephone on 01753 637218 or my colleague Dave Hereward on 01753 637352.

Yours sincerely

XXX

Research Manager, Research and Product Operations

Instructions for accessing the online questionnaire:

School staff can access the questionnaire by visiting the following website address: www.nfer.ac.uk/EEFA/survey

Once at the above website, each member of staff should then enter this survey password number to log in to the survey: **«NFER_No».** Instructions for completing the questionnaire will then appear online. The questionnaires should take approximately 15 minutes to complete. We would be most grateful if up to around five members of staff would take part in the survey by **28th November**, including the Headteacher, your Key Stage 2 literacy coordinator and other Key Stage 2 teachers and leaders.

National Foundation for Educational Research
Research Operations, The Mere, Upton Park,
Slough, Berkshire, SL1 2DQ
Telephone 01753 637007
Fax: 01753 790114
Email address: octopus@nfer.ac.uk

RPO/EEFA/41195/2a

NFER No: «NFER_No»

Reply form

Take part in activities to improve Key Stage 2 literacy

	Are your details correct?	**Please Amend**	**NFER use**
School Name	«Description»		
Headteacher	«Head_Title» «Head_Forename» «Head_Surname»		
Tel. No:	«Phone»		
Fax No:	«Fax»		
Email:	«Email»		

Please read the following statement and then sign below to provide your consent for your school to participate in the evaluation:

I understand that the name of my school and the staff contact details provided on this reply form, and by my staff in the online staff questionnaires, will be provided by NFER to its research partners. I also understand that all of the data collected by NFER and its research partners during the course of this evaluation, including National Pupil Data matched to the school, will be provided to the Fischer Family Trust (FFT). All of the data provided to the FFT will be stored in the Education Endowment Foundation's data archive and also entered into the UK data archive in anonymised format for additional future analysis, to be used for research purposes.

I have read and understood the statements given above regarding the use of the data collected by NFER and its research partners during this evaluation and I agree for my school to take part in the evaluation and for the NFER to access pupil data from the National Pupil Database.

Headteacher/SMT signature: ……………………………………………………… Date: …………………………………….

Please provide the name of a member of staff at your school with whom NFER can liaise with regarding this evaluation:

Name of contact in the school: Mr / Mrs / Miss / Ms / Dr..…

Contact phone number: ……………………………………… **Contact job title:** ………….………………………

Contact email address: …………………………………………………………………………………………………..

If you cannot help us on this occasion, we would be grateful if you could let us know the reasons why your school cannot take part. This will help us understand the factors schools consider when deciding whether or not to participate.

…….… ………………….

…….… ………………….

…… ………………….

Please return your completed reply form to NFER by fax on 01753 790114
or by using the addressed pre-paid envelope provided.

Thank you very much for your help.
If you have any queries regarding this research please do not hesitate to contact
XXX at NFER on octopus@nfer.ac.uk or 01753 637218.

Appendix D: Literacy Octopus providers' Theories of Change

At the start of the trial, the four Literacy Octopus intervention providers were asked to complete a Theory of Change diagram in collaboration with NFER. These were reviewed with providers during interviews in 2015 and again in 2016. A Theory or Change depicts the process by which planned intervention strategies are anticipated to lead to changes in outcomes for the recipients. This appendix presents each of the Literacy Octopus providers' Theories of Change using the project template as well as some providers' existing logic models for their interventions[20].

Comparing and contrasting across the interventions
In all four Theories of Change the ultimate planned impact is to influence teachers practice and behaviour though the use of research-evidence.

IEE and ResearchEd predicted hierarchical impacts: first on teachers' awareness then understanding of the research evidence, then action. The Teaching How2s ToC also predicted similar hierarchical impacts (awareness, understanding, action); however these were related to the How2s approach (i.e. visual teaching and learning techniques and teacher-led peer-to-peer support) rather than the evidence explicitly. I.e. they suggested it was not necessary for teachers to understand the research evidence underpinning a particular approach in order to change their practice. Likewise, CEM's ToC predicts that teachers' action can change without necessarily first altering their awareness and understanding (for example, where materials provide top tips for action underpinned by, but not explicitly directive about, the evidence). However, all four providers predict that there will be a distinction in the impacts between the active and passive arms of their interventions and that the active interventions would be more likely to lead to change, in particular to impact on teachers' action.

CEM and ResearchEd were focused on creating an impact on the classroom teacher. Whereas, IEE and Teaching How2s sought to impact at a whole-school level by focusing on headteachers and senior leaders, which for How2s would then be cascaded to the whole staff.

In follow-up discussions with providers they reflected on their original Theories of Change. The providers indicated that where there was a clear distinction between active and passive interventions and where this meant a higher level of social interaction with teachers (e.g. training, conferences, ongoing online support) they felt the hypothesis still held that the more active interventions would lead to higher levels of engagement and impact. In reality, for some of the interventions there was little distinction in how schools engaged with the active and passive interventions (e.g. ResearchEd Arms 8 and 9) and therefore it was difficult to evaluate this hypothesis.

The providers noted that school senior leaders' and teachers' prior interest in, and engagement with, research evidence were important factors mediating the extent of engagement and impact of their interventions.

Providers also reflected on the process of impacting on teachers' practice. CEM slightly modified their original stance and suggested that it was important for teachers to understand the underpinning theory and research on an approach in order to change their practice (their booklet particularly supports this approach by setting out the evidence for certain strategies; and in the twilight CPD session we observed the CEM researcher briefly talk through a recent research paper on cognitive reading strategies).

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[20] Teaching How2s did not complete a ToC document using the project template.

Draft Theory of Change for Literacy Octopus Trial (IEE Arms 1 and 2)

PASSIVE   ACTIVE   MEDIATING OUTCOMES   FINAL OUTCOME

MEDIATING OUTCOMES

Awareness	*Understanding*	*Assigned Action*	*Independent Action*	*Increased Literacy Attainment*
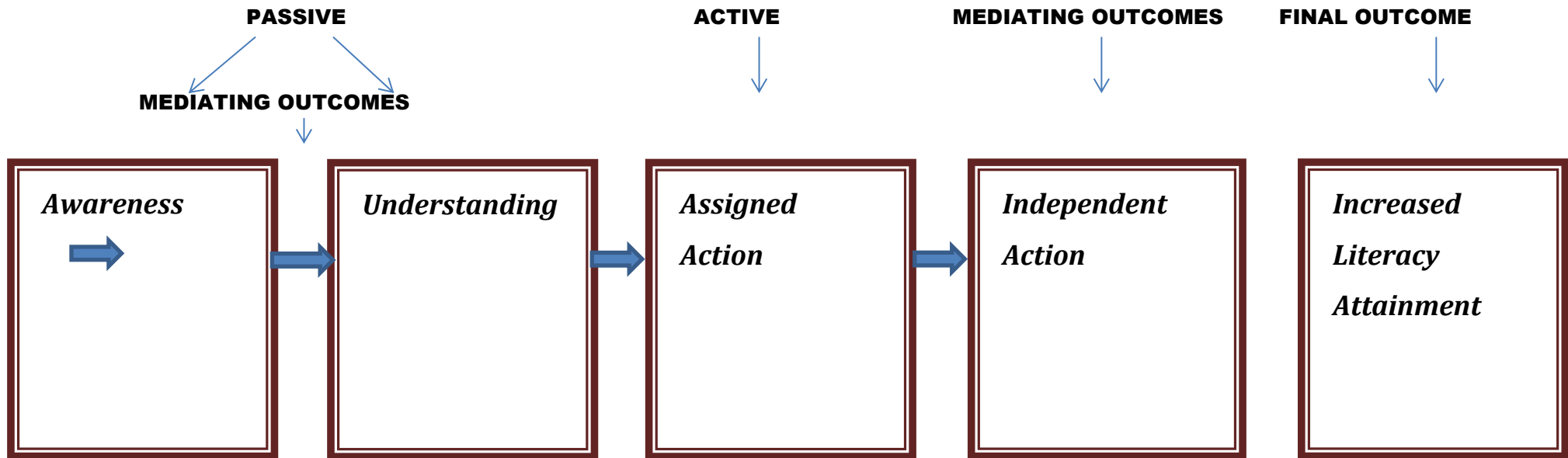
Tracking data

NFER Questionnaire

Further engagement with research

Conference attendance

Writing a Blog

IEE (Arm 2): A Theory of Change (ToC) for Research Evidence for Literacy Excellence (REFLEX) - active

Overall purpose

To investigate whether evidence fairs and related activities can improve teaching and pupils' attainment.

Purpose for your intervention(s)

Encourage schools to use research evidence to guide their decision making, by bringing key staff from several schools together at evidence fairs. Using their own data and priorities, and by working through some sample scenarios, encourage them to select appropriate interventions. Connect them with providers, and peers who have used the interventions, to support successful implementation.

Assumptions

- Headteachers are open to new ideas and want their schools to improve.

- Ownership of the process by senior leadership is essential.

- Research evidence must be supported by face-to-face brokerage to enable schools to select the most appropriate evidence-based interventions for their situations.

- Improvement in attainment is most likely to occur if specific interventions are adopted.

Impact

Outputs: *School leadership engage with the scenarios to refine their needs for raising KS2 literacy. Schools select interventions that meet these needs.*

Outcomes: *Schools implement the interventions, also raising the skills of staff. Improvement in pupil attainment.*

Impact: *Increased awareness of research evidence.*

Wider impact: *School staff will become more accepting of research-based interventions, and supportive of their use. Schools will become more discerning in their selection of interventions, and more resistant to the pendulum swing of fashions in education.*

Strategies

What is your approach? The evidence fairs will bring schools together to use scenarios and their own data to identify effective strategies/interventions. Heads and KS2 literacy co-ordinators from each school will be invited.

What strategies and tools will you use? Intervention providers and schools that have used the interventions will provide support and advice. Before and after the evidence fair, continuing support will be provided to ensure that solutions meet school needs and are implemented effectively.

What resources will you need? This will be supported by a range of communications, including regular emails, mailings, and telephone calls. Magazine (one every term), e-newsletter (one every fortnight) and website will be sent for calendar year 2015

Target Groups

- The main target group are the heads/SLT and KS2 literacy co-ordinators of the schools.

- KS2 literacy teachers (and TAs who support them) will be indirectly targeted/influenced.

- Governors and parents will also be indirectly influenced.

Teaching How2s: Theory diagram for Arms 3 and 4

	DECLARATIVE KNOWLEDGE Knowing what	PROCEDURAL KNOWLEDGE Knowing how
Verbal	Tell me what	Tell me how
Visual	Show me what	**Show me how**

Procedural knowledge needs to be communicated effectively.

