Flexible Phonics
Evaluation Protocol

Evaluator (institution): Institute for Employment Studies
Principal investigator(s): Anneka Dawson and Helen Gray

PROJECT TITLE	Flexible phonics, a two-armed cluster randomised trial
DEVELOPER (INSTITUTION)	UCL, IOE
EVALUATOR (INSTITUTION)	Institute for Employment Studies (IES)
PRINCIPAL INVESTIGATOR(S)	Anneka Dawson and Helen Gray
PROTOCOL AUTHOR(S)	Anneka Dawson, Helen Gray and Clare Huxley
TRIAL DESIGN	Two-arm cluster randomised controlled trial with random allocation at school level
TRIAL TYPE	Efficacy
PUPIL AGE RANGE AND KEY STAGE	Reception year age 4-5
NUMBER OF SCHOOLS	Target: 100, Achieved: 123
NUMBER OF PUPILS	Target: 2,300, Achieved: 2,706
PRIMARY OUTCOME MEASURE AND SOURCE	York Assessment for Reading Comprehension Test- word recognition subscale
SECONDARY OUTCOME MEASURE AND SOURCE	York Assessment for Reading Comprehension Test full score, Mispronunciation Communication Test, delayed post- test of Phonics screening test at end of Year 1

Protocol version history

VERSION	DATE	REASON FOR REVISION
1.2 [*latest*]		
1.1	TBC	Updated after completion of pre-tests and baseline teacher survey, edit to RQ4 and also to update further changes to delivery due to Covid- 19 pandemic. (Please see Appendix A for the full list of amendments and rationale.)
1.0 [*original*]		N/A

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Study rationale and background

Studies show that systematic phonics is effective in supporting younger readers to master the basics of reading[1]. The Flexible Phonics approach is an optimisation of phonics by linking phonics to lexical and semantic information (direct mapping) and strategies to allow independence in reading of the 'deep' (irregular) orthography of English which admits many exceptions to phonic rules (set-for-variability). This approach aims to reinforce phonics learning through reading words in a meaningful context such as reading children's books as well as teaching children strategies to help with learning new, irregular words.

Evidence suggests that combining phonics teaching and book reading is more effective than teaching phonics alone. A series of studies by Hatcher and colleagues (Hatcher et al., 1994, 2004, 2006) found that interventions where children were taught phonics and then read authentic texts in the same session were more effective than teaching phonics alone.

Further studies have found that explicitly linking phonics learning with a relevant reading task was more effective than regular phonics teaching or a vocabulary learning task. Shapiro and Solity (2008) taught phonics to children aged 6-7 years and then explicitly linked this to reading selected children's books which contained a high density of grapheme-phoneme mappings that had been taught as part of the phonics. This approach improved reading outcomes over regular phonics teaching. Similarly, Chen and Savage (2014) established in an RCT with children aged 7-8 years that teaching an explicit direct mapping approach was more effective than a control condition where children were taught a vocabulary intervention. In the direct mapping condition, children articulated grapheme-phoneme mapping that they had recently learned as part of the shared reading of children's books.

The teaching of phonic strategies has been shown to positively affect reading outcomes (Savage et al., 2007) and several studies have shown that focusing on variable vowel pronunciation positively impacts learning (Lovett et al., 2014; Savage & Stuart, 2001, 2006). Tunmer and Chapman (2012) demonstrated that phonics decoding skills can be broken down into component subskills. In current best practice synthetic phonics programme, children are taught to blend speech sounds to read full words, e.g. 'c'-'a'-'t' to read 'cat' and 'c'-'a'-'tch' to read 'catch'. However, some models of word-reading propose an additional step after blending where learners compare the blended sounds with words known to them in their mental lexicon (i.e. existing vocabulary). In particular, additional processing applied in cases where there is variation in the pronunciation of vowels, i.e. irregular words, has been identified in models as either 'set for diversity' (Gibson, 1965) or 'set for variability' (Venezky, 1999).

Recent studies have found that phonics approaches that explicitly teach strategies for set-for-variability are more effective than standard phonics testing. A recent experimental study (Steacy et al., 2016) found that phonics teaching that included a focus on variable pronunciations of vowels (i.e. set-for-variability) yielded better reading outcomes (specifically on the pronunciation of words with variable vowels) compared with phonics teaching that did not incorporate this aspect. Several studies have found that teaching set-for-variability as a strategy for correcting irregular words that have been incorrectly pronounced with a regularised pronunciation improved children's ability to self-correct when they attempt to read new irregular words (Dyson at al., 2017; Zipke, 2016). Furthermore, several studies have proposed that this additional processing step can be applied to all words including words with regular pronunciation (Elbro et al.,2012; Elbro & De Jong, 2017; Kearns at al.,

[1] E.g. Torgerson et al., 2018; Camilli et al., 2008; Galuschka et al., 2014

2016) which suggests that teaching set-for-variability strategies may help with reading of all words and that there may be longitudinal effects seen on development (Steacy et al, 2019).

A Quasi-Experimental Design (QED) study in Canada found that an intervention combining these two strategies (direct mapping and set-for-variability) was more effective than best practice phonics teaching when taught to struggling readers aged 5-7 years, with additional positive outcomes for spelling and reading (Savage et al., 2018). As phonics teaching starts at an earlier age in England, the author suggests that the children in the Canadian study would be at a similar developmental phase of reading as children aged 4-5 years in England. The current study will use a randomised controlled trial (RCT) to test whether a similar intervention incorporating direct mapping and set-for-variability approaches would lead to improved reading outcomes for children of all ability compared with current best practice phonics teaching in England. Further to this, as the intervention in Canada was taught by research assistants, the current study will also investigate the feasibility of reception teachers and teaching assistants delivering this intervention as part of everyday teaching. As phonics teaching in Reception is mixed within schools (and can be led by teachers or teaching assistants in different sized groups) a cluster RCT is the most appropriate design so that contamination across teachers/ groups does not take place. The context of phonics teaching in England is summarised below.

Systematic synthetic phonics has been a core component of teaching reading in England for the last decade since the 2010 white paper 'The Importance of Teaching' was published by the then Conservative and Liberal Democrat Government. In the report, the Government recommended systematic synthetic phonics as the 'best method' for teaching reading, and pledged to promote this approach through providing resources to promote the teaching of systematic synthetic phonics in all primary schools and by making it a part of teacher training. The paper also recommended assessing children's reading at age six through a test of pupil's ability to decode words, and the phonics screening check for children in Year 1 was piloted in 2011 and rolled out across England in 2012 (DfE, 2011). In 2013, the Government published guidance for eight phonics programmes which set-out how the programmes met DfE's criteria for effective systematic synthetics teaching programmes (DfE, 2014). These programmes have now become well-established among primary schools in England and children are expected to demonstrate phonic knowledge as part of the Early Years Framework (DfE, 2017). The Flexible Phonics intervention aims to build on current best practice by training Reception teachers to apply new approaches within phonics teaching (Direct Mapping and Set-for-Variability) which can help children with reading new irregular words.

As well as potential benefits to children's reading and to current phonics practice in the UK, this study makes an especially valuable contribution to the evidence base that EEF is developing. At the time of commissioning this evaluation, the EEF had funded 10 phonics projects but none had focused specifically on Reception class learners. The Flexible Phonics evaluation would therefore fill a gap in EEF's phonics portfolio. Further to this, the Flexible Phonics study contributes to a stated priority of the Early Years Professional Development round which was to improve the training of Reception teachers.

Intervention

The Flexible Phonics intervention helps Reception class teachers and Teaching Assistants in the classroom delivery of new strategies designed to optimise the teaching of reading to all children. The work fits well around existing phonics programmes that can be delivered broadly as usual. A novel aspect of *Flexible Phonics* is that it gives children more strategies

to flexibly read all words, and could be particularly powerful in enabling children to independently read novel exception words (words that break phonic rules such as 'the', 'two', 'between', 'above', etc.). Children learn how to use phonics in close conjunction with authentic children's texts to become confident, motivated, readers. The logic model for the intervention is set out on page 7.

The TIDieR framework for the intervention is as follows:

Name: Flexible Phonics:

Why: Systemic phonics now has a lot of evidence but there are still ways to refine it further and recent evidence suggests combining direct mapping and set-for-variability strategies will help to do this.

Who (recipients): All pupils in Reception year (age 4-5) but there may be added benefits for low achieving pupils. All Reception class Teachers and Teaching Assistants (TAs) will be the direct recipients of the training and then will deliver to the pupils in lesson time.

What (materials): Those who are allocated to receive the intervention will receive three half days of professional development training (remote training using a virtual meeting platform such as Zoom), a copy of a Teacher Manual and associated resources (now confirmed as access to the UCLeXtend online platform which includes a discussion forum and other videos of training activities, audio files for teaching activities, training manual pdf, FAQs, training slides, Mentimeter feedback responses from the training sessions, teaching materials developed and shared by other schools in the trial) and the original plan was for two in-class follow up visits where research assistants (with teacher's consent) will observe the classroom context and provide further feedback and guidance around delivering the intervention (these have now been moved to be virtual due to partial school closures during the Covid-19 pandemic, see update in What (procedures). They will also receive free children's books to the value of £400 per school which can be used to implement the strategies. Ongoing telephone and email support will be provided as needed on schools' request.

What (procedures): The training will introduce the two strategies for the Teachers and TAs to implement in their teaching as follows:

1. The first strategy, Direct Mapping, requires children to read texts that include several examples of the GPCs that they have just learned. In the first instance, these will be carefully selected pre-existing decodable texts, or specifically crafted controlled texts before real books are introduced slowly and strategically. While many models of phonics teaching link phonics and texts, DM aims to do so more thoroughly, consistently, and on the same day as children learn the specific GPCs, aiming to ensure that children understand phonics in context

2. The second strategy, Set-for-Variability (SfV), explicitly teaches pupils to add in another step after they have blended phonemes to graphemes where pupils 'set-for-variability'. This is a metacognitive step, where pupils consider what the word may be, given both the distance between these blended sounds and known words, and potential spelling to sound inconsistencies. For example, when they sound out the phonemes 'c'-'a'-'t', the sounds they make bear little resemblance to the actual word 'cat'. SfV encourages pupils to take a moment to consider what the word may be from the words that they know. This enables children to better recognise all words but can also be especially useful when learning to recognise exception words (e.g. 'wasp'). In comparison with other phonics programmes, SfV makes this metacognitive step following blending much more explicit and can enable children to be more flexible when approaching difficult words

Update (May 2021): The two follow- up visits will now be replaced with three online appointments in February- March, March- April and April-June. The first appointment will be for the teacher/ TAs teaching Flexible Phonics in the school and the second and third will be for the full groups of teaching staff to promote a collaborative approach. However, some schools preferred to have a group appointment instead of the initial 2 to 1 format for the first appointment. The first appointment will be offered to each class in a school (so 4 appointments for a four-form entry school), they will be offered group appointments if preferred. They will be approximately 30- minute sessions expected to be held at twilight sessions 3.30-6pm. They will enable staff to ask questions, get advice on best practice implementation of the programme and for the Flexible Phonics Support Partners to deal with any misconceptions about the programme and provide further clarification. There will also be an online platform, UCLeXtend, with resources including videos of the training sessions, short videos of key lessons, audio files for some of the teaching activities, training manual, FAQs, slides as well as any other training document. This platform will also include a discussion board for all trained teachers and TAs to join and they can ask for 'as and when' additional support through the discussion board as needed. Best practice and resources provided by partner schools will be shared on schools' behalf by the Flexible Phonics Team through this medium.