HOW2
TEACHINGHOW2S.COM
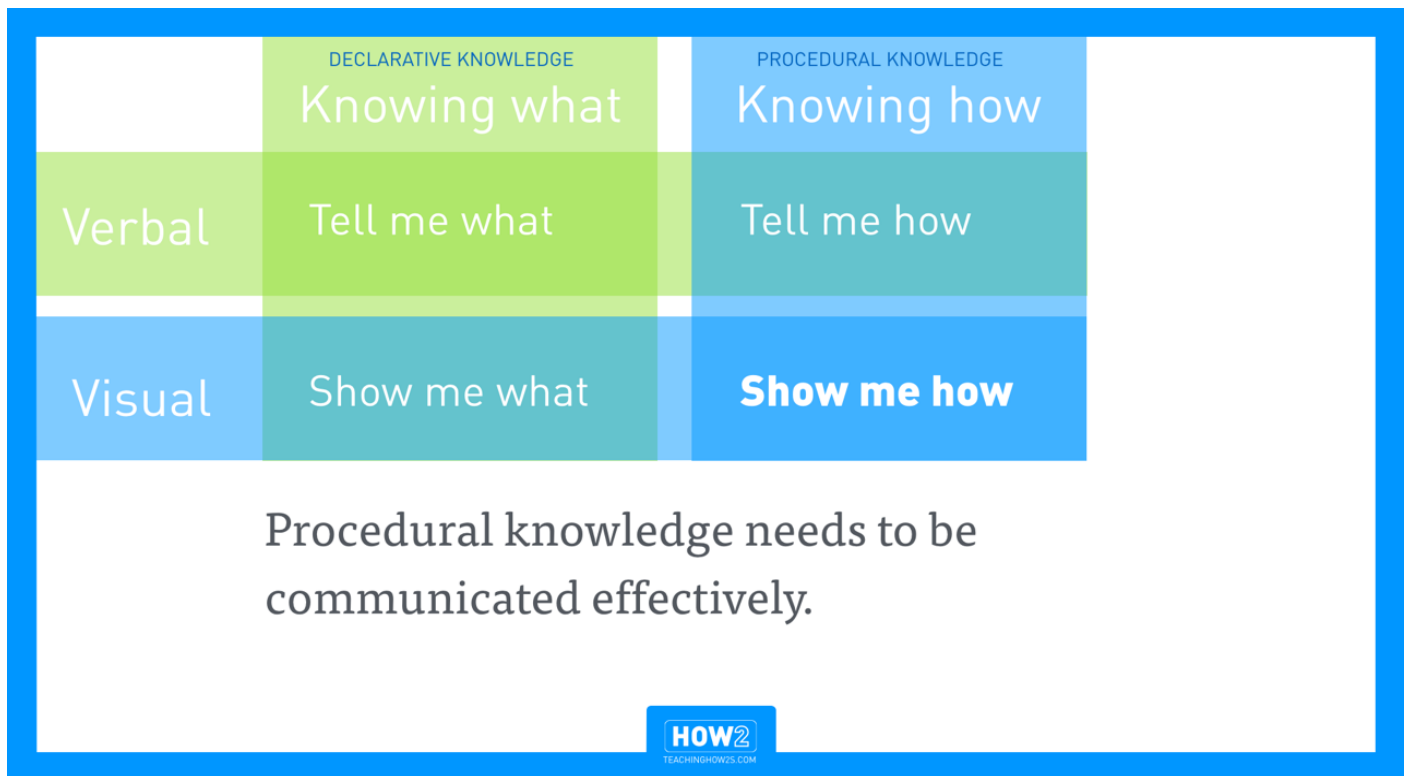
The Teaching How2s approach is based on carefully designed, step-by-step visual guides that walk teachers through activities that they can use in their classroom. The theory is that visual guides can accurately communicate evidence-based teaching strategies to teachers and help implement them in practice. In addition, where schools use the tool as part of peer-to-peer teacher learning, greater impacts on teachers' understanding of the strategies are likely to occur. Moreover, where schools embed the How2s approach into CPD in the school, greater impacts on teachers' practice and pupils' learning are felt to be more likely to occur.

CEM ToC (Arms 5, 6 and 7): 'Embedding research-based interventions for improving literacy into teachers' everyday practice'.

Overall purpose

To investigate different ways to help schools use evidence to improve teaching and pupils' attainment.

Purpose for your intervention(s)

Whilst research has suggested that it takes many hours of training to change professional practice, it is not clear how to effectively encourage and engage teachers to utilise evidence-based research advice, or how much more benefit can be gained from providing different types and levels of engagement resources/activities. This research aims to establish the impact and cost effectiveness of a series of increasingly intensive methods for embedding research-based advice into teachers' everyday practice on a large scale, to improve end of Key Stage 2 literacy.

Assumptions

Teachers can be encouraged to engage with research evidence and incorporate it into their classroom practices. Tymms and Merrell (2006) reported that the provision of research-based advice in the form of a simple booklet with strategies to help severely inattentive, hyperactive and impulsive young children was effective at improving behavioural and attainment outcomes among all young children, not only those with behavioural difficulties; the more frequently teachers reported using the booklet, the higher the pupils' attainment. Other researchers have reported other methods to also be effective, including attendance at Continuing Professional Development (CPD) sessions, peer observations and in-class coaching (Joyce and Showers 1980; Sparks 1986; Adey et al. 2004). This study will incorporate a range of levels of intensity of these approaches.

Impact

Outputs: Teachers engage with trial, evidenced through access to pdf/use of hardcopy, attendance at CPD sessions, number of completed peer-to-peer observations and pupil diagnostic assessments (InCAS).

Outcomes: Teachers incorporate the evidence-based strategies from the booklet into their everyday practice with the aim of improving class literacy. Teachers' awareness (of research use) of action (implementing research based strategies) may be more apparent during the trial for teachers in Level 2 & 3 who will actively reflect upon their practice and use of the booklet via CPD session(s) and peer-to-peer observations (for Level 3 only). At Level 1, we would expect most teachers to acquire new knowledge from the booklet, and engaged with its content by implementing suggested strategies in their classroom; Level 1 teachers however may be unaware that they are implementing research-based evidence as they do not have the opportunity and are not encouraged (by the intervention) to reflect upon their practice (i.e. from attending in-service CPD sessions or participating in peer-to-peer observations). This can be evidenced by assessing how frequently teachers use the booklet and implement strategies within the classroom. At Level 2, we would expect teachers to engage and implement strategies from the booklet more frequently and to understand that they are engaging with research-based evidence more than Level 1 teachers. This is because Level 2 teachers will have had the opportunity to reflect upon and discuss the booklet by attending one in-service CPD session, this will help to foster engagement with and understanding of the booklet's content and purpose. We would expect to see the most engagement with the booklet and implementation of its strategies within the classroom among Level 3 teachers, as they will have had more opportunities to actively reflect upon and discuss the booklets purpose and assess its usefulness (by attending two in-service CPD session, participating in two peer-to-peer observations and acquiring pupil assessment data (InCAS)). With a greater understanding of the research-based evidence, and engagement with the booklet, we would expect behavioural change among Level 3 teachers. This can be evidenced via the frequency in which they implement strategies from the booklet in their classroom, and by gathering data as to whether they have used the booklet's strategies consistently when teaching both their year 5 and 6 cohorts. Throughout all Levels, we would like to know which booklet format (i.e. hardcopy or pdf version) teachers engaged with the most.

Impact: Improved literacy attainment at the end of Key Stage 2. Further contact from schools/teachers, particularly post-intervention in the active arms, is an indication of impact/interest generated directly through the evidence-based materials and sessions provided. We will log all contact and requests we receive from schools as evidence of impact outcomes.

Strategies

What is your approach? **Level 1** will receive evidenced-based materials only (booklet via post and PDF with recommendation for use by Y5/6 teachers, 'Tips for Teachers' card and monthly posters to foster engagement with the research). **Level 2** will receive the same evidence-based materials as Level 1 and one CPD session. **Level 3** will receive the evidenced-based materials, two CPD sessions, participate in two peer-to-peer observations and receive diagnostic information from pupils' assessments (InCAS) to help them tailor the appropriate strategies to their pupils' needs. All levels will receive monthly contact (one per month, via email or telephone contact) from the research team.

What strategies and tools will you use? Booklets which briefly explain how children learn to read and evidence-based strategies on how to improve reading and spelling. 'Tips for Teachers' cards will summarise the main ideas of the booklet and can be placed in an obvious place as a prompt for teachers. Poster, to be displayed in the classroom, will encourage pupil engagement as well as teacher engagement with the research. In-service CPD sessions will explain the information in the booklet, share good practice and, for Level 3 only, explain how to use the diagnostic information from InCAS. In-class peer-to-peer observations will facilitate discussion between teaching peers of the evidence-based teaching strategies. InCAS will provide Level 3 teachers with information surrounding their pupils progress, pinpoint areas of weakness and consequently teacher target teaching strategies from the booklet to improve literacy outcomes.

What resources will you need? Time, research staff, development and production of materials, CPD session locations (participating schools), ICT.

Which wider partners can help? How? EEF; NFER who are responsible for the recruitment of schools and overall evaluation; venues to host in-service CPD sessions.

Target Groups

Key Stage 2 classroom teachers who are interested in engaging with and utilising research-based evidence to improve their literacy teaching strategies.

**ResearchEd (Arms 8 and 9): A Theory
of Change (ToC) for ResearchEd**

Overall purpose

To investigate different ways to help teachers and schools to use evidence to improve teaching and pupils' attainment in relation to Literacy.

Purpose for your intervention(s)

- *Increase how informed and engaged teachers are in relation to evidence based issues*

- *Wider use of research evidence by teachers post intervention*

- *Help them to locate evidence and discern between good and poor evidence as basis for teaching strategies*

- *Engaged, informed teachers Improve performance and tailored support to pupils*

Using Research Ed conference to communicate and engage with issues (Arm 8 and 9)

Online pre-post event peer learning sessions to engage, strengthen and embed learning into practice(Arm 9)

Access to the conference resources post

Assumptions

For your approach to be effective, what background assumptions have to be true? What evidence do you already have that the stages of mechanism will be effective, both from your own work and others?

- *Teachers will attend conference and have means/ability to engage with online events*

- *ResearchEd is already well attended, well thought of, and seems (although no evidence) to be leading to change*

- *L&D events suggest online events increase learning and engagement and help embedding into practice – overcoming hurdles collaboratively and sharing what works.*

Impact

Outputs:

- *Teachers attend and engage (conference and online events)*

- *Learning is shared with peers in school*

Outcomes:

- *Practice becomes more evidence informed*

- *Teachers seek peer support and interaction more often*

- *Practitioners are more research engaged*

Strategies

What is your approach?

- *Using Research Ed conference to communicate and engage with issues (Arms 8 and 9)*

- *Online pre-post event peer learning sessions to engage, strengthen and embed learning into practice (Arm 9)*

What strategies and tools will you use?

- *Marketing and engagement strategies, CPD offer, support package, online tools*

What resources will you need?

- *Time, staffing, ICT, core RCT materials for engagement.*

Target Groups

- KS2 teachers, headteachers, schools

ResearchEd: ToC – based on engagement and research use

ResearchEd Theory of Change – based on engagement and research use

Minimal effect

Passive trial: 2,500 schools sent bulk email message providing URL for ResearchEd conference website including access to videos, all materials POST CONFERENCE

Participant consults information for personal interest

Active trial: Passive arm

60 schools (120 staff, ideally 1 from SLT and 1 KS2 literacy specialist) receive:

- invite to conference

- attend conference

- access to conference website

- may /may not take part in social media discussions but won't be notified of these unlike AA arm

PARTICIPATION

USE

Participant uses some information within their own classroom /practice

Active trial: Active arm

60 schools (120 staff ideally we recruit 1 from SLT and 1 KS2 literacy specialist) receive:

- Invite to conference, online activities & Digital Teacher session at ResearchEd

- Attend pre and post online sessions, participate in Twitterchats

- Attend Digital Teacher session at the conference

- Contribute blogs and video case studies post conference

- Form online community of practice

Participant cascades information within school and/or wider networks and action is taken based on it

Greatest effect

Appendix E: Randomisation syntax

```
title 'EEFA: Active Trial'.


set printback=on.


GET DATA /TYPE=XLSX
 /FILE='K:\EEFA\FINAL list for active trial stats.xlsx'
 /SHEET=name 'FINAL main sample list 221214'
 /CELLRANGE=full
 /READNAMES=on
 /ASSUMEDSTRWIDTH=32767.


add value labels region 1 'North' 2 'South'.


* 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.


* Stratify by region.
freq region.
sort cases by region.


* Randomise within the NORTH.


select if (region=1).
* Set mtindex to a specific number rather than 'random' so that it can be reproduced
* change this number for repeated randomisations.
set rng=mt, mtindex=8.
compute random=rv.uniform(0,1).
print formats random (F15.13).
```

```
exe.

sort cases by random.

list vars random/cases=from 1 to 20.


numeric group (F2.0).

*To maintain balanced control group between north and south.

*North/south split varies between 30/30 and 29/31.

*See k:\eefa\cfs\activeprovider_order.sps for which provider gets which split.

if $casenum le 29 group=1.

if $casenum ge 30 and $casenum le 59 group=2.

if $casenum ge 60 and $casenum le 89 group=3.

if $casenum ge 90 and $casenum le 118 group=4.

if $casenum ge 119 and $casenum le 147 group=5.

if $casenum ge 148 and $casenum le 176 group=6.

if $casenum ge 177 and $casenum le 206 group=7.

if $casenum ge 207 and $casenum le 235 group=8.

if $casenum ge 236 and $casenum le 264 group=9.

if $casenum ge 265 group=10.


freq group.

sort cases by group.

save outfile='K:\EEFA\Temp\north.sav'.


* Randomise within the SOUTH.


GET DATA /TYPE=XLSX
  /FILE='K:\EEFA\FINAL list for active trial stats.xlsx'
  /SHEET=name 'FINAL main sample list 221214'
  /CELLRANGE=full
  /READNAMES=on
  /ASSUMEDSTRWIDTH=32767.


add value labels region 1 'North' 2 'South'.

select if (region=2).


set rng=mt, mtindex=20.

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

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

exe.

sort cases by random.

list vars random/cases=from 1 to 20.


numeric group (F2.0).

*To maintain balanced control group between north and south.

*North/south split varies between 30/30 and 29/31.

*See k:\eefa\cfs\activeprovider_order.sps for which provider gets which split.

if $casenum le 31 group=1.

if $casenum ge 32 and $casenum le 61 group=2.

if $casenum ge 62 and $casenum le 91 group=3.

if $casenum ge 92 and $casenum le 122 group=4.

if $casenum ge 123 and $casenum le 153 group=5.

if $casenum ge 154 and $casenum le 184 group=6.

if $casenum ge 185 and $casenum le 214 group=7.

if $casenum ge 215 and $casenum le 245 group=8.

if $casenum ge 246 and $casenum le 276 group=9.

if $casenum ge 277 group=10.


freq group.

sort cases by group.

save outfile='K:\EEFA\Temp\south.sav'.


add  files  file='K:\EEFA\Temp\north.sav'/in=innorth/file='K:\EEFA\Temp\south.sav'/in=insouth/by
group.


* Labels as in 'Template for providers 191214'.

add value labels group 1 '1 - IEE materials'      2 '2 - IEE evidence fair' 3  '3  -  Cfl  website
access'

                               4 '4 - Cfl support and website'   5 '5 - CEM booklet'     6  '6  -  CEM
booklet and light CPD'

                               7 '7 - CEM booklet and advanced CPD' 8 '8 - NatCen conference'

                               9 '9 - Natcen conference and online community' 10 '10 - Control group'.


cross group by region/cells=count col.


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

```
/TYPE=XLSX
/VERSION=12
/MAP
/REPLACE
/FIELDNAMES
/CELLS=VALUES
/KEEP=contact_id nfer_no region group.
```

Appendix F: Literacy Octopus Engagement Categories

Analysis was conducted on schools' engagement in the Literacy Octopus. Whilst the quantitative and qualitative characteristics of each level of engagement were specific to each trial arm, we adopted an overall consistent approach to categorisation, namely:

Level of engagement	Description of engagement according to Monitoring Information (MI) data
None	No engagement
Low	Engaged less than expected for that arm
Mid	Engaged as expected for that arm
High	Engaged more than expected for that arm

Each provider adopted a pre-agree MI data tool, with pre-specified fields in order to capture the qualitative and quantitative data required. Providers submitted this data at three time-points (April 2015, July 2015 and April 2016). NFER researchers carried out the engagement categorisation at school level. Some qualitative judgements were made by NFER coders where quantitative data was borderline in the categories below. Some double-coding was undertaken on the initial datasets in April 2015, to quality assure the consistency of applying the coding schemes. The detailed engagement schemes were as follows:

Arm 1: IEE Passive	
Level of engagement	Description
None	0% materials opened (incl. bounced back after several attempts / unable to send)
Low	At least one teacher opened a small amount of materials (e.g. 1 – 20% of materials)
Mid	At least one teacher opened some materials (e.g. 21-50% materials)
High	At least one teacher opened most materials (e.g. more than 50% of materials)

NB – MI data for this arm was collated at an individual teacher level. NFER applied the above aggregated metric at school level (i.e. one engagement code per school).

Arm 2: IEE Active	
Level of engagement	Description
None	Did not attend Evidence Fair; 0% materials opened (incl. bounced back after several attempts / unable to send)
Low	Did not attend Evidence Fair; at least one teacher opened a small amount of material (e.g. 1 – 20% of materials)
Mid	At least one teacher attended Evidence Fair; and at least one teacher opened some materials (e.g. 21-50% of materials)
High	More than one teacher attended Evidence Fair (NB – where only one teacher was listed, one teacher attended Evidence Fair); and at least one teacher opened most materials (e.g. more than 50% of materials)

NB – MI data for this arm was collated at an individual teacher level. NFER applied the above aggregated metric at school level (i.e. one engagement code per school).

Arm 3: Teaching How2s Passive	
Level of engagement	**Description**
None	No activity on How2s site (i.e. zero techniques and/or nudges recorded)
Low	Small number of active users (e.g. 1 – 3), and limited activity on How2s site (e.g. 1 – 15 techniques recorded)
Mid	Small number of active users (e.g. 2 – 5), and moderate activity on How2s site (e.g. 15 – 40 techniques recorded); or larger number of active users (i.e. 6 – 25 users) and limited/moderate activity on How2s site (e.g. 10 – 20 techniques recorded)
High	Small number of active users (e.g. 2 – 5), and high activity on How2s site (e.g. over 40 techniques recorded, and in some cases nudges recorded also); or large number of active users (e.g. 10+) and high activity on How2s site (e.g. over 40 techniques recorded, and in some cases nudges recorded also)

Arm 4: Teaching How2s Active	
Level of engagement	**Description**
None	Did not attend induction; no activity on How2s site (i.e. zero techniques and/or nudges recorded)
Low	Did not attend induction; small number of active users (e.g. 1 – 3), and limited activity on How2s site (e.g. 1 – 15 techniques recorded)
Mid	Attended induction; small number of active users (e.g. 2 – 5), and moderate activity on How2s site (e.g. 15 – 40 techniques recorded); or larger number of active users (i.e. 6 – 25 users) and limited/moderate activity on How2s site (e.g. 10 – 20 techniques recorded)
High	Attended induction; small number of active users (e.g. 2 – 5), and high activity on How2s site (e.g. over 40 techniques recorded, and in some cases nudges recorded also); or large number of active users (e.g. 10+) and high activity on How2s site (e.g. over 40 techniques recorded, and in some cases nudges recorded also)

Arm 5: CEM Passive	
Level of engagement	**Description**
None	Did not respond to initial contact, did not engage with materials (none downloaded)
Low	Responded to initial contact, did not engage with materials and did not ask for further materials
Mid	Responded to initial contact, engaged with materials
High	Responded to initial contact, engaged with materials, and engaged further proactively with provider

Arm 6: CEM Active Light	
Level of engagement	**Description**
None	Did not respond to initial contact, and no engagement with materials; or engaged with initial contact, but no engagement with materials
Low	Responded to initial contact, and engaged with materials, did not attend twilight CPD
Mid	Responded to initial contact, engaged with materials, and attended twilight CPD
High	Responded to initial contact, engaged with materials, attended twilight CPD, and engaged further proactively with provider

Arm 7: CEM Active	
Level of engagement	**Description**
None	Did not respond to initial contact, and no engagement with materials; or engaged with initial contact, but no engagement with materials
Low	Responded to initial contact, and engaged with materials, and attended the first round of twilight CPD only (i.e. CPD1)
Mid	Responded to initial contact, engaged with materials, and attended two of the support activities (i.e. from CPD1, CPD2, INCAS support)
High	Responded to initial contact, engaged with materials, and engaged in all three support activities (i.e. CPD1, CPD2, and INCAS). A special note was applied if the school also hosted a CPD session to indicate high levels of engagement.

Arm 8: ResearchED Passive	
Level of engagement	**Description**
None	School did not attend conference
Low	School did not attend conference
Mid	One teacher attended conference
High	More than one teacher attended conference

Note that for Arm 8, the criteria for categorising none and low engagement were the same (i.e. no teachers from the school attended the conference. For analysis purposes, these were categorised as 'none').

Arm 9: ResearchED Active	
Level of engagement	**Description**
None	School did not attend conference
Low	One teacher attended conference
Mid	More than one teacher attended conference; or one teacher attended conference, and school attended webinar conference
High	More than one teacher attended conference, and school attended webinar conference

The NFER team used the MI engagement data to help identify case studies. In addition, we assessed any change in engagement over time in Literacy Octopus activity, and applied a qualitative schema. We used this information to further help identify case studies.

Change in/continued engagement (2016 data compared qualitatively with 2015 data)
School did not engage in 2015, and did not engage in 2016
School engaged less than expected in 2015, and in 2016 had no further or limited engagement
School engaged as expected for their arm in 2015, and in 2016 this continued; OR, school had limited engagement in 2015, but in 2016 increased their engagement moderately
School engaged more than expected for their arm in 2015, and in 2016 continued to engaged highly; OR, school engaged moderately in 2015 and in 2016 increased their engagement

Appendix G: Research Use items and reliability measures

1. Positive disposition to academic research in informing teaching practice (Cronbach's Alpha* = 0.83)	• How easy they find it to understand academic research • Information from research plays an important role in informing my/our teaching practice • I know where to find relevant research that may help to inform teaching methods/practice • I am able to relate information from research to my context • I feel confident about analysing information from research • I use information from research to help me to decide how to implement new approaches in the classroom
2. Use of academic research to inform selection of teaching approaches (Cronbach's Alpha = 0.63)	• Academic research was important in identifying specific approach and they used CPD based on academic research (Combined score based on 3 items) • The extent to which the decision to adopt an approach was due to it being based on academic research • The extent to which they consult academic research (generally)
3. Perception that academic research is not useful to teaching (Cronbach's Alpha = 0.55)	• I do not believe that using information from research will help to improve pupil outcomes • Information from research conducted elsewhere is of limited value to our school
4. Perception that own school does not encourage use of academic research (Cronbach's Alpha = 0.55)	• My school leaders/governors do not encourage me to use information from research to improve my practice • Other staff in my school rarely use information from research to inform their teaching practice
5. Active engagement with online evidence platforms (Cronbach's Alpha = 0.69)	• The extent to which they consult online platforms (generally) • How easy they find it to understand online platforms
6. Research knowledge (Cronbach's Alpha = 0.62)	• Score on research findings question • Score on research methods question

*Cronbach's alpha provides a measure of internal consistency, or reliability, of the measure by comparing how each question performs individually with how all the questions perform together. The value of alpha increases when the correlations between the items increase, so a Cronbach's alpha closer to 1 indicates a more reliable measure. Reliability measures reported in this table are based on endpoint survey responses from 557 teachers. Note, the reliability of the outcome measures in the Literacy Octopus study is similar to those found in the development of the Research Use Survey (Poet *el al.*, 2015, unpublished).

Appendix H: Process evaluation achieved sample

Table H: Process evaluation: Achieved sample of interviews

Group	No. of provider interviews	No. of telephone interviews	No. of case studies	No. of case study interviews
1 IEE – Materials	3	3	1	2
2 IEE – Evidence Fair		2	0	0
3 Teaching How2s – Website access	3	3	1	1
4 Teaching How2s – Support and website access		3	2	5
5 CEM – Booklet	3	3	0	0
6 CEM – Booklet and light CPD		4	1	4
7 CEM – Booklet and advanced CPD		3	2	3
8 ResearchEd – Conference	3	5	1	3
9 ResearchEd – Conference and online community		3	2	4
10 - Control	-	-	-	6
TOTAL	12	29	10	28

Appendix I: Case Study Implementation and Impact Trails

In order to more fully understand how impacts occur as a result of engaging with evidence-based support, we undertook a detailed analysis of four case studies to explore the trail of mechanisms and perceived impacts. We used NFER's impact trail methodology, which provides a rigorous framework for interviewing and analysis, to help understand the sequence of impacts and how they came about. We selected four case studies for this more detailed analysis based on where teachers reported substantial impacts on their practice as a result of participation in the Literacy Octopus intervention and to provide examples of impacts arising from participation in both active and passive interventions.