Teachers can also choose to share videos of their own practice for feedback through video calls with UCL staff if they choose for specific further feedback. A monthly email bulletin will also share updates from UCLeXtend such as resources shared from other schools, as well as highlighting any relevant articles on topics of concern for schools (identified in the support appointments and training) and sharing answers to frequently answered questions raised during the training and in online appointments more widely.

Proactive support for schools will be provided by the Flexible Phonics Support Team by email between February and June between online appointments, where relevant resources and best practice will be shared proactively with their schools. Schools can also contact their allocated Flexible Phonics Support Team by phone or email as needed.

Who (provider): Professor Savage and his team at UCL IOE will deliver the training and follow- up sessions to the Teachers and TAs who will in turn deliver the strategies within their normal phonics practice (both in whole class and small group delivery) after children have learned grapheme to phoneme correspondences (GPCs). (A phoneme is the smallest unit of sound e.g. the word 'rain' has 3 phonemes; 'r'-'ai'-'n'. A grapheme is the written symbol that represents that sound, which can be a single letter or a sequence of letters).

How (format): the strategies will be delivered in normal phonics lessons.

Where (location): The schools will be recruited from greater London

When and how much (dosage): The original intention was for the intervention to be delivered from January 2021- end of May 2021. However, schools in England were partially closed from 5th January to 8th March 2021 because of the pandemic and only delivered in-person teaching to the children of key workers or vulnerable children during this time. In response to this, the intervention delivery time was adapted to run until mid-June. While some schools attempted to teach some Flexible Phonics strategies while teaching remotely, many schools will not have started teaching Flexible Phonics until 8th March when face-to-face teaching resumed with whole classes again. However, some schools used this to plan their delivery of Flexible Phonics once schools reopened fully. The delivery team will now continue to offer support from Support Partners and Professor Rob Savage until mid-June. This will be a shorter time for schools to deliver the Flexible Phonics programme with children while receiving support from the delivery team, but the delivery team believe this,

alongside the remote teaching and planning undertaken in schools should still be a sufficient time period for the intervention to elicit an effect based on previous studies of the intervention with children in other countries[2]. The expectation is that all phonics lessons will incorporate the strategies during this time which is normally 3-4 times a week depending on the school.

Adaptation: Teachers will tailor and differentiate the content to suit children. There is freedom for teachers to adapt and modify as they go (although there will be a defined core that they must follow).

Control condition: The control condition is business as usual phonics practice and schools allocated to the control condition will receive £1000 at the end of the academic year when post-testing is complete.

Theory of Change

After the initial IDEA workshop in October 2019 with the delivery team (UCL) and the evaluators (IES), an initial model was developed to demonstrate the Theory of Change underlying the Flexible Phonics intervention. This initial Theory of Change model shown in Figure A described the rationale for the intervention, the Theory of Change, inputs, activities, enabling factors, expected outputs, short-term outcomes/mediators and the expected long-term outcomes/impacts.
A revised model (Figure B) was created to incorporate changes made to delivery as a response to the ongoing covid-19 pandemic, as well as an increase in the sample size achieved at baseline data collection which were discussed at the second IDEA workshop in April 2021. The revisions to the model included:

1. A note has been added to state the number of participating schools recruited at the time of randomisation (123).
2. The description of the two follow-up sessions has changed from in-person visits at schools to three online appointments.
3. The three follow-up sessions will no longer include observation of a phonics lesson followed by support and will now be an opportunity for schools to ask questions and receive advice on implementation and the delivery of the intervention.
4. Schools will be able to attend a third (optional) appointment for the period following Easter until June. In between online appointments, proactive support for schools will be provided by the Flexible Phonics Support Team by email between February and June where relevant resources and best practice will be shared proactively with their schools. During this time, schools can contact their allocated support partner for any ‘as and when support’ as required.
5. Ongoing support for schools now includes an online platform of resources (UCLeXtend) which will be available for all trained staff including a discussion forum. Any resources posted on UCL eXtend will also be shared via the monthly bulletin. This bulletin contains new resources shared from other schools through their support partner or created by the team in response to school requests, good practice, relevant articles about concerns e.g. adapting Flexible Phonics for EAL children and answers to frequently answered questions raised during the appointments.
6. The option for teachers/ TAs to share videos of their practice with UCL staff for additional feedback too through video calls has been added.
7. A note has been added to the ‘Enabling factors/conditions for success’ section regarding the possible implications of lack of digital access for low- income families

[2] The Savage et al. 2018 SSR study was run for 10 hrs contact time per child over 10-11 weeks in small groups with at-risk learners. Effect size on comparable isolated word reading outcome there = .41.

and in addition the possible impact of schools also taking part in the Nuffield Early Language Intervention (NELI).

In addition, a further two- part optional online workshop about Flexible Phonics will be run in July 2021 for Year 1 teachers over two twilight sessions 3.30-5pm. This has been added at a late stage (end of April 2021) and it is not known if this will be used in any future roll- out of this intervention, so it has been agreed has not been included in the theory of change model at present.

Figure A: Initial Theory of Change logic model (December 2019)

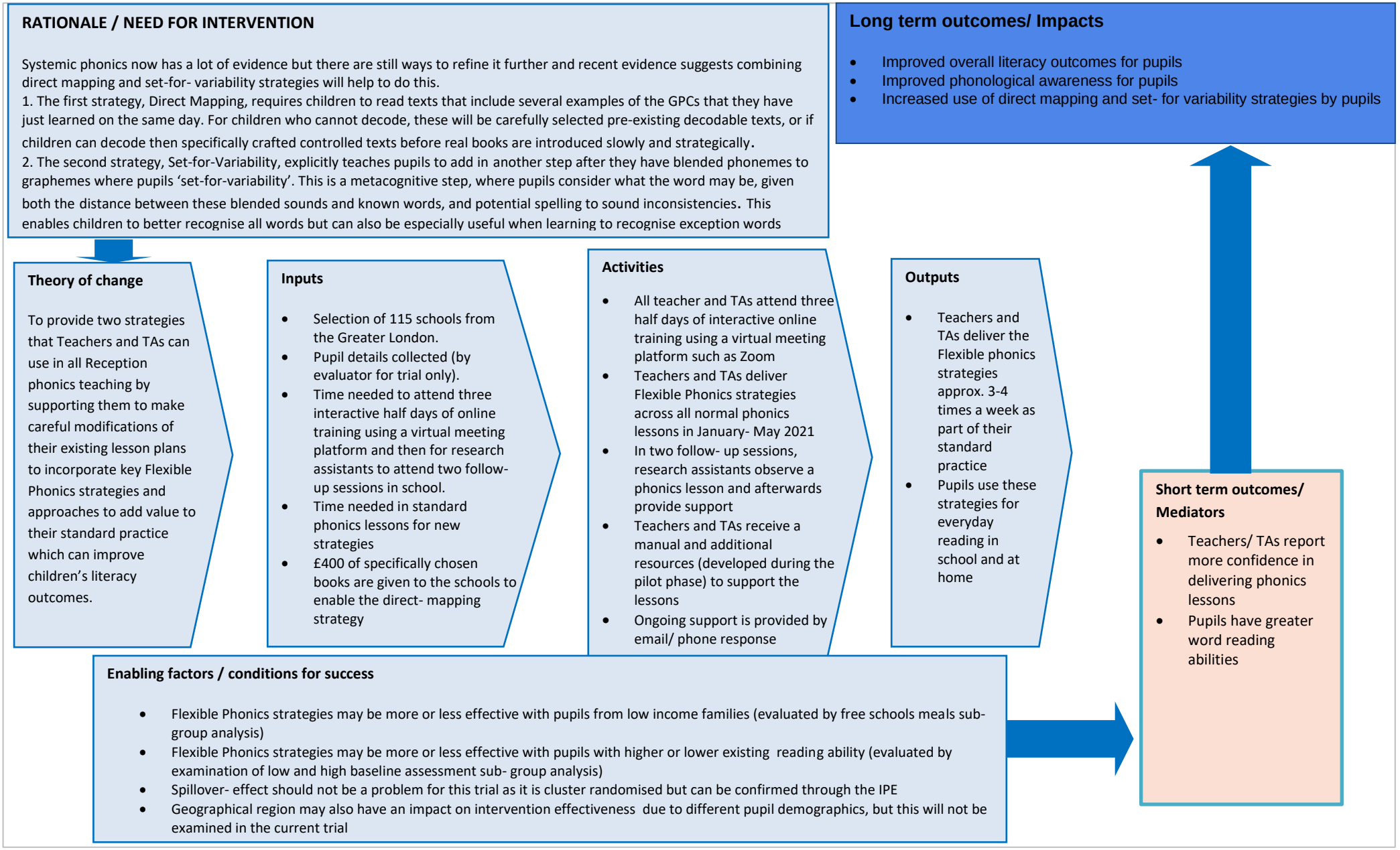
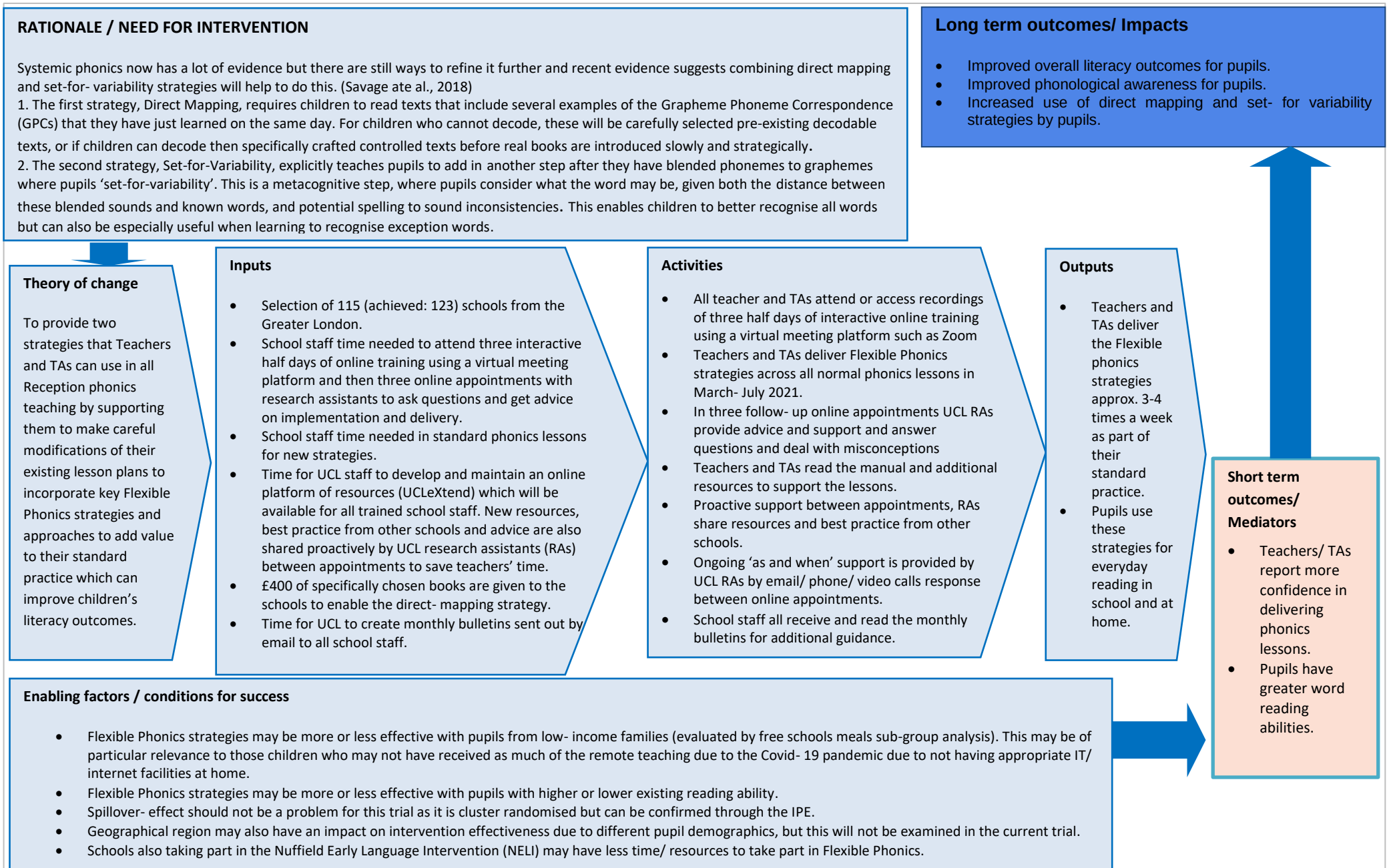