The case studies focused on the 'implementation' stage of the knowledge-mobilisation process. Our analysis revealed that outcomes and impacts are achieved where particular mechanisms are in place in the transformation (i.e. the evidence-based materials and support given by the Literacy Octopus providers) and implementation of evidence (i.e. the implementation of research evidence in practice by the Literacy Octopus schools). The case studies provide examples of how these mechanisms have been instrumental in bringing about impacts in the four schools.

Each case study is accompanied by a visual depiction of the 'trail' of impacts occurring in the school; from the initial input of the Literacy Octopus provider, to the resultant impacts on teachers' (awareness, understanding and action) and on pupils, and, how these impacts are either facilitated or inhibited at each stage by the presence or absence of particular mechanisms. The mechanisms referred to in the 'impact trails' are explained in Table 12 in the main report. Each case study is based on interviews with the key Literacy Octopus contact in the school (usually the literacy coordinator or senior leader), a school leader and a class teacher wherever possible.

Case study A: The headteacher received regular emailed research briefing materials from the IEE. Collaborative and embedded approaches to the implementation of this resource were particularly prominent facilitating mechanisms. The materials were printed and distributed to all staff in staff meetings. At staff meetings, colleagues would discuss the materials and identify strategies that appeared relevant to the school context to explore further, and implement in practice as appropriate. Tangible impacts on practice were, however, rather limited as it was felt that whilst the materials provided a useful 'kick-start' of evidence-based ideas, they required substantial further investigation and development to affect practice. Nevertheless, the use of different sources of research evidence became embedded as part of the schools ongoing school improvement plan. The 'impact trail' for case study A is presented in Appendix I.

Case study F: The Literacy Coordinator and headteacher received free access to the Teaching How2s website and attended an introductory event on how to use the resource. The subsequent use of the resource in practice across the school was particularly facilitated by a planned and phased approach to implementation, including a designated member of staff to lead the process; internal staff training to familiarise colleagues with the resource; and the trialling of particularly relevant strategies across the whole school, staff groups and by individual staff as part of performance management. Interviewees identified that the resource had subtle impacts across a wide range of practices and numerous members of staff. The 'impact trail' for case study F is presented in Appendix I.

Case study H: A Year 5 teacher (who had since left the school) attended CEM CPD sessions and received the accompanying booklet of Key Stage 2 literacy strategies. The school also received posters each month with details of literacy activities for pupils. The school effectively mitigated the effects of losing the original member of staff who received the CPD by running internal training for all school staff to enable the Year 5 teacher to share the learning with colleagues, and identified another member of staff to 'champion' the implementation of the strategies in practice. Interviewees were well informed about the evidence on *how* to implement particular literacy strategies effectively and were convinced by the explicit, yet summarised, evidence that the strategies were worthy of trialling. Senior leaders of the school supported the implementation and adaptation of numerous literacy strategies across the

whole school, leading to substantial impacts on practice and perceived positive impacts on pupils. The 'impact trail' for case study H is presented in Appendix I.

Case study L: Five members of staff (including senior leaders) attended a Saturday ResearchEd conference. This case appears to be atypical in this regard as monitoring information shows that typically only one or sometimes two members of staff from a school attended the conference. The opportunity to attend the conference was opened up to all school staff. Group attendance facilitated professional discussion and reflection on practice, and enabled staff to identify, collaboratively, the particular ideas from the conference to pursue. Also important was the focus of the conference sessions on the practical implementation of literacy strategies, including examples from schools. However, this was insufficient information alone to support effective implementation, and the school sought further external training on the approach of Reciprocal Reading. An idea inspired by attending a conference was thus successfully developed with further input to achieve considerable impact in a particular area of literacy practice across the whole school. The 'impact trail' for case study L is presented in Appendix I.

The mechanisms referred to in the diagrams are explained in Table 12 of the main report. A '+' denotes an enabling mechanism and a '-' denotes an inhibiting mechanism. Mechanisms relating mainly to evidence 'transformation' (i.e. the Literacy Octopus provider) are coloured green and mechanisms relating mainly to evidence 'implementation' (i.e. the Literacy Octopus school) are shaded red. Impacts were identified in three main areas: teacher awareness and understanding (shaded peach boxes); teacher action/practice (shaded blue boxes); and pupil impact (shaded purple boxes).

Time

Initial input	Mechanisms	Impact	Mechanisms	Impact	Mechanisms	Impact	Mechanisms

CSA: Institute for Effective Education literacy research materials

Mechanisms

+ relevance e.g. existing school culture of research engagement and use of research in school improvement

+ relevance e.g. SLT endorse and encourage staff to engage with research evidence

+ collaborative e.g. discussion of articles/topics at staff meetings and decision making on implementation

+ relevance e.g. SLT endorse focus on strategies

+ relevance e.g. content relevant to school's needs

+ accessibility e.g. accessible style of delivery

+ status of evidence e.g. research evidence provides validity to the strategies and ideas

Impact

Teacher awareness of practice e.g. evidence-based strategies and practices

Teacher awareness and understanding of research evidence e.g. of the range of topics being investigated

Mechanisms

+ further enquiry and follow-up e.g. regular input of information/materials from IEE focuses attention

+ embedded e.g. part of regular CPD and school improvement plan to read and discuss selected articles

+ relevance e.g. interested in Education Endowment Foundation (EEF) guidance on effective deployment of Teaching Assistants (TAs)

+ further enquiry and follow-up e.g. seeking further training, expertise, input on particular topics of interest

Impact

Teacher practice e.g. reviewed deployment of Teaching Assistants

Teacher research engagement e.g. interested in continuing a subscription to the materials

Teacher research engagement e.g. involvement in other research studies as participants

Mechanisms

+ tryout and review e.g. re-deploying TAs to provide targeted, earlier intervention for pupils not achieving expected levels of progress

Impact

Teacher practice e.g. quicker and earlier interventions for children delivered by TAs

Mechanisms

- accessibility e.g. continuing to subscribe to the materials will depend on affordability in the context of other expenditure and priorities

Time

| Initial input | Mechanisms | Impact | Mechanisms | Impact | Mechanisms | Impact | Mechanisms | Impact | Mechanisms |

CSF: Access to Teaching How2s website, online materials and face-to-face induction support

Mechanisms

+ relevance e.g. breadth of teaching strategies

+ relevance e.g. resource shows 'how' to implement strategies

+ status of evidence e.g. case studies of how other schools have used How2s effectively

+ status of evidence e.g. training explained that strategies are underpinned by research-evidence

+ collaborative e.g. Headteacher and acting Deputy Headteacher attended training

+ relevance e.g. senior staff convinced of value of using How2s to support teachers' professional development

Impact

Teacher awareness of practice e.g. classroom management, mind mapping, pupil self-assessment

Teacher understanding of practice e.g. how to use/navigate the How2s resource

Teacher research engagement e.g. interest in evaluating the impact of strategies and participating in research

Mechanisms

+ further enquiry and follow-up e.g. exploring range of How2s resources

+ planned e.g. action plan for implementing use of How2s, including costs, resources, staffing, review.

+ collaborative e.g. staff meeting to introduce How2s resource

+ further enquiry and follow-up e.g. staff encouraged to initially explore resources

+ relevance e.g. required strategies to address a pupil's disruptive behaviour

- collaborative e.g. reluctance of some staff to engage with the resource

Impact

Teacher practices e.g. teacher implemented behaviour strategies

Pupil behaviour e.g. reduction in a pupil's disruptive behaviour and improved engagement in lessons

Mechanisms

+ champion e.g. acting Deputy Head leads whole-school implementation of new pupil self-assessment strategy

+ tryout and review e.g. acting Deputy Head trialled pupil self-assessment strategy and reviewed in a subsequent staff meeting

+ collaborative e.g. staff meeting to introduce pupil self-assessment strategy

+ embedded e.g. approach to KS2 pupil self-assessment written into assessment policy

Impact

Teacher practices e.g. consistent and simple approach for pupils to explicitly self-assess their own work across all subject areas

Teacher practices e.g. use of mind mapping approaches to break down different stages of planning and encourage pupils to work independently in developing their extended writing

Pupil impact e.g. pupils producing more detailed and longer pieces of writing using mind-mapping techniques

Mechanisms

+ tryout and review e.g. staff encouraged to select one new teaching strategy per half term to trial and review with colleagues in phase meetings

+ embedded e.g. use of How2 resources to address teacher needs identified through Performance Management and lesson observations

+ further enquiry and follow-up e.g. regularly updated content on How2s resource

+ collaborative e.g. staff send each other 'nudges' to highlight particular How2 resources of interest

+ adaptation e.g. adapted ideas on mind mapping to help younger pupils condense, organise and summarise information

+ relevance e.g. used How2 visuals to help pupils understand the concept of mind mapping

+ relevance e.g. all staff able to access the resource and visuals to show 'how' to implement strategies

Impact

Teacher practices e.g. useful strategies for new teachers and reminders of effective strategies for longer-standing teachers to raise the quality of teaching

Teacher practices e.g. questioning of pupils; class management through establishing routines; liaising with parents about homework

Pupil impact e.g. improved behaviour due to clear and consistent classroom routines