Figure B: Second Theory of Change logic model (April 2021)



Impact evaluation

Research questions

The primary research question is:

- RQ1. Does the Flexible Phonics intervention improve Reception children's word reading ability? (measured by the York Assessment for Reading Comprehension (YARC) Early Word Recognition subscale)

The secondary research questions are:

- RQ2. Does the Flexible Phonics intervention improve Reception children's literacy outcomes? (measured by more general literacy tests)
- RQ3. What is the differential impact of direct mapping and set- for-variability skills on children's word reading ability?
- RQ4. Does the Flexible Phonics intervention provide value- added improvement to Reception children's word reading ability compared to good phonics teaching alone in schools identified with good phonics practice?

  Update: Removed RQ4. It will not be possible to answer this research question as Year 1 Phonics Screening data was not collected from schools during recruitment and it is felt to be too much of a burden to collect this data from schools during the intervention in the context of the ongoing pandemic.
- RQ5. Does the Flexible Phonics intervention improve word reading ability differentially for children eligible for Free School Meals (FSM)?
- RQ6. Does the Flexible Phonics intervention improve word reading ability differentially for children of low ability?
- RQ7. Does the Flexible Phonics intervention improve Reception children's phonics skills one year later at the end of Year 1?

Design

Table 1: Trial design

Trial design, including number of arms		Two-arm, cluster randomised control efficacy trial with pupil-level outcomes
Unit of randomisation		School
Stratification variables (if applicable)		None
Primary outcome	variable	Early Word Recognition
	measure (instrument, scale, source)	Early Word Recognition subscale raw score (0-30) from the York Assessment for Reading Comprehension (YARC)
Secondary outcome(s)	variable(s)	Early Word Reading composite measure Mispronunciation Correction Literacy over the longer-term
	measure(s) (instrument, scale, source)	For literacy: - The sum of standardised scores derived from each of the four YARC subscales i.e. early word recognition, letter sound knowledge, sound deletion and sound isolation. - Score on the Year 1 Phonics Screening check for longer-term outcomes. For Mispronunciation Correction: - An adapted version of Tunmer and Chapman's Mispronunciation Correction Test (2012) as used in Dyson et al. (2017) using the words most commonly used in English children's books.
Baseline for primary outcome	**variable**	Early Word Recognition
	measure (instrument, scale, source)	Early Word Recognition subscale raw score from YARC
Baseline for secondary outcome	**Variable**	Early Word Recognition and Letter Sound Knowledge composite measure
	measure (instrument, scale, source)	Constructed from the standardised scores for the Early Word Recognition and Letter Sound Knowledge subscales from YARC

As the intervention involves training all reception teachers and teaching assistants, randomisation will be at the school-level. Half of the participating schools will be allocated to treatment, the other half will be assigned to the control group. These latter schools will continue usual approaches to phonics teaching[3].

The study will measure the impact of flexible phonics for pupils in Reception class at the start of 2020/21. Children will participate in a pre-test of reading ability (the York Assessment

[3] While it is possible that not all Reception teachers and TAs will be trained in larger schools, within-school randomisation risks cross-contamination and demoralisation among teachers and teaching assistants randomised to the control group.

for Reading Comprehension, YARC using the early word recognition and letter sound knowledge subscales) prior to randomisation to verify treatment and control groups are well-matched. Information on the balance between the two groups pre-intervention enables assessment of the likely robustness of findings and accounts for some of the variance in the post-test, meaning sample size is optimised. In our TipsByText (TBT) trial we explored the possibility of avoiding a pre-test by gathering internal EYFS profile data from teachers, but found this infeasible. We also considered using the new Reception Baseline Assessment, but this has now been cancelled for autumn 2020 due to the covid-19 pandemic and so we are proceeding with using the YARC. We will manage the risk of delays due to the pre-test carefully (see risks section).

To reduce the costs of testing, as well as minimising the burden on schools, the pre-test and post-test will be administered to one class per school. Where there is more than one reception class per school, the class will be selected at random from a list of teachers provided by the school. Whilst only a single class will take part in the pre- and post-tests, as all teachers or TAs will be invited to take part in the training and the training will be designed to be cascaded to any non-participants, the transfer of teachers between classes should not affect whether pupils receive the intervention. However, it is possible there will be a dilution of effects which will be explored in the implementation and process evaluation through observations and interviews.

Randomisation

The aim is for 100 (achieved: 123) schools to participate in the trial. All recruited schools will be asked to supply a list of reception teachers. Where the school has more than one teacher of reception-aged children, one teacher per school will be selected at random from this list. Having made this initial selection of 100 (achieved: 123) teachers, each teacher will be assigned to the treatment or control group at random. The classes selected for the treatment and control conditions at the start of the 2020/21 academic year will be the focus in pre- and post-testing. Test administrators will not be told whether the school has been assigned to the treatment or control group.

Stata will be used to generate a unique random number for each reception teacher within each school with more than one reception class. Teachers will be sorted in ascending order on this random number and the teacher with the lowest random number from each school will be selected for random assignment.

Having made this initial selection of a single reception teacher from each school and carried out the pre-test, Stata will be used to generate a random number for each of the 100 (achieved: 123) teachers. Again, they will be sorted in ascending order on the random number and this will be used to derive a sort order variable. Those with odd numbers on the sort order variable will be assigned to the treatment group, and those with even numbers will be assigned to the control group. The delivery team will be supplied with a list of schools assigned to the treatment group in order to invite them to training.

The seed used to generate the random numbers used to select one teacher per school and to assign schools to the treatment and control groups will be saved, along with all other syntax used to make the random assignment. Analysts will not be blind to whether schools are part of the treatment or control group and which class is the subject of testing.

Two randomisation points were necessary due to the Covid- 19 pandemic delaying some being able to be booked in for testing or resulting in some schools needing to rearrange

testing. These were six days apart, with 83 schools randomised on 3 December 2020 and 40 on 9 December 2020.

Participants

The intervention is targeted at children in Reception classes, who are expected to turn five in the 2020/2021 academic year. All children in Reception classes in the schools recruited to the trial will be eligible to participate. Parents will have the option of withdrawing their child's data from use in the trial. All teachers and teaching assistants of Reception-aged children in the schools assigned to the treatment group will be invited to attend training and participate in other activities to equip them to teach flexible phonics.

Schools participating in the English Hubs programme will not be eligible to participate in the trial. All other schools with Reception age children in Greater London will be eligible to participate as long as they are not participating in another EEF Reception year trial other than the Nuffield Early Language Intervention effectiveness trial. All teachers and teaching assistants of Reception-age children allocated to the treatment group will be invited to participate in Flexible Phonics training and resources will be made available to those who are unable to attend.

The delivery team (from University College London, Institute of Education) are expected to recruit approx.115- 125 schools so that approx. 100 will go forward to participate in the trial allowing for attrition between signing up and being randomised.

Update: UCL recruited 127 schools initially and used a wait list to replace schools that dropped out. 25 schools dropped out between recruitment and randomisation and were replaced with wait list schools until 123 were randomised in December 2020 (therefore a total of 148 were recruited in total).

Sample size calculations

Table 2: Sample size calculations

		OVERALL	FSM
Minimum Detectable Effect Size (MDES)		0.23 Standard deviations	.37 Standard deviations
Pre-test/ post-test correlations	level 1 (pupil)	0.4	0.4
	level 2 (class)		
	level 3 (school)		
Intracluster correlations (ICCs)	level 2 (class)		
	level 3 (school)	0.15	0.15
Alpha=		0.05	0.05
Power		0.8	0.8
One-sided or two-sided?		Two-sided	Two-sided
Average cluster size		23[4]	3
Number of schools	Intervention	50	50

[4] This is based on the lowest expected achieved sample size i.e. after higher than normal attrition due to the pandemic.

		OVERALL	FSM
	Control	50	50
	Total	100	100
Number of pupils	Intervention	1,150	150
	Control	1,150	150
	Total	2,300	300

The MDES reported in Table 2 were calculated using the Optimal Design software package, available at: http://hlmsoft.net/od/

DfE figures indicate that the average infant class contained 27 pupils in 2018[5]. If as many as 15 per cent of pupils withdraw from trial participation prior to randomisation or do not participate in data collection for the study's lifetime, this suggests an average of around 23 pupils per school will participate in the trial. The calculation of the MDES assumes that the pre-test explains 16 per cent of the variation in the post-test scores[6], and that the intra-class correlation is 0.15[7].

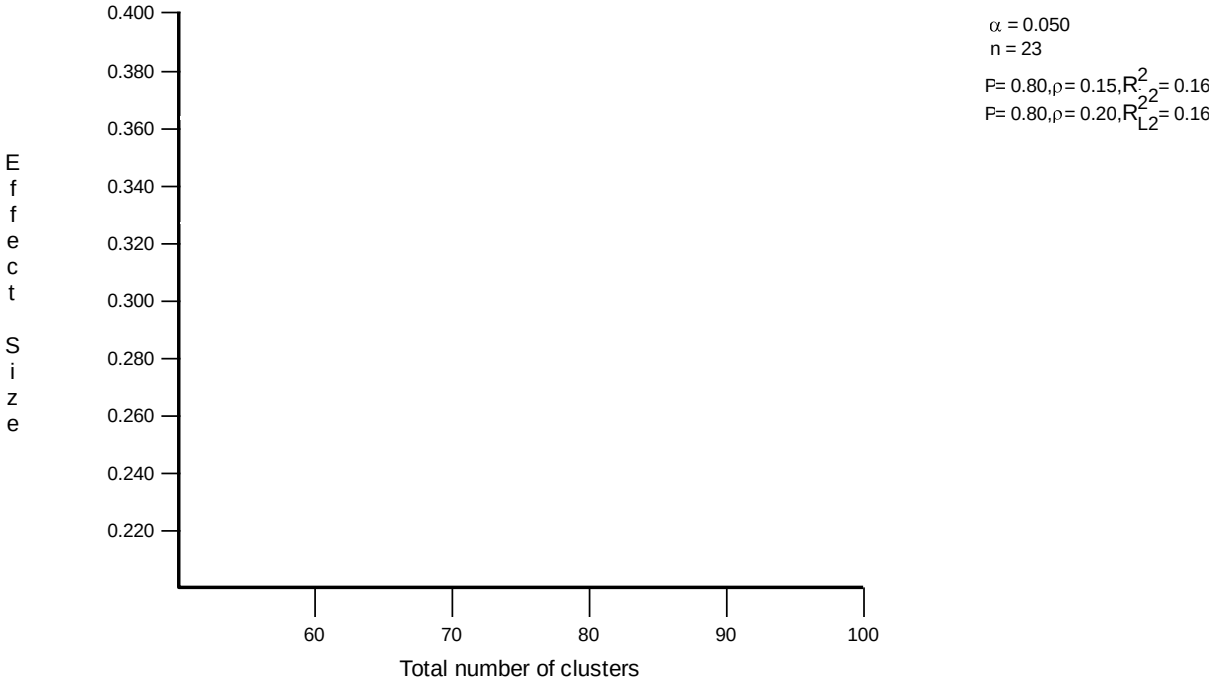
With the standard assumptions of 80% power and 5% significance level and an even split in the number of schools in the treatment and control groups between the 100 schools expected to participate in the trial, the MDES of the primary outcome measure would be 0.23 standard deviations. This calculation is based on an assumption that only pupils in a single class per school will participate in the pre- and post-tests.

Update (March 2021): Randomising 123 schools, rather than 100 reduces the MDES to 0.21 standard deviations. If the intra-class correlation is 0.20, rather than 0.15, but all the other assumptions stay the same, the MDES increases to 0.26 standard deviations (see graph below).

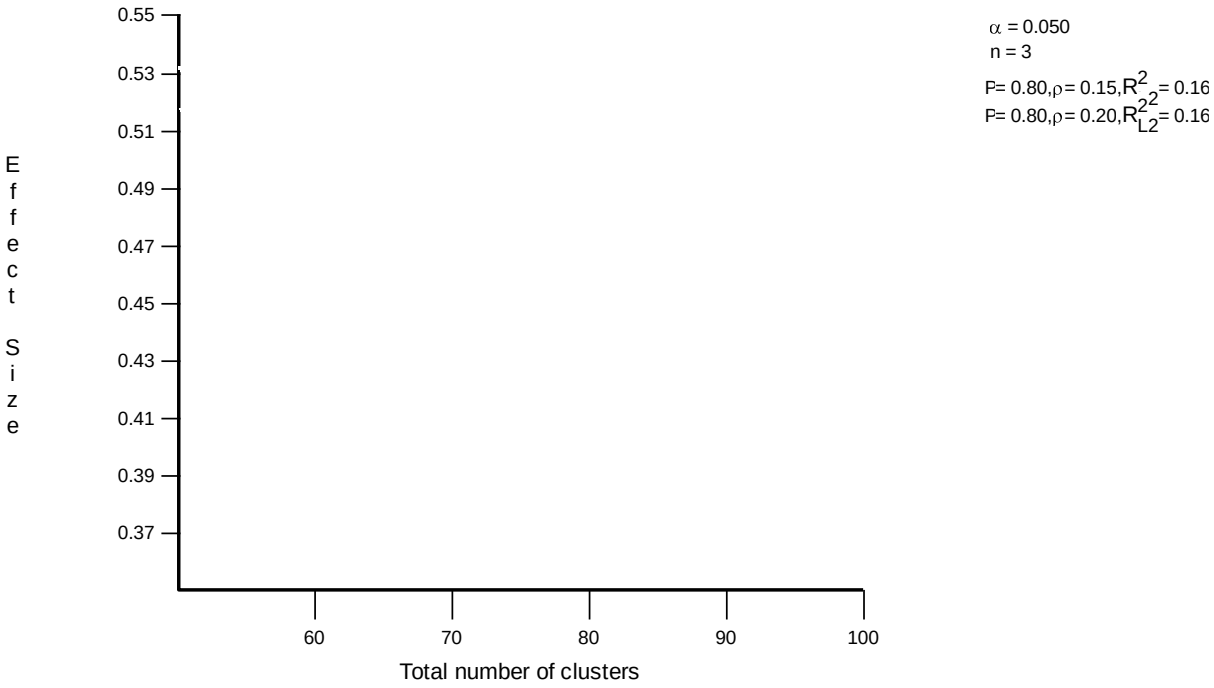
[5] DfE 2018: 11

[6] To our knowledge, there is currently no publicly available information on the likely correlation between pre- and post-test scores for our primary outcome measure, the early word recognition subscale from the York Assessment of Reading for Comprehension. The efficacy trial of the Nuffield Early Language Intervention (implemented with a similar age group) found that around 55% of the variation in post-test scores (a composite language score) was explained by the pre-test and pupil characteristics when using the full YARC (Sibieta et al., 2016). This would be higher due to the additional inclusion of pupil characteristics; we therefore use a lower estimate of 16 per cent for our assumptions.

[7] Previous EEF evaluations on early years have indicated that schools explain around 15 per cent of the variation in pupil attainment. For example, the efficacy trial of EasyPeasy found an ICC of 0.18 (Robinson Smith et al. 2019), whilst the efficacy trial of Family Skills reported an ICC of 0.15 at class level (Husain et al. 2018).



In the case of free school meals, DfE figures indicate that 14.9 per cent of nursery and primary school children in Inner and Outer London were known to be eligible for and claiming free school meals in January 2018. Allowing for attrition between pre- and post-testing, this equates to around three children per class. As a result, the MDES would be 0.37 standard deviations if the intra-class correlation was 0.15 and all other assumptions remained the same. With 123 schools randomised, the MDES is 0.33. With the original target sample size of 100 schools the MDES would be 0.38 standard deviations if the intra-class correlation was 0.20. Given the large MDES in either scenario, it may be not be possible to discern whether the intervention has had a clear impact on this particular subset of pupils.



Outcome measures

Baseline measures

The York Assessment of Reading for Comprehension (YARC) test is suitable for 4 to 7 year olds and covers four dimensions: sound isolation, sound deletion, letter sound knowledge and early word recognition. Two subscales (Early Word Recognition and Letter Sound Knowledge) from the York Assessment of Reading for Comprehension (YARC) Early Reading test[8] will be used as the baseline measure. An overview of the four subscales are given below, including internal reliability scores and correlation with the Single Word Reading Test (SWRT)[9] as a measure of validity.

- The **Early Word Recognition** test measures reading attainment in young readers. Children are asked to read 30 single words which are graded in difficulty. Half of the words have regular correspondence between the graphemes and phonemes, i.e. letter to sound mapping, and half are irregular. The test's internal reliability using Cronbach's alpha is 0.98, and correlation with the SWRT was 0.88. This test is a measure of overall literacy outcomes which are a longer term outcome/impact identified in the logic model.
- The **Letter Sound Knowledge** test measures alphabetic knowledge. Children are shown lower case letters and digraphs, one at a time, and are asked to say what sound the letters and digraphs make. The core test comprises 11 letters and 6 digraphs. The extended test comprises 26 letters and 6 digraphs. The Core test's internal reliability using Cronbach's alpha is 0.95. Its correlation with the SWRT was 0.55. This test is a measure of phonological awareness which is a longer term outcome/impact identified in the logic model.
- The **Sound isolation** test measures phoneme isolation skills which are a component of phonemic awareness. Children hear a series of 12 nonsense words and are asked to identify either the first or the final sound in the word. The test's internal reliability using Cronbach's alpha is 0.88, and correlation with the SWRT was 0.62. This test is a measure of phonological awareness which is a longer term outcome/impact identified in the logic model.
- The **Sound Deletion** test measures phoneme deletion skills which are a component of phonemic awareness. Children hear a series of 12 words accompanied by a picture of what they represent and they are asked to repeat the word but 'take away' a sound from the word. The test's internal reliability using Cronbach's alpha is 0.93, and correlation with the SWRT was 0.76. If the Sound Isolation and Sound deletion scores are combined, this combined score has an internal reliability of 0.95 using Cronbach's alpha. This test is a measure of phonological awareness which is a longer term outcome/impact identified in the logic model.