Mechanisms

- accessibility e.g. leaders will evaluate the relative impact of How2s compared with other professional development resources in deciding whether or not to continue the subscription

+ collaborative e.g. the school is keen to become a 'hub'; supporting and training other local schools to use the Teaching How2s.

Time →

Initial input	Mechanisms	Impact	Mechanisms	Impact	Mechanisms	Impact	Mechanisms	Impact

CSH: CEM literacy materials and CPD sessions

Mechanisms:
+ relevance e.g. literacy identified as an area of school improvement

+ status of evidence e.g. detailed discussion of evidence-base for strategies and the conditions for effective implementation in training

+ collaborative e.g. opportunity for face-to-face and in-depth discussion in training

Impact:
Teacher awareness and understanding of practice e.g. various evidence-based literacy strategies

Mechanisms:
+ champion e.g. teacher enthusiasm

+ relevance e.g. SLT identified literacy strategies to trial across the school

+ collaborative e.g. in-house staff training to disseminate selected literacy strategies

- champion e.g. teacher who attended CPD left the school

Impact:
Teacher awareness and understanding of practice e.g. various evidence-based literacy strategies

Mechanisms:
+ champion e.g. Deputy head led implementation of strategies

+ status of evidence e.g. used evidence to justify implementation of strategies

+ tryout and review e.g. implemented buddy reading; spelling games; and mind-mapping strategies across the school

+ adaptation e.g. adapted strategies for KS1 pupils

+ further enquiry and follow-up e.g. ongoing input from provider giving prompts and ideas and responding to queries

- status of evidence e.g. where evidence not clear unable to provide rationale for introducing strategies

+ status of evidence e.g. implemented buddy reading as evidence suggested most effective; with two-year age gap in buddy pairs, where possible

Impact:
Teacher practice e.g. buddy reading implemented with all year groups

Teacher practice e.g. used spelling strategies with all year groups

Teacher practice e.g. used posters to focus literacy activities, including 'word of the week'

Teacher practice e.g. used mind mapping strategies

Teacher practice e.g. used 'magpie' books

Mechanisms:
+ tryout and review e.g. staff fed back on their experiences of implementing strategies at staff meetings; positive feedback so decided to continue

+ collaborative e.g. whole school implementation engages all staff and staff can share challenges and successes and engage in professional discussion

+ adaptation e.g. to address logistical challenges identified and refine approach

+ embedded e.g. plans to continue to use buddy reading and other literacy strategies long term

Impact:
Teacher practice e.g. more consistent literacy teaching approaches and enhanced quality of literacy teaching

Teacher research engagement e.g. more likely to seek evidence-based strategies in the future as positive experience

CPD practice e.g. gained experience of implementing whole-school strategies which will apply to other aspects of practice

Pupil impact e.g. raised pupil achievement in reading

Pupil impact e.g. enhanced reading comprehension skills through more discussion of books and words

Pupil impact e.g. enhanced confidence reading to peers in non-threatening 'buddy reading' context

Pupil impact e.g. pupils making friends across age-groups through buddy reading

Pupil impact e.g. extended vocabulary

Time

Initial input	Mechanisms	Impact	Mechanisms	Impact	Mechanisms	Impact	Mechanisms	Impact

CSL: ResearchEd literacy conference

Mechanisms

+ relevance e.g. inspiring practical ideas and demonstrations from other schools

+ status of evidence e.g. explicit citations to evidence

+ collaborative e.g. several school staff attended allowing professional reflection and discussion

+ relevance e.g. senior staff keen to develop evidence-informed practice

Impact

Teacher awareness and understanding of **practices** e.g. of reciprocal reading

Teacher awareness and understanding of **literacy strategies** e.g. slow writing

Teacher awareness and understanding of **research evidence** e.g. how the EEF toolkit works

Mechanisms

+ relevance e.g. senior staff identified reciprocal reading as strategy to improve 'guided reading'

+ collaborative e.g. staff meeting and informal discussion to disseminate information on reciprocal reading

+ further enquiry and follow-up e.g. further enquiry into a broader range of evidence on reciprocal reading

+ adaptation e.g. staff adapted their existing guided reading practices to incorporate elements of a reciprocal reading approach with their class

+ champion e.g. teacher enthusiasm

+ relevance e.g. teacher's interest in the potential of slow writing as a strategy to support struggling writers

+ collaborative e.g. professional discussion of evidence

Impact

Teacher literacy **practices** e.g. several staff implemented a reciprocal reading approach with their class

Teacher literacy **practices** e.g. a teacher implemented elements of 'slow writing' in their own class with struggling writers

Teacher research **engagement** e.g. more use of EEF toolkit; greater interest in evidence-informed practice; developing interest in action research (attended further conference)

Mechanisms

+ tryout and review e.g. informal review of how staff experienced reciprocal reading which highlighted benefits but also practical challenges of implementation

- relevance e.g. insufficient information from conference on detail of 'how' to implement reciprocal reading effectively

+ planned e.g. action plan for implementing reciprocal reading across the school

+ further enquiry and follow-up e.g. reading lead and senior leader attended external training on reciprocal reading and obtained resources

+ collaborative e.g. internal training for all staff on reciprocal reading

+ champion e.g. reading lead provided ongoing coaching support to colleagues to implement reciprocal reading effectively

+ embedded e.g. reciprocal reading approach incorporated into whole school literacy policy and all staff required to use the approach

- collaborative e.g. teacher using slow writing left the school

- relevance e.g. slow writing approach did not align with leader's aspiration to improve children's independent writing.

- status of evidence e.g. senior leader's perception of a lack of evidence on the effectiveness of slow writing

Impact

Teacher knowledge and **practice** e.g. greater depth of knowledge of reciprocal reading pedagogy; more reflective practice; more confident to try new approaches

Teacher **practices** e.g. all staff using reciprocal reading approach

Pupil literacy skills e.g. more child-led (as opposed to teacher-led) group discussion of texts; children using wider range of dialogue and more confident to discuss texts in group reading activities

Mechanisms

+ further enquiry and follow-up e.g. planned further training for all staff (and TAs) with external provider to consolidate understanding of reciprocal reading approach and refine practice

+ embedded e.g. planned ongoing internal training for new staff on the key features of effective reciprocal reading

+ embedded e.g. planned review to refine reciprocal reading practice to ensure effectiveness, differentiation and consistency across the whole school

Impact

Pupil literacy skills e.g. anticipated long-term impact on children's reading performance

Addendum – added January 2019

Executive summary

The project

The *Evidence-based Literacy Support—'Literacy Octopus' Trial* tested a range of dissemination interventions and resources, all of which aimed to engage schools in using evidence-based materials to improve teaching and learning in Key Stage 2 (KS2) literacy. These included light-touch, 'passive' approaches such as emailing materials to schools, and more 'active' support such as face-to-face events about putting research into practice. The following four delivery partners provided interventions: 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. Interventions were delivered in the spring term 2015, and delivery partners continued to send schools materials and/or offer light touch support until summer 2016.

The initial analysis measured KS2 literacy attainment outcomes for the 2015/16 cohort of Year 6 pupils in 823 trial schools (Lord *et al.*, 2017), as well as measuring teachers' use of research using a Research Use survey (Poet *et al.*, 2015). 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). In addition, two aspects of analysis that remained outstanding from the main report have been conducted as part of the addendum work, namely: KS2 literacy attainment outcomes for the 2014/15 cohort (not undertaken previously as the variables differed to those in the main analysis dataset and were not as expected)[21], and an analysis to ascertain the impact of teacher research use on school-level progress between Key Stage 1 (KS1) and KS2.

Summary of previous results

There was no evidence that any of the 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). Schools' different levels of engagement with the Literacy Octopus interventions made no difference to these results. Literacy Octopus interventions made no difference to teachers' research use as measured by a validated Research Use Outcomes Survey: when each intervention arm was compared to the control group there was no evidence of any impact on any of the six Research Use Measures. The lack of impact across the different interventions suggested that simply communicating research evidence to schools was not enough to improve outcomes, or certainly not in the timescale measured (one academic year).

Summary of new results

There was no evidence that any of the interventions had an impact on pupils' English results at KS2 in 2014/15 or in 2016/17 (i.e. one year earlier and one year later than the main trial). The result from 2014/15 is not surprising, given that it takes time for any change in practice to embed in schools, and communication from Literacy Octopus providers was only in the spring term of 2015 (i.e. one term before measurement). The result from 2016/17 is perhaps indicative of limited engagement or limited embedding, although no further process evaluation was conducted alongside the 2016/17 measurement to explore this.

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[21] The SAP specified KS2_ENGTOTMRK for 2014/15 (total marks in English test as a sum of reading and writing tests). As this was not available on the NPD and as it included writing, which is vulnerable to bias, we have instead used KS2_KS2READPS.

Analysis on the Research Use measures conducted as part of the addendum found that there was no relationship between any of the Research Use measures and progress between KS1 and KS2 (according to the data for the 2015/16 cohort, and 384 teachers who responded to the baseline and follow-up survey in the main trial).

As per the 2015/16 reports, Literacy Octopus interventions were very low cost per school. The protocol did not require further collection of cost data for the 2014/15 and 2016/17 cohorts. Costs can be taken to be very low, as they were for the 2015/16 cohort.

Tables 1a, 1b and 1c present a summary of the results for the 2014/15, 2015/16 and 2016/17 cohorts respectively.