To reduce testing time and burden on the school, only the early word recognition (measured on a scale of 0-30) and extended letter sound knowledge (0-32) subscales will be used as a pre-test. These two subscales are most likely to be affected by the intervention, as the early word recognition subscale reflects children's ability to read, whilst letter sound knowledge is more appropriate than the other subscales given the timing of the pre-test.

[8] Available from GL at https://www.gl-assessment.co.uk/products/york-assessment-of-reading-for-comprehension-yarc/

[9] The Single Word Reading Test (SWRT) is available from GL: https://www.gl-assessment.co.uk/products/single-word-reading-test-swrt/

These two tests will be used in combination as the baseline for the secondary outcomes, whilst the early word recognition subscale will be used as the baseline for the primary outcome. The baseline tests will be administered in November 2020.

Primary outcome

The primary outcome will be the early word recognition subscale score as the theory of change model suggests that this is where most of the impact will be seen. Qa Research will carry out the pre and post- tests as an independent test administrator and administrators will be blind to whether the school has been assigned to the treatment or control group.

It was necessary to carry out some of the testing remotely due to the Covid- 19 pandemic in a total of 18 schools. This was piloted by QA with a couple of children not from any of the Flexible Phonics schools. Test administrators used the same procedure for the tests, but used a virtual video programme such as Zoom to speak to the children and show them the pictures. A TA was present with the children at all times but sat behind the child and was given instructions by the assessor not to interfere with the testing process or prompt the children. Assessors were briefed on strategies for responding appropriately if a staff member was interfering in the test and the test administrators checked in with each assessor after testing to monitor for any interference from school staff. If there had been an issue then the test administrators would have followed up with the school before any subsequent remote testing days. However, there were no issues with staff interference at pre-test.

Secondary outcomes

All four subscales from YARC will be used as a post-test, with a composite measure of Early Word Reading constructed by standardising the raw scores on each of the subscales and then combining them into a single metric.

To capture the differential impact of the Direct Mapping and Set for Variability strategies we will use an adapted version of the Mispronunciation Correction Test (MCT) developed by Tunmer and Chapman (2012) to assess the impact of Set for Variability. During the MCT, children are asked to play a game with a puppet that they are told sometimes says words wrong. The children are then presented with examples of irregular words that are incorrectly pronounced with a regularised pronunciation. The children are asked to ‘correct’ the puppet which requires them to consider other possible pronunciations of the word they have just heard, i.e. implement a set-for-variability strategy. The number of words that a child successfully ‘corrects’ is then used as a measure of their ability to use set-for-variability strategies. In their 2012 paper, Tunmer and Chapman deliver the test as two sessions conducted two weeks apart (one presenting the word in isolation and one where the words are embedded in sentences), but for this study, children will be tested once with the puppet pronouncing the words embedded in sentences following the methodology used by Dyson et al. (2017).

The MCT will be administered at post-test only due to the limited time to carry out testing in the period prior to the delivery of the intervention and only for a subsample of 15 pupils per school. This will reduce the burden on schools and pupils and keep costs to a minimum, but the reduction in sample size means that it will be necessary to interpret findings carefully, as it is less likely that the estimate of impact will be statistically significant. We will seek to explore the means by which SfV affects the primary outcome measure in order to isolate the impact of direct mapping and compare the differential impact of each strategy. Again, all the post-tests will be administered by Qa Research and testing will take place in June and July 2021.

In addition to the post-test outcome measures, we will use data from the Year 1 Phonics Screening check to explore the impact of the intervention on longer-term outcomes. This is discussed in further detail in the section on longitudinal follow-ups.

Compliance

Our primary analysis will capture the intention- to-treat effect and will not take into account attendance at training sessions, or delivery during the year. We will work with UCL to ensure the engagement of teachers, TAs and schools to minimise non-compliance, which will be examined through the implementation and process evaluation (IPE).

Whilst the focus will be on the impact of the intention-to-treat, we will also use a measure of compliance to determine how the intervention affects participants. A school will be considered to be compliant with the Flexible Phonics programme where:

A) the teacher of the class that has been selected for impact testing has attended all three training sessions (or watched the videos and attended a catch- up tutorial with Professor Savage or a session with a Flexible Phonics Support Partner (RA)) and
B) Where teaching practice within that teacher's class is considered by the UCL team to have met the requirements in the rubric created by UCL (Global Treatment Fidelity Rating, GTFR[10]). Originally, support partners were going to observe teachers/TAs teaching the phonics to their class during support visits to rate compliance, but as support visits have moved to online, support partners will rate compliance based on their discussions with schools during the three follow-up support sessions. Schools have been invited to send videos of practice for feedback from the delivery team, but this is optional and not required. This part of the compliance measure is examined on a 4-item scale, ranging from zero to 3: 0: No implementation of Flexible phonics, 1 Entry level: Some (but likely poor quality) implementation, 2: Adoption: clear and competent regular delivery of intervention, 3: Adaptive delivery: Expert and extended delivery of intervention. Some measures may not be relevant and so would be marked as 'Not applicable', e.g. a class of low performing readers may not be quite ready for print- based flexibility in mispronunciation correction of phoneme strings. The ratings for each measure will be the highest score seen over the course of the follow- up visits. The compliance measures are:

1. Direct mapping (linking GPCs to text that densely represent them). This is a core element and should be given a score of 2 or 3 indicating they are delivering this in classes at an appropriate level[11].
2. Oral flexibility – delivery of oral games to teach 'mispronunciation correction' of phoneme strings' (e.g. in games such as 'Simon says' or in wider classroom communications, this, **or** print-based flexibility, must also be given a score of 2 or 3 or Not applicable alongside Direct mapping.
3. Print-based flexibility in mispronunciation correction of phoneme strings (in print–based reading tasks and games and often linked to texts with high word frequency or

[10] Please note that Vocabulary and continuous phonation also make up part of the GTFR for RAs to score but these do not factor into our compliance score and are used for UCL purposes only as they are necessary but not sufficient pre-requisites not considered essential for compliance.

[11] It is possible that by the time the intervention starts in the school year that all pupils have moved past the point direct mapping would be needed (they know all the GPCs) and if so, direct mapping could also be marked as not applicable but this is regarded as very unlikely by the delivery team.

in wider reading, this **or** oral flexibility must also be given a score of 2 or 3 or not applicable alongside Direct Mapping.

The attendance and outcome on the GTFR will be collapsed into a binary measure indicating that the school is either delivering the Flexible Phonics programme to the required standard, or cannot be considered to be compliant.

Analysis

The analysis will use multi-level modelling, to take account of the trial's nested structure. The primary outcome will be measured at pupil level and the primary analysis will control for prior attainment, to increase statistical power and precision of the impact estimate (following EEF guidance).

Estimated impacts will be converted into Hedges' *g* effect size (1981) which uses the estimated total pooled standard deviation of the treatment and control groups. This provides a more conservative estimate of impact compared with using the within-school pooled standard deviation. Hedge's *g* effect sizes will be reported along with 95 per cent confidence intervals, as per EEF reporting guidelines and the analysis will explore whether impact estimates are statistically significant at the 5 per cent level or better.

We will conduct separate analysis of the subgroup of pupils eligible for Free School Meals (FSM), using the NPD indicator of whether the pupil has ever been eligible for FSM (EVERFSM_6_P) interacted with the treatment indicator. We will also seek to estimate the differential impact of the intervention on low-ability pupils by again including an interaction term in the model. Low-ability pupils will be defined as those who score less than the median on the pre-test (compared to those scoring over the median score on the pre-test).[12] We will combine the standardised Early Word Recognition and Letter Sound Knowledge subscales to identify the median pre-test score.

A subgroup analysis was planned to explore the impact of the intervention in schools with existing good phonics practice. Where possible this would also have estimated the differential impact of the intervention in schools with/without existing good practice by including an interaction term. The delivery team were asked to collect information on the percentage of pupils passing the phonics screening check administered in 2019 as a measure of existing good phonics practice. This information would have been used to identify schools with an above-average proportion of pupils passing the screening check. 82% of pupils passed the phonics screening check in 2019[13] and so if schools where the percentage of pupils passing the phonics screening check exceeds the national average are considered to provide good phonics teaching a high proportion of schools will fall into this category. The fact that a large proportion of schools are likely to have existing good practice was expected to make it feasible to explore the impact of Flexible Phonics in the subset of schools with existing good practice. If numbers had allowed, we would also have looked at

[12] As an alternative, we considered whether it would be feasible to explore the differential impact of Flexible Phonics throughout the ability distribution. Whilst in theory this could shed light on whether it is particularly effective for subsets of pupils, this would add to the complexity of the analysis and with expected sample sizes there is a risk that findings could be inconclusive or difficult to interpret. Existing evidence from Canada (Savage et al. 2018) indicates that Flexible Phonics is effective for low ability pupils and so it seems prudent to focus on ascertaining whether this is the case in the English context in the current study.

[13] As reported in Department for Education (2019).

the differential impact of the intervention on schools with existing good practice compared to those without.

Unfortunately, Year 1 Phonics Screening data were not collected during the recruitment process. The delivery and evaluation team both felt that trying to collect this information from schools during the pandemic would impose an unacceptable burden on schools. An alternative option of using the publicly available data on progress between Key Stage 1 and Key Stage 2 to identify good phonics practice was also rejected due to the high proportion of schools showing 'average' progress.[14][15].

During the trial, the evaluation team became aware that some schools participating in the Flexible Phonics trial also signed up for a language and early literacy skills programme, the Nuffield Early Language Intervention (NELI), which was rolled out as part of the government's COVID-19 support strategy. EEF have provided a list of all the Flexible Phonics schools that have signed up. Forty per cent of schools in the trial have also taken up NELI (49 out of 123 settings). Forty-three per cent of the control schools (23 out of 61 settings) and forty-two per cent of treatment schools have taken up NELI (26 out of 62 settings). As the distribution of schools participating in the NELI is relatively balanced across the groups then we would not expect this to influence the trial but will use a subgroup analysis to check for this. Again, we will use an interaction term to estimate the differential impact of Flexible Phonics for schools participating in NELI, as well as estimating the impact of Flexible Phonics in the subset of schools not participating in NELI. This will provide an insight into whether Flexible Phonics has an impact on the primary outcome measure in schools which do not participate in NELI, as well as whether the impact of the Flexible Phonics intervention varies depending on whether schools take part in the NELI programme.

If the analysis suggests that treatment and control groups differ on characteristics likely to be related to outcomes at baseline, we will explore whether the findings are robust to the inclusion of these additional characteristics (as a secondary model). We will also explore the impact of controlling for the full range of characteristics prior to treatment, alongside a simplified model based on differences in outcome between treatment and control groups. This will indicate how varying the model specification affects likelihood of detecting impact. Additional analyses of the primary outcome will be carried out to explore whether the main findings hold when excluding pupils who were tested remotely.

We will explore the impact of the two strategies using path analysis to identify the relative effectiveness of each, drawing on existing evidence on causal pathways to capture the differential impact of each alongside direct/indirect effects on the primary outcome. To assess the differential impact of DM and SfV, we will use MCT to measure SfV, and then multilevel generalised path analysis to disentangle the part of the intervention effect that can be ascribed separately to DM (and any other effect) and SfV. A full statistical analysis plan will be delivered that complies with EEF's guidance.

Longitudinal follow-ups

Additionally, we propose a delayed outcome measure. We have considered re-administering the post-intervention test during 2021/2022. However, the costs and time implied for schools make this impractical. Instead, we will use Year 1 phonics screening check data, which will become available in September 2022 to provide a delayed outcome measure at

[14] Available at: https://www.compare-school-performance.service.gov.uk/

[15] We rejected the option of oversampling schools that do not have good phonics teaching to enhance the prospects of being able to explore differential impacts because of the risks this poses to recruiting sufficient schools for the trial.

comparatively low-cost. The analysis will take a similar approach to that used in the primary analysis i.e. it will be based on the intention to treat.

The phonics screening check is a statutory assessment which takes place at the end of year 1 when pupils are typically aged 6. It confirms whether pupils have met the expected standard in phonic decoding. All state-funded schools with a year 1 cohort must administer the check. Teachers administer the check one-on-one with each pupil and record whether their response to each of the 40 words is correct. The words include 20 words and 20 pseudo-words. Pupils are told before reading each page of the test whether the words presented are real words or words for imaginary animals, i.e. pseudo-words. Each pupil is awarded a mark between 0 and 40, and in 2019, the threshold to determine whether a pupil had met the expected standard was 32. In 2022, the phonics screening checks are scheduled for the week commencing Monday 6 June. The Flexible Phonics intervention will run until July 2021 so there will be approximately 12 months between the end of the intervention and the phonics screening assessment.

The phonics screening check is an imperfect measure of the added benefit of the intervention as it measures the decoding of regular words, whereas the intervention focuses on the words that break the phonic rules, however it is the only freely available phonics measure that can be collected systematically across all schools and so provides an indication of longer- term outcome in this area which may still be affected by the intervention. Professor Savage suggested this measure could be impacted on by the section of the manual on continuous phonation (Section 5) which would help poor readers and therefore they may be a stronger effect at delayed post- test for the weaker readers.

Implementation and process evaluation

Research questions

The IPE will assess the eight key implementation dimensions set out below and identify moderating/contextual factors that influence impact and explain quantitative findings. It will gather evidence to inform any effectiveness trial.

Key research questions are:

Fidelity:

- IPE1: Are schools delivering the interventions and the trial as intended[16]?
- IPE2: Could the intervention be rolled-out on a larger scale so that the intervention is delivered as intended?

IPE3: What adaptations would be required to roll-out the intervention on a larger scale and how might these affect the integrity of how the intervention is delivered?

Dosage:

- IPE4: Do teachers and/or TAs teaching reception receive all intended training?

[16] The delivery team will rate compliance on a series of five key features of programme delivery on the basis of two follow-up support sessions. These key areas include: Direct mapping, Vocabulary, Oral flexibility, Print-based flexibility in mispronunciation correction of phoneme strings, and Continuous phonation. Schools do not have to be compliant in all areas as some may not be relevant, depending on what children in a class need support with.

- IPE5: How often do participating teachers and TAs deliver Flexible Phonics strategies in phonics teaching?

Quality:

- IPE6: How well is initial training and follow-up support received by teachers, TAs and senior leadership at the school?
- IPE7: Is it necessary to conduct cascading training - has this been monitored/supported?
- IPE8: How effectively do teachers/TAs use Flexible Phonics strategies?
- IPE9: What facilitates/hinders effective implementation?
- IPE10: Would teachers/TAs find additional support helpful in maintaining quality - what and from whom?
- IPE11: Are there unintended or negative effects of the intervention?
- IPE12: What are TAs/teachers' perceived benefits and outcomes of the intervention?

Reach:

- IPE13: Do all intended pupils receive Flexible Phonics teaching?
- IPE14: Do some pupils receive more Flexible Phonics teaching than others?

Responsiveness:

- IPE15: Do teachers/TAs engage well?
- IPE16: Is the intervention acceptable and practicable in schools' contexts?
- IPE17: Do senior managers perceive the intervention as worthwhile/cost-effective?

Programme differentiation:

- IPE18: How does the intervention enhance/differ from existing phonics teaching?
- IPE19: Before Flexible Phonics implementation, what was business-as-usual and how was this embedded in wider approaches to reading?

Control group monitoring:

- IPE20: What phonics teaching and wider reading strategies are used in control schools?
- IPE21: Does the behaviour of control schools change during the trial?

Adaptation:

- IPE22: Have schools adapted the intervention - how and why?

Research methods

Drawing on the EEF guidance (Humphrey et al 2016, EEF, 2019a) we will use a multiphase mixed methods design involving:

- Two IDEA workshops and reviewing programme materials;
- Observations of one pilot training day, and review of UCL pilot reports.
- Observation of three online training half days for the main trial and three online follow- up support sessions;

- Online surveys (baseline and post-treatment) of Reception teachers/other staff to gather evidence about business-as-usual and changes to practice;
- Case study visits were planned to eight intervention schools towards the end of the programme to observe teaching, interviews with Reception teachers and/or TAs who are involved in teaching phonics to the class participating in the study, literacy or early years leads and a senior leader; Update: Case studies will now be conducted online but the observation component will not be possible so short interviews with staff have been replaced with longer interviews including questions exploring practice and how they have integrated the Flexible Phonics approach with their usual approach,
- Interviews with UCL; and
- Analysis of data collected by UCL e.g. attendance and cost data.

In the **IDEA workshops**, our own and UCL's team will explore the intervention as part of an initial session shortly after set-up (October 2019) and then another after pre-trial development (in June/ July 2020). Building on the set-up meetings, we would: co-develop the TIDieR framework and theory of change; examine training/delivery materials; re-visit evidence about the interventions. This will lay a solid foundation for the evaluation and enable us to tackle key questions such as an appropriate compliance measure.

As part of the UCL pilot stage, we observed one training day. No further attendance was possible due to the covid-19 pandemic[17]. We will also read the two UCL pilot reports to learn more about the intervention and how it develops through the pilot to further develop the theory of change and prepare our observation, interview and survey materials for the main trial.

We will then **observe three half day training online sessions** on the virtual meeting platform such as Zoom for the main trial (instead of the original two in-person training sessions - 1.5 days in total) and two-follow up sessions (which may be virtual instead of in-person depending on the status of the covid-19 pandemic) to understand expectations for delivery and if things have changed from the pilot and how effective that has been, to underpin the IPE. Observations will help us to develop well-tailored research instruments (case study topic guides, post-intervention survey of teachers and TA) which will be quality assured by the lead on IPE. By observing all three online training half days, we will be able to observe all of the training material being delivered and also possible differences between training cohort groups (of which there will be six groups in total). The delivery team is doing this to have smaller training group sizes which makes the practical nature of the sessions (such as breakout groups and any interactive activities) easier to manage.

The survey of teachers and other key staff (across all schools) will be developed by IES using online survey software, SNAP, which allows completion on mobile devices. The baseline survey will capture usual- practice prior to randomisation, and information on broader approaches to teaching reading. We will use resources such as the Ofsted report on features of a good and outstanding Reception curriculum, which include characteristics of strong phonics teaching[18] and EEF guidance on improving literacy at Key Stage 1[19] to formulate questions. Our original intention was to match individuals' responses at baseline and endline in order to support the identification of value-added impact e.g. in combination with data on past reading attainment it would be possible to explore links between usual-practice and past performance, differences in practice between control and intervention

[17] We were due to also attend a follow- up session and two school support sessions.
[18] Ofsted, 2017
[19] EEF, 2017

schools, as well as whether any overall differences in teaching practice at the outset have a bearing on the effectiveness of flexible phonics. Unfortunately, due to an error in the implementation of the baseline survey, it is no longer possible to identify individual responses in the baseline survey and, therefore, to measure changes between baseline and endline for individual respondents or to identify which respondents belonged to the intervention or control groups. However, we can still explore business as usual and approaches to teaching reading in the endline survey and/or interviews although it will require respondents to report previous practice so responses will rely on recall. The survey will still help identify the extent to which results may be explained by control schools improving phonics teaching (due to compensatory rivalry/other drivers) or displacement of other literacy activities in treatment schools. The endline survey will repeat questions about phonics teaching and, for treatment schools, cover experiences of taking part, staff time and resources required (to inform the cost-per-pupil estimate). It will also include questions on adaptations made to the programme (beyond expected differentiation to meet the needs of individual pupils) and about participating in the NELI trial, where relevant, to understand how this has also affected how staff support children's language development. We anticipate the surveys will be sent to approximately 230 teaching staff, including teachers and/or TAs, at least at both time points. The surveys will be census surveys sent to all teachers/TAs of participating classes and at endline. Due to an error with the implementation of the baseline survey it will not be possible to review any differences between non-responders and those who have completed the survey.