Table 1a: Summary of impact on additional outcome, KS2 English attainment 2014/15

Outcome Group	Effect size (95% CI)	Est. months' progress	No. of pupils*	P value**	EEF cost rating
IEE Passive Arm 1 vs control	0.08 (-0.04-0.19)	1	2,148		£££££
IEE Active Arm 2 vs control	-0.05 (-0.16 – 0.07)	-1	2,121		£££££
How2s Passive Arm 3 vs control	0.00 (-0.11 – 0.12)	0	2,369		£££££
How2s Active Arm 4 vs control	-0.04 (-0.16 – 0.07)	0	2,425		£££££
CEM Passive Arm 5 vs control	-0.05 (-0.16 – 0.07)	-1	2,099	0.27	£££££
CEM Active Light Arm 6 vs control	-0.03 (-0.14 – 0.09)	0	2,056		£££££
CEM Active Arm 7 vs control	0.06 (-0.06 – 0.17)	1	2,305		£££££
ResearchEd Passive Arm 8 vs control	-0.02 (-0.13 – 0.09)	0	2,475		£££££
ResearchEd Active Arm 9 vs control	-0.01 (-0.13 – 0.10)	0	2,122		£££££

*Number of pupils' refers to the number of pupils' results analysed in the primary outcome multi-level model. Note, the model included results from 10,103 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 primary outcome, Key Stage 2 English attainment 2015/16[22]

Group	Effect size (95% CI)	Est. months' progress	No. of pupils*	P value**	EEF cost rating
IEE Passive Arm 1 vs control	-0.02 (-0.15, 0.11)	0	2,272		£££££
IEE Active Arm 2 vs control	-0.03 (-0.16, 0.09)	0	2,181		£££££
How2s Passive Arm 3 vs control	-0.01 (-0.13, 0.12)	0	2,319		£££££
How2s Active Arm 4 vs control	-0.03 (-0.16, 0.09)	0	2,426		£££££
CEM Passive Arm 5 vs control	-0.03 (-0.15, 0.10)	0	2,163	0.98	£££££
CEM Active Light Arm 6 vs control	0.02 (-0.11, 0.14)	0	2,070		£££££
CEM Active Arm 7 vs control	0.02 (-0.10, 0.15)	0	2,374		£££££
ResearchEd Passive Arm 8 vs control	0.00 (-0.12, 0.13)	0	2,455		£££££
ResearchEd Active Arm 9 vs control	0.03 (-0.10, 0.15)	0	2,103		£££££

* Number of pupils' refers to the number of pupils' results analysed in the primary outcome multi-level model. Note, the model included results from 10,205 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.

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[22] 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.

Table 1c: Summary of impact on additional outcome, Key Stage 2 English attainment 2016/17

Group	Effect size (95% CI)	Est. months' progress	No. of pupils*	P value**	EEF cost rating
IEE Passive **Arm 1 vs control**	-0.01 (-0.14-0.11)	0	2,180		£££££
IEE Active **Arm 2 vs control**	-0.02 (-0.14-0.10)	0	2,248		£££££
How2s Passive **Arm 3 vs control**	0.05 (-0.08-0.17)	-1	2,348		£££££
How2s Active **Arm 4 vs control**	-0.05 (-0.17-0.07)	-1	2,479		£££££
CEM Passive **Arm 5 vs control**	-0.04 (-0.16-0.09)	0	2,264	0.26	£££££
CEM Active Light Arm 6 vs control	-0.03 (-0.16-0.09)	0	2,183		£££££
CEM Active **Arm 7 vs control**	-0.03 (-0.15-0.09)	0	2,424		£££££
ResearchEd Passive **Arm 8 vs control**	-0.01 (-0.13-0.11)	0	2,519		£££££
ResearchEd Active **Arm 9 vs control**	0.10 (-0.02-0.22)	1	2,114		£££££

*Number of pupils' refers to the number of pupils' results analysed in the primary outcome multi-level model. Note, the model included results from 10,740 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.

Key conclusions
1. There was no evidence that any of the interventions improved pupils' Key Stage 2 English scores in either of the cohorts one year earlier (2014/15) and one year later (2016/17) than that measured in the main trial (2015/16).
2. The results from 2014/15 are not surprising, given that it takes time for any change in practice to embed in schools, and communication activities only started in spring 2015 (i.e. one term before measurement).
3. Given that only a small proportion of schools engaged to a great extent with the communication and support in 2015/16, it is reasonable to assume that continued use of the materials and changes in practice were not widespread across the 540 intervention schools in the following year. However, no further process evaluation was undertaken to explore the extent of any embedding or to test whether lack of embedding is the reason for lack of impact. It could also be that the interventions were too light touch to impact longer term; or that it may take longer for improvements in outcomes to be seen.
4. There was no relationship between any of the Research Use measures and progress between KS1 and KS2 (using data for the 2015/16 cohort). This analysis was based on small numbers (384 teachers).
5. The Literacy Octopus interventions did not continue into 2016/17. It seems that communicating research evidence alone, or with light touch support, for an unsustained period is insufficient to improve pupil attainment outcomes. Further research should explore what level of support is needed to bring about evidence-based change and improvements to pupil outcomes.

Introduction

Intervention

The main report for this trial summarised the findings from the *Evidence-based Literacy Support—'Literacy Octopus' Trial* on the 2015/16 Year 6 cohort's KS2 English outcomes (the primary outcome) (Lord *et al.*, 2017). It also presented the outcomes on teachers' research use using a Research Use measure developed for EEF trials involving research engagement and use (Poet *et al.,* 2015). The trial was a school-randomised trial, involving ten arms and 823 schools in total.

The *Evidence-based Literacy Support—'Literacy Octopus' Trial* tested a range of dissemination interventions and resources, all of which aimed to engage schools in using evidence-based materials to improve teaching and learning in Key Stage 2 (KS2) literacy. These included light-touch, 'passive' approaches such as emailing materials to schools, and more 'active' support such as face-to-face events about putting research into practice. Four delivery partners provided interventions: the Institute for Effective Education (IEE) at the University of York, the Campaign for Learning in partnership with Train Visual providing Teaching How2s, the Centre for Evaluation and Monitoring (CEM) at Durham University, and NatCen in collaboration with ResearchEd. Each delivery partner provided a light-touch passive intervention, and a more 'active' supported intervention. In addition, one of the delivery partners – CEM – provided two active interventions – one involving a twilight CPD session and the other involving a further CPD session and some peer observation and pupil diagnostics in between sessions. In total there were nine intervention arms (with 60 schools in each arm), and one control group (of 283 schools). Interventions were delivered in the spring term 2015, and delivery partners continued to send schools materials and/or offer light touch support until the end of the summer term in 2016. The main report provides a detailed description of each of the intervention arms.

Evaluation objectives

As per the protocol[23], 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[24]. 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 and support in 2015/16. No sub-group analyses were specified for this secondary addendum outcome.

In addition, two aspects of analysis that remained outstanding from the main report have been conducted as part of the addendum work. These are:

- KS2 literacy attainment outcomes for the 2014/15 cohort (not undertaken previously as the variables differed to those in the main analysis dataset and were not as expected) in order to assess immediate outcomes[25]

- an analysis of any relationship between teacher research use (according to the 2015/16 teacher survey in the main study) and school-level progress between Key Stage 1 (KS1) and KS2.

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[23]

https://educationendowmentfoundation.org.uk/public/files/Projects/Evaluation_Protocols/EEF_Project_Protocol_TheLiteracyOctopusActiveTrial.pdf
and amended here:
https://educationendowmentfoundation.org.uk/public/files/Projects/Evaluation_Protocols/EEFA_protocol_active_trial_update.pdf

[24]

https://educationendowmentfoundation.org.uk/public/files/Projects/Evaluation_Protocols/SAP_Literacy_Octopus_-_Active.pdf

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 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'. These were: the Institute for Effective Education (IEE) at The University of York (in charge of delivering two arms); the Campaign for Learning on behalf of Train Visual (the organisation that owns Teaching How2s; two arms); the Centre for Evaluation and Monitoring (CEM) at Durham University (three arms); and NatCen working with ResearchEd (two arms).

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

Methods

Trial design

The *Evidence-based Literacy Support – the 'Literacy Octopus'* trial was commissioned as a multi-armed trial of four providers' evidence-based literacy materials and support for schools. Schools were randomised into one of ten groups or arms – nine intervention arms and a 'business as usual' control arm. Each provider communicated evidence-based materials in two ways, passive and active, with each school in the trial only experiencing one of these means of intervention (i.e. one of nine possible arms, or control). Three of the four providers each delivered one passive and one active arm (IEE, Teaching How2s, and ResearchEd/NatCen). The fourth, CEM, delivered three arms (passive, active light, and active).

Teachers completing the follow-up survey for the secondary outcomes for the main trial could opt to receive a £5 high street gift voucher or donate £5 to one of six charities.

Participant selection and sample size

The Methods section of the main report provides full details of school selection and sample size. In summary, the main sample consisted of primary schools in England with a Year 6, excluding special schools, independent schools, and local authorities (LAs) that were classed as too far from York and London for travel within one day (which was required for several of the arms of the intervention).

Randomisation was stratified by geography (north and south of England), so that each of the arms contained 60 schools (30 from the north and 30 from the south). In total, 823 schools were randomised, with 540 schools allocated across the nine intervention arms, and 283 schools to the control group. All 823 schools were included in the analysis specification for the addendum analysis.

The main primary analysis was conducted on the 2015/16 Year 6 cohort. The addendum analysis involved the 2016/17 cohort and the outstanding 2014/15 cohort analysis. It also involved the further analysis of the 384 teacher survey respondents who had completed both baseline and follow-up surveys in the main trial, to see if there was any relationship between their research use outcomes and progress between KS1 and KS2 for the 2015/16 cohort.

Addendum outcome measures

The Literacy Octopus trials aimed to improve pupils' literacy skills in KS2. The primary outcome for the 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 interventions started.

Secondary outcomes for the trial included KS2 literacy attainment scores for the cohorts one year earlier (2014/15) and one year after (2016/17) the cohort involved in the primary analysis respectively, to explore immediate and longer-term outcomes. We used amended KS2 data from the DfE NPD for each of these cohorts. The same outcome variables were used for the 2016/17 cohort, i.e. the sum of READSCORE and GPSSCORE. As KS2_READSCORE and KS2_GPSSCORE were not included in the NPD datasets prior to 2015/2016, we have used the 'KS2 reading attainment score for progress measure' (KS2_KS2READPS) variable for the 2014/15 analysis[26]. Schools had been involved in the