Eight case studies will allow detailed qualitative exploration of delivery. The sample will be selected to include schools of different sizes/types, and potentially a mix of compliance. We will also aim to include three schools that are participating in the NELI trial. We will explore this selection process further during the pilot. If the baseline survey indicates differences in pre-intervention phonics teaching, this will be built into sampling. In each case study, we originally planned to observe teachers/TAs using Flexible Phonics strategies and use these data to inform assessment of fidelity and shape questions for follow-up interviews. However, as this will not be possible due to pandemic restrictions, we will undertake longer interviews with teachers, TAs, a literacy/early years lead and senior leader to explore how they have integrated the strategies into their phonics teaching and elicit examples. We anticipate an individual interview with senior leaders and will interview teachers and TAs separately to ensure open/honest discussions. Interviews will explore: training received; materials; workload/time requirements of Flexible Phonics; costs incurred; facilitators/barriers to implementation; adaptations and reasons (including views on how children with SEND/EAL respond); how Flexible Phonics compares to usual-practice; pupils' outcomes; suggested improvements and, where relevant, any changes to how they support children's language and communication as a result of participating in the NELI trial. Interviews will last around 45 minutes. We expect to interview about 3-4 participants per case study so up to a total of 32 participants.

We will also conduct **6 telephone interviews with UCL** towards the end of intervention delivery, including Professor Savage, the project manager and four of the seven research assistants. As schools in England were closed from 5th January to 8th March 2021 and only delivering in-person teaching to the children of key workers or vulnerable children, contracts for some of the research assistants were extended to offer support to schools for a longer period once all children were back to in-person delivery. For this reason, research assistants will be interviewed at three time points to capture their experiences before their contract ends: late March, late May and late June. These interviews will explore delivering training, school engagement and participation, and enablers/barriers to successful implementation of the programme. This should provide a rich picture of how training and

support was delivered to schools across geographical areas, school types and pre-existing phonics programmes.

Finally, we will analyse data collected by UCL. We will work with them to specify additional data requirements during the pilot, which will cover teacher/TA attendance at training (which will be used for the compliance analysis) and also potentially school requests for additional support. In addition we will collect the observational data that the RAs collect at the follow-up visits which will also form part of the compliance analysis. This observational data will no longer be collected by UCL so cannot be analysed by IES. This data would be analysed/triangulated with the evaluation data. We would ask UCL to inform us if schools withdraw, and will conduct short telephone interviews (up to nine) with such schools to explore reasons or via an email form. We will collect cost data from UCL to calculate the cost-per-pupil, including fees charged and length of training days/visits.

Analysis

Interviews will be digitally recorded with the agreement of participants and transcribed verbatim. We will analyse data using 'framework', drawing themes and messages from an analysis of interview transcripts, observations of training, and other materials collected by evaluation and project teams as a pragmatic cost- effective approach for this amount of qualitative data. Data will be collected using the methods described in the table below and analysed according to the research questions listed.

Framework is an excel-based qualitative analysis tool that ensures that the analytical process and interpretations from it are grounded in the data and tailored to the research questions. It was designed to ensure a systematic and consistent treatment of all units of data (e.g. transcripts of interviews). It also allows for the analytical framework to be refined and modified in the early stages of its use.

The context of the information is retained and the page of the transcript from which it comes is noted, so that it is possible to return to a transcript to explore a point in more detail or to extract text for verbatim quotations.

Framework allows full within case analysis (looking in detail at each individual case) and between case analysis (comparing individual cases and groups of cases), and it is the ability to interrogate data at both these levels that adds real richness and depth to the analysis and interpretation. Organising the data in this way allows us to compare the full range of experiences and accounts and patterns across different groups of people.

Observations and themes identified in the qualitative data through the fieldwork can then be compared with quantitative data gathered such as survey findings, training attendance, etc, to test whether perceptions are reflected across the settings overall. Triangulating rich qualitative and quantitative data will allow us to interrogate the mechanisms proposed in the logic model, understand factors contributing to outcomes or identify barriers/enablers.

Table 3: IPE methods overview *(adapt as necessary)*

Data collection methods	Participants/ data sources (type, number)	Data analysis methods	Research questions addressed	Implementation/ logic model relevance

Two IDEA workshops	Evaluation team and delivery team	Theory of Change	IPE 5, 15.	Theory of Change, Inputs, Activities
Reviewing intervention materials	Training materials, support materials	Literature review, thematic analysis	IPE 2, 3, 16, 18.	Inputs, Activities
Observations of pilot training day	Delivery team (Prof. Savage) and Reception teachers/TAs from pilot schools	Observation framework, Theory of Change	IPE 2, 7, 10, 18.	Input, Activities, Outputs
Observation of three online training half days for the main trial and three follow-up training sessions	Delivery team (Prof. Savage and RAs) and Reception teachers/TAs from half of schools receiving the intervention (~25-35 schools)	Observation framework	IPE 2, 4, 7, 10, 15, 18.	Input, Activities, Outputs
Online surveys (baseline and post-treatment) of Reception teachers/other staff	Reception teachers/ TAs from all schools participating in the study (<=120)	Descriptive: frequencies, cross-tabs, t-tests, ANOVA, regression	IPE 5, 7, 9, 10, 12, 13, 15, 17, 19-21.	Activities, Outputs, Outcomes, Enabling factors
Case study including observations and interviews	8 intervention schools, 8 or more Reception teachers/TAs , Up to 8 literacy or early years leads, up to 8 senior leaders;	Teaching observation framework, Extraction framework	IPE 1-3, 4-5, 6-12, 13-14, 15-17, 18-19, 22.	Inputs, Activities, Outputs, Outcomes, Enabling factors
Interviews with UCL	Intervention designer/trainer: Prof. Savage, Amy Fox project manager, RAs undertaking support visits	Extraction framework	IPE 1-4, 7, 15, 18.	Inputs, Activities, Enabling factors
Analysis of intervention data collected by UCL	Training attendance, summary of compliance,	Thematic analyses, Descriptives :frequencies	IPE 2-4, 7, 13, 15.	Inputs, Activities, Outputs

	satisfaction surveys, and cost data	, cross-tabs, average cost per child.		

Cost evaluation

Cost data will be collected directly from the delivery team on their own costs for running the training and follow- up sessions and materials provided and then from schools cost and time data will be collected during the post survey on training (and whether or not cover was required) and other time taken for preparing for the lessons/ reading materials etc.

A cost per pupil over three years will be calculated using the new EEF cost guidance (EEF 2019b).

Ethics and registration

IES will apply for ethics approval through the internal IES system once the recruitment materials are finalised in January 2020. Schools will sign a MOU to agree to take part in the project and an information pack of details of the project. Teachers/ TAs will also receive an information sheet detailing the trial and data sharing and will have the chance to opt out of taking part in the IPE when they receive the invitation to complete the survey/ take part in an interview. Schools are all also being invited to webinars in July with the UCL, IES and Qa teams to hear more about the project and ask any questions they have.

Parents will receive an information sheet detailing the trial and data sharing and will have a chance to withdraw their child's data from being shared with the evaluation team at the start of the trial by telling the school. After randomisation the parents can contact IES directly to have their child's data removed from the data stored by the evaluation team.

The trial will be registered at www.controlled-trials.com once the protocol has been finalised and will be updated when necessary. The study is registered with the ISRCTN registry with the study ID ISRCTN18428598 and can be accessed at: http://www.isrctn.com/ISRCTN18428598

Data protection

We take seriously the ethical issues raised by this research, including burden on schools and pupils. We also recognise the utmost importance of data protection and are fully committed to complying with the Data Protection Act 2018 legislation and will carry out a Data Protection Impact Assessment for this project.

All participants interviewed will sign a consent form to indicate that they have understood the research aims, agree to the interview being recorded/transcribed, and will be given assurance of anonymity. Schools will sign a MOU identifying the requirements of the project and how the data will be used, shared and stored. Parents will receive a letter explaining the trial and how they can withdraw their child's data.

We will develop a privacy notice explaining how information collected will be used and stored, and to communicate to participants their right to withdraw from data processing. This will be available online, with the link provided in letters/briefings. We will also develop a data-sharing agreement between IES, UCL and EEF stating data to be shared by whom, how and why, to ensure full data-security.

Our approach involves personal data collection including pupil name, date of birth, gender and Unique Pupil Number (UPN). IES will access and link this pupil data to background and

school data held on the National Pupil Database (NPD) at two points in time. The first NPD extract to be requested will include whether or not the pupil is eligible for Free School Meals (FSM), to be used in the initial round of analysis. A second request will be made for the longitudinal follow-up and at this point the results of the Year 1phonics screening check will be sought (if available). IES will match the above pupil data to data on pupil outcomes collected throughout the study. This will include data from questionnaires and assessments administered as part of the project including a standard assessment of literacy skills and a measure of mispronunciation correction as well as data on outcomes available through the NPD.

IES' legal basis for processing personal data is 'legitimate interests'. The evaluation of Flexible Phonics fulfils one of IES' core business purposes (undertaking research, evaluation and information activities) and is therefore in our legitimate interest, that processing personal information is necessary for the conduct of the evaluation. IES is required to process data for the following tasks as part of the evaluation:

- To conduct the randomisation (i.e. to randomly allocate schools to receive or not receive the intervention)
- To match data received from schools to NPD data and outcome data
- To contact teachers about participating in interviews and surveys
- To instruct and liaise with independent test administrators
- To evaluate the impact and effectiveness of the programme and prepare a report about the project

The only special category data under GDPR to be collected or processed as part of this evaluation is gender. This is necessary for scientific research purposes and is in the public interest.

For the purposes of conducting the evaluation to assess the impact of Flexible Phonics, IES and IOE will both become data controllers of personal data of school staff and pupils obtained from schools and other sources such as the National Pupil Database. Personal data may be shared with trusted processors such as test administrators and transcribers as well as members of the delivery and evaluation teams solely for the purposes of proper delivery, management and evaluation of the project. At the end of the project, data will be submitted to the EEF's data archive. At this point, EEF will become a data controller and the archive manager will be a data processor.

IES will securely delete all personal data within six months of the project finishing, i.e. once the final draft of the addendum report has been submitted and the trial data has been submitted to the EEF archive. UCL IOE will keep the data for five years.

Personnel

DELIVERY TEAM

Professor Rob Savage- UCL IOE- developer of the Flexible Phonics intervention

Amy Fox - UCL IOE - Project Manager

Flexible Phonics Support Partners (Research Assistants) UCL IOE –

Alice Robinson, Clare Whalley, Denise Amankwah and Greta Boldrini (UCL eXtend lead) (January – July).

Ameena Khan Sullivan, Sophia Gowers (UCL eXtend lead), Sam Dexter, (January – April).

EVALUATION TEAM

Dr Anneka Dawson Co- Principal investigator of the evaluation. Anneka will lead on the implementation and process evaluation (IPE) and overseeing the assessments and quality assuring materials.

Dr Helen Gray- IES. Co- Principal investigator of the evaluation. Helen will lead on the impact assessment.

Dr Clare Huxley- IES. Project Manager will be responsible for managing all research activity, liaising with UCL, drafting research tools and coordinating members of the research team.

Dr Susie Bamford- IES associate. Susie will support the impact evaluation analysis.

Dr Dafni Papoutsaki, IES. Dafni will also support the impact evaluation analysis.

Kate Alexander, IES. Kate will support the IPE.

Georgie Akehurst, IES. Georgie will support the IPE.

Risks

Issue/risk	Action to address issue/reduce risk	Likelihood	Impact
Delays to the timetable	Experienced trial lead and project manager; close communication between delivery team and evaluators particularly during the autumn term, which is a critical point in timetable. Careful selection of a pre-test measure to ensure it is as practicable as possible within the narrow timeframe available. Clear communications with schools at the recruitment stage about the timeframe for the pre- and post-test	Medium-High	Medium
Covid-19 causing school closures or other disruption	Some of the pilot observations were cancelled as the pilot work changed to include a survey rather than in-person sessions. The training has been rescheduled to three half days in a virtual meeting platform rather than 1.5 in-person days and therefore the observations will also take place on this platform. UCL surveyed	Medium	Medium

Issue/risk	Action to address issue/reduce risk	Likelihood	Impact
	teachers to gauge interest in carrying on with the testing and training in person or virtually and testing will go ahead as planned. Further updates may be necessary if there is further disruption to schools which may mean follow- up sessions by UCL may need to be virtual and the corresponding observations and interviews may also need to be virtual. This will be reviewed in early 2021 and the protocol updated if necessary.		
Pre- or post- test data completion rates are low	We will develop clear communications about testing requirements at the recruitment stage. We will work closely with the team recruiting schools to make sure they feel well-briefed and comfortable explaining the process in detail, listening to and addressing schools concerns. This will include providing information about the skills and experience of test administrators. We will work with the test administrator organisation and the UCL team to have school details as early as possible to plan testing at both time points. Mop- up visits will be completed by the test administrator wherever possible when there is absence to maximise the number of pupils tested. Progress will be monitored carefully throughout the testing period so that action can be taken swiftly if required.	Medium	High

Issue/risk	Action to address issue/reduce risk	Likelihood	Impact
Reluctance of schools to participate in case study research or survey research	Schools will have their responsibilities clearly laid out in a Memorandum of Understanding (MoU). It is likely that not all TAs and teachers will be aware of the detail of the MoU so we will produce early on a clear and concise research briefing for teachers, which explains the requirements and timings of the evaluation activity and provide a point of contact for questions which we will include in an information pack. All schools will be invited to take part in a webinar for further information and to ask questions. We will work to reduce burdens on participants as much as possible with short surveys and interview times. A broad team means we can be flexible about dates for case studies. As a contingency, if it is not possible to set up face- to- face visits at schools, we would consider conducting depth telephone interviews with school staff instead but this would be discussed with EEF and used only as a last resort.	Low	High
Schools drop out	Evaluators have limited ability to affect participant numbers other than explore reasons for low participation, identify good practice in maximising participant engagement and share this across schools. We can work to maximise research participation among those taking part, including trying to keep control schools engaged by being in relatively frequent contact.	Low	Medium
Delays to receiving NPD data for addendum report	Submit early application; experienced researcher to oversee application to ensure no delays due to incomplete application	Medium	Low

Timeline

Table 4: Timeline

Dates	Activity	Staff responsible/ leading
June-Oct 2019	Set up meetings and first IDEA workshop	Delivery team and evaluation team
Sep 2019-Feb 2020	Recruitment of pilot schools	Delivery team
Dec 2019-July2020	Recruitment of trial schools	Delivery team with support from evaluation team
Oct 2019-June 2020	Pre-trial development of programme Observation of pilot training session	Delivery team Evaluation team
July 2020	Webinars - School Information Session for participating schools.	Delivery Team with support from Evaluation and Assessment Team
Sep- Dec 2020	Collection of pupil data Collection of pre-test data Business as usual survey of teachers/ TAs Randomisation	Delivery team and evaluation team (overseeing Qa Research test administrator)
Jan- June 2021	School training days by end Feb, school follow-up sessions completed by mid-June Second IDEA workshop in April 2021 Observation of school training sessions Schools deliver Flexible Phonics	Delivery team and evaluation team
Apr- Jun 2021	Collection of data from delivery team School case studies (observation, senior leader, teacher/TA and literacy lead/ early years lead/SENCO interviews)	Evaluation team
June- July 2021	Administration of post –test assessments	Evaluation team (overseeing Qa Research test administrator)
June- July 2021	Post- intervention survey of teachers/ TAs	Evaluation team
Autumn 2021	Analysis of project and evaluation data	Evaluation team
Dec 2021-Jan 2022	Evaluation report writing	Evaluation team
Jan 31st 2022	First draft of evaluation report	Evaluation team
Sept 2022	Obtain NPD data for Year 1 phonics	Evaluation team
Autumn 2022	Analysis of Year 1 phonics and evaluation data for addendum report	Evaluation team
Jan- Feb 2023	Addendum report writing	Evaluation team
Jan 31st 2023	First draft of addendum report	Evaluation team

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Appendix A: Protocol amendments and rationale

Page	Section	Amendment	Rationale
1	Evaluation summary table	Updated to reflect number of schools and pupils recruited	Pre-test completed and participation numbers confirmed
1	Protocol version history	Brief summary of changes to protocol	Changes to methodology and recruitment numbers after pre-test, baseline survey and changes to delivery in response to the Covid-19 pandemic.
5	Intervention	Edits to 'What (materials)' section: detail added for training materials and support visits with observations by research assistants (known as support partners now) changed to virtual and detail of ongoing support to schools.	Training materials finalised and changes to methodology in response to the Covid-19 pandemic.
5-6	Intervention	Edits to 'What (procedure)' section: added description of new online delivery format including a third optional follow- up training session, monthly email bulletin and online platform, UCLeXtend.	Changes to methodology in response to the Covid-19 pandemic and school disruption..
7	Intervention	Edits to 'When and how much (dosage)' section: updated with changes to delivery period as a result of schools disruption in early 2021.	Changes to methodology in response to the Covid-19 pandemic and school disruption.
7, 8, 10	Theory of Change	Summary and description of changes to the Theory of Change model and also the addition of a two- part workshop for Year 1 teachers that has been additionally funded for this year but may not be part of	Model updated following changes to delivery in response to the covid-19 pandemic.

		a future Flexible Phonics programme	
11	Impact evaluation	Updated RQ4 to state that it is no longer possible to answer this research question	Year 1 Phonics Screening data was not collected during recruitment and would create too much burden on schools to collect during the evaluation.
13-14	Randomisation	Updated to reflect actual numbers at pre-test and change to using two randomisation points	Pre-test and randomisation completed.
14	Participants	Updated to reflect final numbers recruited at pre-test and also to include the distinction that schools could take part in the Nuffield Ealy Language Intervention but no other EEF trials.	Pre-test completed and roll out of NELI has been introduced..
15-16	Sample size calculations	Updated with MDES for 123 schools and clarified wording on lowest expected sample size as 100- rather than expected attrition.	123 schools recruited at pre-test.
17	Outcome measures: baseline measures	Text reorganised to discuss primary outcome measure first.	Makes sections clearer and easier to read.
18	Outcome measures: primary outcome	Description of remote-testing added	Remote-testing used for pre-test as some schools were not allowing external visitors due to covid-19 pandemic restrictions.
18	Outcome measures: secondary outcome	Note added to clarify that careful interpretation of the MCT analysis will be necessary due to smaller sample	Delivery team requested clarification added.
19	Compliance	Compliance measures based on attendance and delivery of at least two key	Delivery team confirmed compliance measures for online delivery model.

		aspects of the programme added.	
20-21	Analysis	Updated to reflect that Year 1 Phonics Screening data is no longer being used for subgroup analysis and new analysis excluding schools participating in the NELI trial. Subgroup analysis for low-ability pupils also amended to use the combined standardised Early Word Recognition and Letter Sound Knowledge pre-test data, rather than only the Early Word Recognition pre-test raw score. Subgroup analysis has also been added to investigate the impact of NELI on intervention schools.	Year 1 Phonics Screening data not collected at recruitment and finding that 40% of schools in the trial were participating in the NELI effectiveness trial. Lack of differentiation between pupils in the Early Word Recognition pre-test, reducing confidence that this alone would provide a reliable indicator of low ability. The subgroup analysis on NELI was added as this has very widespread take up in our sample which could be impacting on the effectiveness of Flexible Phonics.
22	Implementation and process evaluation: Research questions	Footnote for IPE1 updated with more detail on intended delivery.	Delivery team confirmed new online delivery and compliance.
23-25	Implementation and process evaluation: Research methods	Updated to reflect move of follow-up sessions and case study visits to online with no observations and subsequent changes to case study interview approach and removal of observation analysis; changes to survey analysis after comparison of individuals at baseline and endline is no longer possible; addition of questions regarding participation in the NELI trial; change to timing of interviews with the delivery	Follow-up sessions and case study visits moved to online so no observations possible. Error with survey meant that it is not possible to identify individual respondents or whether they belong to control or treatment group. 40% of schools in trial also participating in the NELI effectiveness trial. Period of support from delivery team extended in response to school closures in early 2021.

		team as the intervention period has been extended.	
26	Implementation and process evaluation: Analysis	IPE5 added to 'Research Questions Addressed' for surveys in IPE methods overview table.	Reviewed identified accidental omission.
27	Ethics and registration	ISRCTN registration number added.	Trial registration completed.
28	Data protection	Caveat added around Year 1 Phonics score. Amended to note that gender, which is special category data under GDPR, is being collected, and to provide the justification for this.	Year 1 Phonics Screening score not collected during recruitment. Change to note collection of special category data made to reflect the latest guidance from the Department for Education.
29	Personnel: Delivery Team	Detail added for research assistants (known as support partners).	Research assistants employed recruited in January 2021.
29	Personnel: Evaluation Team	Georgie Akehurst replaced Julie Vanderleyden as support on IPE.	Julie Vanderleyden left IES.
32	Timeline	Second IDEA workshop moved from Aug-Sept 2020 to April 2021, school follow-up sessions changed from visits to online and timeline extended from March to April.	Second IDEA workshop moved to April 2021 because delivery adapted in response to school closures in early 2021. Follow-up sessions moved to online as in-person visit not feasible with pandemic restrictions. Delivery support period extended as schools re-opened on 8th March and face-to-face delivery of the intervention with the whole class was not possible until then.