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[26] Note, this is different to the outcome suggested in the statistical analysis plan, which specified KS2_ENGTOTMRK (total marks in English test as a sum of reading and writing tests). As this was not available on the NPD and as it included writing, which is vulnerable to bias, we have instead used KS2_KS2READPS.

Literacy Octopus for one term when the 2014/15 cohort took their Year 6 assessments. Literacy Octopus dissemination and support then continued into 2015/16, but finished in July 2016. Hence, the additional 2016/17 outcomes were measured a year after Literacy Octopus interventions 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 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). These criteria are different to that used in the main analysis, as the inclusion of pupils with only one score may violate the assumption of normally distribution residuals in the model. As such, the results for 2015/16 are also summarised here based on these updated criteria, in order to be comparable[27]. (Note, the 2014/15 analysis is based on the KS2 reading attainment score for progress measure, i.e. one score only rather than a sum of scaled scores (see footnote 6).)

Analysis

Primary and secondary attainment outcome analyses

The primary outcome analysis conducted for the main trial (Lord *et al.*, 2017) was 'intention to treat' (that is, the analysis of KS2 literacy attainment data from all schools that were randomly allocated to the intervention and control arms in the trial, regardless of level of engagement with the support or materials). 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 arms (i.e. different ways of communicating and supporting research) 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 the independent variable—in addition to a dummy variable identifying if the school is in the north to account for the stratified randomisation; and a second model identical to the first but including nine dummy variables that indicated which group an individual is in (the default being control). A likelihood ratio test (LRT) between these models provided a global test for the impact of the 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 approach when compared to the 'business as usual' 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 using the R package nlme. Dunnett's Test was used to control the family-wise error rate using the R package multcomp.

The secondary outcome analyses presented in this addendum used the same modelling approaches, for the 2014/15 and 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 2014/15 or 2016/17 cohorts.

Computation of KS1 and KS2 attainment scores

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[27] 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.

The KS1 attainment variables were computed as the sum of two KS1 attainment variables, KS2_KS1READPS[28] and KS2_KS1WRITPS[29], in the main trial (2015/2016 primary analysis) and in the addendum (for the 2014/15 and 2016/17 cohorts).

In the main trial, 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 2014/15, 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[30] and KS2_GPSSCORE[31]. 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 KS2 2015/16 data showed that including 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 noted in the section on outcome measures, the 2014/15 outcome was just one attainment variable KS2_KS2READPS[32] – hence pupils were included in the analysis if they had this score, and excluded if it was missing. .

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 present.

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), Region (North and South) and Group (identifier of the trial arm assigned to a pupil's school).

Other analysis

We conducted regression analysis to ascertain the impact of teacher research use on school-level progress between KS1 and KS2. All teachers who responded to the follow-up survey (as reported in the main report) were included and their responses were aggregated to school level (n = 384). The model contained KS2 2015/16 attainment (using the data from the primary analysis, not with the amended criteria modelled in this addendum) as the dependent variable. Model covariates included the school location (North or South) to account for the stratified randomisation, a flag variable to indicate whether the school contained at least one Y5 and/or Y6 teacher, KS1 attainment as a baseline measure, and Research Use Measures 1 to 6.

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[28] Described in the NPD codebook as **KS1 reading point score**
[29] Described in the NPD codebooks as **KS1 writing point score**
[30] Described in the NPD codebook as **Scaled score in reading**
[31] Described in the NPD codebook as **Scaled score in GPS** (grammar, punctuation and spelling)
[32] Described in the NPD codebook as **KS2 reading attainment score for progress measure**

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 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 2014/15 and 2016/17 cohorts. Participant flow diagrams for 2014/15, 2015/16 and 2016/17 are shown in Figures 1, 2 and 3.

For the 2014/15 cohort, the school level attrition rate was less than 1% (two schools of the original 823)[33]. Pupil-level missing data, through individuals not having a full complement of test scores at baseline and follow-up, accounted for 6% (1,866 of the 32,089) pupil results available on NPD for the 2014/15 trial cohort).

For the 2015/16 cohort, randomised schools that could not be matched to the NPD accounted for less than 1% (four schools)[34] of the original 823. Pupil-level missing data, through individuals not having a full complement of all parts of test scores at baseline and follow-up, accounted for 6% (2,045 of the 32,613 pupil results in the 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.

For the 2016/17 cohort the school level attrition rate was less than 1% (2 schools of the original 823)[35]. Pupil-level missing data, through individuals not having a full complement of all parts of test scores at baseline and follow-up, accounted for 6% (2,147 of the 33,646 pupil results available on NPD for the 2016/17 trial cohort). Baseline comparison for the 2015/16 cohort analysed groups 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.
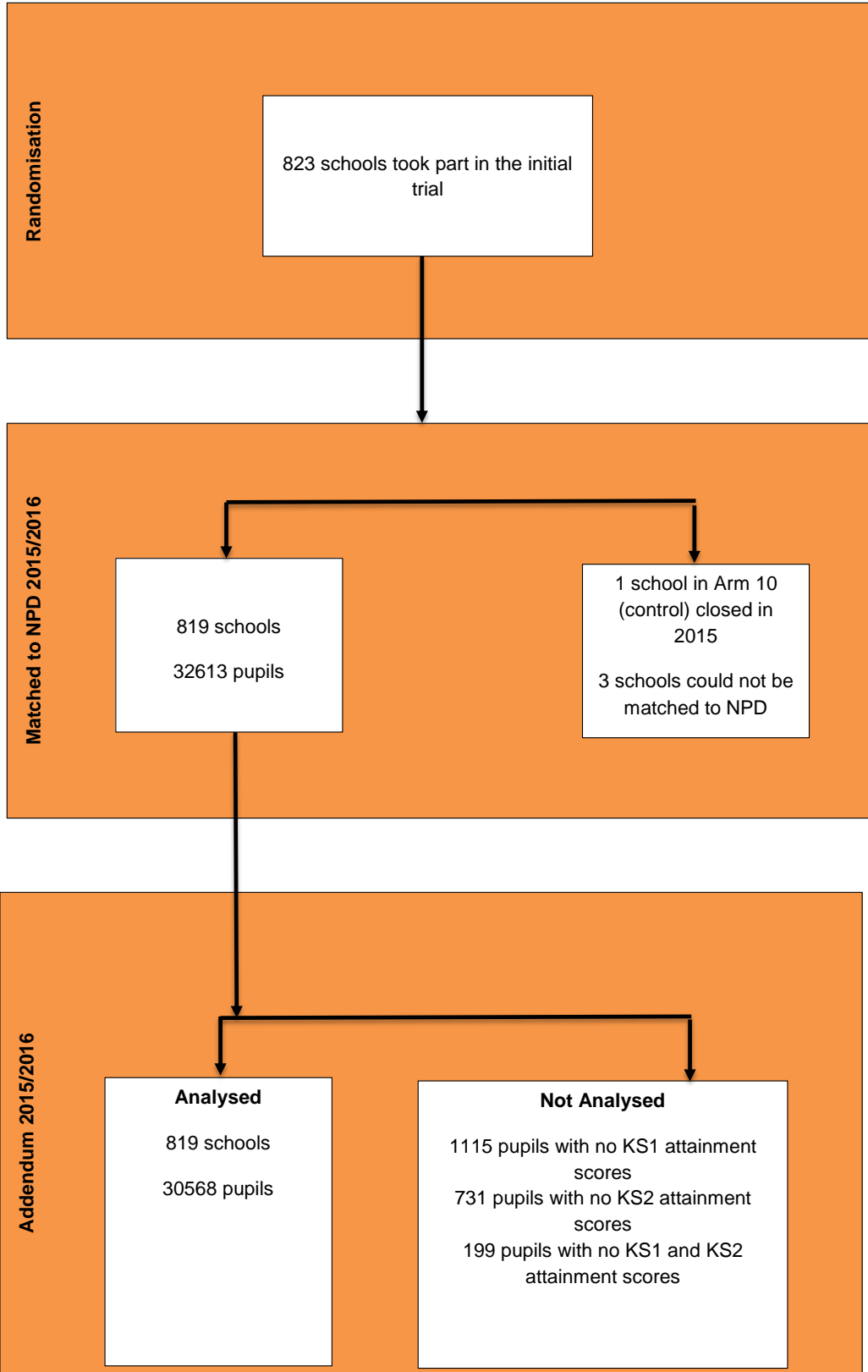
School-level attrition for each of these cohorts is very low. As in the main analysis, we used the 'Get information about schools service' (previously known as Edubase) to try to identify these schools and explore possible reasons for being missing at school level. Reasons were entirely down to changes in school organisation, such as closures, mergers, or academisation. There were no biased reasons.
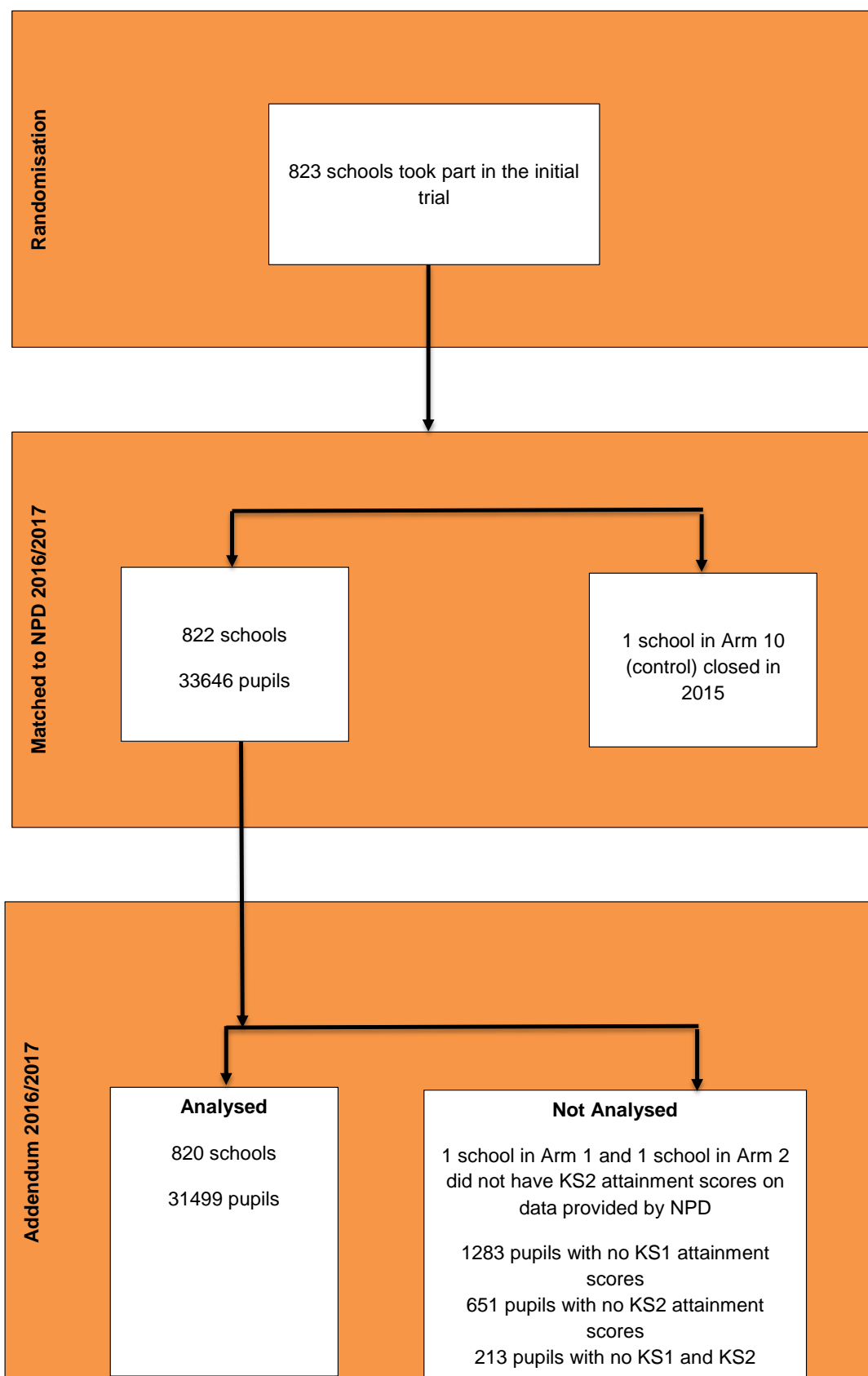
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[33] One of the randomised schools closed in 2015 and could not be matched to the NPD and another school, although matched to NPD, did not provide KS2 attainment results and for this reason was not included in the analysis.

[34] One of the randomised schools closed in 2015 and could not be matched to the NPD and the remaining three could not be matched to NPD.

[35] One of the randomised schools closed in 2015 and could not be matched to the NPD and another school, although matched to NPD, did not provide KS2 attainment results and for this reason was not included in the analysis.

823 schools took part in the initial trial

822 schools

32089 pupils

1 school in Arm 10 (control) closed in 2015

Analysed

821 schools

30223 pupils

Not Analysed

1 school in Arm 7 did not have KS2 attainment scores on data provided by NPD

1142 pupils with no KS1 attainment scores

510 pupils with no KS2 attainment scores

214 pupils with no KS1 and KS2
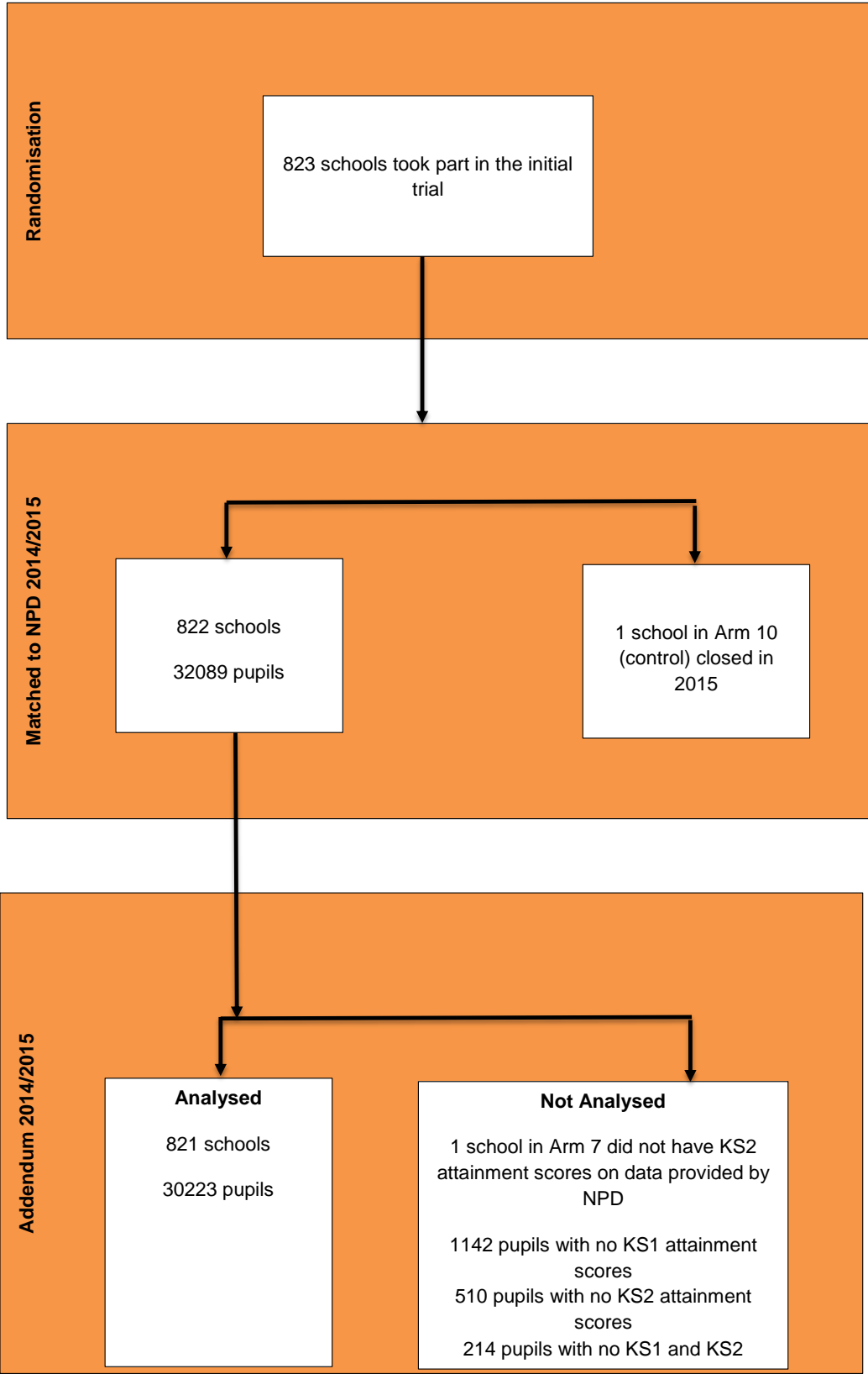
Analysis

Addendum attainment results

The main results for each of the 2014/15, 2015/16 and 2016/17 cohort analyses were from a likelihood ratio test (LRT) between a multi-level model containing just baseline and region and one containing baseline and region plus all the intervention groups as covariates.

For the 2014/15 cohort, this yielded a likelihood ratio of 11.1 (*df* = 9*, p* =0.27), 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 and the results are presented in Table 2a. Figure 4 shows the distribution of KS2 outcome scores included in the 2014/15 model. The 2014/2015 cohort's KS2 attainment scores distribution is unimodal with a slight left skew (skewness= -0.5). The range varies from zero to 50, with a mean score of 31.5 and the standard deviation 8.8. There are no outliers. Note that since the KS2 attainment for the 2014-2015 cohort was measured differently from those of the 2015-2016 and 2016-2017 cohorts, the range of variation for this attainment variable does not coincide with those of subsequent cohorts.

For the 2015/16 cohort, the addendum analysis yielded a likelihood ratio of 2.51 (*df* = 9*, p* =0.98), meaning that we do not reject the null hypothesis and there is no evidence of any effect of the various interventions. Figure 5 shows the distribution of KS2 outcome scores included in the 2015/16 model. The attainment scores range from 160 to 240 with no outliers, although the data presents a slight left tail (skewness=-0.2). The KS2 scores distribution is unimodal and has a mean of 207.1 and a standard deviation of 14.4.

For the 2016/17 cohort, this yielded a likelihood ratio of 11.2 (*df* = 9*, p* = 0.26), 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 and the results are presented in Table 2b. Figure 6 shows the distribution of KS2 outcome scores included in the 2016/17 model. The attainment scores' distribution shows the same overall characteristics as those of the previous cohorts: a slightly left skewed (skewness=-0.3) unimodal distribution with no outliers. The mean score for 2016/2017 is 210.6 and the standard deviation 14.9. As in 2015-2016 the KS2 scores range from 160 to 240.

Table 2a: Additional analysis; number of schools (n), number of pupils (N) – for 2014/15 data

Outcome	IEE materials (Arm 1)		IEE evidence fair (Arm 2)		How2s website access (Arm 3)		How2s support and website (Arm 4)		CEM booklet (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)	ES (95% CI)
KS2 English	60 2,148 (0 108)	0.08 (-0.04-0.19)	60 2,121 (0 123)	-0.05 (-0.16 – 0.07)	60 2,369 (0 133)	0.00 (-0.11 – 0.12)	60 2,425 (0 142)	-0.04 (-0.16 – 0.07)	60 2,099 (0 157)	-0.05 (-0.16 – 0.07)

Outcome	CEM booklet and light CPD (Arm 6)		CEM booklet and advanced CPD (Arm 7)		ResearchEd conference (Arm 8)		ResearchEd conference and online community (Arm 9)		Control
	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	60 2,056 (0 109)	-0.03 (-0.14 – 0.09)	59 2,305 (1 235)	0.06 (-0.06 – 0.17)	60 2,475 (0 158)	-0.02 (-0.13 – 0.09)	60 2,122 (0 79)	-0.01 (-0.13 – 0.10)	282 10,103 (0 622)

Source: NFER Literacy Octopus Evidence-based Literacy support Trial Addendum Analysis.
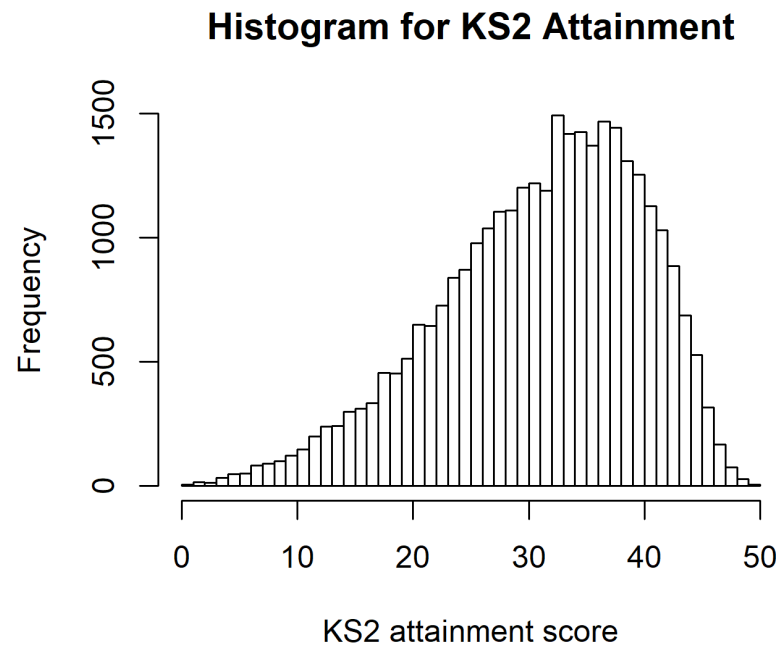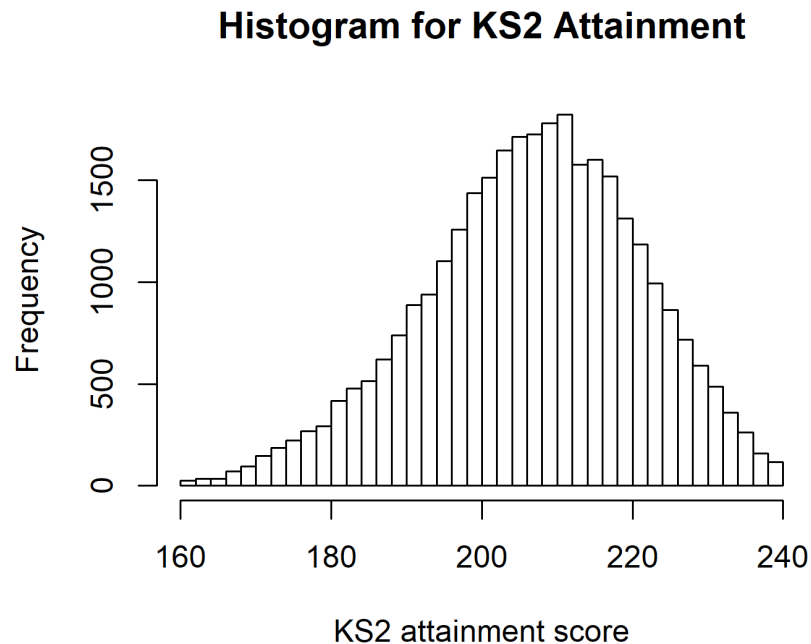
Figure 4: Distribution of KS2 attainment 2014/15

Histogram for KS2 Attainment

Figure 5: Distribution of KS2 attainment 2015/16 (using revised 'score' criteria)

Histogram for KS2 Attainment

Table 2c: Additional analysis; number of schools (n), number of pupils (N) – for 2016/17 data

Outcome	IEE materials (Arm 1) n N (missing)	ES (95% CI)	IEE evidence fair (Arm 2) n N (missing)	ES (95% CI)	How2s website access (Arm 3) n N (missing)	ES (95% CI)	How2s support and website (Arm 4) n N (missing)	ES (95% CI)	CEM booklet (Arm 5) n N (missing)	ES (95% CI)
KS2 English	59 2,180 (1 141)	-0.01 (-0.14-0.11)	60 2,248 (0 173)	-0.02 (-0.14-0.10)	59 2,348 (1 176)	0.05 (-0.08-0.17)	60 2,479 (0 138)	-0.05 (-0.17-0.07)	60 2,264 (0 152)	-0.04 (-0.16-0.09)

Outcome	CEM booklet and light CPD (Arm 6) n N (missing)	ES (95% CI)	CEM booklet and advanced CPD (Arm 7) n N (missing)	ES (95% CI)	ResearchEd conference (Arm 8) n N (missing)	ES (95% CI)	ResearchEd conference and online community (Arm 9) n N (missing)	ES (95% CI)	Control n N (missing)
KS2 English	60 2,183 (0 131)	-0.03 (-0.16-0.09)	60 2,424 (0 184)	-0.03 (-0.15-0.09)	60 2,519 (0 179)	-0.01 (-0.13-0.11)	60 2,114 (0 121)	0.10 (-0.02-0.22)	282 10,740 (0 752)

Source: NFER Literacy Octopus Evidence-based Literacy support Trial Addendum Analysis.

Figure 6: Distribution of KS2 attainment 2016/17

Histogram for KS2 Attainment
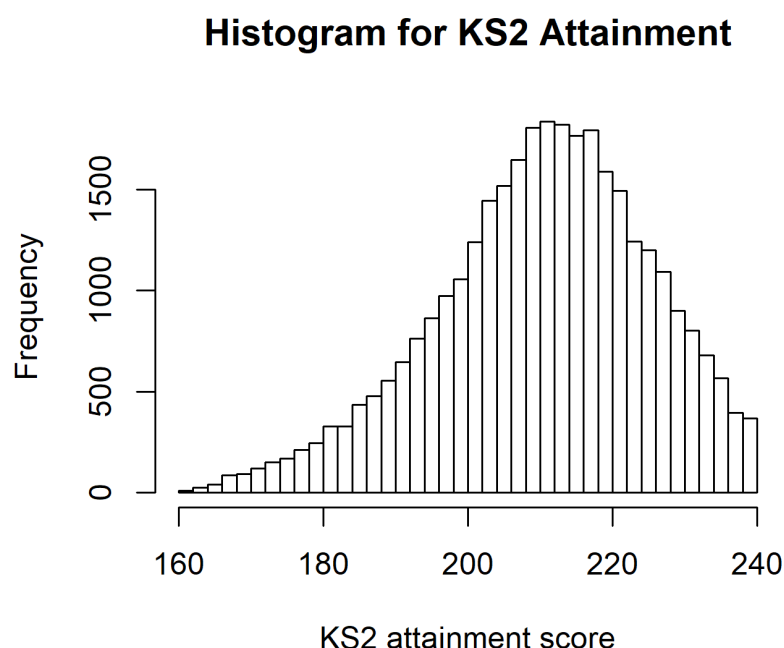
We also present the raw means using KS2 English attainment data for all pupils in trial schools in the NPD 2014/15 and 2016/17 KS2 datasets (i.e. prior to KS1-KS2 match) – so that the reader can see the raw results prior to complex modelling. The results are shown in Tables 3a and 3b. Missing data relates 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 3a: Raw means—unadjusted confidence intervals; numbers of pupils (N) – for 2014/15 data

Outcome	IEE materials (Arm 1)		IEE evidence fair (Arm 2)		How2s website access (Arm 3)		How2s support and website (Arm 4)		CEM booklet (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)
KS2 English	2,208 (48)	32.9 (32.6-33.3)	2,202 (42)	30.6 (30.2-31)	2,447 (55)	32.1 (31.7-32.4)	2,505 (62)	31.1 (30.7-31.4)	2,204 (52)	31.3 (30.9-31.7)

Outcome	CEM booklet and light CPD (Arm 6)		CEM booklet and advanced CPD (Arm 7)		ResearchEd conference (Arm 8)		ResearchEd conference and online community (Arm 9)		Control (Arm 10)	
	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)
KS2 English	2,129 (36)	31.1 (30.8-31.5)	2,407 (133)	32 (31.7-32.4)	2,587 (46)	31.3 (31-31,7)	2,172 (29)	31.2 (30.9-31.6)	10,504 (221)	31.5 (31.3-31.6)

Source: NFER Literacy Octopus Evidence-based Literacy support Trial Addendum Analysis.

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

Outcome	IEE materials (Arm 1)		IEE evidence fair (Arm 2)		How2s website access (Arm 3)		How2s support and website (Arm 4)		CEM booklet (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)
KS2 English	2,273 (48)	212.2 (211.6-212.9)	2,360 (61)	209.3 (208.7-209.9)	2,441 (83)	212.1 (211.5-212.7)	2,569 (48)	210.1 (209.5-210.6)	2,356 (60)	210.5 (209.9-211.1)

Outcome	CEM booklet and light CPD (Arm 6)		CEM booklet and advanced CPD (Arm 7)		ResearchEd conference (Arm 8)		ResearchEd conference and online community (Arm 9)		Control (Arm 10)	
	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)
KS2 English	2,260 (54)	210 (209.4-210.6)	2,529 (79)	210.5 (210-211.1)	2,631 (67)	210.9 (210.3-211.5)	2,184 (51)	211.6 (211-212.2)	11,179 (313)	210.4 (210.2-210.7)

Source: NFER Literacy Octopus Evidence-based Literacy support Trial Addendum Analysis.

Other modelling results

As described in the section on Analysis, we conducted regression analysis to ascertain the impact of teacher research use on school-level progress between KS1 and KS2 for the 2015/16 cohort in the main trial and the results are shown in Table 4. The tolerance check revealed that the measures were correlated to varying degrees, ranging from -0.484 to 0.503; not high enough to give rise to multicollinearity if included together. The regression model revealed that none of the individual measures had a significant impact on progress between KS1 and KS2. The addition of all six research

use measures produced no significant improvement in the model (R^2 change = 0.002, p = 0.963), thus confirming their lack of association overall.

Table 4 : Regression table teacher research use measures (2015/16 data)

Variable	Raw Coefficient	Standard Error	*p* value
KS1 attainment (mean)	1.489	.109	.000
Region	.351	.594	.555
A Year 5 / Year 6 classroom teacher	.143	.587	.808
Research Use Measure 1 (mean)	.063	.126	.619
Research Use Measure 2 (mean)	-.251	.272	.357
Research Use Measure 3 (mean)	-.026	.308	.932
Research Use Measure 4 (mean)	.019	.217	.932
Research Use Measure 5 (mean)	.103	.344	.765
Research Use Measure 6 (mean)	-.099	.152	.513

Source: NFER Literacy Octopus Evidence-based Literacy support Trial Addendum Analysis.

Conclusion

Key conclusions
1. There was no evidence that any of the interventions improved pupils' Key Stage 2 English scores in either of the cohorts one year earlier (2014/15) and one year later (2016/17) than that measured in the main trial (2015/16).
2. The result from 2014/15 is not surprising, given that it takes time for any change in practice to embed in schools, and communication activities only started in spring 2015 (i.e. one term before measurement).
3. Given that only a small proportion of schools engaged to a great extent with the communication and support in 2015/16, it is reasonable to assume that continued use of the materials and changes in practice were not widespread across the 540 intervention schools in the following year. However, no further process evaluation was undertaken to explore the extent of any embedding or to test whether lack of embedding is the reason for lack of impact. It could also be that the interventions were too light touch to impact longer term; or that it may take longer for improvements in outcomes to be seen.
4. There was no relationship between any of the Research Use measures and progress between KS1 and KS2 (using data for the 2015/16 cohort). This analysis was based on small numbers (384 teachers).
5. The Literacy Octopus interventions did not continue into 2016/17. It seems that communicating research evidence alone, or with light touch support, for an unsustained period is insufficient to improve pupil attainment outcomes. Further research should explore what level of support is needed to bring about evidence-based change and improvements to pupil outcomes.

Interpretation

There was no evidence that any of the interventions had an impact on pupils' English results at KS2 in 2014/15 or in 2016/17 (i.e. one year earlier and one year later than the main trial). The result from 2014/15 is not surprising, given that it takes time for any change in practice to embed in schools, and communication from Literacy Octopus providers was only in the spring term of 2015 (i.e. one term before measurement). A number of questions arise from the 2016/17 result. Firstly, the interventions themselves were not sustained (communication activity from deliverers finished as planned in July 2016), but did any schools continue to implement and embed any evidence-based literacy practice they had learnt about through the Literacy Octopus interventions? We know from the 2015/16 data that only a small proportion of intervention schools (16%) engaged to a greater extent than expected (for example, they hosted CPD sessions or requested further materials) and a further 22% engaged as expected; and it seems reasonable to assume that these and perhaps only these kinds of schools might continue to implement what they had learnt. Certainly, it seems reasonable to assume that the two-fifths of intervention schools (42%) that did not engage at all previously would continue unengaged. That said, we know from the previous analysis that the degree of engagement did not affect outcomes. Secondly, was the light touch communication insufficient to impact longer-term, or would schools benefit from more sustained input? Thirdly, might it take longer than two academic years for any change to embed and improvements in outcomes to be seen? As no further process evaluation was conducted alongside the 2016/17 measurement, we cannot be sure of the extent to which schools have used the evidence-based support to embed in their KS2 literacy practices. However, taking longer to embed seems unlikely given the poor engagement with the original interventions.

The results presented in this addendum report also include revised criteria for the 2015/16 outcome measure, namely taking account of attainment scores only when both reading and GPS scores are

present. These criteria are 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, show 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. (Note, the 2014/15 analysis is based on the KS2 reading attainment score for progress measure, i.e. one score only rather than a sum of scaled scores, as no other suitable measure was available.)

Analysis on the Research Use measures conducted as part of the addendum found that there was no relationship between any of the Research Use measures and progress between KS1 and KS2 (according to the data for the 2015/16 cohort). The finding suggests that extent of research use was insufficient to make a difference to pupil outcomes, or moreover that perhaps some other mechanism is needed in addition to receiving, engaging and using evidence-based materials in order to affect change. The process evaluation in the main report highlighted that transforming evidence into practice and collaboration amongst staff to use research-evidence were important (Lord *et al.*, 2017).

As per the 2015/16 reports, Literacy Octopus interventions were very low cost per school. The protocol did not require further collection of cost data for the 2014/15 and 2016/17 cohorts. Costs can be taken to be very low, as they were for the 2015/16 cohort.

Limitations

There were very few limitations in the addendum study. 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 remove any bimodal distribution; sensitivity checks between the two models reveal similar results.

In the main report, there was lower confidence in the results relating to research use, as there was a low response rate to the questionnaire designed to capture these items, and some measures were only moderately reliable. The results relating to any relationship between research use and KS2 outcomes must therefore be viewed in the light of a small sample and only moderately reliable measures.

Future research and publications

The Theory of Change for the Literacy Octopus evidence-support trial posited that it would take time for schools to embed any changes in practice in KS2 literacy, and hence measuring KS2 outcomes a further year on was an important part of the project. Further research is needed to explore what level of evidence-based support is needed to improve pupil outcomes, how sustained this needs to be, and what other ingredients or conditions might be needed to engage teachers with research evidence to improve practice and outcomes. It will also naturally be the case that all schools are wanting to improve KS2 results, and it could be that control schools were doing just as much improvement activity as intervention schools, but in different ways and with different sources and resources during this the trial period (spring term 2015 – summer term 2017).

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